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IMPROVING TEACHERS' JUDGMENTS: OBTAINING CHANGE THROUGH COGNITIVE PROCESSES

A central aspect of teachers' professional competence is the ability to judge students' achievements adequately. Giving grades and marks is the prototypical task in this context. Besides giving grades, assessments for school placements or tracking decisions belong to these tasks. Other judgments are more implicit in that no specific judgment is required, but students' achievements are estimated intuitively. Examples are decisions made during class such as "calling on a particular student". These judgments have substantial relevance for individual students, and consequently, high competence in judging students correctly is seen as a key skill for teachers and future teachers (Shepard, 2006). However, at the same time, a number of studies have shown that teachers' judgments of student performance frequently do not meet the criteria of measurement theory such as reliability and validity, but seem to be rather subjective (Givvin, Stipek, Salmon & MacGyvers, 2001; Swanson, 1986). Within educational systems where judgments are used to make decisions about a student's future academic career, this may contribute to problems of social segregation and may be harmful to the personal and later professional development of students (Alpert & Bechar, 2008).

In their meta-analysis on teacher judgment accuracy Hoge and Coladarci (1989), and more recently Südkamp, Kaiser and Möller (2012), come to the conclusion that although teachers' judgment accuracy of students' performance is fairly high, the teachers' judgments leave 57% up to 72% of the variation of students' test performance unexplained 'which leaves plenty of room for improvements' (Südkamp et al. 2012, p. 13). In this regard, research has consistently provided evidence that, although academic achievement is important, teachers' judgments and decision making processes are also influenced by non-academic variables such as the social and migrant background of students. To analyse teachers' judgments, insights from the field of social judgment formation and decision making have proven valuable. This theoretical framework focuses on the question how person attributes, such as behaviours, beliefs, etc., are selected and integrated into a judgment. Applied to education, the questions concern how teachers select, use and integrate student information, such as grades, gender, background, motivation and behaviour, into a judgment. Theories of social judgment formation consider a decision as the result of a cognitive process involving not only the search for information, whereby one has to decide on which type information is to be acquired, but also the application

of (implicit) rules regarding the use of information. Teacher expectations have been identified to affect this cognitive processes, such that teachers' stereotypical expectations about students' achievements on the basis of socioeconomic or ethnic background, or gender affects teacher judgment (e.g. Andrews et al. 1997; Brophy & Good, 1974; Parks & Kennedy, 2007; Pigott & Cowen, 2000; Reyna, 2000; Weiner, 2000). In addition, several variables have been identified as moderator variables such as teachers' goals, motivations, and accountability. Biases in judgments due to expectations are more likely to occur when there is an incentive to confirm an expectation or a striving to rapidly reach a particular conclusion. Judgment biases are less likely when there is motivation to develop an accurate impression of the target person or when the perceiver's outcomes depend on the target person (see Jussim, Eccles, & Madon, 1996, for a review). For example, teachers' assessments of students' achievements become less biased when teachers have the goal of improving students' achievements (Goldenberg, 1992) or when assertive parents offer evidence that conflicts with teachers' expectations (Good & Nichols, 2001).

Assuming an association between teachers' cognitions and student learning (see Orton, 1996), changing teachers' cognitions may then improve student performance. In order to change teachers' cognitive processes, teachers have to be informed about the processes, which might unconsciously influence their classroom behaviour and judgments. Knowledge concerning the different processes and their consequences enables teachers to counter these effects. To this extent, there are several phenomena of which teachers should be aware to avoid unconscious influences. This chapter will outline the extent to which teachers' cognitions and beliefs may affect teachers' judgments, and their association with student learning. Moreover, we will focus on factors that can moderate teachers' cognitive processes and on trainings to improve the quality of teachers' judgments. More specifically, following the above we will first focus on teacher expectations, and then show how accountability could moderate teachers' cognitive processes. Finally we will discuss how statistical prediction rules, which confront decision makers with immediate feedback on the relation between predicted and actual decisions, may be utilised to reduce bias and errors in decision making and hence improve teacher judgment accuracy.

TEACHER EXPECTATIONS AND STEREOTYPE THREAT

Since the pivotal study from Rosenthal and Jacobson (1968) teacher expectations are discussed as important factors that influence teachers' judgments and students' academic performance. More specifically, teachers interact with their students corresponding to their expectations and this behaviour might lead their students to act consistent with these expectations (Brophy & Good, 1974; Rosenthal & Jacobson, 1968). Although expectancy effects are rather small and nowadays teachers should be informed about them (Jussim & Harber, 2005), they persist to occur in the classrooms. This suggests that merely informing teachers is not enough to ensure that such effects could be avoided. Rather, to avoid expectancy effects in the classroom,

teachers have to be made aware of their expectations regarding their students and understand where these stem from. Although generally teachers are not told what they have to expect of a particular student, they nevertheless hold expectations, which often stem from stereotypes, which may be conceptualized as knowledge about members of social groups (e.g. Fiske & Taylor, 1991). These knowledge structures simplify the world, in that people use them in judgment formation (e.g. Macrae & Bodenhausen, 2000; Stangor & Schaller, 1996). With experience, teachers learn much about different students and develop stereotypes about students who share important characteristics. Based on these stereotypes, expectations develop which can colour perception and judgments (Ferguson, 2003). However, in order for teacher expectancy effects to occur as a result of self-fulfilling prophecies, students' actual academic performance needs to adapt to the teachers' expectations (Jussim & Harber, 2005). In other words, teachers not only have to hold expectations and act accordingly, but students also have to react consistent with these expectations. In this process, stereotype threat (Steele, 1998; Steele & Aronson, 1995) comes into play. Stereotype threat is the phenomenon that academic achievement decreases among the members of negatively stereotyped groups due to the fact that the intellectual capacity of the group is assumed to be low (Steele, 1998). This decrease in academic achievement is due to anxiety of the group members because they know about the negative stereotypes and do not only risk personal failures, but also risk confirmation of the negative intellectual group stereotype (Osborne, 2001; Steele, 1998). There is ample evidence that members of intellectually stigmatized groups actually perform lower in achievement tests, particularly when their group membership is salient (e.g., Aronson et al., 1999; Steele & Aronson, 1995; Steele, Spencer, & Aronson, 2002). Although in theory positive associations with stereotype expectations are feasible in the way that students might profit from high teacher expectations, most research has focused on the fact that students from minority groups are more susceptible for low teacher expectations (McKown & Weinstein, 2002) and react with stereotype threat.

ATTITUDES, STEREOTYPES, AND SUPPRESSION

Teachers should prevent that stereotypes affect their own judgments. Südkamp et al. (2012) suggested teachers' judgments may depend on stereotypes, which could affect accuracy. To this extent, research has provided evidence for stereotypes biasing teachers' judgments (Krolak-Schwerdt, Böhmer, & Gräsel, 2012), particularly racial stereotypes coloured teachers' judgments (McCombs & Gay, 1988; Neal, McCay, Webb-Johnson, & Bridget, 2003; Parks & Kennedy, 2007). Even student teachers' judgments were already biased through ethnicity (Glock & Krolak-Schwerdt, 2013). Particularly, when members of social groups strongly confirm stereotypical expectations, person perception and judgments are coloured through stereotypes (Stangor & McMillan, 1992). Thus, minority students who behave like typical exemplars of the stereotype are at risk to get stereotyped (e.g., Glock & Krolak-Schwerdt, 2013; Neal et al., 2003). Moreover, not only stereotypes shape

person perception and judgment, but also attitudes (Sanbonmatsu & Fazio, 1990). Usually, a distinction between explicit and implicit attitudes is made (Gawronski & Bodenhausen, 2006). Explicit attitudes are thoughtful reflections (Gawronski & Bodenhausen, 2006) people engage in to derive an evaluation of an attitude object. The expression of explicit attitudes involves controlled and effortful processes (Fazio, 1990; Gawronski & Bodenhausen, 2006), because people have to either construct an evaluation on the spot (Bassili & Brown, 2005; Schwarz & Bohner, 2001) or retrieve the evaluation from memory. Thus, the expression of explicit attitudes always depends on the ability and on the motivation to engage in those processes (Fazio, 1990; Fazio & Towles-Schwen, 1999). Relying on self-report measures, explicit attitudes are prone to social desirability bias (De Houwer, 2006). By contrast, implicit attitudes are automatic evaluations (Gawronski & Bodenhausen, 2006) that automatically come into mind whenever the attitude object is present (Fazio, 2007; Olson & Fazio, 2009). Especially implicit attitudes often guide behaviour, affect judgments, and determine how information is processed (Houston & Fazio, 1989; Schuette & Fazio, 1995). Thus, implicit attitudes are crucial, as they play a pivotal role in situations which are cognitively demanding and in which cognitive resources are restrained (Hofmann, Gschwendner, Castelli, & Schmitt, 2008). This might be of particular relevance for teachers in classrooms, as teaching can be stressful (van Dick & Wagner, 2001) and teachers are often required to manage excessive demands under time pressure (Santavirta, Solovieva, & Theorell, 2007).

Research on implicit attitudes towards minority students among teachers is sparse. Although there are some studies focusing on teachers' implicit attitude towards students with special needs (Enea-Drapeau, Carlier, & Huguet, 2012; Hornstra, Denessen, Bakker, van den Bergh, & Voeten, 2010; Levins, Bornholt, & Lennon, 2005) the paradigm has not been used often to explain teachers' judgments about students from ethnic minority groups. There is one study (van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010) which investigated implicit attitudes and their relation to teachers' judgments. The authors provided evidence for negative implicit attitudes towards minority students being a strong predictor of teachers' expectations and of their achievement judgments while explicit attitudes neither had a predictive value for achievement judgments nor a relationship to implicit attitudes (van den Bergh et al., 2010).

Although there is ample evidence for stereotypes affecting teachers' judgments and some evidence for the role of implicit attitudes in teachers' expectations and judgments, teachers could be trained in stereotype and implicit attitudes suppression. Training in stereotype and attitudes suppression could avoid the rebound effect, that is, the tendency of people to rely on stereotypes much stronger after suppression than before. Stereotype suppression is, when untrained, cognitively demanding and the resource depletion elicits stereotyping afterwards, because stereotyping occurs without much cognitive resources (Macrae & Bodenhausen, 2000). Thus, training teachers in stereotype suppression and in controlling their attitudes would result in automatic suppression, and this, in turn, would leave open cognitive resources,

which could be used for instructional and classroom demands (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000). One way to ensure the success of training is to integrate feedback as a key factor. Empirical findings in the fields of instructional skills and diagnostic competence have demonstrated the importance of feedback in developing training programs to improve judgment accuracy. It should be noted that transfer of new skills to classroom behaviour has proven difficult, especially for experienced teachers, requiring the implementation of numerous feedback loops (Scheeler, 2008). In contrast, changing teachers' cognitive processes, which are associated with teaching behaviour and teachers' judgments, might be reached with relative ease (Wahl, Weinert, & Huber, 2007) and can also be transferred to school practice without difficulty (Helmke, Hosenfeld, & Schrader, 2004). Feedback at the cognitive level to improve judgment accuracy could utilize self-reflection, whereby teachers' predictions of student achievement are compared to the results of the students on standardized achievement tests (Wahl, et al., 2007). Via this method, teachers' implicit hypotheses and judgments are subject to explicit and empirical control, in which discrepancies between judgment and actual achievement could be consulted to find sources of errors.

In sum, many mechanisms might bias and influence the teachers' cognitive processes but there are possibilities to overcome these often automatic mechanisms, which result in more accurate and less biased teachers' judgments.

ACCOUNTABILITY

As stated above, cognitive processes and associated judgments might be influenced and biased by different factors. So far, we have focused on the extent to which stereotypical beliefs may bias teacher judgments. However, biases may also result from the way the teachers process the information upon which judgments are based.

In social cognitive psychology, theories of judgment formation have been put forward to describe and explain different ways in which people form judgments of other people. One group of models assumes that people collect information in a systematic way and weigh and integrate these informational cues when making a decision. Such information integrating strategies (e.g. Dawes & Corrigan, 1974; Brehmer, 1994; Swets, Dawes & Monahan, 2000) lead to deliberate decisions. Another group of models assumes less complex judgment processes: A judge relies on only a minimum of critical cues to make a decision (e.g. Gigerenzer & Todd, 1999; Hoffrage & Reimer, 2004) whereby stereotypes have priority and determine the nature of the judgment while other relevant cues are widely ignored (Bodenhausen, Macrae & Sherman, 1999; Fiske & Neuberg, 1990). Accordingly, such stereotype-based strategies pose judgment formation processes to be highly cognitive economical and efficient. Dual process theories of impression and judgment formation (Fiske & Neuberg, 1990) posit that people can shift between the two processing strategies in response to certain demands and in accordance with motivation. The stereotype-based strategy occurs when the available information

about a target person easily fits already familiar stereotypes (Gilbert & Hixon, 1991). The information integration strategy mainly occurs when the actual information does not easily fit stereotypes or when people have high motivation and cognitive resources to engage in the processing of individual information. In this processing strategy, cues which are diagnostic for the judgment are collected in a systematic way, carefully elaborated and integrated into the decision. Research has shown that teachers shift between the two strategies, depending on the situational context, their goals, and their motivation. Krolak-Schwerdt and colleagues (Krolak-Schwerdt, Böhmer, & Gräsel, 2009; Krolak-Schwerdt et al., 2012) demonstrated that teachers involved in more thorough examination of students' profiles and were more likely to use the information integration strategy when they were asked to predict the student's future educational career. In contrast, teachers who were instructed to form an impression of the student subsequently relied more on available stereotypes.

In general, people who are highly motivated to be accurate, preferentially use the information integration strategy, whilst people with low motivation to attend to the given target person's information more likely rely on the stereotype-based strategy (Gollwitzer & Moskowitz, 1996; Kunda & Spencer, 2003; Quinn & Schlenker, 2002). Thus, the motivation moderates the activated information processing strategy. The motivation is influenced by the need to justify the judgment to a third party (Pendry & Macrae, 1996), which increases the accountability for the judgment (Tetlock, 1983). When people are made accountable towards an anonymous third party before they engage in the encoding of information and judgment formation, they make more use of the information integration strategy (Lerner & Tetlock, 2003). This is indicated by reduced levels of overconfidence (Siegel-Jacobs & Yates, 1996), the use of less traits in person descriptions (Boudreau, Baron, & Oliver, 1992) and reduced cognitive or judgment biases resulting from effort demanding, integrative complex and evaluative inconsistent thinking, required to demonstrate awareness of alternative perspectives (Tetlock, 1983). Increasing people's expectancies about personal consequences before they form a judgment initiates a need for accuracy, whereas receiving such information after a judgment is made generates fear of invalidity.

Being accountable for a judgment with serious consequences may also result in high attention to and careful integration of all available information (Lee, Herr, Kardes, & Kim, 1999; Lerner & Tetlock, 1999). Consequently, accountability – defined as people's implicit or explicit expectations to justify their beliefs, feelings, and actions to others (Tetlock & Lerner, 1999) – could be a moderator of judgment formation strategies. The findings of Krolak-Schwerdt and colleagues (2009, 2012) support the role of accountability as a moderating factor because having to predict the student's future academic career increases teachers' personal accountability for the judgment (Glock, Klapproth, Böhmer, & Krolak-Schwerdt, 2012; Glock, Krolak-Schwerdt, Klapproth, & Böhmer, 2012).

Generally, high accountability towards an external audience is associated with the consideration of more information, spending more time examining

information, and the consideration of more alternative decisions than low accountability (Lee et al., 1999). High accountability further leads to increased depth and complexity of information processing, regardless of people's previous competence concerning the task (Lee et al., 1999). High accountability may draw people's attention towards extrinsic rewards, such as audience's approval of their decision (Lee et al., 1999).

However, there are contradicting empirical results concerning the effects of accountability. Some studies have shown accountability to amplify bias (Hattrup & Ford, 1995; Siegel-Jacobs & Yates, 1996), others have found no effect on the quality of people's judgments (Johnson & Kaplan, 1991; Simonson & Nye, 1992), whereas there are also studies reporting that increased accountability can attenuate bias (e.g. Tetlock, 1985; Thompson, 1995). One explanation of these mixed findings may be the use of different definitions of accountability or applied theoretical frameworks and research designs. Different experimental manipulations of accountability could also explain the mixed findings. According to Tetlock, Skitka, and Boettger (1989) people respond differently to accountability demands depending on the situation they find themselves in. For example, when people know the views of the audience, they shift their own views towards those of the prospective audience. In other words, they are likely to adopt the salient, socially acceptable position, as this saves cognitive work. In contrast, when people do not know the views of the constituency, they are motivated to think in relatively flexible, multidimensional ways and involve in self-critical information processing trying to anticipate the objections of potential critics. This accountability coping strategy is a process of pre-emptive self-criticism, which improves performance and stimulates information-integration processing but, at the same time, increases sensitivity to risk (Tetlock et al.,1989). Still another way to deal with demands of accountability is called defensive bolstering: People who expect to be held accountable for positions, to which they feel committed, devote the majority of their mental effort to justifying those positions (Tetlock et al., 1989). Finally, when people are accountable to conflicting audiences, when the potential risks of the judgment are moderate to high, and when it is necessary to impose losses in order to promote general good, people tend to engage in procrastinating and other judgment avoidance strategies (Tetlock et al.,1989).

Each one of those four coping responses has differential effects on judgment quality and could be adaptive in different circumstances. This could explain partially the contradicting empirical results on effects of accountability, that is, accountability leads to more use of information-integrating processing strategies and less bias only under certain circumstances. Most empirical evidence, however, puts forward bias-reducing effects of accountability on information processing. People who were held accountable for their judgments generally invested cognitive effort into making judgments and decisions (Tetlock, 1983), indulged in a deeper information search and spent more time to arrive at a decision (Hattrup & Ford, 1995). Lerner and Tetlock (1999, 2003) argue that the expectation of having to justify one's views motivates people to be more attentive information processors and increases the

likelihood to perform difficult tasks, both indicators of high quality judgments. In addition, this processing strategy most likely increases judges' resistance towards different cognitive biases, particularly biases resulting from a reliance on stereotypes.

Most of the above referred accountability effects apply to educational context in which teachers are required to judge their students. Results of two recent studies (Glock, Klapproth, et al., 2012; Glock, Krolak-Schwerdt, et al., 2012) showed that teachers with low accountability were twice as likely to orient students without immigrant background to the highest secondary school track compared to ethnic minority students, even after controlling for achievement level. In contrast, teachers with high accountability did not differentiate between students with different ethnic backgrounds and similar achievement profiles, indicating that increased accountability is associated with reduced stereotypical bias. Studies have also demonstrated that a change of motivation led to less biased judgments. That is, in the case of school tracking recommendations, objectivity is improved when teachers receive pre-decisional accountability instructions (Glock, Krolak-Schwerdt, et al., 2012; Krolak-Schwerdt et al., 2009, 2012). In effect, just asking teachers about their perceived accountability already increased the accuracy of the judgments, thus leading to less biased judgments (Pit-ten Cate, Krolak-Schwerdt, Glock, & Markova, 2012). More specifically, after accountability priming, teachers' transition decisions became not only more accurate, but as a result of increased accountability, differences in accuracy of transition decisions for students from different backgrounds reduced.

These empirical findings confirm that accountability moderates the use of processing strategy. Applied to the educational context, research shows accountability differentially shifts teachers' processing of student information and their assessments of student performance, whereby teachers will shift from a stereotype-based to an information integrating strategy. More specifically, low accountability induces stereotype-based processing with stereotypes affecting attention, memory and judgment, whereas high accountability directs attention to the individual information given about a student with memory and judgment being unaffected by stereotypes. In addition, this line of research sheds light on the cognitive processes that underlie the variations in the quality of teachers' judgments by demonstrating that increased accountability influences early phases in the processing of student information, that is, attention and memory. This, in turn, may also constitute the cognitive mechanisms of relatively more biased or accurate judgment formation in the educational domain.

STATISTICAL PREDICTION RULES

As stated above, judgment accuracy may be affected by racial, social class, or gender bias. Bias may result not only from stereotypical beliefs but also from the way the judge integrates information upon which the decision is based (Garb, 1997). One way to improve judgments is to focus on diagnostic competence, that is, the skillset to judge people adequately. In education, diagnostic competence would entail judgments of students' academic achievement and would include the

ability to formally assign grades for school work or to provide recommendations for school placement as well as the more intuitive and informal estimation of student performance and behaviour in class. Improving judgment accuracy may involve increasing the ability to distinguish between alternatives and to select the correct one. For example, if teachers have to judge students' academic performances, they will need to choose between the alternatives 'achieved' or 'not achieved', and possible intermediate levels. Similarly, if a teacher has to decide which type of education suits a student best, available information needs to be assessed and a choice is then made between different options (e.g. school tracks). However, such judgments may be prone to bias given underlying cognitive processes. An alternative way to increase judgment accuracy, especially in situations with fixed alternatives (yes-no; achieved-not achieved), may be to rely not only on improving accuracy, but also take into account the probability of the alternative decisions as well as the benefits and costs of the (in)correct decisions (Swets, et al., 2000). That is, judgment accuracy is affected by the extent to which different alternatives are possible given a certain student profile and therefore one should consider the consequences of the different outcomes for the student.

Given the risk of bias associated with judgments, especially when affected by intuitive inferences, judgment accuracy could be improved by using formal decision rules on the weighted integration of informational cues, which have a proven diagnostic value for the judgment. Such statistical prediction rules (SPR) can be created by aggregating relevant information about the issue to be judged (predictor variables) into a decision (Swets et al., 2000).

The use of SPRs in terms of linear models is not new. In a review, Dawes and Corrigan (1974) outlined the utility of linear models in decision making, dating the first normative use of linear models as far back as 1887. The universal use of linear models follows their appropriateness given the characteristics of various decision making situations. The authors concluded that linear models outperform intuitive judgments in situations in which the predictor variables have a conditionally monotone relationship to the criterion (e.g. no matter how students score on other variables, they are more likely to fare better when they score higher on a specific achievement test). Furthermore, linear models are not greatly affected by measurement error in the dependent variable, and possible measurement error in the predictor variables will tend to increase linearity (Dawes & Corrigan, 1974). Since then, numerous studies have shown linear models to be generally useful in modelling individual decisions in different areas, specifically in the field of medicine (e.g. Bankowitz, McNeil, Challinor, & Miller, 1989; Berner et al., 1994; Getty et al., 1997) and psychology (e.g. Grove, Zald, Lebow, Snitz, & Nelson, 2000). For example, Berner and colleagues (1994) found that computer generated medical diagnoses in 70-90% matched the clinicians list of possible diagnoses for 105 cases. In addition, newly generated computer diagnoses were retrospectively considered valuable by the clinicians. Getty and colleagues (1994) showed that the optimal integration of cues yielded an improvement in accuracy of prostate cancer staging,

whilst Bankowitz and colleagues (1989) showed that SPRs could be a valuable tool to provide feedback to clinicians, as they showed clinicians felt inclined to change or considered changing their diagnosis after consulting the SPR predictions. In a meta-analysis, Grove and colleagues (2000) showed that in up to 47% of the studies they examined, SPR based judgments outperformed clinical predictions and that on average such mechanical judgments were 10% more accurate than clinical predictions. More recently, Aegisdóttir and colleagues (2006) concluded that clinical predictions of mental health practitioners were generally less accurate than predictions based on statistical methods (effect size -.12, i.e. accuracy levels increased by 13% when using statistical techniques rather than clinical judgment). The use of SPRs will address common problems associated with human decision making, such as bias. Also, SPRs may provide valuable feedback to clinicians which will give them insights into their decision making processes and allow them to change less effective habits (Garb, 1997; Grove et al., 2000).

Thus, findings suggest that SPR predictions may be more accurate than clinical judgments and some have recommended clinical judgments should therefore be replaced by SPRs. Others however, see SPRs more as a tool to guide clinicians in their decision making. In this respect, Brehmer and Brehmer (1988) reviewed research on the use of linear models and concluded that, although linear models generally fit judgments well, judges often use few cues and use them inconsistently. In addition, there are considerable inter-individual differences in the assigned weight to cues. Thus, linear models may prove effective in judgment situations in which it is standard practice to review different cues and rules on how to combine information, and when results are viewed in terms of accuracy, but are less useful when striving for uniformity, as the context in which judgments are made will result in inter-individual differences as to the selection and use of decision rules. Indeed, judgment accuracy depends on the correlation between the decision making rules and the environment (Hogarth & Karelaia, 2007). Linear models can, however, be fruitful as a feedback tool in a dynamic process of human decision making, as they will provide guidance to the judge (Brehmer, 1994). However, whilst accepting possible limitations of SPRs in certain situations, Dawes (2002) argued that if well validated SPRs, that generally outperform professional judgment are available, professionals should replace, rather than use to educate, one's intuitive judgment, especially within the psychological profession. To this extent, Dana and Thomas (2006) also commented that, although clinical expertise should not be dismissed, given the superiority of SPRs over human judgment, there are no grounds to refrain from using SPRs for socially important decisions.

In summary, the use of SPRs could lead to a higher consistency in judgments. This means that decision makers would make the same decision each time for any given set of information. This may be of particular importance when decisions are based on a combination of objective and subjective information and when the decision maker is more or less accountable for his/her decisions (e.g. within the field of education). SPRs can increase judgment accuracy, and may be most useful in

supplying the judges with objective output which they can then use to make a final judgment. Within the educational domain, this approach may be especially useful when teachers make judgments for their students' schooling. These judgments may not only concern the short term (e.g. does the student need extra learning support?), but also the long term (e.g. can the student proceed to the next class or which secondary track would be most suitable for this student?). Given the importance of such judgments and the success of SPRs in other domains, one should encourage both teachers and student teachers to use SPRs in order to increase judgment accuracy by reducing bias and error.

CONCLUSION

The ability to make valid and reliable judgments of student achievement is a key component of teachers' professional competence. This chapter has focused on the role of cognitive processes in decision making. We have shown that changing cognitive processes associated with teachers' judgments affects teaching behaviour, resulting in a reduced influence of intuitive beliefs and stereotypes and increased accuracy. Methods have included stereotype suppression, goal-setting, and increased accountability, as well as the application of SPRs. Although different in nature, all approaches have in common that they aim to raise teachers' awareness of their intuitive inferences, to overcome stereotype bias in judgment and to reduce judgment discrepancies between individuals. Research has consistently shown that stereotype bias is, at least temporarily, reduced as a result of changing the underlying cognitive processes. More specifically, teachers are more inclined to consider a range of information rather than to rely on stereotypical beliefs in situations, in which they are motivated to suppress stereotypes, either by increased awareness, increased accountability, or the application of formal decision rules. So far most research has focused on the cognitive processes themselves (e.g. Glock, Klapproth et al. 2012; Krolak-Schwerdt et al 2012), that is, the association between differences in processing strategy and bias. However, limited data exist on the effect of this on judgment accuracy. To this extent, Jussim and Harber (2005) have commented that although social psychologists generally assume reduced bias will alleviate self-fulfilling prophecies in the classroom, educational research has shown that teacher expectancies are generally accurate. They concluded that more research is needed to investigate to what extent the validity of teachers' judgments creates, sustains or alleviated social injustices. Furthermore, limited information exists on the relative efficacy of the various methods used to accomplish change. Therefore, more research is needed to evaluate the effects of different modes of establishing changes in cognitive processes on judgment accuracy. In this evaluative process, the different techniques may be more or less suitable in different situations. For example, the extent to which accountability levels could be increased may be dependent on the school structure or educational system whereas the use of prediction rules may be especially useful for trainings, as they enable to provide teachers with cognitive

feedback. Such situational circumstances should be taken into account when making recommendations for training.

First studies on the association between overcoming stereotype bias and teachers' judgment accuracy look promising (Pit-ten Cate et al, 2012). However longitudinal studies are necessary to evaluate to what extent the qualitative changes in teachers' judgments resulting from changes in cognitive processes are maintained over time.

In conclusion, to increase judgment accurary, one should consider different strategies, including both training of diagnostic competence and focussing on underlying cognitive processes. More specifically, teachers' professional competence should encompass not only teaching knowledge and skills, but also the ability to judge fairly, to assure the validity of learning outcomes. Especially in combination, whereby insights from both education and social psychology could mutually support each other, such strategies can enhance the validity of judgments, which could contribute to a more equitable educational system.

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