Coping Successfully with Dyslexia: An Initial Study of an Inclusive School-Based Resilience Programme

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A dyslexia coping programme entitled *Success and Dyslexia* was implemented in two primary schools within a whole-class coping programme and whole-school dyslexia professional development context. One hundred and two year 6 students, 23 of whom had dyslexia, undertook surveys pretest, post-test and at 1-year follow-up. Effectiveness of the coping programme and maintenance of effects for the students after transition to secondary school were investigated. Inclusion of contrast group data in the follow-up year suggested significant positive changes at first and second follow-ups in locus of control and nonproductive coping may also be associated with increase in age. Most trends were in the expected direction, especially for students with dyslexia. At follow-up, students with dyslexia reported similar perceived control and adaptive coping to students without dyslexia rather than a decrease in these areas as is usually the case. A larger sample and an ongoing control group are needed to confirm these results. Copyright © 2013 John Wiley & Sons, Ltd.

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There is increasing evidence that specific learning disabilities (SLD) including dyslexia are associated with lifelong difficulty in some academic areas (Ingesson, 2011; Nalvany, Carawan, & Rennick, 2011; Shaywitz, Morris, & Shaywitz, 2008; Stampoltzis & Polychronopoulou, 2009; Undheim, 2009) and carry risks of negative life outcomes including the following: school dropout (Deshler, 2005; Scanlon & Mellard, 2002), juvenile delinquency (Ahrens, Dubois, Lozano, & Richardson, 2010; Prior, 1996; Svetaz, Ireland, & Blum, 2000), unemployment (Waring, Prior, Sanson, & Smart, 1996), social isolation (Bryan, Burstein, & Ergul, 2004; Svetaz *et al.*, 2000; Wong & Donahue, 2002), lower self-esteem (Humphrey, 2002), depression (Ahrens *et al.*, 2010; Wilson, Armstrong, Furrie, & Walcot, 2009) and mental health problems (Bryan, 2005; Nelson and Harwood, 2011).

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Recent papers have described the significant emotional difficulties experienced by those who have dyslexia (Nalvany *et al.*, 2011; Stampoltzis & Polychronopoulou, 2009). There is evidence of the intense emotional distress, often exacerbated by bullying (Singer, 2005) experienced by many school-aged students who have dyslexia (Hellendooorn & Ruijssenaars, 2000; Nalvany *et al.*, 2011; Singer, 2005, 2007; Stampoltzis & Polychronopoulou, 2009). McNulty (2003) contends that an early experience of unexplained and unsupported failure in the crucial academic areas of reading and writing experienced by people who have dyslexia negatively affects the rest of their lives.

Students who have dyslexia are also at risk of responding to these difficulties with maladaptive coping strategies that may further exacerbate the problem. Many studies of SLD that use definitions that include dyslexia (see Method section for the dyslexia definition used for this study) have shown the risk of responses of passivity or learned helplessness (Lackaye, Margalit, Ziv, & Ziman, 2006; Núñez *et al.*, 2005; Sideridis, Morgan, Botsas, Padeliadu, & Fuchs, 2006), avoidance (Singer, 2007), disruptive behaviour (Bender, 1987; Chan & Dally, 2000; Prior, 1996) and social withdrawal (Bryan, 2005; Forness & Kavale, 1996; Kotzer & Margalit, 2007; Pearl, 2002; Wong & Donahue, 2002).

Importantly, however, adaptive coping has been found to be a better predictor of life success than the extent of SLD/dyslexia (Goldberg, Higgins, Raskind, & Herman, 2003; Margalit, 2003). Studies of these successful adults indicate that they used adaptive coping skills to deal with their difficulties. In particular, they were aware of their dyslexia but not defined by it, they were proactive, set goals, learned how to cope with frustration and to persevere in the face of difficulty, and how to access appropriate help and to be flexible in finding ways around obstacles (Goldberg *et al.*, 2003; Hellendooorn & Ruijssenaars, 2000; Madaus, Zhao, & Ruban, 2008; Nalvany *et al.*, 2011).

Adults who have dyslexia have expressed anger that they were not assisted at school in coping with their situation (Rodis, Garrod, & Boscardin, 2001; Nalvany *et al.*, 2011). Young people have also asked for this kind of support (Raskind, Margalit, & Higgins, 2006). There is a growing recognition therefore of an urgent need to develop ways to give emotional support to these young people and to assist them to develop adaptive coping resources (Humphrey, 2002; Margalit, 2003; McGrady, Lerner, & Boscardin, 2001; McNamara & Willoughby, 2010; Nalvany *et al.*, 2011; Raskind, Goldberg, Higgins, & Herman, 2002; Reiff, Ginsberg, & Gerber, 1995; Rodis *et al.*, 2001; Singer, 2007; Westwood, 2008) and to do so before lifelong, maladaptive coping patterns are established (McNulty, 2003; Raskind, Goldberg, Higgins, & Herman, 1999).

Three studies in this area have yielded encouraging initial results. Kotzer and Margalit (2007) implemented a programme for adolescents who had SLD/dyslexia that comprised online awareness and communication skills supported by self-advocacy activities at the students' schools. Year 8 students who undertook the programme reported increased competence compared with the control group. Haydicky (2009) found that a programme of mindfulness and martial arts for adolescents who had SLD/dyslexia was associated with decreased externalizing behaviours and decreased anxiety. Firth, Frydenberg, and Greaves (2008) trialled a programme for lower secondary level adolescents who had SLD/dyslexia that taught strategies of challenging negative self-talk, assertiveness training, problem solving and goal setting, all specifically in relation to coping adaptively with dyslexia.

Findings included increased perceived control and productive coping strategies for students who had undertaken the coping programme compared with a control group.

A number of studies including a systematic review of school mental health promotion initiatives suggest however that for maximum impact and sustainability, mental health interventions need to be broader than the curriculum and to focus also on the whole-school environment (Bond, Glover, Godfrey, Butler, & Patton, 2001; Devaney *et al*, 2006; Firth *et al*., 2008; Greenberg *et al*., 2003; Wells, Barlow, & Stewart-Brown, 2003). Dyslexia-friendly school environments are examples of this approach and are therefore recommended by some researchers in addition to targeted mental health programmes (Firth *et al*., 2008; Humphrey, 2002). Humphrey found that children attending units for students with SLD, where staff were dyslexia aware and supportive, had higher self-esteem than students who had dyslexia and were in mainstream schools. The students at the units also reported feeling isolated and excluded when they were in the mainstream setting. Dyslexia-friendly mainstream schools as promoted by the British Dyslexia Association (BDA) involve a policy outlining appropriate practice at four levels: school leadership, teaching and learning, classroom environment and partnership with parents and students. The policy includes initiatives such as teacher training in dyslexia awareness and support, systematic dyslexia screening and classroom practice such as nonprint-based access to curriculum and means of expression. For a complete description, see Riddick, 2006 or the BDA site: http://www.bdadyslexia.org.uk/quality-mark-and-accreditation.html. Dyslexia-friendly schools are widespread in the UK (Rose, 2009). Initial evaluation of these schools has been encouraging. Measures have included numbers of expulsions, tribunal hearings and phone calls from concerned parents, and interviews with students, but there is a need for more detailed data over an extended period (Riddick, 2006).

The current study builds on the findings of the study of Firth *et al*. (2008). To introduce the programme at an optimum time and counter the increase in school disengagement that can accelerate in the early secondary school years (Russell, 2003), the coping programme was introduced in the last year of primary school rather than in the early secondary school years. Additionally, to increase the priority given to the programme within the school and its sustainability (Bond *et al*., 2001; Firth *et al*., 2008; Greenberg *et al*., 2003), it was embedded within a universal coping programme and within a model of dyslexia-friendly whole-school change.

The study involved both qualitative and quantitative methods and associated research questions. This paper reports on the quantitative findings from the project. Qualitative outcomes regarding sustainability of the intervention have been reported (Firth, Frydenberg, & Bond, 2012). The research questions reported in this paper are as follows:

(1) Is there confirmation of a difference at baseline in well-being, perceived control and coping styles and strategies between young adolescent students who have dyslexia and those who do not have dyslexia?
(2) Do students (both those with and without dyslexia) in the intervention schools report increased well-being, perceived control and adaptive coping gains?
(3) Is any increase in well-being, sense of control and adaptive coping strategies maintained to transition to secondary schools for students (both those with and without dyslexia)?

(4) Do students (both those with and without dyslexia) in the intervention group at follow-up report increased well-being, perceived control and adaptive coping gains compared with students (both those with and without dyslexia) in the follow-up contrast group?

METHOD

Participants

Two government-funded co-educational primary schools (with approximately 650 students in each school) agreed to participate in the study. The schools were regional schools about 40 km on the western side of Melbourne in the state of Victoria, Australia. Approximately a third of the students in both schools received a government-funded education maintenance allowance that is assessed on family income level, and both schools had weekly individual specialist support for some students in literacy or maths. One hundred and two of a total of 157 year 6 students and their parents consented to participate. Student ages ranged from 10 to 11 years (mean age was 10.6). Forty-six students were male, and 56 were female. Following screening/testing, 23 students were classified as having dyslexia (8 female, 15 male). Teachers reported that the students were primarily Australian-born and of Anglo/European background. Year 6 class teachers taught the universal component of the coping programme to all students, and teachers who were interested and available taught the dyslexia component.

Because of funding constraints, it was not possible to include a control group throughout the study, but after the intervention and during the follow-up year, a grant enabled the recruitment of a contrast group of 39 students (see Wilkinson, Task Force on Statistical Inference, & APA Board of Scientific Affairs, 1999 regarding contrast group terminology and use). These students were from four secondary schools that were close to the primary schools and were attended also by many of the students who had completed the intervention the previous year. Students in this contrast group had not attended either of the primary schools where the programme had been implemented. Twenty-three students were girls, and 16 were boys. Of this group, 10 students were assessed as having dyslexia. Students and their parents in this group were primarily Australian-born and of Anglo/European background. Of the 10 students who had dyslexia in the contrast group, four were male, and six were female.

Dyslexia screening
The definition of dyslexia used in the study was based on Australian definitions recorded by the recent National Dyslexia Working Party (2010), the National Health and Medical Research Council (1990) definition of learning disabilities and the definition of SLD used by the Australian Temperament Project (Prior, 1996). According to these definitions, students who have SLD/dyslexia have neurological processing problems that are likely to be genetically based and lifelong, and are highly resistant to change despite excellent teaching. Because these problems are independent of intelligence, they may be experienced by students at all levels including those who are gifted. These students have significant difficulty (e.g. are 2 years or more below expected level for age) with reading, spelling or mathematics and have

associated processing problems such as difficulty with phonic analysis or auditory short-term memory. Their difficulties are not caused by intellectual disability, visual or hearing problems, Aspergers syndrome, lack of opportunity or emotional difficulties unrelated to dyslexia.

Selection into the dyslexia group in this study was therefore on the basis of scores 2 or more years below chronological age in reading or spelling. Students were excluded from the dyslexia group if their literacy difficulty was related to intellectual disability (an IQ score lower than 80), learning English as a new language, lack of educational opportunity, hearing or vision difficulties or diagnoses such as Aspergers syndrome.

The researcher consulted student files to ascertain previously documented dyslexia diagnosis and to check the presence of the aforementioned listed exclusions. Results of the *Wechsler Intelligence Test for Children* (Wechsler, 1991) were available through school records for some students, and these were used to exclude students who may have intellectual disability.

Each school also conducted annual normed literacy tests that were used to ascertain literacy levels of the students (e.g. *the Single Word Spelling Test*, Socre & Masterson, 2001; *the Progressive Achievement Test in Reading*, ACER, 2003). The study was not concerned with investigating literacy acquisition or dyslexia diagnosis per se but with an intervention that may change students' attitudes to their experience of dyslexia. Results from different normed literacy tests were therefore accepted.

Where dyslexia was suspected because of the aforementioned tests but the student had not already been assessed by a psychologist, the researcher assessed these students using normed spelling and reading tests (e.g. *the South Australian Spelling Test*, Westwood, 1999; *the Neale Analysis of Reading Ability*, Neale, 1999), The Wechsler Intelligence Test for Children (Wechsler, 1991) and the *Kaufman Brief Intelligence Test* (Kaufman and Kaufman, 1996). Systematic dyslexia diagnosis is not part of state school procedure in Australia. The researcher therefore undertook full or partial assessment of about two-thirds of the students. Of the 102 students, 23 were assessed as having dyslexia, 10 in one school and 13 in the other.

The Intervention

A withdrawal coping programme for year 6 students who had dyslexia was nested within a classroom coping programme involving all year 6 students, which in turn nested within whole-school dyslexia professional development and change. This inclusive model of whole-school change rather than that of a stand-alone programme for a particular target group has been shown to promote the priority and resources needed to ensure implementation fidelity and sustainability of mental health in schools programmes (Bond *et al.*, 2001).

Whole-school dyslexia professional development and change
The whole-school component comprised a minimum of 2-h professional development about dyslexia for all school staff. Topics for professional development included defining, diagnosis and support strategies for students who have dyslexia. A team of leading teachers and the school principal then developed a dyslexia support action plan for the school. The model of dyslexia-friendly whole-school support is little known in Australia, and schools who took part in the research

were unfamiliar with this model. A researcher visited the schools at least fortnightly to provide ongoing professional development, facilitate an environment for teacher reflection on effective support of students with dyslexia in school policy and programmes, maintain project momentum (Butler, Bond, Glover, & Patton, 2002; Glover & Butler, 2004) and monitor programme implementation. These visits continued over a period of a year during the implementation of the universal and intensive dyslexia component of the coping programme. The researcher had a background of extensive experience in working with teachers and with students who had dyslexia.

Universal classroom coping programme

A 10-session universal coping programme was provided to all year 6 students, including those who had dyslexia, at both schools during regular class time. The programme was run over 12 weeks beginning at the end of term one (April). This programme was based on cognitive behavioural therapy principles and involved awareness of current coping strategies, use of positive thinking, assertion, goal setting and problem solving. In the programme, students initially developed awareness of their current coping style by completing the *Adolescent Coping Scale* (Frydenberg & Lewis, 1993). This scale yields an individual coping profile for each student and thus provides a basis on which to make future decisions about coping choices. Students were then encouraged to use active, productive coping strategies such as thinking positively, persevering and working directly on the problem in preference to strategies such as self-blame, giving up and ignoring the problem. Personal goals, one of which related to academic work, were chosen by the students, and they were encouraged to use coping strategies that were likely to lead to achievement of these goals. Next, students were taught positive cognitive restructuring strategies. These included recognition of the link between thought and feeling, avoiding overgeneralizing difficulty into the future or across domains and replacing negative self-talk with more realistic and empowering self-talk. The inclusion of positive cognitive restructuring was expected to counter negative global attributions associated with learning disabilities and learned helplessness. Similar positive thinking programmes have been shown to be effective in changing negative attributional thinking (Cunningham & Walker, 1999; Roberts, Brown, Johnson, & Reinke, 2003). The final assertion component of the programme involved activities to develop awareness of the differences between assertion, aggression, and passivity, and role playing assertive verbal responses and assertive body language. Taking control was found to be a key strategy used by successful people who had SLD/dyslexia (Raskind, Goldberg, Higgins, & Herman, 1999). Assertiveness programmes have been found to be effective in increasing internal locus of control orientation (Waksman, 1984) and assertion skills of adolescent students (Wise, Bundy, Bundy, & Wise, 1991). An assertiveness programme designed specifically for access by students who have SLD/dyslexia has also been successfully trialled with students who had SLD/dyslexia (Firth, 2001).

Class teachers were encouraged to reinforce skills and strategies in the regular year 6 classroom environment with all students, including those who had dyslexia. To increase student motivation and opportunity for generalization, the programme was centred on goals individually set by students and included behavioural activities such as role plays. Print content was kept to a minimum and replaced by drawing, discussion, acting or handouts that contained only a few keywords.

Withdrawal dyslexia coping programme

The 10 (minimum) concurrent, additional withdrawal sessions held for students with dyslexia focused all these coping strategies onto dyslexia-related situations and included role modelling by successful adults who have dyslexia. It also included direct teaching of the efficacy of taking control in the face of dyslexia, development of individual awareness of current coping approaches to having dyslexia, opportunities for individual investigation of dyslexia, discussion of dyslexia-related issues in a supportive group and individualized support for a dyslexia-related goal. These students received both the universal and withdrawal sessions of the programme.

Programme structure

The structure of the universal and dyslexia support components of the programme involved the aforementioned core mandatory segment of content and process for each session with reinforcement activities that could be chosen and adapted to meet individual school and student needs. Examples of reinforcement activities included the following: blowing up a balloon, writing on it a negative thought and jumping on the balloon; inviting a speaker who has dyslexia to speak to the students/teachers/parents; being a mentor for a younger student who has dyslexia; making a Snakes and Ladders game using positive and negative coping strategies; making an advertisement for clever coping; videoing role plays; and sharing and discussing related stories, art, poems and films.

Both the universal and dyslexia support components of the programme incorporated best practice instruction for students who have SLD including dyslexia. These are explicit instruction (Purdie & Ellis, 2005; Westwood, 2001), teaching of strategies (Deshler, 2005; Gresham, 1998; Meltzer *et al.*, 2004; Vaughn, Gersten, & Chard, 2000), clear structure, opportunity for intensive revision, opportunity for generalization of skills (Borkowski & Muthukrishna, 1992; Gresham, 1998; Westwood, 2001), emphasis on student motivation (Gresham, 1998) and print-free mediums (Firth, 2001). Content and sequencing is summarized in Figure 1. See also the published programme (Firth & Frydenberg, 2011) for further details regarding content and process.

Procedure

The universal coping programme component and the concurrent, additional dyslexia support component each involved ten 50-min lessons over a period of 11 weeks. Year 6 class teachers delivered the universal component of the coping programme to all year 6 students, including those with dyslexia, in each of the schools. This programme was implemented during normal class time. The dyslexia support component was taught in a withdrawal situation during school time by an assistant principal in one school and by a leading teacher in the other school. Both teachers were highly experienced but neither had special education qualifications or training. The teachers for both the universal and dyslexia components participated in professional development sessions of approximately 2-h duration, and teachers were provided with a manual. Teachers were also given on-site fortnightly support during the 10-week intervention period by a researcher who had a background of extensive experience in working with teachers and with students who had dyslexia.

Content of the coping program

SESSION	TITLE	CONTENT SUMMARY
1	**What is Coping**	Meaning of stress and coping.
2	**How Do You Cope?**	The *Adolescent Coping Scale* (Frydenberg, E. & Lewis, 1993).
3	**Your Coping Profile**	Coping strategies and styles - individual profile graphs.
4	**What's Your Goal?**	Setting personal goals.
5	**Choose Clever Coping**	Coping strategies that may be non- productive (self-blame, worry, not coping) and alternative productive strategies (physical exercise, relaxation).
6	**Choose Powerful Thoughts**	Positive cognitive reframing. Disputing negative thoughts.
7	**Problem Solving**	Problem solving steps.
8	**Why Be Assertive?**	The meaning of assertion.
9	**Assertive Language**	Assertive verbal responses.
10	**Assertive Body Messages**	Assertive body language.

Figure 1. Content of the coping programme.

Evaluation

Procedure

Students completed surveys regarding perceived control, coping, well-being and school engagement before the intervention ($t0$) and twice after programme completion. First follow-up was after programme completion ($t1$) and second follow-up was 12 months later after transition to secondary school ($t2$). All test and questionnaire items were read aloud to the students.

Instruments

The perceived control measures. The perceived control measures used in this study were *The Locus of Control Scale for Children* (Nowicki & Strickland, 1973) and the *Arc Self-Determination Scale* (Wehmeyer, 1996). The Locus of Control Scale for Children measures the extent to which a child feels they have control over their lives (internal locus of control) as distinct from being controlled by external circumstances (external locus of control). Each item involves a statement (e.g. 'Do you believe that if somebody studies hard enough he or she can pass any subject?'). The scale has been widely used (Mamlin, Harris, & Case, 2001; Richardson, Bergen, Martin, Roeger, & Allison, 2005) and is amenable to change in response to programmes for students who have learning disabilities (e.g. Firth *et al.*, 2008; Gomez, 1997). Responses take the form of a choice between yes and no. Higher scores indicate more external locus of control. The Cronbach's

alpha in the current study increased over the three data collection times from 0.57 at pretest to 0.67 at post-test and to 0.70 at follow-up.

The perceived control section of the *Arc Determination Scale* (Wehmeyer, 1996) involves 14 items that measure self-determination or the feeling of being in control. Items elicit choices between two alternative statements that respondent feels best describes them (e.g. 'I usually do what my friends want me to' or 'I tell my friends if they are doing something I don't want to do'). The scale was developed for and has been used extensively by students who have learning disabilities (Wehmeyer, 1996). The Cronbach's alpha of the scale in this study was 0.69 at baseline, 0.80 at post-test and 0.78 at follow-up.

The coping measure. Coping in this study refers to the behavioural and cognitive efforts used by individuals to manage the demands of a person–environment relationship (Frydenberg, 2008)

Coping responses were measured using the 50 productive and nonproductive coping items (general version) from the Adolescent Coping Scale (Frydenberg & Lewis, 1993) that were modified for use with younger children and have been successfully used in this form with young adolescents in Australian schools (Jones & Frydenberg, 2004). The general version relates to how a participant deals with concerns in general, and the specific version requires participants to focus on a particular concern. There is usually similarity in outcome regardless of the use of general and specific versions of the scale (Frydenberg & Lewis, 1999). Productive coping strategies included in the scale are working hard, working at solving the problem, relaxing, keeping fit and healthy, and thinking positively. Nonproductive coping strategies are ignoring the problem, self-blame, not having a way of coping and tension-reduction activities such as crying, worrying, keeping problems to oneself and wishful thinking. Each item consisted of a statement (e.g. 'Try to work out what the problem is'). Responses involve choosing between three options of *never*, *sometimes* and *often*. In this study, the Cronbach's alpha was 0.80 at baseline, 0.85 at post-test and 0.79 at follow-up.

Measures of well-being and school engagement. Well-being was measured using 12 items of the *Reynolds Adolescent Adjustment Screening Inventory* (Reynolds, 2001). Each item involved a statement and a choice of how true the statement was for the respondent (e.g. 'I had fun with friends'). These items are scored on a scale of 1–3. Higher scores indicate lower well-being. The Cronbach's alpha for the scale was 0.82 at baseline, 0.80 at post-test and 0.83 at follow-up.

School engagement was measured using 10 items from the *Social Questionnaire for Secondary Students* (DEET, Victoria, 2000), a survey that measures how students feel about their time at school. Each item consists of a statement (e.g. 'I like school'), and responses are on a 1–3 scale with 3 representing the highest level of school engagement. The Cronbach's alpha of the scale was 0.88 at baseline, 0.86 at post-test and 0.86 at follow-up.

Data analysis

For any scale for which a participant had missed an item, the value of their response to that item was imputed using their mean score on other items in the scale. If more than 10% of items were missing from a scale response, it was not

included. Missing responses could occur if a participant chose not to respond or responded in a way that was not able to be understood. Comparisons between the groups with and without dyslexia were conducted using two-way ANOVA looking at the main effect for group (dyslexia or not) and time effect, across the three periods (pretest ($t0$), post-test ($t1$) and 12-month follow-up ($t2$)). Interaction effects between the main effects of group and time were examined (i.e. to determine if the rate of change in one group was different from another group over time). At the second follow-up, comparisons between groups with and without dyslexia were made between the students who had received the intervention and a contrast group of students who had not received the intervention, using two-way ANOVA. Again, likely interactions between the main effects of group and time were examined.

RESULTS

Primary School Intervention Group: Comparison Between Students with and without Dyslexia at Baseline ($t0$) and Post-Intervention ($t1$) and at 1-Year Follow-up ($t2$)

Contrary to our expectations, there were no significant differences between students with and without dyslexia on any measures at baseline. Table 1 shows the mean scores for each period for the perceived control, coping, well-being and school engagement for students with and without dyslexia who received the intervention. There was a significant and sustained improvement in locus of control for all students. Students who had and those who did not have dyslexia improved on average by about three points. There were significant reductions in nonproductive coping for both groups following the intervention at post-test ($t1$) and follow-up ($t2$) data collections (i.e. both groups improved over time). There was however no significant difference between the two groups and no statistically significant interaction effects (data not shown). That is, the rate of improvement or decline in any of the measures did not differ between the groups over the periods.

School connectedness decreased over time for both students with and without dyslexia. This is not unexpected: school connectedness usually decreases over time at this age level (Bond et al., 2007). There were no interaction effects (data not shown) indicating that for both intervention groups (students who had and did not have dyslexia), decrease in connectedness was similar.

Transition to Secondary School: Comparison of Intervention and Contrast Group Participants at Follow-up Data Collection ($t2$)

Table 2 shows the mean scores between the intervention students and the contrast group on follow-up after transition to year 7 ($t2$). The mean scores for the students with dyslexia in the contrast group were *worse* for all outcomes, although none of the differences were statistically significant. There was a marginally significant effect ($p = 0.07$) for well-being (the contrast group scoring higher, i.e. less well-being, than the intervention groups). Again, there were no significant interaction effects ($p > 0.1$, details not shown).

Table 1. Comparison of intervention students with and without dyslexia at pretest (*t0*), post-test (*t1*) and follow-up (*t2*)

	Non-dyslexia n = 79*		Dyslexia n = 23*		Time	Dyslexia/ non-dyslexia
	Mean	(SD)	mean	(SD)	*p*	*p*
Locus of control						
t0	18.30	(4.88)	17.71	(4.23)		
t1	16.49	(4.78)	17.00	(5.08)		
t2	15.25	(5.36)	14.32	(4.11)	<0.001	0.735
Arc perceived control						
t0	11.20	(2.41)	10.78	(3.00)		
t1	11.29	(2.82)	11.65	(2.66)		
t2	11.55	(3.20)	12.16	(2.22)	0.157	0.872
Productive coping						
t0	2.42	(0.30)	2.46	(0.30)		
t1	2.46	(0.23)	2.45	(0.29)		
t2	2.44	(0.21)	2.44	(0.19)	0.754	0.984
Nonproductive coping						
t0	1.89	(0.22)	1.95	(0.30)		
t1	1.82	(0.26)	1.88	(0.32)		
t2	1.80	(0.26)	1.83	(0.23)	0.015	0.150
Well-being						
t0	18.30	(4.39)	18.00	(4.35)		
t1	17.92	(4.03)	18.33	(4.29)		
t2	17.90	(4.53)	17.53	(3.36)	0.498	0.889
School connectedness						
t0	25.61	(4.38)	24.26	(4.36)		
t1	24.96	(3.99)	24.72	(4.29)		
t2	22.80	(4.56)	23.47	(4.14)	<0.001	0.480

SD, standard deviation.
*Note at *t2* numbers were 69 and 19, respectively.

DISCUSSION

Baseline comparisons between students who had dyslexia and those who did not indicated no significant difference on perceived control, coping, well-being and school connection. This result is of interest as studies have shown differences between these populations at secondary school level with students with dyslexia having more external locus of control and less adaptive coping (Firth, Frydenberg, & Greaves, 2008; Lackaye *et al.*, 2006; Wehmeyer & Kelchener, 1996). There have been few, if any, studies involving these variables for younger students who have dyslexia. It is possible therefore that students who have dyslexia do not develop less adaptive coping strategies and a more external sense of control until they reach the more challenging environment of secondary school. Interventions at this earlier age may therefore be particularly timely in assisting these students to avoid developing such responses. Indeed it appears that this may have occurred in the study. At follow-up in year 7, the students who had dyslexia and had received the intervention had similar profiles with regard to school connectedness and happiness to those who did not have dyslexia, and they had higher well-being than the students in the contrast group who had dyslexia but who had not received the intervention.

Table 2. Comparison of intervention and contrast group students in secondary school (*t2*)

| | Intervention group | | | | Contrast group | | | | | |
| | Non-dyslexia n = 69 | | Dyslexia n = 19 | | Non-dyslexia n = 30 | | Dyslexia n = 9 | | Group p-value | Dyslexia p-value |
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)		
Locus of control	15.25	(5.36)	14.32	(4.11)	16.00	(4.68)	17.22	(4.52)	0.198	0.817
Arc perceived control	11.55	(3.20)	12.16	(2.22)	12.17	(2.45)	10.78	(3.03)	0.769	0.967
Productive coping	2.44	(0.21)	2.44	(0.19)	2.40	(0.26)	2.33	(0.22)	0.161	0.722
Nonproductive coping	1.80	(0.26)	1.83	(0.23)	1.84	(0.23)	1.99	(0.18)	0.153	0.218
Well-being	17.90	(4.53)	17.53	(3.36)	19.07	(4.23)	20.11	(4.04)	0.070	0.930
School connectedness	22.80	(4.56)	23.47	(4.14)	23.87	(3.51)	21.44	(3.00)	0.650	0.730

SD, standard deviation.

Post-programme results also indicated that there was a reduction in nonproductive coping strategies for both students with and without dyslexia who received the intervention, with the students who had dyslexia achieving greater reductions and more internal locus of control. We found similar results for the contrast group which suggests that these positive changes at both post-test and follow-up in locus of control and nonproductive coping may also be due in part to an increase in age. However, the greater reduction in nonproductive coping and more internal locus of control by the students in the intervention group who had dyslexia is of interest as it is contrary to previous studies of students at this age who have SLD/dyslexia and who have not had assistance with coping with their situation (Firth *et al.*, 2008; Lackaye *et al.*, 2006; Wehmeyer & Kelchener, 1996). It suggests that the coping programme may have particularly assisted these students to feel they had more control over their situation and feel less likely to use maladaptive responses such as giving up or worrying in response to their difficulties.

After the transition to secondary school, the students in the intervention group who had dyslexia reported similar perceived control and adaptive coping to students without dyslexia in the intervention group rather than a decrease in these areas as has previously been reported (Firth *et al.*, 2008, 2010; Lackaye *et al.*, 2006; Mamlin *et al.*, 2001; Wehmeyer & Kelchener, 1996). Although not statistically significant, trends for perceived control and productive coping for students in the intervention group were also all in the expected direction and were maintained across the three collection periods, especially for the students with dyslexia. This increase in perceived control and adaptive coping is similar to those of the Firth *et al.* (2008) study. That study of lower secondary school students who had SLD/dyslexia who undertook a coping programme showed a statistically significant increase for perceived control and productive coping compared with the control group who had SLD/dyslexia.

Limitations

Although it is encouraging to see that the students who had dyslexia in the intervention group made and maintained similar gains to the students who did not have dyslexia, and appeared to be doing better than the students in the contrast group who had dyslexia, this was a small trial and was not sufficiently powered to assess differences in outcomes. Attrition for the students who received the intervention was very low at the post-test, and reasonably low for follow-up on transition to secondary school (10 children without dyslexia and 4 children with dyslexia), but this loss further reduced the power to detect statistically significant differences. A larger sample and a control group identified at baseline rather than a contrast group in the follow-up year would have allowed ongoing comparison throughout the study rather than only at the follow-up stage. It would also have allowed the awareness of when and if students in the control group who had dyslexia began to develop difficulty with their coping and would have thus strengthened the outcome of the study. Other covariates such as family support may also need to be included. Family support is likely to also influence outcomes for perceived control and coping responses used by students, including those who have dyslexia.

These results rely only on student report. The qualitative data however included teacher reports and interviews, school documents and surveys. This qualitative data provides support for the quantitative results in that it presents

mostly positive feedback about the effect of the intervention, particularly for the students who had dyslexia (Firth *et al.*, 2012).

The intervention was also a complex one, and it is neither possible with our study design to ascertain whether particular aspects were powerful nor whether the combination of all its elements was necessary. However, we would argue that the intensive, longer version of the programme for the SLD students was a crucial aspect of the programme.

The influence of the dyslexia-friendly whole-school change environment may also have been a crucial element. The qualitative data reported on aspects of the intervention model that appeared to improve implementation with particular investigation of the nested, inclusive model used and the sustainability of the intervention. Both schools successfully implemented the programme and continue to use components of the programme. One school has continued to develop its dyslexia-friendly practice (Firth *et al.*, 2012) and is becoming a satellite school for others in Australia.

Implications for practice

Given the limitations of this study, we need to be cautious about drawing firm conclusions regarding the effectiveness of the intervention. Ideally, a large-scale randomized controlled trial would be required to extend and confirm these findings. The aforementioned trialled coping programme has been published (Firth & Frydenberg, 2011) and is available for use by teachers. Included in the manual is a recommendation regarding inclusion of an evaluation component in each implementation as well as some evaluation guidelines for teachers.

We believe this study makes a contribution to the investigation of how to best assist young people who have dyslexia to develop critically important adaptive coping responses. That there is such a need is no longer in doubt (Nalvany *et al.*, 2011; Singer, 2007). In addition to assistance with literacy and numeracy, programmes that focus on young people's resilience and well-being need to be an integral part of support for students who have dyslexia and need to occur within a dyslexia-friendly environment.

Such targeted adaptive coping programmes and environmental supports can give students with dyslexia more access to opportunities to use their frequently high abilities, to feel included and in control, and to lead productive and happy lives.

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