MODELLING THE INFLUENCE OF TEACHER CHARACTERISTICS ON STUDENT ACHIEVEMENT FOR CANADIAN STUDENTS WITH AND WITHOUT LEARNING DISABILITIES

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The present study explored the relationships between teacher characteristics and the academic achievement of students with and without Learning Disabilities (LD) in a path model. Teacher-related variables included teacher self-efficacy, expectations of students' educational attainment, level of education and years of experience. Data were drawn from the Canadian National Longitudinal Survey of Children and Youth and participants included students in grades one through six who were taught by a single teacher (N = 2367). Results indicated that the hypothesized path model was an excellent fit to the data. Furthermore, academic achievement was significantly impacted by teacher expectations, LD status, and teacher efficacy. Teachers felt less confident in their ability to instruct students with LD, had lower expectations of their long-term success and also rated their achievement more poorly. The findings are discussed within existing research and implications for teacher preparation and in-service training programs are presented.

Students with Learning Disabilities (LD) are now increasingly included in regular, or inclusive classrooms across North America (Data Accountability Center, 2009a). These students are typically taught by teachers who have varied training and expertise with respect to including students with exceptionalities in their classes (Booth, Nes & Stromstad, 2003). As well, these teachers bring to their classroom their own beliefs, expectations, attitudes and sense of self-efficacy related to instruction and assessment for students with LD (Anderson, Greene & Loewen, 1998; Gibson & Dembo, 1984; Woolfson & Brady, 2009).

These characteristics of teachers have been shown to impact the choices that teachers make with respect to their classrooms; in terms of interactions with students, instructional strategies, curricular materials, and collaboration with colleagues and parents (Anderson et al., 1998; Gibson & Dembo, 1984; Stanovich & Jordan, 1998). In turn, these decisions effect the academic achievement of students through mediating variables such as student engagement and motivation (Eccles & Wigfield, 1985).
There has been limited research exploring the influence of teacher characteristics, such as teacher efficacy and expectations, on the achievement of students with Learning Disabilities. This type of information is crucial as efforts to improve outcomes for students with LD continue. Students who are diagnosed with Learning Disabilities constitute approximately 50 percent of students receiving special education services in Canada and the United States (British Columbia Ministry of Education, 2006; Ontario Ministry of Education and Training, 2005; U.S. Department of Education, 2008). Compared to their peers without exceptionalities, these students achieve at significantly lower levels (Lane, Carter, Pierson, & Glaeser, 2006), are less likely to complete high school (Data Accountability Centre, 2009b), and have lower academic self-efficacy (Baird, Scott, Dearing, & Hamill, 2009; Lackaye & Margalit, 2006).

In the following sections, the relationship between teacher characteristics, in particular self-efficacy and expectations of student success, and their impact on achievement will be summarized with a particular emphasis on students with exceptionalities, and if possible, Learning Disabilities.

Teacher Efficacy
The role of teacher efficacy in student outcomes has been long demonstrated in research literature. Although defined in various ways by researchers, the present study looks at teachers' present views of themselves as competent in terms of promoting learning and managing their classroom and of

facilitating academic growth in all of their students, including those with difficulties. This perspective on teacher efficacy aligns most closely to Bandura's *Self-Efficacy* (1977), *Personal Teaching Competence* as defined by Tschannen-Moran, Woolfolk Hoy and Hoy (1998) and *Personal Teaching Efficacy* as defined by Gibson and Dembo (1984) in their construct validation study.

Teachers' sense of efficacy has been found to be significantly related to student achievement and motivation (Anderson et al., 1998; Ross, 1992). In theory, teachers with a higher sense of their ability to effect change in their students should *persist longer, provide a greater academic focus in the classroom, and exhibit different types of feedback* (Gibson & Dembo, 1984, p. 570). Teachers with high efficacy have been found to be more flexible and willing to explore new methods that may prove more efficacious for their students (Stein & Wang, 1988). These behaviours should in turn impact positively the engagement achievement of the students in their classes. Ross, in his examination of the implementation of a new curriculum in Ontario, examined the relationships between teacher efficacy, use of personnel resources and student mean achievement with 18 teachers. He found that personal teaching efficacy was significantly correlated with student achievement ($r = .59$, $p < .05$).

With respect to the links between teacher efficacy and student characteristics, there is some evidence that teachers feel less efficacious when working with classes of students at lower academic levels (Raudenbush, Rowen, & Cheong, 1992). This relationship was mediated by student engagement. Other researchers have also found that self-efficacy beliefs were related to teachers' decisions to refer students experiencing learning difficulties to special education (Soodak & Podell, 1993). Teachers with a higher sense of self-efficacy were more likely to recommend a general class placement and to take responsibility for meeting the needs of students with exceptionalities in their classes (Brownell & Pajares, 1999; Soodak & Podell, 1994). Clearly then, teacher self-efficacy may play an important role in the school success of students with Learning Disabilities.

Research exploring the relationship of teaching experience and teacher efficacy has been mixed with some studies showing greater efficacy among teachers later in their career stage (Campbell, 1996; Di Fabio, Majer & Taralla, 2006; Hoy & Woolfolk, 1993; Wilson & Tan, 2004), and other showing no changes with years of experience (DeMesquita & Drake, 1994; Pigge & Marso, 1997). With respect to students with learning difficulties in particular, Woolfson and Brady (2009) found no relationship between self-efficacy specifically related to teaching these students and years of experience among a sample of 199 regular education teachers.

As well as experience, level of education, particularly in the area of special or inclusive education, may be assumed to impact on teacher efficacy. If teachers have received specific training that may improve their teaching repertoire and understanding of students with exceptionalities, they may then feel more confident teaching these students. This hypothesis has been supported in part by studies documenting higher self-efficacy for teaching students in inclusive settings among special education teachers, compared to general or inclusive class teachers (Buell, Hallam, Gamel-McCormick & Sheer, 1999; Leyser, 2002). However, Woolfson and Brady (2009) failed to find a relationship between teacher education, as measured by postgraduate qualifications and attendance at in-service training sessions, and self-efficacy related to teaching students with learning difficulties. The present study will add to the limited existing literature in this area.

Teacher Expectations

The influence of teacher expectations of student's academic performance on the behaviours of teachers and students has been explored for many years. As defined by Good (1987), teacher expectations are *inferences that teachers make about the future behavior or academic achievement of their students, based on what they know about these students now* (p. 32). According to Cooper and Good (1983), teacher expectations employ two effects. The first is a self-fulfilling prophecy effect in which teachers have incorrect expectations and their behaviour subsequently cause the expectations to become true; this is known as the Pygmalion effect. The second is a sustaining expectation effect in which teachers expect previously exhibited behaviours to continue to happen and do not recognize and capitalize on changes when they do occur.

In research taking place mainly in the 1970s and 1980s, teacher expectations of students were found to influence their classroom behaviour in a number of ways. These include paying less attention to or interacting less with low achievers and praising low achievers less frequently than high achievers for success (Adams & Cohen, 1974; Firestone & Brody, 1975; Good, Cooper & Blakey, 1980). These

behaviours may have a direct effect on student achievement and they likely also impact outcomes through student perceptions and motivation and student-teacher relationships (Eccles & Wigfield, 1985; Weinstein, 1983). However, many researchers concluded that teachers typically have accurate estimations of their student's abilities and exert only moderate effects on student achievement (Brophy, 1983).

Teacher expectations of students are impacted by a number of student factors, including disability labels, attractiveness, socio-economic status, and race (Auwarter & Aruguete, 2008; Dusek & Joseph, 1983). Related to learning disabilities, Clark (1997) explored teacher expectations through the lens of attributional theory and presented teachers with vignettes describing a male student failing a test. The teachers were given information about the student's ability, effort and their identification as either learning disabled or nondisabled. Results showed that for students with learning disabilities, teachers held lower expectations of future success, regardless of the students' ability or expended effort. Regardless of actual academic ability then, teacher's future expectations of students with Learning Disabilities may be lower.

Expectations are also influenced by characteristics of the teachers themselves, such as self-efficacy (Allinder, 1995; Ashton, 1985). A study conducted by Tournaki and Podell (2005) explored the relationships between teacher efficacy, student characteristics, such as behaviour and academic difficulties, and teachers' predictions of student success. Results showed that teachers with higher efficacy made more positive predictions of their student's academic success, regardless of student's behavioural characteristics. As well, teachers had more positive expectations of girls, of those who read at grade level and of attentive and friendly students.

Present Study

Given the recognized impact of teacher characteristics such as self-efficacy and teacher expectations on student achievement, an exploration of these with respect to students with LD is warranted. Students with this identification continue to experience lower grades, graduate rates and levels of education and employment than their peers. This is despite the wealth of research that has accumulated documenting effective instructional practices for these students and the plethora of resources that are available to support students with LD at the post-secondary level (Stodden, Whelley, Chang & Harding, 2001; Swanson, Harris & Graham, 2003).

Accordingly, the present study will examine the relationships between teacher expectations, teacher efficacy and student achievement for students with and without Learning Disabilities. These relationships will be examined simultaneously in a cross-sectional path model. Given the salient influences identified in the research literature, variables will also include student sex, teacher years of experience and teacher level of education with respect to special education in particular. Findings from the study will contribute to the theoretical understanding of teacher efficacy and expectations with respect to students with LD and will also provide guidance for those involved in teacher preparation and in-service programs.

Data Source

Data from the present study were drawn from the National Longitudinal Survey of Children and Youth (NLSCY). This survey contains school-based nationally stratified data and is maintained jointly by Statistics Canada and Human Resources and Social Development Canada (HRSDC, 1996). Every two years beginning in 1994, surveys have been completed by parents and, if over the age of ten, children themselves. Up until Cycle 4 (2000-2001), surveys were also completed by the classroom teachers and principals of the children involved. Topics within the surveys include the physical, emotional and cognitive development of the child, parenting practices, education-related factors, and influences such as peers, schools and the larger community (Statistics Canada, 1997). Of particular relevance for the current study is the teacher survey that assesses the perception of the classroom teacher regarding the child's academic performance and behaviour at school, the teachers' methods of instruction and the atmosphere in the classroom (Statistics Canada, 2001, p. 13).

Participants

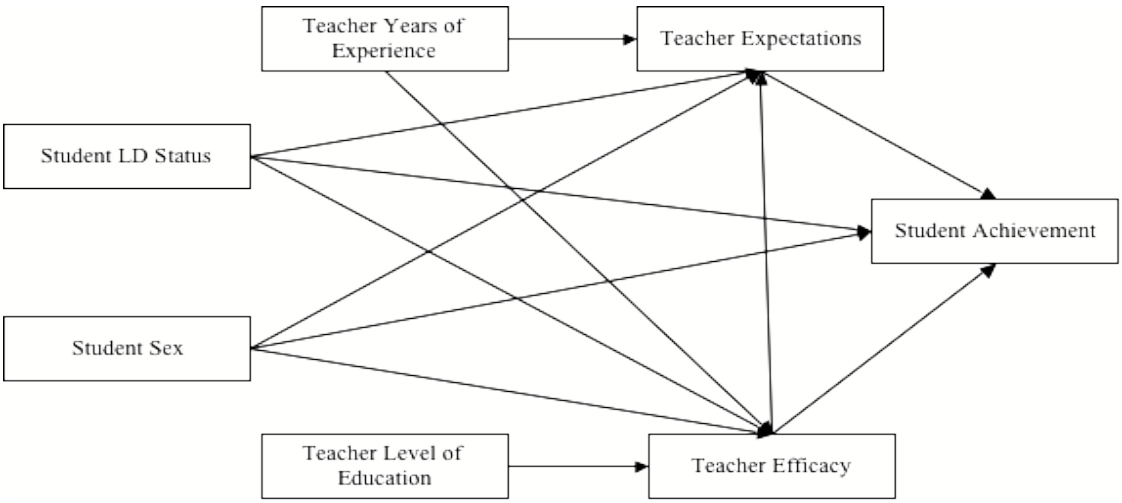
As the unit of analysis in the NLSCY is the child, students rather than teachers are described as the participants. For the purposes of the present study, students were selected if they a) had a teacher who completed the NLSCY questionnaire, and b) were instructed by a single classroom teacher. The latter criterion was established in an effort to create a sample with similar school experiences. Applying these

selection criteria resulted in a sample size of 2367. Students ranged in grade from one through six with fairly even distribution across grades and were evenly split in terms of sex.

Theoretical Model

The theoretical model to be tested is presented in Figure 1 and was developed based on the research and theoretical literature described in the previous sections. In the model, student sex has a direct effect on achievement, teacher expectations and teacher efficacy. Student LD status has a direct effect on student achievement, teacher expectations, and teacher efficacy. LD status also has an indirect effect on achievement through teacher expectations and teacher efficacy. Teacher level of education has a direct effect on teacher efficacy. Teacher experience has a direct effect on teacher expectations and teacher efficacy. Teacher efficacy has a direct effect on teacher expectations and student achievement. Teacher expectations have a direct effect on student achievement.

Figure 1.
Hypothetical Model of Student Academic Achievement



Analyses

The following seven variables were included in the analyses: a) Student sex, b) Student LD status, c) Teacher level of special education training, d) Teacher years of experience, e) Teacher efficacy, f) Teacher expectations, and g) Student level of achievement. Student sex and LD status were dichotomous variables. LD status was determined by the students' classroom teacher. Teacher level of special education was a categorical variable with three levels that was calculated using a number of survey items where teachers described their level and domain of education. Responses were categorized into level 1 (no expertise in special education), level 2 (one class, or part of a special education program), or level 3 (certificate, degree, or graduate degree in special education). Teacher years of education were calculated simply by dividing the number of months of teaching experience provided by the teacher by twelve resulting in a continuous variable.

Teacher efficacy was assessed through an average score of five items that teachers responded to on a 5-point scale ranging from *1 = strongly disagree* to *5 = strongly agree*. The items include the following: a) I have a strong effect on the academic achievement of the students I teach, b) I feel competent in dealing with students' behavioural problems, c) I feel competent in dealing with students' learning problems, d) I have high expectations for the academic success of my students, and e) I strongly encourage students to achieve their full academic potential. The internal consistency of the scale was found to be adequate (Cronbach's alpha = .73). Teacher expectations were assessed via a single item that asked how far they thought the student in question had the potential to go in school ranging from *1 = complete some secondary* to *5 = obtain a university degree*.

Lastly, student level of achievement was assessed using two variables. The first asked teachers to rank the overall achievement of the student in question relative to the rest of the class on a five point scale ranging from *1 = near the bottom of the class* to *5 = near the top of the class*. To account for the relative achievement level of the class, a second question was considered which asked teachers whether, compared to other classes at the same grade and level, their class was of lower, similar or higher in academic ability. For students in classes of higher than average ability, one point was subtracted from their achievement level to a minimum low of 1. For those in classes of lower than

average ability, one point was added to their achievement level to a maximum high of 5. For example, if a student was rated as *3 = in the middle of the class* but was in a class that was of higher ability than other classes at the same grade and level, their score would be moved to a *4 = above the middle of the class*.

The variables of interest were first examined using SPSS 17.0 (2008). All were fairly normally distributed, with skewness and kurtosis within acceptable ranges. Missing data was analyzed using SPSS Missing Values Analysis and appeared to be missing at random. The proportion of missing data ranged from 0 to 8.8 percent. The correlations between variables, as well as means and standard deviations, are summarized in Table 1.

Table 1
Means, Standard Deviations and Correlations of Model Variables

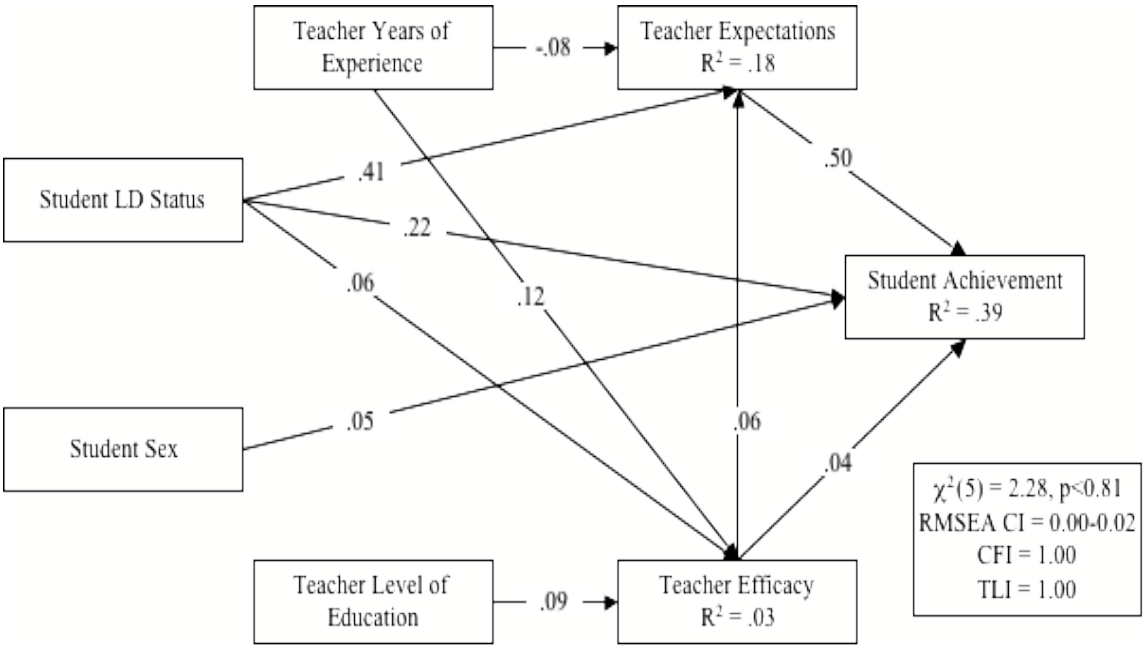
	1	2	3	4	5	6	7
Mean	4.21	4.30	3.55	16.90	1.62	1.92	1.53
(SD)	(.46)	(1.09)	(1.16)	(9.76)	(.81)	(.27)	(.54)
1.Teacher efficacy	--						
2.Teacher expectations	0.08	--					
3.Student achievement	0.10	0.59	--				
4.Teacher experience	0.12	-0.06	-0.02	--			
5.Teacher education	0.09	0.01	0.01	-0.02	--		
6.Student LD status	0.06	0.41	0.43	0.03	0.00	--	
7. Student Sex	-0.03	0.01	0.06	-0.04	0.00	0.03	--

Results

Model Testing

The theoretical model was tested using MPlus Version 4.2 (Muthén & Muthén, 2006), which is a statistical modelling program appropriate for a variety of data and model types. Maximum likelihood estimation was used to estimate the model, which is summarized using standardized path coefficients in Figure 2. The fit indices indicate that the model provided a very good fit to the data and explained approximately 39 percent of the variance in academic achievement. All estimated paths were significant save two (student sex to teacher efficacy and teacher expectations); these were dropped in order to create the most parsimonious model possible.

Figure 2:
Tested Model of Student Academic Achievement



Model Effects

As can be seen in Figure 2, a number of variables were significantly related to students' academic achievement. Standardized path values can be understood as standardized regression weights and, as such, may be interpreted as the number of standard deviations change in a variable expected to follow a one standard deviation increase in another variable, holding all the other relationships constant. For example, a one standard deviation change in teacher efficacy is expected to lead to an increase of 0.04 standard deviations in academic achievement, after accounting for the other effects (see Figure 2). In addition to direct effects, variables may also have indirect (mediated) effects. The indirect, direct, and total effects of each variable on academic achievement are summarized in Table 2. Effect sizes are categorized according to Keith (1993), who states that *for manipulable influences on learning, paths of .05-.10 may be considered small but meaningful influences, paths of .10-.25 may be considered moderate influences, and paths above .25 may be considered large effects* (p. 26).

Table 2
Indirect, Direct and Total Effects of Model Variables on Student Achievement

Variable	Effects		
	Indirect	Direct	Total
Teacher efficacy	.03	.04	.07
Teacher expectations	--	.50	.50
Teacher experience	.03	--	.03
Teacher education	.01	--	.01
Student LD status	.21	.22	.43
Student Sex	--	.05	.05

The strongest influences on student's academic achievement were exerted by teacher expectations and student LD status. The former was entirely direct, due to its placement in the model. The latter had a moderate direct and indirect effect through teacher expectations and to a lesser extent, teacher efficacy. These effects were positive, indicating that students with LD had lower achievement, their teachers had lower expectations of them in the long-term and their teachers felt less of a sense of self-efficacy.

Other variables had small, significant effects. Teacher efficacy had a small influence both directly and indirectly through teacher expectations. Teachers' years of experience had a negative influence on expectations, indicating that as the number of years of experience increased, teachers' expectations of student decreased slightly. Experience had a moderate positive effect on teacher efficacy however. The overall effect of experience on achievement was negligible. Teacher's level of training in special education had a small, positive influence on teacher efficacy and its overall impact on achievement, like experience, was negligible. Finally student sex had a small positive direct effect on achievement, with girls having slightly higher achievement scores than boys.

Discussion

In the present study, a model of academic achievement was tested that included a number of teacher-related variables (efficacy, years of experience, training in special education) as well as student-related variables (teacher expectations of student educational attainment, student sex, student LD status). These came together to influence student achievement in a number of interesting ways.

The key role of the student LD status was clear throughout the model. For students with an identified LD, teachers had lower expectations of long-term educational attainment and they also reported lower self-efficacy. These factors impacted student achievement in addition to a direct effect exerted by the Learning Disability to result in lower achievement for students with LD compared to those without.

That students with Learning Disabilities experience academic difficulties is not a novel finding. In fact students are typically identified as having LD as a result of their poor academic performance (Fletcher, Denton & Francis, 2005). However, the influence of teacher expectations and self-efficacy adds to the small body of existing research exploring influences on achievement for students with LD and other exceptionalities. Specifically, previous studies have found that teachers working with students at lower academic levels report lower self-efficacy and these teachers are less likely to take responsibility for the learning of students with exceptionalities in their classes (Brownell & Pajares, 1999; Raudenbush et al., 1992; Soodak & Podell, 1993). The research linking teacher self-efficacy and student motivation, engagement, and ultimately achievement is clear (Anderson et al., 1998; Ross, 1992). Given the present findings, it appears that, despite the many years in which inclusive education has been the reality for Canadian teachers, some continue to feel challenged by the task of including students with LD in their

classrooms. This sense of self-doubt no doubt impacts on the choices that teachers make regarding their instruction of students and ultimately the academic success of their students.

Previous research has documented higher rates of self-efficacy by teachers who specialized in special or inclusive education compared to generalist teachers (Leyser, 2002). Although the NLSCY does not focus extensively on teacher training, the variable included in the present model does capture the level of education that teachers have with respect to special education. In developing the theoretical model for this study, it was hypothesized that teachers with higher levels of special education training would have higher self-efficacy. This was confirmed, although the relationship was small than expected. With respect to student achievement, teacher level of education did not have an impact indicating that students did not benefit academically from having a teacher with advanced special education credentials.

Although programs certainly vary, information provided in general special education courses at the undergraduate or graduate level typically include methods of instruction and assessment for students with particular difficulties or characteristics of students with various exceptionalities (Ontario Ministry of Education, 2009; University of Alberta, 2009; University of Saskatchewan, 2008). Given provincial policies regarding the inclusion of students with exceptionalities in regular classrooms, many programs have begun to include a focus on inclusive practices in supporting the needs of students. For example, the Masters of Education program at the University of Manitoba in *Inclusive Special Education* includes courses on organizing inclusive classrooms, and assessment and instruction in inclusive settings (University of Manitoba, 2009). Similarly, a new post-graduate certificate program at the University of British Columbia's Okanagan campus aims to *prepare teachers to work with children and adolescents with diverse needs establishing inclusive practices in classrooms and in schools so that all students have equitable access to learning and achievement* (University of British Columbia Okanagan, 2009, 2). As most students with learning disabilities are included in general classrooms, preparation in traditional special education programs might not promote a greater sense of competence and self-efficacy among teachers and lead to greater gains in achievement by students. Analyses by type of program were not possible in the present study and as there is no existing research exploring this hypothesis, it remains to be seen whether or not this is the case.

Finally, teachers with greater years of experience had higher self-efficacy, a finding that is supported by some studies (Di Fabio et al., 2006; Wilson & Tan, 2004) and in contrast to others (Pigge & Marso, 1997). However, the impact of teacher experience on achievement was very small indicating that experience, while contributing teachers' teaching repertoire and beliefs in their own ability, is insufficient to ensure student success.

With respect to teacher expectations, the influence of this variable on student achievement was by far the largest in the model. Although not presented as reciprocal, it is assumed that the present achievement of the student certainly impacts teachers' estimations of long-term academic attainment. However, in the present model, the hypothesis being tested was that LD Status would influence teacher expectations, which would in turn impact teachers' evaluation of present achievement. The excellent fit of the model supports this hypothesis. As has been found in previous studies (Clark, 1997), teachers held much lower expectations of students with LD and these expectations in turn predicted student achievement. Given the information available in the NLSCY, it is not possible to determine whether teacher's estimations of achievement and expectations are indeed accurate, as has been suggested by some (Brophy, 1983). However it is interesting that the impact of student LD status is twice as influential for expectations as for achievement. Teachers clearly have difficulty viewing the long-term outcome of students with LD as one that includes academic success. It may seem less worthwhile, then, for these teachers to exert the same amount of effort in terms of student engagement, motivation, and novel instructional approaches.

Teacher efficacy also influenced teacher expectations, although the relationship was not a strong one. This finding is also supported by limited previous research (Tournaki & Podell, 2005) and indicates that teacher's estimations of long-term success are impacted by more than just present achievement. Teachers who may not feel that they have the ability to impact success for their students, particularly those with LD, may view their students as having more limited potential and may not believe that these students are amenable to change.

Taken together, the effects in the model highlight the negative impact of a Learning Disability on teacher perceptions. Teachers feel less confident in their ability to instruct students with LD and also believe that in the long-term, these students are less likely to complete high levels of education. Ultimately, teachers view students with LD as doing more poorly than their peers. Teachers who have higher levels of special education training and with more experience feel more able to influence the learning of their students; however these variables have very little impact on student achievement.

Implications and Future Research

The present findings have implications for practice. Although teachers may be fairly accurate in their assessment of student potential as measured by present achievement, research has demonstrated that holding low long-term expectations for students may lead teachers to make choices in their classrooms that do not promote increases in achievement, particularly for students with learning disabilities. However, their level of self-efficacy also impacts teachers' expectations. Perhaps then, rather than attempting to change teacher beliefs or perceptions regarding the abilities of students with LD, efforts would be best placed in designing preparation and in-service programs that better prepare teachers to meet the needs of these students. Once teachers feel confident in their abilities to intervene effectively with students who are struggling in diverse, inclusive settings, their expectations may increase along with student achievement. Future research that explores the impact of various types of teacher education programs on teacher self-efficacy and expectations of students with exceptionalities may shed light on the best ways in which to increase achievement for students with LD.

Limitations

A number of limitations are inherent in the use of secondary data such as those provided by the NLSCY. The most salient of these is that present analyses were restricted to the items included in the survey. There may be measures of variables such as teacher self-efficacy that may more accurately have captured this construct but that were not available to the researcher. As well, given that teachers were responsible for identifying students with Learning Disabilities, and given that criteria are provincially mandated in Canada, their reports were certainly based on a range of definitions. Thus the learning profiles of students with LD in the sample may vary.

Conclusions

While research exploring the role of teacher self-efficacy and expectations on student achievement has been ongoing for decades, this study represents the first to examine the influence of these variables within a path model, and to look specifically at the role of these with respect to students with LD. Given the difficulties that this group of students continue to experience in achieving long-term academic success, the need for this type of research is clear. The findings indicate that teachers do have difficulty viewing the potential of students with LD in a positive way and that they also feel less competent and skilled in working with this group. Future research in this area should continue to explore mechanisms for increasing teacher self-efficacy in terms of working with students with LD, particularly within inclusive education settings.

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