

Within-teacher variation of causal attributions of low achieving students

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Abstract In teacher research, causal attributions of low achievement have been proven to be predictive of teachers' efforts to provide optimal learning contexts for all students. In most studies, however, attributions have been studied as a between-teacher variable rather than a within-teacher variable assuming that teachers' responses to low achievement are stable for different students in one classroom. To understand teachers' variation of their behaviour towards different low achieving students it would seem worthwhile to identify within-teacher variation of causal attributions. In this study, we analysed the within-teacher variance of attributions of 64 secondary school teachers. Analyses of attribution ratings for three low performing students per teacher showed that, in general, the amount of within-teacher variance was very large, although the within-teacher variance differed among attributions. It can be concluded that teachers' causal attributions of low performance should be investigated as within-teacher variables because they vary between low achieving students.

Keywords Teacher attributions · Within-teacher variance · Low achieving students · Teacher–student relations

1 Introduction

In every classroom, students differ from each other in many aspects, such as their abilities, interests, learning styles, motivation and work attitude (Rubie-Davies 2009;

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Tomlinson et al. 2003). Students also have diverse backgrounds in terms of their socio-cultural and socio-economic family contexts (George 2005; Ginsberg 2005). In their daily practice, teachers face diverse groups of students for whom they are expected to provide optimal learning opportunities (Rubie-Davies 2009; Tomlinson et al. 2003). However, in every classroom students differ in the extent to which they succeed in reaching the learning goals set by their teacher. The ‘failing student’ is a common type of student for every teacher.

Research on teachers’ behaviour towards low performing students has shown that how teachers respond varies; teachers may behave punitively and with anger, show empathy, express their pity with low achieving students, persevere in attempts to help their low achieving students, or they may give up helping the student (Georgiou et al. 2002; Poulou and Norwich 2000; Reyna and Weiner 2001). In explaining this student-directed teacher behaviour it is assumed that teacher behaviour is shaped by the perceptions teachers have of the causes of their students’ low level of performance (Pajares 1992; Rolinson and Medway 1985). The human tendency to use causal explanations to give meaning to events is a well-known and thoroughly researched phenomenon within the field of behavioural psychology and is conceptualised in attribution theory (Weiner 1985). Attribution theory has proved its value in explaining behaviour in educational settings and has provided insight into the behaviour of teachers towards their low performing students (Cooper and Burger 1980; Georgiou et al. 2002; Weiner 1985).

1.1 Teacher attributions

According to the attribution theory, the attribution of a cause does not influence subsequent behaviour on its own, but it is how a cause is evaluated that affects the response to an event (Weiner 1985). Attribution theory states that causes are evaluated on three dimensions. The first dimension is locus of causality and describes whether the cause is perceived as internal (e.g., effort) or external (e.g., family) to the student. The second dimension evaluates the stability of a cause over time. The third dimension is the dimension of control or intent; causes can be perceived as controllable by the student (e.g., effort), or uncontrollable (e.g., luck) (Weiner 1985). The evaluation of the ascribed cause of these dimensions is important, because how a cause is perceived influences the response to the observed event (Kelley and Michela 1980; Weiner 1985). When a student performs poorly, teachers can ascribe this failure to different causes (Cooper and Burger 1980; Georgiou et al. 2002; Medway 1979). How teachers evaluate the attributed cause(s) of a students’ failure influences their behaviour towards the student. Cooper and Burger (1980) concluded, for example, that underachieving students perceived as lacking motivation, which is a presumed controllable cause, were criticised more often by their teachers than underachieving students perceived as lacking ability, a presumed uncontrollable cause. The attributions teachers make, that is, the explanations they have for the failure of their low achieving students, thus seem to affect their student directed teacher behaviour.

Cooper and Burger (1980) were among the first to explore the causal attributions teachers use to explain students’ success and failure. They studied the responses of 43 primary and secondary teachers to open-ended questions about why they thought stu-

dents performed well or poorly in school. The teachers' free responses were analysed and transformed into a categorisation scheme. Ten years later, [Tollefson et al. \(1990\)](#) validated this categorisation scheme and specified it for students' poor performance. After the analysis of 44 teachers' free responses concerning the causes for one of their low achieving students, Tollefson et al. slightly remodelled the categorisation scheme of Cooper and Burger into a scheme including the following causes for achievement: (1) motivation (typical effort), (2) family (support from the home environment), (3) acquired study skills, (4) previous experience (academic background/experience), (5) interest in subject (attitude towards subject), (6) attention (concentration in class), (7) other students (interference or help from other students), (8) attendance (presence in class) (9) quality of instruction (teacher quality), (10) (immediate) effort, (11) task difficulty and (12) physiological state (mood, health). From the studies of Cooper and Burger and Tollefson et al., it appeared that teachers mention 'motivation' and 'family' most frequently as causes for students' low achievement. Motivation was mentioned by 50 % of the teachers in the [Tollefson et al. \(1990\)](#) study and family by 30 % of the teachers. Of the teachers 90.9 % indicated that student characteristics were the most important factor in explaining students' low achievement ([Tollefson et al. 1990](#)).

More recently, [Georgiou et al. \(2002\)](#) studied the effects of teacher attributions on the helping behaviour of teachers directed at their low achieving students in a sample of 277 Cypriot elementary school teachers. They found results that supported the findings of [Cooper and Burger \(1980\)](#), [Medway \(1979\)](#) and [Weiner \(1985\)](#). When teachers attributed student failure to uncontrollable factors internal to the student (e.g., insufficient ability), teachers reported reacting more often out of empathy and less often out of anger. When student failure was attributed to factors perceived as controllable by the student (e.g., effort) teachers were more likely to respond with anger and were more likely to give up helping the student ([Georgiou et al. 2002](#)). [Lucas et al. \(2009\)](#) reported within their sample of 60 teachers in England the same behavioural tendency towards students who show challenging behaviour or display intellectual disabilities. They concluded that teachers who believed that students had control over their behaviour showed more anger and less sympathy, optimism, and helping behaviour.

1.2 Within-teacher variance of attributions

Various conclusions on the teacher level have been drawn in research on teacher attributions and their effects on teacher behaviour. For example, [Georgiou et al. \(2002\)](#) concluded that 'There are teachers who respond to low-achieving students with pity... and others who feel upset and express anger' (p. 592). That some teachers put more effort than others into trying to support their low achieving students is discussed and supported by other studies (cf. [Jordan et al. 2010](#); [Lucas et al. 2009](#); [Poulou and Norwich 2000](#)). In these studies claims are made about how teachers respond to their 'low achieving students', 'students at risk' or other types of students (see also [Jordan et al. 1997](#); [Kerry and Kerry 1997](#)). In studies on teacher attributions, teacher attribution is thus commonly researched on the teacher level (i.e., a between-teacher variable). This implies that it is assumed that teachers' ascribe identical causes to all their low-

achieving students. In this study we tested this assumption, because it may well be the case that teachers attribute different causes to the low achievement of different students. As early as 1989, Hoge and Coladarci indicated in their review of teacher-based judgements that it would be worthwhile investigating the intrapersonal aspect of teacher judgment, whether all teachers judge the same and judge every student the same. A within-teacher approach to gain insight in teacher attributions complements existing between-teacher research and could be used to do justice to the differences in teacher perception at the student level.

In this study, we focus on the attributions of mainstream secondary education teachers and their low achieving students. In contrast to many of the more recent studies on the teacher attributions, that are done either within the context of special education or with regard to attributions of behavioural problems, learning disabilities, misbehaviour or exceptional or high ability students, we focus on the attributions of mainstream secondary education teachers regarding their low achieving students. As [Brady and Woolfson \(2008\)](#) compared the attributions of mainstream and special education teachers and found differences in attributions of regular and special education teachers, findings in special educational settings cannot be assumed to be valid for mainstream education.

In addition, vignettes are often used in studies of teachers' perceptions, attributions and feelings to present standardized case descriptions that enable between-teacher differences in attribution styles (cf. [Lucas et al. 2009](#); [Poulou and Norwich 2000](#)). Although vignettes do have the advantage of comparing teachers on standardized cases, they suffer from some severe limitations, especially related to the ecological validity of research findings ([Lucas et al. 2009](#); [Poulou 2001](#)). Teaching takes place in a context wherein personal and specific contextual factors play a substantial role that cannot be taken into account when teachers are asked about hypothetical students with whom they do not have a personal connection.

In this study we aimed to address the question about the extent to which secondary school teachers attribute the same causes to different students' low achievement. The focal point of this study is thus to assess to what extent teachers vary in their attributions among their own low achieving students.

1.3 Research questions

The aim of this study is to provide insight into the intrapersonal (i.e., within-teacher) variance of teachers' attributions of their low achieving students. The research question addressed in this study is: *To what extent do attributions of achievements of different low achieving students vary within teachers?* The results of this study may have implications for research on teacher attributions and resulting teacher behaviour because this approach of teacher attributions has not been used in earlier research on teacher attributions and their effect on student directed teacher behaviour.

2 Method

To answer the research question an online questionnaire was designed in which teachers were asked to describe three of their own low achieving students and to respond to

statements about the causes of those individual students' low achievement. We chose to ask teachers about three students to obtain sufficient data to calculate within-teacher variance while keeping the questionnaire at an acceptable length.

2.1 Participants and procedure

Teachers from 15 randomly selected secondary schools received an email with an invitation to participate in a study about teacher perceptions of low achieving students and the hyperlink which led them to the online questionnaire. The schools were spread across the Netherlands and were of different size and profile. We approached teachers both directly, by sending them a mail, and indirectly by approaching heads of department with a request to forward the questionnaire to the teachers. Of the approximately 900 teachers who worked at the selected schools and received the invitation directly or indirectly, 172 teachers visited the online questionnaire. Of these 172 teachers only 64 provided sufficient data to be included in the analyses. Teachers who stopped the questionnaire before finishing the questions about the second student were not included in the analyses.

The total number of teachers was 64 (62 provided ratings for three students and two teachers provided responses for two students) and the total number of students for whom ratings were provided was 190. Of the teachers in the sample 60.9% were female and 39.1% male. The age of the participating teachers ranged from 22 to 64 years old ($M = 42.89$, $SD = 12.18$), their teaching experience ranged from 1 to 42 years ($M = 15.28$, $SD = 10.60$). Compared with the percentage of female teachers in the total secondary school teacher population in the Netherlands (48.6%, [DUO 2013](#)), female teachers in the sample were slightly overrepresented ($\chi^2(1) = 3.887$, $p = .049$). The mean age of the sample did not deviate significantly from the population mean (44.26 years; $t(63) = -0.899$, $p = .372$). The teachers taught various subjects; 34.4% were language teachers (Dutch, English, French, German or Latin), 26.6% of the teachers taught science subjects (mathematics, physics or biology), 18.8% taught a subject within the social sciences (geography, history, sociology or economics), 20.3% taught 'other' subjects such as physical education, technology or art. The students described by the teachers in the data set were spread across different years or grade levels (1st year¹: 22.6%; 2nd year: 23.2%; 3rd year: 23.2%; 4th year: 25.3%; 5th year: 4.2%; and 6th year: 1.6%). As, in the Netherlands, lower secondary school takes 4 years and senior secondary school five or six, the percentages of 5th and 6th year students are relatively small.

2.2 Instrument

To collect the data a questionnaire was developed. The questionnaire was aimed at teacher attributions of individual low achieving students. Teachers were asked to describe and assess three of their own low achieving students, one by one and in

¹ The years referred to are the 6 years of Dutch secondary school. Students in the 1st year are 12–13 years old.

two consecutive stages. After responding to all questions for one student, the same questions in the same order were asked about a second and a third student.

The first stage was designed to enhance the teachers' visualisation of the students they had chosen as focal student for the questionnaire. To enhance visualisation teachers were asked to write in an open text box a short description of how that particular student behaved in the classroom and performed academically. For example, a 34-year-old female English teacher filled in the questionnaire about a student in her first year lower secondary vocational class. The description she gave was: 'This student hangs around passively and clearly does not cooperate. He does not say or ask anything. He seems indifferent. Outside the classroom he is a tough guy. He is often in detention because of unacceptable behaviour, such as throwing eggs at passing people and drinking before school. Pretty boy.'

In the second phase, the teacher attributions for the described student's low achievement were to be rated along a five point scale ranging from 1, totally disagree, to 5, totally agree. Teachers were presented with 13 factors and asked to what extent they thought the stated factor was a cause for that particular student's low achievement. These factors were based on previous studies of [Cooper and Burger \(1980\)](#) and [Tollefson et al. \(1990\)](#) as discussed in Sect. 1.1. Compared with the scheme of [Tollefson et al. \(1990\)](#) two factors were omitted and three factors were added. The omitted factors were task difficulty and physiological state. These factors were deleted for two reasons. Firstly, for this research design, teachers are not questioned about their explanation for specific achievement, but for a student's 'average' achievement during a year. The explanatory value of these highly unstable constructs is likely to be negligible with regards to performances across longer periods ([Cooper and Burger 1980](#)). Secondly, [Tollefson et al. \(1990\)](#) concluded that these two factors were seldom given as an explanation of student failure by the teachers.

The first added factor was 'ability'. [Tollefson et al. \(1990\)](#) classified ability as a 'student characteristic' and not as an 'explanation for achievement'. Because this classification is not used in this study, ability has been reclassified as 'an explanation for student achievement'. This is in line with the categories of [Cooper and Burger \(1980\)](#) and [Weiner \(1985\)](#). In addition, we included 'difficulty of the lessons' and 'adaptation of assignments to the learning needs of the student' as potential attributions to provide more factors related to teachers' internal attributions. 'Difficulty of the lessons' can be seen as an internal and more general substitute for the deleted factor 'task difficulty'. The factor 'adaptation of assignments to the learning needs of the student' was chosen because it relates to the context of this research, i.e., that of addressing individual differences between students.

2.3 Data analysis

Data analyses were aimed at estimating the extent to which attributions ascribed by teachers to their low achieving students vary within and between teachers. Before examining the variability we first computed the descriptive statistics of the causal factors and their intercorrelations. Since we aimed to identify the extent of variability within teachers for each causal attribution, we then calculated intra-class correlation

coefficients per causal attribution. For the calculation of intra-class correlations (r_1),² we applied analyses of variance as suggested by Kenny et al. (2006). The intra-class correlations indicate the extent to which teachers are consistent in their attributions among their low achieving students. The formula $(1 - r_1)$ gives an indication of the extent to which attributions vary within teachers (Bartko 1976; Levin et al. 1999). We tested the intra-class correlations for statistical significance with a set level of significance of .05.³

3 Results

In this study we asked the question whether, and to what extent, causal attributions of low student achievement vary within secondary school teachers. Before focusing on teacher variability in Sect. 3.2 we will first present and discuss some descriptive statistics of the teacher attributions and the correlations among the teacher attributions in Sect. 3.1.

3.1 Descriptive statistics of teacher attributions

The mean scores of teacher attributions are presented in Table 1. These mean scores show that teachers attributed low performance to causes related to student characteristics to a relatively large extent (attention, $M = 3.61$, $SD = 1.30$; effort, $M = 3.58$, $SD = 1.26$; and motivation, $M = 3.56$, $SD = 1.26$). The factor 'acquired study skills' was also attributed frequently as a cause for low achievement. The lowest rated attributes were 'attendance' and 'quality of instruction'. The low mean scores of teacher internal attributions (quality of instruction and difficulty of the lessons) and high mean scores of student related attributions (attention, effort and motivation) suggest that teachers predominantly used student-related causal attributions to account for low achievement of their students.

Table 2 presents the correlations among the causal factors. Results show many significant correlations among the attributions. Although it is not within the scope of this article to elaborate thoroughly on the interrelations, we will report and discuss some of the significant correlations. Firstly, the relative highly rated student-factors 'effort', 'motivation', 'attention' and 'subject interest' were strongly interrelated. It seems that teachers tended to rate these student-factors as an interlinked set of causal attributions for students' low achievement. Secondly, there are a few significant negative correlations, mostly with the cause 'ability' and the above-mentioned student factors. These negative correlations suggest that teachers tended to ascribe 'ability' and its negatively correlated factors more exclusively than in combination. Teachers may thus have perceived hard-working students who perform poorly as lacking abil-

² r_1 can be estimated by $(MS_b - MS_w)/(MS_b + (k' - 1)MS_w)$, where k' is the corrected number of students rated per teacher. Because we gathered ratings of 3 students for 62 teachers and ratings of 2 students for 2 teachers, $k' = 2.97$, see Kenny et al. (2006, p. 276).

³ Statistical significance for r_1 was tested with an F -test ($F = MS_b/MS_w$) with $df_1 = 63$ ($n_{\text{teachers}} - 1$) and $df_2 = 126$ ($n_{\text{students}} - n_{\text{teachers}}$).

Table 1 Mean (range 1–5), standard deviation, mean squares between and within teachers and intraclass correlation (r_1) and $1 - r_1$ values of teachers' causal attributions (N = 64)

Causal attributions	Mean	SD	MS_b	MS_w	r_1	($1 - r_1$)
Attention	3.61	1.30	1.74	1.68	.011	.989
Effort	3.58	1.26	1.70	1.52	.040	.960
Motivation	3.56	1.26	2.02	1.36	.141*	.859
Acquired study skills	3.54	1.19	1.81	1.23	.136*	.864
Interest in subject	3.46	1.19	1.51	1.36	.036	.964
Other students	3.44	1.30	2.20	1.43	.152*	.848
Adaptation to student needs	2.99	1.12	1.61	1.06	.150*	.850
Family	2.96	1.26	2.35	1.17	.255*	.745
Ability	2.83	1.28	2.52	1.18	.278*	.722
Previous experience	2.71	1.08	1.44	1.02	.123	.877
Difficulty of the lessons	2.51	1.10	1.94	0.84	.309*	.691
Attendance	2.38	1.26	2.47	1.53	.170*	.830
Quality of instruction	2.31	0.89	1.73	0.33	.585*	.415

* $p < .05$

Table 2 Correlation coefficients of teacher attributions (N = 190)

Factors	1	2	3	4	5	6	7	8	9	10	11	12
1. Effort												
2. Motivation	.68*											
3. Attention	.65*	.66*										
4. Interest in subject	.43*	.55*	.50*									
5. Other students	.33*	.44*	.58*	.37*								
6. Attendance	.17*	.23*	.17*	.18*	.15*							
7. Family	.30*	.24*	.24*	.10	.17*	.41*						
8. Ability	-.25*	-.19*	-.15*	-.01	-.17*	-.09	-.08					
9. Previous experience	-.18*	-.11	-.00	.05	.04	.10	.14	.44*				
10. Acquired study skills	.07	.09	.11	.15*	.08	.07	.06	.18*	.24*			
11. Adaptation to student needs	.07	.13	.15*	.27*	.03	.09	.10	.16*	.26*	.27*		
12. Difficulty of the lessons	-.23*	-.10	-.10	.07	-.05	-.12	-.03	.49*	.29*	.14	.33*	
13. Quality of instruction	-.12	.02	.05	.09*	-.01	.03	.03	.14	.21*	.16*	.40*	.27*

* $p < .05$

ity. Thirdly, there appeared to be a positive significant correlation of ‘difficulty of the lessons’ with ‘ability’. This suggests that, when teachers ascribed poor performance to student ability, they tended to rate the difficulty of their lessons as too high for that specific student. Teachers may thus have been aware of the fact that they assigned work that is too difficult for their low ability students, but persevered in assigning these difficult tasks. Finally, student attendance was positively related to the students’ family. This indicates that teachers who perceived student absenteeism as a cause

for poor performance were likely to perceive the students' family background as a cause too, which suggests that teachers may have held parents accountable for student absenteeism.

3.2 Within-teacher variance

The extent to which teachers have been consistent in their attributions was analysed in order to answer the research questions about the variability of attributions within teachers among low achieving students. Table 1 shows the intra-class correlations (r_1) of each cause. The intra-class correlations show that there was a considerable variability in teachers' attributions for student low achievement. As the table shows, many intra-class correlations were low, especially those related to student-internal factors such as 'attention', 'effort' and 'interest in the subject', indicating high levels of within-teacher variation of these causal attributions. The highest level of within-teacher variation of attributions was observed for 'attention', with a within-teacher variance of 98.9%. ANOVA F -tests of the intra-class correlations showed that there was significant consistency for nine of the thirteen causal attributions. The highest intra-class correlations (i.e., the lowest within-teacher variance) were observed for the factors 'family', 'ability', 'difficulty of the lessons' and 'quality of instruction'. Apparently teachers tended to rate these factors as causes for low achievement consistently high or low for their low performing students, although intra-class correlations indicate the presence of some within-teacher variation of attributions for different students.

4 Discussion and conclusion

4.1 Discussions and implications for research on attributions

The research question of this study is to what extent attributions of achievement of different low achieving students varied within teachers. Before we discuss our findings regarding the research question we will first briefly discuss the between-teacher results presented above. Based on the mean scores presented in Table 1, we concluded that teachers predominantly use student-related causal attributions to account for their students' low achievement. This finding is in line with the study of [Tollefson et al. \(1990\)](#), who reported that 90.9% of the teachers indicated student characteristics as the most important factor in explaining student's low achievement. We also presented the interrelations among the causal attributions. There were many significant correlations between attributions and, although some were low, it might be interesting to further investigate when and how teachers attributed distinctive attributions.

Results of the within-teacher variance analysis showed that the amount of within-teacher variation was considerably high, although the amount differed per causal factor. Student factors that seem controllable for students, like attention, effort and interest in the subject matter, were ascribed inconsistently for different low achieving students. While teachers may ascribe a lack of attention, effort or interest in the subject to low achievement of some students, these factors are not automatically ascribed to the low achievement of other low achieving students.

The relatively high consistencies of difficulty of the lessons, quality of instruction, family background and student ability indicate that teachers perceive these causes consistently for all their low achieving students. This might suggest that some teachers are more inclined to use those attributions as explanations for student failure than other teachers. These results could support, or be supported by, studies that examined the differing perspectives that teachers hold about their responsibilities in dealing with low achieving students, the effect on the attributions they use and behaviour they show (Jordan and Kircaali-Iftar 1993; Jordan et al. 1997). In these studies it has been concluded that some teachers are more likely to attribute failure to student ability and/or their families, than other teachers.

The causal attribution 'quality of instruction' showed the lowest within-teacher variance. It seems that if teachers ascribe their instructional quality as a cause for the low achievement of one student, they are likely to ascribe their quality for the low achievement of other students as well. Although this may be explained because teacher quality is actually the same for all students as it is inherent to the teacher. It should be noted that, based on the low mean score of 'instructional quality' (see Table 1), we concluded that teachers, in general, are not inclined to ascribe their instructional quality as a cause for their students' low achievement. This finding is in line with research about personal teacher efficacy beliefs (i.e., the confidence of a teacher in his or her own capabilities to influence student learning; Tschannen-Moran and Woolfolk-Hoy 2001) in relation with teaching low achieving students. Some studies have discussed that teachers, in order to preserve their self-image, are not likely to attribute failure to factors under their control (Hoge and Coladarci 1989; Mavropoulou and Padelidiadu 2002).

As discussed in the introduction Sect. 1.2, teachers' attributions have often been presented as a 'teacher variable', stable within a teacher for different low achieving students. The focal point of this study was to examine whether teachers attribute the same causes to the failure of all of their low achieving students or whether they account for individual differences among their low achieving students. The results of our study indicate that there is quite some within-teacher variation in causal attributions for low achievement. These results imply that attributions are not mere teacher variables and that they should be studied with multi-level models in which teacher attributions are included at the lowest (i.e., student) level.

It would be interesting for future research to explore the student and teacher characteristics that affect teachers' attributions and, for example, to investigate to what extent different teachers differ in their ascription of causes of poor performance of the same (low achieving) student. Also, in future research, cultural factors could be taken into account. Cultural factors may influence how teachers perceive and ascribe their students' low achievement and what their perceptions are of the remediation possibilities of poor performance, as suggested by Salili and Hau (1994). It would be interesting to investigate to what extent cultural characteristics of either teachers or students affect the prevalence as well as the between-teacher and within-teacher variance of causal attributions.

Past research has sought to gain insight into the cognitive and emotional processes that influence student directed teacher behaviour by focusing on the perceptions teachers have of their students (Georgiou et al. 2002; Pajares 1992; Rolinson and Medway

1985). Teacher perceptions and expectations of their students determine, to a large extent, teacher behaviour and teacher interaction patterns with their students (Brophy and Good 1970; Rubie-Davies 2009). Only teacher perceptions have been studied in this research, future research could integrate preceding studies and the results of the present research by investigating observable emotional and behavioural teacher responses to individual (low) achieving students. It would also be of great value to include the effects that teacher responses have on their students, since the consequences of specific teacher behaviour seem to be disputable (cf. Georgiou et al. 2002).

4.2 Limitations

The findings in this study should be interpreted with caution because of some limitations in the research design. The first limitation is the low response rate of teachers in this study. Low response rates are not, however, uncommon in online teacher research (Mertler 2003). Mertler (2003) researched causes of low response rate among teachers. The main cause found was that teachers 'simply didn't want to take the time to respond', predominantly because they are too busy to participate in 'extra' activities. Because the questionnaire for this study was rather lengthy (the estimated time for filling in the questionnaire was 15–20 min) and less than 50 % of teachers who started the questionnaire finished it, time constraints may partly explain the low response rate. Future research could use a questionnaire design that features a 'save and continue' option. Such an option might increase the response rate because teachers can then spread the time spent on the questionnaire. The low response in this study might have affected the generalisability of the results, especially when response selectivity is related to specific teacher characteristics. Future research can address this issue, preferably by studying teacher attributions in more controlled settings.

A second limitation of the study that may have affected the external validity of this research is related to the selection of students by the teachers. Teachers were free to choose three low achieving students for whom they provided their causal attributions. This selection might lead to some bias, because teachers may have selected three particularly different low achieving students or failing students who were salient, for example because they were particularly difficult to teach. This selection bias might lead to either under- or overestimations of within-teacher variance. To minimise the risk of selection bias, teachers could be asked to provide attributions for each student in their classroom. This would, however, be too time-consuming to consider it a feasible method of data collection.

4.3 Conclusion

In earlier research, teacher attributions have shown to be predictive of student-directed teacher behaviour towards failing students (Georgiou et al. 2002; Poulou and Norwich 2000; Reyna and Weiner 2001). This behaviour may or may not enhance student learning. In light of providing each student with an optimal learning environment it seems important that teachers are aware of the attributions they make for individual students and the consequences of these attributions for their student-directed behaviour. Teacher

awareness of the learning needs of individual students is important (Tomlinson et al. 2003; Jordan et al. 1997), especially within the current educational climate of inclusion and the accompanying demand on teachers to address all individual students' learning needs (Ferguson 2008). This is even more important with regard to the needs of low achieving students who are struggling in class and who are most in need of adequate adaptation of student-directed teacher behaviour.

This study has provided insight into the within-teacher variation of causal attributions and suggests that attributions are not mere teacher variables and that they should be studied at the student-level. It would be interesting to study how teachers' interactions with their students can be understood from these attributions. Effects of attributions on teacher behaviour are relevant to study as Rubie-Davies et al. (2012, p. 286) stated: 'Instructional practices do not just happen. They are predicated on beliefs and hence further exploration in this area could result in understandings about teachers of which we are not currently cognisant'. Teacher attribution is a belief system that has been used in explaining and predicting teacher behaviour and, because of its promising results, will probably be used in future research. To study the effects of attributions on teacher-student interactions, research on teacher attributions could be expanded with additional classroom observations. With this knowledge teachers can be supported to be more attentive and adaptive to their individual students' learning needs.

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