Mathematics Education Research Journal 2009, Vol. 21, No. 3, 86-106

Teacher Identification of Student Learned Helplessness in Mathematics

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Teachers frequently encounter students with learned helplessness who are discouraged, turned off, or have given up trying to learn mathematics. Although learned helplessness has a long history in psychology, there has been no reliable means by which mathematics teachers can identify students exhibiting these debilitating yet changeable characteristic behaviours in the classroom. The psychometrically robust Rasch calibrated "Student Behaviour Scale" consisting of ten items rated on a five point scale provides teachers with an efficient interval measure of student learned helplessness and an ordered hierarchy of these behaviours as they are manifest in mathematics classrooms.

The objective to raise the quality of learning of all students rather than just for some was identified as a significant, perennial issue facing all nations in an Organisation for Economic Co-operation and Development (2004) discussion paper. For this objective to be achieved it is essential that schools promote motivational equity (Covington, 1992) and goal-orientation cognitions (Brookhart, 2004) in all students and that teachers foster individual student engagement with learning in their classrooms. However, in mathematics, as in other areas of the curriculum, many teachers regularly encounter students with negative attitudes towards learning who are discouraged, disengaged, exhibit inappropriate behaviour in the classroom, and have lower achievement. Some students behave during mathematics lessons as if they believe they are powerless to influence the outcomes of their learning (Seligman, 1995). They do not make much effort to learn, do not persist when mathematics tasks become difficult, often refuse to try, avoid work wherever possible, engage in a variety of off-task behaviours, respond badly to failure, or simply give up (Diener & Dweck, 1978). When presented with new or different mathematics tasks or problems, disaffected students are likely to complain that they are too hard or they cannot do them, even before they have attempted to do so (McLeod, 1992). These students have learned to be helpless (Peterson, Maier, & Seligman, 1993) and believe that the subject matter is beyond them, a belief more commonly espoused by girls than boys (Monaco & Gentile, 1987; McLeod, 1992). Although the concept of learned helplessness has a long history in psychology (Peterson et al., 1993), there appears to be no recognised measure of this trait in terms of teacher perceptions of learned helplessness

in mathematics. While students exhibiting learned helpless behaviours are likely to be found in almost all classrooms, very little research has been directed towards teacher perceptions of students with the disposition to exhibit this characteristic in mathematics or towards a reliable method for the determination of learned helplessness in the classroom by teachers.

Helplessness is characterised by student passivity (Peterson et al., 1993) resulting from changes in cognition and emotion, a loss of motivation, and a reduction in behavioural agency (Gentile & Monaco, 1988; Peterson et al., 1993). Among the changes in student cognition is the perception of non-contingency or belief that important outcomes are uncontrollable (Seligman, 1990, 1995). Students with learned helplessness see success as determined by factors such as luck which are outside of their control (Seligman, 1993). Furthermore, they generally believe they will never be successful at school for a variety of reasons including their perceived lack of ability (Dweck & Repucci, 1973) and the difficulty of the tasks. By contrast, students who are mastery oriented tend to believe that success is determined by effort and are motivated, display more positive attitudes towards learning, use more effective learning and study strategies, and prefer challenging assignments (Ames & Archer, 1988).

In comparison with many other subject areas, mathematics has the least positive level of student motivation (Pintrich, Wolters, & De Groot, 1995). Learned helplessness is likely to occur in mathematics (Gentile & Monaco, 1986), because it is an area of the curriculum in which success and failure are highly salient and more obvious (Dweck & Licht, 1980), with answers to questions and problems viewed frequently as either right or wrong (McLeod, 1992). Furthermore, many students believe that mathematical ability is inherited and that learning mathematics is related to ability rather than effort (McLeod, 1992). In Western societies mathematics is often considered to be a subject only for the very able (McLeod, 1992). Students will often explain away their failure in mathematics by saying their parents were no good at maths when they were at school (McLeod, 1992). In addition, many students think that mathematics is governed by rules and that problems should be able to be solved within a few minutes (McLeod, 1992). These beliefs have detrimental effects on students' behaviours, particularly when they are confronted with problems for which there are no simple or quick solutions. The net result of these negative attitudes is that when students encounter difficulties in learning mathematics, many attribute their failure to their lack of mathematical ability and consequently decrease their efforts, engage in a variety of work avoidance strategies, or simply give up trying and opt out altogether. In response to repeated failure, students exhibit characteristically passive learned helplessness behaviours in the classroom (Peterson et al., 1993; Seligman, 1995) and reduce their

participation in the activities and lessons provided by the teachers. This in turn interacts with their lower achievement (Brookhart, 1994), to create a vicious cycle of failure.

Perceptions of success and failure in the mathematics classroom affect both teachers and students alike (Brookhart, 2004). For many students, how they explain the causes of their successes and failures has a decisive effect on their attitudes towards and engagement in mathematics (Kloosterman, 1988; McLeod, 1992; Middleton & Spanais, 1999). Most studies of causal explanations have relied on student self-report measures of their internal states (Peterson et al., 1993), but in classroom contexts it is likely that helplessness can be observed readily through the way in which students respond to situations of conceivable or actual failure. Teachers are therefore in a position to assess at least some of the recognised dimensions of helplessness as they surface in classroom life. As helplessness is a learned behaviour that is amenable to change (Seligman, 1994) there is a clear need for a reliable and valid measure of learned helplessness which can be used by teachers to identify students exhibiting this debilitating characteristic in mathematics classrooms, particularly at the primary school level before such negative behaviours become entrenched.

Measurement of Learned Helplessness

Many of the internal states measured through self reports of learned helplessness (Peterson et al., 1993) are manifest in a range of students overt behaviours in the classroom and are directly and easily observable by teachers who have a vested interest in being able to reliably identify student motivational predispositions (Covington, 1992; Brookhart, 2004). These characteristic behaviours which include student reaction to failure, motivation, persistence, and effort identified in several research studies (Peterson et al., 1993), were incorporated into the *Student Behavior Checklist* (SBC), a five-point rating scale developed by Fincham, Hokoda, and Sanders (1989, p. 140) "to explore teacher reports as a means of identifying helpless children". Development of the SBC is consistent with Gronlund's (1971) criteria for improving scale construction as the attributes being rated are directly observable as behaviours, categories and points in the scale are defined clearly, between three and seven rating positions are provided, and the characteristics being rated are recognised as being of educational significance. However, Fincham et al. (1989) reported that although the learned helpless and mastery orientation subscales are highly correlated ($r = -0.81$), the psychometric robustness of the checklist had not been established. Further, the issue of whether the SBC specifically measured learned helplessness and mastery orientation or whether the items reflected academic competence (Harter, 1983) had not been addressed. They also

considered that as the scores on the checklist were related strongly and consistently to concurrent and future achievement scores in their own study and that of Nolen-Hoeksema, Girgus, and Seligman (1986), perhaps a shorter version of the scale might "provide a cost-effective measure of helplessness" (Fincham et al., 1989, p. 143). These three concerns were addressed in the present study in which the SBC was used as part of a three year inquiry into motivational variables likely to influence primary and lower secondary school students' achievement in mathematics (Yates, 1997, 1998, 1999a, 1999b, 1999c, 2000, 2004).

Objectives of the study

The objectives of the study were to:

1. examine the psychometric robustness of the SBC;
2. determine whether the SBC measured learned helplessness and mastery orientation or academic competence; and
3. consider the feasibility of a shorter version of the SBC.

Method

Sample

The longitudinal study commenced with 293 students in Grades 3 to 7 in two government primary schools in South Australia. One year later (Time 2) (T2), 258 of these students who were then in Grades 4 to 8 were traced to 31 government and nongovernment schools in South Australia where they were taught mathematics by 58 teachers. Students in Grades 4 to 7 were in primary schools and those in Grade 8 in the first year of their secondary education. Mathematics was a compulsory subject for all of the students in all of the schools.

Student Behavior Checklist

The SBC, presented in Appendix 1, is composed of 24 items, with 12 items designated by Fincham et al. (1989) as measuring learned helplessness (items 1, 4, 6, 8, 9, 12, 14, 17, 18, 20, 21, 23) and 12 items as measuring mastery orientation (items 2, 3, 5, 7, 10, 11, 13, 15, 16, 19, 22, 24). The extent to which the learned helpless and mastery-oriented items describe students' behaviour in the classroom over the previous two to three months is rated by their teacher on a five-point Likert scale ranging from 1 (*not true*) through 3 *(somewhat or sometimes true)* to 5 (*very true*). The 12 helpless items and 12 mastery-oriented items are summed to provide total helplessness and mastery oriented scores respectively and a composite score is calculated by

subtracting the total mastery score from the total helplessness score.

Ethics

Permission was obtained from the students' parents/caregivers to continue their participation in the study at T2.

Procedure

The 31 schools were contacted by telephone in the final term of the school year and the 58 teachers who taught mathematics to the designated student(s) invited to complete the SBC. The checklist was forwarded by post to each teacher, together with a letter explaining the purpose of the longitudinal study. Instructions for the completion of the SBC, printed at the top of the checklist (see Appendix 1), directed the teacher to consider the nominated student over the last two or three months and for each of the 24 items place a tick in one of five boxes numbered from 1 (*not true*) through 3 (*somewhat or sometimes true*) to 5 (*very true*) to indicate how true that description was of the student's behaviour during mathematics lessons over the previous two to three months. Teachers were also requested to read the items carefully as they dealt with different aspects of student behaviour in the classroom. Because of the wide dispersion of the students across the 31 schools, some teachers rated only one or two students in their class while others completed the SBC for the majority of the students in their class. Teachers who rated the students at T2 were generally not those who taught them mathematics in either the first or third year of the longitudinal study as most students changed their grade level annually, some students progressed from primary to secondary schools, and many primary level students moved school at least once over the three year period of the study. Completed checklists were returned by post.

Analyses

As the raw data from the polytomous Likert rating scale were ordinal and the response categories not necessarily spaced equally, it was necessary to transform the data mathematically with the Rasch model (Rasch, 1966) which preserved the rank ordering and produced an interval scale (Doig & Groves, 2006). Use of the probabilistic Rasch modelling measurement technique overcame any sample-item interdependence problems (Wright & Stone, 1979) and allowed both the item difficulties and teacher ratings of students' behaviour to be measured using the same metric and placed on the same scale. The Rasch model postulates that estimates of item difficulties are independent of the particular persons whose performances are used to

estimate them, and estimates of the performance of persons are independent of the particular items that are attempted (Wright & Stone, 1979). That is, estimates of the difficulty level of the SBC items were not dependent on the sample of teachers who completed the ratings for the students in their classrooms while at the same time estimations of the teachers' ratings of students' classroom behaviour were independent of the items in the SBC.

With respect to the second objective of the study, the advantage of the Rasch scaling procedure is that the item response model which underlies the Rasch procedure employs the notion of a single specified construct (Snyder & Sheehan, 1992) or an inherent latent trait dimension underlying the data, referred to as unidimensionality (Wolf, 1994). Thus the question raised by Fincham et al. (1989) of whether the SBC measured learned helplessness and mastery orientation or involved a single underlying latent dimension of academic competence was addressed through the fit statistics from the Rasch analyses which indicated how well each item addressed the underlying unidimensional construct (Callingham & Bond, 2006) and provided evidence of the internal consistency of the scale (Curtis & Bowman, 2007). Rasch modelling seeks to "scale the data in such a way that interval scale data were obtained for the variable formed" (Wolf, 1994, p. 4926). Responses to the SBC, however, also involved unipolar scales with the same response categories across all items. The partial credit model for rating scales (Masters, 1988) in which the steps or distances between thresholds are permitted to vary across items (Curtis & Bowman, 2007) was the preferred procedure for the analysis of these response categories. Distances in the interval scale formed from a partial credit analysis have substantive meaning (Doig & Groves, 2006) as they represent the degree of endorsement needed to respond to a particular item (the item difficulty) and the degree to which teachers agreed with the statements in the SBC items as being indicative of student behaviour in the classroom (teacher perception).

The question inherent in the third objective of the study as to whether a short version of the SBC would be more effective can be answered empirically by the Rasch scaling procedure, as the final instrument is composed of only those items with the information weighted index (Infit Mean Square or IMS) values that fit the Rasch model. The IMS is a measure of the extent to which the fit of the items deviates from the expected value of 1.00 when the data conform to the measurement model. While there are no definitive rules for acceptable ranges of item fit using IMS values (Curtis & Bowman, 2007), the range was set between 0.83 and 1.20 so that the variation between the observed and predicted response patterns represented a balance between too much item dependency where all of the items might be too similar and too much item independence where the items might be too dissimilar (Waugh, 1999).

Results

Teacher ratings of students on the SBC were entered into a Statistical Package for the Social Sciences (SPSS), with ratings recoded from (1, 2, 3, 4, 5) to (0, 1, 2, 3, 4) for ease of data handling. There was very little missing data overall but it was noted one teacher rated all students in her class as 3 (*somewhat or sometimes true*) on all of the SBC items. Exploratory principal components analysis indicated the *Learned Helplessness* and *Mastery Orientation* items loaded in opposite directions, with all of the *Learned Helplessness* items having positive factor loadings and the *Mastery Orientation* items negative factor loadings. It was therefore decided to reverse the *Learned Helplessness* item responses from (0, 1, 2, 3, 4) to (4, 3, 2, 1, 0) in the Rasch analyses.

The SBC was Rasch-scaled with the *Quest* software (Adams & Khoo, 1993) using the partial credit model for rating scales (Masters, 1997). All 24 SBC items were entered into the analysis, but only items with IMS values within the predetermined range between 0.83 and 1.20 were considered to fit the Rasch model and were retained to form a *Student Behaviour Scale*. Items with IMS values outside this range were deleted systematically from the SBC through progressive rerunning of the *Quest* programme. Item 11 was the first item to be deleted as its IMS value of 2.37 indicated clearly it did not belong to the scale. A further 13 misfitting items were deleted one at a time in subsequent analyses. Misfitted items were discarded either because they represented a different construct, were ambiguous, did not discriminate well, or discriminated so well as to be redundant with other items (Green, 1996). Table 1 presents the IMS and discrimination index for the 24 SBC items before the deletion process began and the IMS, discrimination index, and threshold values for the 10 items constituting the *Student Behaviour Scale* after the 14 misfitting items had been deleted.

Table 1
Results of Rasch-Scaling of the Student Behavior Checklist

Items		Before Deletion		After Deletion		
		Infit Mean Square	Discrim. Index	Infit Mean Square	Discrim. Index	Threshold Values
1	Item 1	1.02	0.70	0.94	0.75	0.44
2	Item 2[m]	0.67	0.74	Deleted		
3	Item 3[m]	0.53	0.85	Deleted		
4	Item 4	1.19	0.68	1.1	0.72	-0.24
5	Item 5[m]	0.75	0.74	Deleted		
6	Item 6	0.94	0.70	0.9	0.73	-0.02
7	Item 7	0.90	0.77	0.9	0.77	-0.05
8	Item 8 [m]	1.31	0.60	Deleted		
9	Item 9	0.96	0.69	1	0.67	-0.54
10	Item 10[m]	0.89	0.77	Deleted		
11	Item 11[m]	2.37	0.25	Deleted		
12	Item 12[m]	0.66	0.77	Deleted		
13	Item 13	0.93	0.74	0.85	0.78	0.35
14	Item 14[m]	1.47	0.54	Deleted		
15	Item 15[m]	0.59	0.79	Deleted		
16	Item 16[m]	1.29	0.47	Deleted		
17	Item 17[m]	0.64	0.79	Deleted		
18	Item 18	0.82	0.73	0.87	0.72	-0.05
19	Item 19[m]	0.69	0.73	Deleted		
20	Item 20	1.08	0.67	1.06	0.69	0.1
21	Item 21[m]	1.56	0.50	Deleted		
22	Item 22	0.96	0.66	0.99	0.66	-0.02
23	Item 23[m]	0.77	0.77	Deleted		
24	Item 24	0.91	0.66	0.95	0.65	0.03

Note. [m] = Misfitting items outside the accepted range of 0.83 to 1.20

The 10 items in the *Student Behaviour Scale* are presented in Table 2. The six items designated by Fincham et al. (1989) as indicative of learned

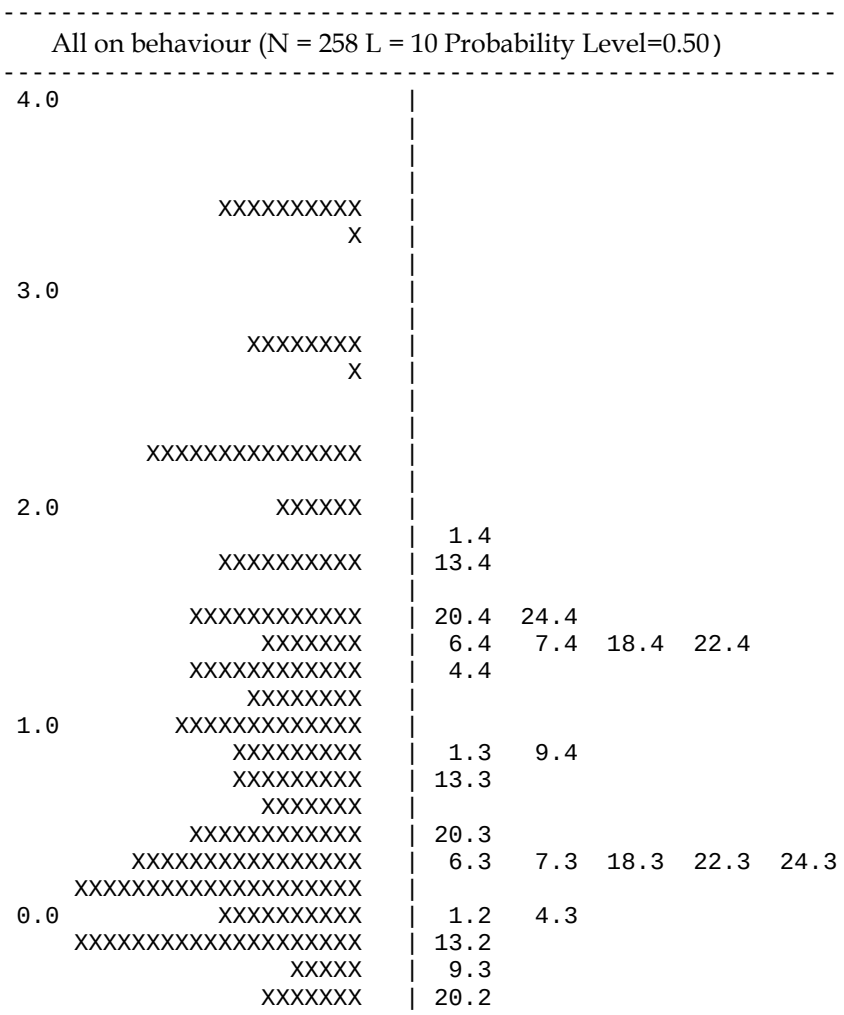
helplessness (1, 4, 6, 9, 18, 20) and four items indicative of mastery orientation (7, 13, 22, 24) are grouped in relation to the behavioural characteristics of learned helplessness and mastery orientation identified in previous research studies (Peterson et al., 1993).

Table 2
Student Behaviour Scale

Characteristics	Learned Helplessness Behaviours	Mastery Oriented Behaviours
Reaction to Failure	6 When s/he fails one part of a task, s/he looks discouraged-says s/he is certain to fail at the entire task	24 When s/he receives a poor grade, says s/he will try harder in that subject the next time
	9 Gives up when you correct him/her or find a mistake in his/her work	
Motivation	4 Takes little independent initiative; you must help him/her to get started and keep going on an assignment	7 Tries to finish assignments, even when they are difficult
	18 Does not respond with enthusiasm and pride when asked how s/he is doing on an academic task	
Persistence	20 Says things like "I can't do it" when s/he has trouble with his/her work.	22 When experiencing difficulty s/he persists for a while before asking for help
Effort	1 Prefers to do easy problems rather than hard ones	13 Prefers new and challenging problems over easy problems

Rasch-scaled teacher rating scores were estimated for each student with the 10 item *Student Behaviour Scale.* Figure 1 presents a variable map with the distribution of the student estimate scores on the left and the threshold levels of the 10 items which retain their original numbering from the SBC on the right. Numerical values on the extreme left hand side of the map which

range from -4 to+4 are expressed as a log odd unit interval or logit which is the natural unit of the Rasch scale (Beard & Pettie, 1979). As the partial credit Rasch model had been employed in these analyses, each item is depicted four times on the map with the decimal point values of 0.1, 0.2, 0.3, or 0.4 indicating the estimated thresholds between each of the five rating points which had been recoded from (1, 2, 3, 4, 5) to (0, 1, 2, 3, 4). Estimated thresholds of the items which range from -2 to +2 logits, with a mean of 0.00 and standard deviation 0.28, represent an equal probability of teacher endorsement of either of the two adjacent response categories (Curtis & Bowman, 2007).



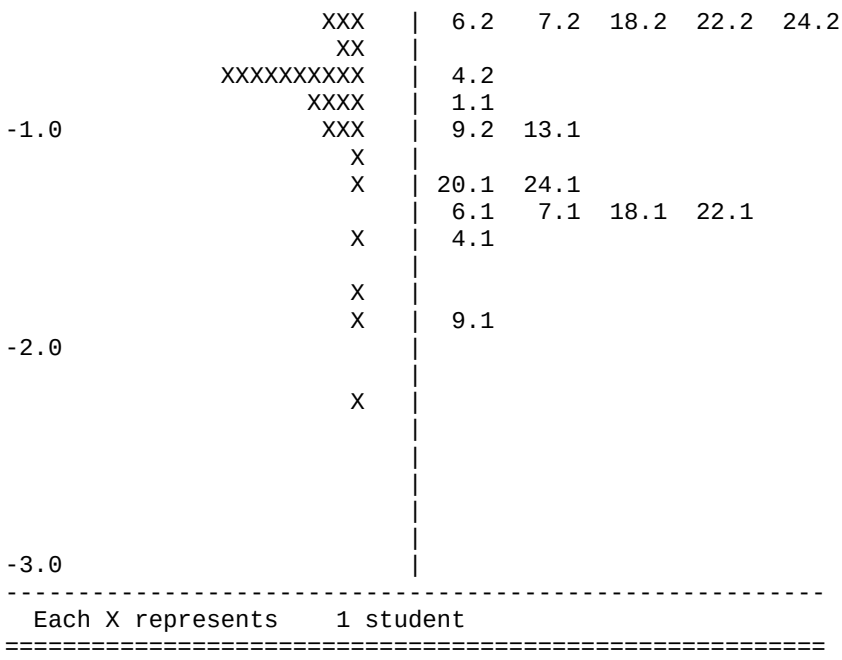


Figure 1. Map of case estimates and item estimates for the *Student Behaviour Scale*.

The advantage of the mapping of the *Student Behaviour Scale* from the Quest output presented in Figure 1 is that the partial credit model (Masters, 1988) provides valuable information as to the relationship between the estimates of student behaviour as rated by teachers and the estimates of the difficulty of the items (Doig & Groves, 2006; Griffin, 2007) measured on the same interval scale (Callingham & Bond, 2006). This information can be ascertained readily in the variable map from the distribution of the 258 students each of whom is represented by an "x" and the positions of the item thresholds along the logit scale. The height of the scale of the "x" indicates the relative academic competence of the student "x", and where students x are at the same level as the item, the academic competence of the student is equal to the difficulty of the item and the odds of the behaviour being rated by the teacher are 50:50 (Griffin, 2007). Students whose estimated scores are adjacent to clusters of items can be shown to have odds of approximately 50:50 of demonstrating the behavioural characteristics described by the items in the cluster (Griffin, 2007). Students' scores, which had a mean of 0.77 and the standard deviation 1.10 are distributed between -2.3 and +3.5 on the logit scale. Sixty of the 258 students scored below the

item mean of 0.0, with nine students in particular with scores at or below -1 logit rated by their teachers as displaying marked behavioural characteristics indicative of learned helplessness in mathematics.

In variable maps "easier" items typically are those that are more likely to be endorsed by the respondents, have negative logit values, and are presented in the lower section of the scale while "harder" items are less likely to be endorsed, have higher logit values, and are located towards the top of the scale (Doig & Groves, 2006). With the exception of item 1.1 which is positioned just above -1 logit, the lowest threshold values of 0.1 for 9 of the 10 items are located in the section of the map between -2 and -1 logits. As the coding for the learned helplessness items was reversed for the Rasch scaling, the threshold values for items 1.1, 4.1, 6.1, 9.1, 18.1, and 20.1 must be interpreted as meaning that there was a 50% chance that the behaviours described by these items would be rated by teachers as being *very true* (0) or *true* (1) of some students over the previous two to three months while the threshold values of mastery oriented items 7.1, 13.1, 22.1, and 24.1 indicate a 50% chance that teachers rated these behaviours as being (0) *not true* or 1. Similarly, items with the highest threshold of 0.4 are located further up the map, with item 9 having a threshold value slightly below +1 logit and 9 of the 10 items having logit scores between +1 and +2 logits. The threshold value of 1.4 at the top of the map indicates that the item 1 *Prefers to do easy problems rather than hard ones* is the most difficult item measuring learned helplessness for teachers to endorse as *not true,* with the item 13 immediately below it *Prefers new and challenging problems over easy ones* the most difficult mastery orientation item for teachers to endorse as *very true*.

Using the information provided by the lowest threshold values between -2.0 and -1.0 logits in Figure 1, the 10 items in the Rasch calibrated *Student Behaviour Scale* presented in Table 2 were reorganised in Table 3 to reflect the progressive order of the logit thresholds estimated from actual teacher endorsements of the passive behaviours indicative of learned helplessness that surfaced during the course of several mathematics lessons and were readily observable by teachers in the classroom. To facilitate interpretation, items with equivalent logit values have been placed within the same box in Table 3 and the mastery oriented behaviours identified as (MO) The items have been numbered progressively in the reordered *Student Behaviour Scale,* with the former SBC item number shown in brackets immediately after each new number.

Table 3
Reordered Student Behaviour Scale

1 *not true*	2	3 *somewhat or sometimes true*	4 *true*	5 *very true*

Order	**Item**	**1 2 3 4 5**
1 (9)	Gives up when you correct him/her or find a mistake in his/her work	☐☐☐☐☐
2 (4)	Takes little independent initiative; you must help him/her to get started and keep going on an assignment	☐☐☐☐☐
3 (6)	When s/he fails one part of a task, s/he looks discouraged - says s/he is certain to fail at the entire task	☐☐☐☐☐
4 (7)	Tries to finish assignments, even when they are difficult (MO)	☐☐☐☐☐
5 (18)	Does not respond with enthusiasm and pride when asked how s/he is doing on an academic task	☐☐☐☐☐
6 (22)	When experiencing difficulty s/he persists for a while before asking for help (MO)	☐☐☐☐☐
7 (20)	Says things like 'I can't do it" when s/he has trouble with his/her work	☐☐☐☐☐
8 (24)	When s/he receives a poor grade, says s/he will try harder the next time (MO)	☐☐☐☐☐
9 (13)	Prefers new and challenging problems over easy ones (MO)	☐☐☐☐☐
10 (1)	Prefers to do easy problems rather than hard ones.	☐☐☐☐☐

Discussion

The psychometrically robust, 10-item *Student Behaviour Scale* meets the need identified by Fincham et al. (1989) for a short yet cost-effective means for teachers to identify students exhibiting behaviours characteristic of learned helplessness in their mathematics classrooms. Use of the Rasch model to mathematically transform the raw ordinal data from the *Student Behaviour Scale* and produce scale-free measures of student behaviour and sample-free measures of item difficulties (Wright & Masters, 1982) is

considerably more efficacious than the calculation of a composite score from the raw data (Callingham & Bond, 2006). Threshold values of the items which represent the points in the scale at which teachers have an equal probability of endorsing either of the two adjacent rating categories (Curtis & Bowman, 2007) are ordered progressively along the scale indicating that teachers' ratings were consistent (Waugh, 1999). Further, the *Student Behaviour Scale* is well targeting as over 90% of the case scores lie in the range from -3 to +3 logits (Curtis, 2003) and the distance between the mean score of the items which is set at 0.0 by default and the case mean score of 0.77 is adequate (Curtis & Bowman, 2007). While the precision of the *Student Behaviour Scale* is greatest where most of the thresholds are located (Curtis & Bowman, 2007), the estimate scores for the 35 mastery oriented students who are located above +2 logits are less precise as there are no items above this logit. More items would need to be developed if the scale was to be used by teachers or researchers to identify students with a strong mastery orientation to learning.

Fit statistics from the Rasch analyses presented in Table 1 indicate clearly that the 10-item *Student Behaviour Scale* is internally consistent and measures a single underlying latent trait of academic competence. While a latent trait is unobservable, the item descriptors indicate the latent trait of academic competence is manifest in classrooms in student behaviours which have been identified in the research literature as being indicative of learned helplessness and mastery orientation (Peterson et al., 1993). In the reordered *Student Behaviour Scale* presented in Table 3 items 1 (9) and 3 (6) relate to changes in student cognition and emotion, countered by item 8 (24) which measures an increase or renewal of effort in response to failure, items 2 (4) and 5 (18) relate to lack of motivation with item 4 (7) as the converse, and items 10 (1) and 7 (20) relate to a reduction in behavioural agency with items 9 (13) and 6 (22) as their antitheses. The lack of enthusiasm and pride in response to teacher monitoring in item 5 (18) has been found to be a significantly different trait in optimistic and pessimistic children in relation to their reported attitudes towards mathematics (Yates, Yates, & Lippett, 1995). However, the information provided by the Rasch calibration in Figure 1 and Table 3 shows clearly that it was students' reaction to failure and lack of motivation which were the most salient behavioural characteristics of learned helplessness which teachers observed during mathematics lessons over an extended period of time in primary and lower secondary classrooms. This is a significant finding, as students' perceptions of their academic competence have been found to be critical to their adaptive functioning in the classroom (Harter, 1983), with students interpreting failure as a sign of academic incompetence (Peterson & Bossio, 1991). Data in this study were collected in the last term of the school year when most

teachers would have been very familiar with students' customary behaviours exhibited during mathematics lessons. Further, teacher ratings were gathered in the second year of the longitudinal study and were significantly predictive of student depression in the third year, which in turn was linked to their motivation and achievement in mathematics (Yates, 1998, 2000, 2004). The items in the *Student Behaviour Scale* clearly relate to the manner in which students responded to mathematics tasks and activities set by classroom teachers. It is therefore likely that these achievement related behaviours influenced students' actual achievement in mathematics, thus creating a vicious circle in which helplessness and lack of achievement were inextricably intertwined.

Implications for Teachers

The 10-item *Student Behaviour Scale* provides mathematics teachers with an efficient yet reliable interval scale for the identification of learned helplessness which can be used judiciously in primary and lower secondary classrooms. Students receiving ratings which are predominantly in the *very true* to *true* range on the six items designated by Fincham et al. (1989) as indicative of learned helplessness can be considered to be exhibiting learned helpless behaviours in mathematics that clearly warrant further consideration by teachers. While effective ways to address these characteristics have been described elsewhere (see Gentile & Monaco, 1986; Peterson et al., 1993; Marshall, 1994), the passivity engendered by learned helplessness (Peterson et al., 1993) and disaffection with learning are important considerations for all teachers if motivational equity (Covington, 1992) is to be realised. Teachers need to help students to view failure less catastrophically and teach them how to cope productively with frustration and failure (Brophy, 1998). Competitive practices in classrooms which create performance anxiety should be avoided wherever possible, since these shift students' focus from learning to competitive performance goals (Brophy, 1998). Teachers also need to demonstrate actively their own enthusiasm for learning and to project routinely positive and facilitative attitudes, beliefs, expectations, and attributions in their everyday interactions with students in the mathematics classroom.

In all curriculum areas students should be provided with a "common heritage in the reasons they learn" (Covington, 1992, p. 21) and the necessary strategies needed to learn how to learn and think, to set learning goals and to decide how to achieve them (Brookhart, 2004). In mathematics, classroom teachers not only not only want students to learn, but also to be able to enjoy and be confident about the subject (Kloosterman, 1990; Reyes, 1984), sentiments which are echoed in the goals for mathematics education in *The National Statement on Mathematics for Australian Schools* (Australian Education

Council, 1991) and other policy documents (Department of Education, Training and Employment, 1989; National Council of Teachers of Mathematics, 1991). The *Student Behaviour Scale* has the potential to be a very valuable tool for teachers and researchers as it provides them with the necessary means by which students exhibiting typical patterns of learned helplessness traits in mathematics can be identified efficiently, readily, and reliably in the classroom.

Acknowledgments

Deepfelt thanks are extended to Professor John P. Keeves and to Tilahun Mengesha Afrassa for his analysis of the *Student Behavior Checklist.* This study was supported by a Flinders University Research Board Establishment Grant.

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Appendix 1

The Student Behavior Checklist (Fincham, Hokoda, & Sanders, 1989)

Below is a list of items that describe some children's behaviour during mathematics lessons. Please consider the behaviour of the child named above over the last 2-3 months. For each item, tick the box that indicates how true that description is of the child. The meaning of the numbers is as follows:

1	2	3	4	5
not true		*somewhat or sometimes true*		*very true*

Read the items carefully, as they ask about several different aspects of the child's behaviour

		1 2 3 4 5
1	Prefers to do easy problems rather than hard ones.	□□□□□
2	Expresses enthusiasm about his/her work.	□□□□□
3	When s/he encounters an obstacle in his/her work, s/he works to overcome it.	□□□□□

4	Takes little independent initiative; you must help him/her to get started and keep going on an assignment	□□□□□
5	In general, s/he expects to do well on schoolwork (rather than expecting to do poorly and expressing surprise at each success)	□□□□□
6	When s/he fails one part of a task, s/he looks discouraged - says s/he is certain to fail at the entire task	□□□□□
7	Tries to finish assignments, even when they difficult	□□□□□
8	Makes negative or degrading comments about his/her ability when s/he performs poorly	□□□□□
9	Gives up when you correct him/her or find a mistake in his/her work	□□□□□
10	In general, attempts to do his/her work thoroughly and well, rather than just trying to get by	□□□□□
11	If asked why s/he received a poor grade, s/he is likely to say something about trying harder (e.g., "I didn't concentrate enough that time")	□□□□□
12	After failing a few problems on an academic task, s/he continues to do poorly on remaining problems even though they are within his/her ability range	□□□□□
13	Prefers new and challenging problems over easy problems	□□□□□
14	Asks for help from aides, other students, or yourself on academic tasks more than is necessary	□□□□□
15	When you point out a mistake s/he "takes it in stride", tries to correct the error, and continues to work	□□□□□
16	Can see that s/he is proud when s/he receives a good grade or when his/her work is praised	□□□□□
17	When s/he begins a difficult problem, his/her attempts are half-hearted	□□□□□
18	Does not respond with enthusiasm and pride when asked how s/he is doing on an academic task	□□□□□
19	When s/he does badly on one part of a task, s/he still expects to perform well on the rest of the task	□□□□□
20	Says things like "I can't do it" when s/he has trouble with his/her work	□□□□□

21	When given a good grade, s/he does not believe s/he really can do that subject - says, for example, that you were being nice, the problems were just easy, or s/he was lucky	□□□□□
22	When experiencing difficulty s/he persists for a while before asking for help	□□□□□
23	When s/he encounters an obstacle in schoolwork s/he gets discouraged and stops trying. S/he is easily frustrated	□□□□□
24	When s/he receives a poor grade, says s/he will try harder in that subject next time	□□□□□

Key

	Items
Learned Helplessness	1, 4, 6, 8, 9, 12, 14, 17, 18, 20, 21, 23
Mastery Orientation	2, 3, 5, 7, 10, 11, 13, 15, 16, 19, 22, 24