TEACHER TRAINING IN A PROACTIVE APPROACH TO CLASSROOM BEHAVIOUR MANAGEMENT: TEACHER AND STUDENT OUTCOMES

by

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The present study was undertaken to evaluate the effectiveness and impact of a brief teacher training program in proactive classroom management (PCM), on both teacher and student outcomes. The teacher training program was conducted in a large, inner city public school and was designed as an efficient and cost-effective approach to assisting school personnel in the prevention of off-task and disruptive student behavior. Four groups of teachers (N=16) participated in a single, 4-hour workshop that focused on didactic and performance-based training of such PCM procedures as building rapport, priming for transitions, scaffolding for success, building child tolerance to classroom stressors and teaching replacement behaviours. The program was implemented using a multiple baseline design across groups of teachers. Data were collected through classroom observations of teacher skill implementation and student behaviour (two students in each classroom who presented with behavioural challenges were observed), as well as pre and post self-report rating scale measures of teacher attributions and perceptions and student behaviour. Visual and statistical analyses of group and overall teacher data revealed significant increases in the use of reinforcement and antecedent strategies, reported use of rewards as an intervention strategy, reported levels of confidence in their ability to manage student misbehaviour, and a shift in teachers’ views of student misbehaviour as being more temporary rather than chronic. Significant decreases in teacher reactive responses and reported levels of student inattention and overactivity were also demonstrated. With respect to students, visual and statistical analyses of group and overall data revealed increases in student
on-task non-disruptive behaviour and reported levels of self-reliance. Student disruptive and off-
task behaviour were significantly reduced. Despite several limitations, the results of the present
study demonstrate that student problem behaviour can be efficiently and effectively managed in
the classroom without the use of reactive strategies.
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Table of Contents

Abstract ................................................................................................................................. ii

Acknowledgements ........................................................................................................... iv

Table of Contents ............................................................................................................. v

List of Tables ..................................................................................................................... viii

List of Figures ................................................................................................................... ix

List of Appendices .......................................................................................................... xiv

Introduction ....................................................................................................................... 1

The Impact of Public Pressure and Legislation On Behaviour Management In the Schools 2

Demographics of Disruptive Behaviour in Schools .............................................................. 3

Classification and frequency of disruptive behaviour ....................................................... 4

School characteristics ........................................................................................................ 4

Student characteristics ..................................................................................................... 5

Classroom environment .................................................................................................... 5

The Impact of Disruptive Behaviour Problems on Child Outcomes ................................. 6

The Impact of Disruptive Behaviour Problems on Teachers ............................................ 7

Teacher-Student Relationships and Student Well-Being ............................................... 8

Teachers’ Knowledge of Classroom Behaviour Management .......................................... 9

Teachers’ Attributions and Perceptions About Student Disruptive Behaviour ................ 11

Commonly Used Classroom Behaviour Management Strategies .................................. 12

Reactive Classroom Discipline Techniques ..................................................................... 13

Reprimands ....................................................................................................................... 13

Response cost ................................................................................................................... 14

Time-out ............................................................................................................................ 15

Suspensions ...................................................................................................................... 15

General disadvantages and limitations associated with punitive strategies ..................... 16

Proactive Classroom Behaviour Management .................................................................. 17

A Conceptual Model of Proactive Behaviour Management ................................................ 17

Moderating strategies ....................................................................................................... 18

Stimulus control procedures .......................................................................................... 18

Ecological approaches .................................................................................................... 19

Rapport building ................................................................................................................ 19

Remedial strategies .......................................................................................................... 20

Functional equivalence .................................................................................................... 20

Errorless remediation ...................................................................................................... 21

Praise as a Reinforcement Strategy in Proactive Behaviour Management ......................... 23

School–Wide Positive Behavior Support ......................................................................... 25

Interventions In Public School Systems .......................................................................... 28

In-Service Teacher Training ......................................................................................... 29

Critical Components of In-Service Teacher Training ...................................................... 30

Use of performance-based strategies .............................................................................. 30
List of Tables

Table 1. Participant Teachers’ and Students’ Grade/Program and Gender: Groups 1 and 2 ................................................................. 37
Table 2. Participant Teachers’ and Students’ Grade/Program and Gender: Groups 3 and 4 ............................................................................ 38
Table 3. Descriptive Statistics and Results of Wilcoxon Signed Rank Test for Teacher Questionnaires .................................................. 112
Table 4. Descriptive Statistics and Results of Wilcoxon Signed Rank Test for Student Questionnaire .................................................. 119
List of Figures

Figure 1. Teacher frequency of reinforcement per session across all study phases for Group 1 ................................................................. 56

Figure 2. Teacher frequency of reinforcement per session across all study phases for Group 2 ........................................................................ 57

Figure 3. Teacher frequency of reinforcement per session across all study phases for Group 3 and Group 4 .......................................................... 58

Figure 4. Group mean frequency of reinforcement per session across all study phases ................................................................. 59

Figure 5. Distribution of the mean frequency of reinforcement during baseline, post-training, and follow-up .......................................................... 60

Figure 6. Teacher frequency of antecedent behaviours per session across all study phases for Group 1 ................................................................. 62

Figure 7. Teacher frequency of antecedent behaviours per session across all study phases for Group 2 ........................................................................ 63

Figure 8. Teacher frequency of antecedent behaviours per session across all study phases for Groups 3 and 4 .......................................................... 64

Figure 9. Group mean frequency of antecedent behaviours per session across all study phases ........................................................................ 65

Figure 10. Distribution of the mean frequency of antecedent behaviours during baseline, post-training, and follow-up .......................................................... 66

Figure 11. Teacher frequency of reactive responses per session across all study phases for Group 1 ........................................................................ 68

Figure 12. Teacher frequency of reactive responses per session across all study phases for Group 2 ........................................................................ 69

Figure 13. Teacher frequency of reactive responses per session across all study phases for Groups 3 and 4 .......................................................... 70

Figure 14. Group mean frequency of reactive responses per session across all study phases ........................................................................ 71
Figure 15. Distribution of the mean frequency of reactive responses during baseline, post-training, and follow-up ................................................................. 72

Figure 16. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c ................................................................. 76

Figure 17. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e ................................................................. 77

Figure 18. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h ................................................................. 78

Figure 19. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 2, Students 14h to 16 ................................................................. 79

Figure 20. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 3 ............................................................................................. 80

Figure 21. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 4 ............................................................................................. 81

Figure 22. Group mean percentage of on-task non-disruptive behaviour per session across all study phases ....................................................................................... 82

Figure 23. Distribution of the mean percentage of on-task non-disruptive behaviour for baseline, post-training, and follow-up ................................................................. 83

Figure 24. Percentage of on-task disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c ................................................................. 85

Figure 25. Percentage of on-task disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e ................................................................. 86

Figure 26. Percentage of on-task disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h ................................................................. 87

Figure 27. Percentage of on-task disruptive behaviour per session across all study phases for Group 2, Students 14h to 16 ................................................................. 88

Figure 28. Percentage of on-task disruptive behaviour per session across all study phases for Group 3 ............................................................................................. 89
Figure 29. Percentage of on-task disruptive behaviour per session across all study phases for Group 4 .......................................................... 90

Figure 30. Group mean percentage of on-task disruptive behaviour per session across all study phases ........................................................................................................ 91

Figure 31. Distribution of the mean percentage of on-task disruptive behaviour for baseline, post-training, and follow-up ........................................................................................................ 92

Figure 32. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c ........................................................................................................ 94

Figure 33. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e ........................................................................................................ 95

Figure 34. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h ........................................................................................................ 96

Figure 35. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 2, Students 14h to 16 ........................................................................................................ 97

Figure 36. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 3 ........................................................................................................ 98

Figure 37. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 4 ........................................................................................................ 99

Figure 38. Group mean percentage of off-task non-disruptive behaviour per session across all study phases ........................................................................................................ 100

Figure 39. Distribution of the mean percentage of off-task non-disruptive behaviour for baseline, post-training, and follow-up ........................................................................................................ 101

Figure 40. Percentage of off-task disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c ........................................................................................................ 103

Figure 41. Percentage of off-task disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e ........................................................................................................ 104

Figure 42. Percentage of off-task disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h ........................................................................................................ 105
Figure 43. Percentage of off-task disruptive behaviour per session across all study phases for Group 2, Students 14h to 16 ................................................................. 106

Figure 44. Percentage of off-task disruptive behaviour per session across all study phases for Group 3 ........................................................................................................ 107

Figure 45. Percentage of off-task disruptive behaviour per session across all study phases for Group 4 ........................................................................................................ 108

Figure 46. Group mean percentage of off-task disruptive behaviour per session across all study phases ........................................................................................................ 109

Figure 47. Distribution of the mean percentage of off-task disruptive behaviour for baseline, post-training, and follow-up ................................................................. 110

Figure 48. Distribution of teachers reported levels of teacher efficacy prior to and following the teacher training .......................................................................................... 113

Figure 49. Distribution of teachers reported levels of student inattentive/overactive behaviour difficulties prior to and following the training ........................................ 113

Figure 50. Distribution of teachers reported levels of student oppositional/defiant behaviour difficulties prior to and following the training ............................................. 114

Figure 51. Distribution of teachers reported use of rewards as a classroom behaviour management strategy prior to and following the training ............................................ 114

Figure 52. Distribution of teachers' reported use of negative consequences as a classroom behaviour management strategy prior to and following the training ............... 115

Figure 53. Distribution of teachers' reported use of severe punishment as a classroom behaviour management strategy prior to and following the training ................. 115

Figure 54. Distribution of teachers' responses to items relating to teacher affect on the Teacher Attribution and Affect Scale ................................................................. 116

Figure 55. Distribution of teachers' responses to items relating to teacher attributions on the Teacher Attribution and Affect Scale ................................................................. 117

Figure 56. Distribution of students' T-scores on the Attitude to School scale of the BASC2-SRP ........................................................................................................ 120
Figure 57. Distribution of students' T-scores on the Attitude to Teachers scale of the BASC2-SRP ................................................................. 120

Figure 58. Distribution of students' T-scores on the Social Stress scale of the BASC2-SRP ........................................................................................................ 121

Figure 59. Distribution of students' T-scores on the Sense of Inadequacy scale of the BASC2-SRP ........................................................................................................ 121

Figure 60. Distribution of students' T-scores on the Attention Problems scale of the BASC2-SRP ........................................................................................................ 122

Figure 61. Distribution of students' T-scores on the Hyperactivity scale of the BASC2-SRP ........................................................................................................ 122

Figure 62. Distribution of students' T-scores on the Interpersonal Relationships scale of the BASC2-SRP ........................................................................................................ 123

Figure 63. Distribution of students' T-scores on the Self-Esteem scale of the BASC2-SRP ........................................................................................................ 123

Figure 64. Distribution of students' T-scores on the Self-Reliance scale of the BASC2-SRP ........................................................................................................ 124
List of Appendices

Appendix A. Sample Classroom Observation Coding Form: Teacher Behaviour 183
Appendix B. Sample Classroom Observation Coding Form: Student Behaviour 184
Appendix C. Statistical Analysis of Single-case Repeated Measures Data 185
Teacher Training In A Proactive Approach to Classroom Behaviour Management:

Teacher and Student Outcomes

Disruptive behaviour, including conduct problems, inattention, impulsivity, oppositionality and hyperactivity, is among the most prevalent of childhood problems (Waschbusch et al., 2004). Specifically, oppositional-defiant and conduct problems are the most common reasons for child clinic referrals, accounting for one third to one half of all referrals of children to inpatient and outpatient clinics (Kazdin, 1989; Robins, 1991). Indeed, child disruptive behaviour problems appear to be a concern in many countries across North America and Europe, with similar prevalence rates (ranging between 4 and 23%) found within community samples of children and adolescents (Andres, Catala, & Gomez-Beneyto, 1999; Kaplan & Sadock, 1985). Given the prevalence of child disruptive behaviour problems in the general population and the fact that school-aged children spend a greater amount of their waking hours at school than at home, it is not surprising that such behavioural difficulties are a significant concern within the public school system (Putnam, Luiselli, Handler, & Jefferson, 2003; Walker, Colvin, & Ramsey, 1995).

It is estimated that 15% of students regularly break school rules, and another 5% of students are chronic rule breakers who are out of control much of the time (Hardman & Smith, 2003). Sugai, Sprague, & Horner (2000) found that approximately 21% of elementary school students (grades Kindergarten to 6) and 48% of middle/junior high school students (grades 6 to 9) experienced some form of disruptive behaviour resulting in one or more office discipline referrals over the course of a school year. Approximately 3-6% of school-aged children require special education services because of emotional and behavioural problems (Kauffman & Landrum, 2008). Such high rates of disruptive behaviour significantly tax teachers’ ability to manage their classrooms. Not surprisingly, Storey, Lawry, Ashworth, Danko, & Strain (1994)
report that almost half of all preschool and early elementary school teachers request formal assistance with classroom behaviour management. Moreover, discipline problems are frequently cited as one of the most troubling concerns for teachers (Hardman & Smith, 2003; Ingersoll, 2001; Ingersoll, 2003). In a poll of 714 elementary and high school teachers regarding their attitudes toward the public school system, 50% reported that students are frequently oppositional and noncompliant, and 58% reported that students are often disruptive in the classroom (Langdon, 1997).

Given the challenges for both students and teachers presented by such problem behaviour, practical and efficient classroom intervention is needed. The present study was undertaken to evaluate the effectiveness and impact of a brief teacher training program in proactive classroom behaviour management (PCM), on teachers' behaviour management skills and student classroom behaviour. Given limited school budgets and time restraints, the training was designed to be efficient and cost-effective. Following, is a review of the literature relevant to this study.

**The Impact of Public Pressure and Legislation On Behaviour Management In the Schools**

Recent high-profile violent incidents in schools in the United States and Canada, such as those at Columbine High School, Virginia Tech, and Dawson College, have made school safety a national priority (Kern & Manz, 2004). For nearly 40 years, Gallup polls have consistently documented that lack of discipline in the schools has been one of the chief concerns identified in surveys of the public’s views about public education (O’Shea & Drayden, 2008; Rose & Gallup, 2006). In 1996, 70% of the public graded schools a “C” or lower in the area of discipline (Elam, Rose, & Gallup, 1996). In the United States and Canada, legislation and public policy have developed in response to public pressure. For example, in the United States, the No Child Left Behind Act of 2001 (NCLB) “imposed a duty to protect all students, including students with
disabilities, by guaranteeing a right to discipline that ensures safe, secure, and peaceful classrooms” (O’Shea & Drayden, 2008, p.106). In Ontario, Canada, the Safe Schools Act of 2001 was initially based on a “get tough”, zero tolerance approach to discipline, with clearly delineated disciplinary measures for student misbehaviour and rule-breaking (Drolet, Paquin, & Soutyrine, 2007). In 2008, this Act was amended to be more flexible and allow for a variety of alternatives to suspension and expulsion after implementation of the Act resulted in a dramatic increase in the number of suspensions (Ontario Ministry of Education, 2005), and a report commissioned by the Ontario Human Rights Commission found that the Act had a disproportionate impact on minority students and students with disabilities (Bhattacharjee, 2003).

The introduction of "safe school" legislation reflects formal acknowledgment of the importance of a safe and orderly school environment in ensuring the academic success of its students (O’Shea & Drayden, 2008). Through funding practices, such legislation and public policy reform has also created a mandate for the development and implementation of intervention programs to reduce disruptive behaviour problems in the schools and consequently, to improve student achievement (George, White, & Schlaffer, 2007). To encourage a “best practices” approach, many policies such as NCLB require that only interventions or remedial strategies that are validated through scientific research be used (Brigham, Gustashaw, & Wiley, 2004). Currently, classroom behaviour management programs and models are diverse, representing a variety of philosophical perspectives and methods, but are not always founded on empirically supported principles (Little, Hudson, & Wilks, 2002).

**Demographics of Disruptive Behaviour in Schools**

To develop and implement a successful behaviour management program it is imperative to have a solid understanding of the nature and distribution of disruptive behaviour problems in
the schools so that interventions are targeted to areas of greatest need and are maximally efficient and effective. Research on the demography of disruptive behaviour in schools has resulted in a number of consistent findings about the current distribution of problem behaviour in public education.

Classification and frequency of disruptive behaviour. Although there is much public concern about serious behaviour problems in the schools, such as use of weapons and serious assault against students and teachers, these types of infractions are relatively uncommon and appear to be declining over time (Algozzine, Christian, Marr, McClanahan, & White, 2008). In fact, the rate of violent offences against students aged 12 to 18 years in school settings in the United States declined 50% between 1992 and 2002 (O’Shea & Drayden, 2008). Far more common are less serious infractions such as “disrespect, disobedience, inappropriate language, defiance, excessive noise, and general disruption” (Fields, 2004, p. 104). These behaviours are often cited as being of greatest concern for teachers given their high frequency and intensity (Bibou-Nakou, Kiosseoglou, & Stogiannidou, 2000; Little et al., 2002; Wheldall & Merrett, 1988), and constitute the most frequent reasons for disciplinary referral in the school system (Algozzine et al., 2008; Imich, 1994). Further, the rate of these less serious behaviour problems appears to be increasing (Kern & Manz, 2004). Not surprisingly with “get tough/zero tolerance” policies, rates of school suspensions have increased dramatically in North America, Europe, and Australia (Arcia, 2007; Fields, 2008).

School characteristics. A number of school characteristics are associated with higher levels of student disruptive behaviour. Research suggests that overall, large schools have higher rates of disruptive behaviour than smaller schools (Howley, Strange, & Bickel, 2000; Thomas, Bierman, & The Conduct Problems Prevention Research Group, 2006). Furthermore, urban schools and schools with large class sizes have disproportionately high rates of disruptive
behaviour (Stephenson & Smith, 1989; Thomas et al., 2006). Schools located in “risky” or high-crime neighbourhoods and/or schools that have high levels of socioeconomic disadvantage in the student body are also high risk schools (Battistich, Solomon, Kim, Watson, & Schaps, 1995; Colder, Mott, Levy, & Flay, 2000; Thomas et al., 2006).

**Student characteristics.** Prevalence research has consistently found far higher rates of school disruptive behaviour in males than in females. Algozzine et al. (2008) reported that rates of disruptive behaviour in males were 3 times higher than that of females. Moreover, children of ethnic minorities, and especially African American children, are at increased risk for disruptive behaviour problems in the schools (Algozzine et al., 2008; McLoyd, 1998). Some of this increased risk is thought to be due in part to the fact that ethnic minority children are more likely to live in urban, socioeconomically disadvantaged, and higher crime neighbourhoods than other groups of children (Thomas et al., 2006). Student age or grade level has also been found to play a role in patterns of disruptive behaviour. Generally, rates of disruptive behaviour tend to increase with grade level (Putnam et al., 2003, Arcia, 2007). Furthermore, some studies have found that disciplinary referrals are low in the fall during the first few months of the school year and slowly increase as the school year progresses (Lopes, 2007; Tidwell, Flannery, & Lewis-Palmer, 2003).

**Classroom environment.** Research has consistently found that the majority of disruptive behaviour occurs in classrooms rather than in other parts of the school (Algozzine et al., 2008). Moreover, exposure to classrooms with high levels of disruptive behaviour has a significant impact on children’s behavioural adjustment, increasing the likelihood of the development of persistent behaviour problems (Barth, Dunlap, Dane, Lochman, & Wells, 2004; Kellam, Ling, Merisca, Brown, & Ialongo, 1998; Thomas et al., 2006). Research by Thomas et al. (2006) found that the impact of exposure to highly disruptive classrooms on child behaviour
was greater than that of student poverty and school size, suggesting that general school demographics are not as influential on child behavioural adjustment as are more proximal contextual influences such as those provided by teacher and peer interaction in the classroom.

**The Impact of Disruptive Behaviour Problems on Child Outcomes**

Disruptive behaviour problems in the classroom impede learning, particularly for the child displaying such responses, but also for other students in the classroom (Putnam et al., 2003). Disruptive behaviour is incompatible with on-task behaviour, which is a requirement for the acquisition of academic skills (Lee, Kelly, & Nyre, 1999). Not surprisingly, classroom disruptive behaviour problems are associated with less academic engagement time, lower grades, and poor performance on standardized tests (Shinn, Ramsey, Walker, Stieber & O’Neill, 1987; Stage & Quiroz, 1997). Moreover, teacher interactions with disruptive students are characterized by a high frequency of reprimands and commands, at a level twice as high as that used with typical peers (Cullinan & Sabornie, 2004).

Researchers have noted that the school day of frequently disruptive students is significantly different from that of their peers. On a typical day, these students experience a curriculum of “noninstruction” (Gunter, Denny, Jack, Shores, & Nelson, 1993, p. 265), low expectations from their teachers, and less positive interactions with their teachers (Farmer & Farmer, 1999; Lago-Delello, 1998). In the longer term, disruptive behaviour problems are associated with high rates of school dropout and peer rejection (Coie, Dodge, Terry, & Wright, 1991; Schiff & BarGil, 2004). Even more troubling is the fact that more serious disruptive behaviour problems increase the risk for juvenile delinquency (Nagin & Tremblay, 1999), early initiation of substance use (Milberger, Biederman, Faraone, & Chen, 1997), development of antisocial behaviour problems later in life (Huesmann, Eron, Lefkowitz, & Walder, 1984; Tremblay, Pihl, Vitaro, & Dobkin, 1994), and the onset of psychiatric disorders in adulthood.
The many deleterious consequences of disruptive behaviour problems on child behavioural adjustment and development underscores the need for effective prevention and early intervention programs in school settings to ameliorate these behaviour problems before they significantly compromise the student's present and future well-being.

**The Impact of Disruptive Behaviour Problems on Teachers**

Disruptive classroom behaviours pose significant professional and personal challenges for teachers. These behaviours threaten teacher authority and control in the classroom and can diminish teachers’ feelings of self-efficacy (Fields, 2004; Wiley, 2000). Consistent with this notion, research suggests that one of the greatest sources of stress for teachers is maintaining discipline in the classroom (Kyriacou, 2001). This is also one of the primary reasons why public school teachers abandon the teaching profession (Hester, Hendrickson, & Gable, 2009; National Center for Education Statistics, 2002). Classroom disruptive behaviour problems consume an inordinate amount of teacher time and detract from teaching and learning time (Little et al., 2002). In a poll of 13,103 teachers conducted in the United States in 1997-1998, 27% of middle and high school teachers reported that the behaviour of some students kept them from teaching “a fair amount” or “a great amount” of the time (Gottfredson et al., 2000). Moreover, regular classroom teachers have been found to spend as much as 90% more time attending to the educational needs of students with disruptive behaviour problems than with students without such problems (Johnson & Fullwood, 2006). At the same time, growing class sizes and the inclusion of students with special needs in the regular classroom have already seriously taxed teachers’ ability to effectively manage classroom behaviour (Schumm et al., 1995; Hardman & Smith, 2003).
Stress related to problems managing classroom behaviour places teachers at risk for using more punitive and confrontational discipline strategies (Blase, 1986; Wisniewski & Gargiulo, 1997). Unfortunately, students are much more likely to misbehave when they perceive their teachers as using overly harsh or punitive discipline strategies, setting the stage for a reciprocal cycle of continuous disruption in the classroom (Lewis, Romi, Qui, & Katz, 2005; Walker, Stieber, Ramsey, & O'Neill, 1991). It is not surprising then that difficulty managing disruptive students has been found to be one of the leading causes of teacher burnout (Byrne, 1994; Hastings & Bham, 2003; Lowenstein, 1991), as well as teacher turn-over and attrition (Billingsley, Bodkins, & Hendricks, 1993; Brownell, Smith, and McNellis & Miller, 1997; Ingersoll, 2001; National Center for Education Statistics, 2002).

**Teacher-Student Relationships and Student Well-Being**

The importance of teacher-student relationships in shaping student outcomes has been well-documented. Specifically, a close teacher-student relationship characterized by warmth, open communication, low conflict, optimistic expectations and caring has been found to be associated with a wide range of factors related to positive school adjustment (Brooks, 1994; Pianta, Steinberg & Rollins, 1995). Positive teacher-student relationships have been found to act as a protective factor for children at risk for school failure (Hamre & Pianta, 2005, 2006; Pianta & Steinberg, 1992). They have also been associated with higher levels of academic achievement (Conner, Son, Hindman, & Morrison, 2005; Goodenow, 1993; Midgley, Feldlaufer, & Eccles, 1989) and decreased levels of off-task behaviour in the classroom (Bru, Stephens, & Torsheim, 2002; Hughes & Kwok, 2006). Positive teacher-student relationships do not just impact academic functioning, but also influence social-emotional functioning. Hughes and Kwok (2006) found that a close teacher-student relationship in Grade 1 was predictive of higher levels of peer acceptance in Grade 2. A plethora of research on attachment has consistently found that
secure relationships with teachers can compensate for insecure attachment relationships with parents (Goossens, & Van Ijzendoorn, 1990; Van Ijzendoorn & Tavecchio, 1987; Kesner, 2000).

As previously mentioned, difficulties managing classroom behaviour can result in acute teacher stress, which often leads to use of more reactionary or punitive discipline strategies. In turn, students tend to react to harsh discipline with more disruptive behaviour (Walker et al., 1991). This reciprocal cycle of reactivity and disruption can impede the development of a close teacher-student relationship. Consistent with this notion, close teacher-student relationships have been associated with low levels of disruptive behaviour, including aggression (Hughes, Cavell, & Jackson, 1999; Jenkins and Keating, 1998; Silver, Measelle, Armstrong, & Essex, 2005), and increased levels of on-task behaviour (Hughes & Kwok, 2006). Thus, the development of positive teacher-student relationships, mediated through the use of proactive, effective classroom discipline strategies, is essential for enhancing school achievement, reducing disruptive classroom behaviours, and consequently, reducing teacher stress and burnout. This is particularly true for students with high levels of disruptive behaviour, as they have been found to be particularly susceptible to the positive effects of close teacher-student relationships (Silver et al., 2005).

**Teachers’ Knowledge of Classroom Behaviour Management**

Given that one of the greatest sources of stress for teachers is maintaining classroom discipline and that disruptive behaviour is one of the leading causes of teacher burnout and attrition, one might expect that preservice and inservice teacher preparation programs would focus intensively on training of behaviour management approaches. In fact, student teachers commonly identify classroom behaviour management as an area in which they receive little preparation (Pilarski, 1994; Purcell & Seifert, 1982; Tulley & Chiu, 1995). Moreover, Merrett & Wheldall’s (1993) interviews of 176 secondary school teachers revealed that almost 75% of
teachers were dissatisfied with the preparation provided by their initial training in classroom behaviour management. Many of these teachers expressed the belief that they spent too much class time on issues of order and control. The finding that teachers generally report receiving little training, whether preservice or inservice, in classroom behaviour management has been corroborated in the literature (Barrett & Davis, 1995; Kauffman, 1999; Kauffman & Wong, 1991; Kellam, 1999; Tidwell et al., 2003).

Teachers often identify the area of classroom behaviour management as an area in which they would like to receive in-service training (Maag, 1999, 2001; Padeliadu & Patsiodimou, 2000) and actively seek information regarding effective methods of classroom discipline (Hardman & Smith, 2003). Unfortunately, such information does not appear to be readily available. Hardman & Smith (2003) conducted an analysis of the content of a variety of well-respected peer-reviewed journals in education over a 10 year period and found that only 1% of 6785 articles were about classroom behaviour management. Thus, there appears to be inconsistency between teachers’ need for classroom behaviour management strategies and the learning opportunities available to them. Complicating matters is the fact that much of the behaviour management literature is vague in descriptions of practical strategies for classroom use. In their study, Hardman & Smith (2003) found that 53% of the articles relating to classroom discipline did not discuss the teacher’s role in implementing interventions and for those that did, the descriptions were usually vague and impractical, (e.g., 77% recommended that teachers discuss problems with their students and ask them to reflect on their behaviour). The unavailability of practical classroom behaviour management information may result in teachers feeling incapable of handling problem behaviour and relying instead on special-services staff, such as school psychologists and social workers (Hardman & Smith, 2003).
Teachers’ Attributions and Perceptions About Student Disruptive Behaviour

Teachers’ beliefs influence their self-confidence and style of interacting in the classroom (Johnson & Fullwood, 2006; Martin, Linfoot, & Stephenson, 1999). A teacher who attributes disruptive classroom behaviour to unstable and uncontrollable factors that are external to him or herself, such as parenting problems (e.g., lack of discipline in the home) or child factors (e.g., innate personality, mental disorder), is unlikely to feel that he or she will be able to successfully intervene to remedy problem behaviour. On the other hand, a teacher who attributes disruptive behaviour to unstable and controllable factors that are internal to him or herself, such as teaching style or attitude, is more likely to feel confident in his or her ability to successfully intervene to remediate disruptive behaviour (Mavropoulou & Padeliadu, 2002). Further, teachers’ perceptions about the causes of disruptive classroom behaviour can influence their choice of interventions (Kauffman & Wong, 1991; Jordan, Kirkaali-Iftar, & Diamond, 1993; Podell & Soodak, 1993; Scott-Little & Holloway, 1992). For example, Soodak & Podell (1994) found that teachers who attributed disruptive behaviour and learning difficulties to family situation often suggested parental involvement as a solution, whereas teachers who attributed disruptive behaviour and learning difficulties to school factors tended to suggest teacher-focused interventions for remediation.

Research suggests that teachers tend to attribute disruptive behaviour problems to factors external to themselves and the school setting, such as child and parent/caregiver factors. For example, attention seeking, biological/mental disorder, unstable family circumstances, low parent education, and lack of parental discipline (Christenson, Ysseldyke, Wang, & Algozzine, 1983; Guttman, 1982; Poulou & Norwich, 2002). This perspective may perpetuate the notion that students with challenging behaviour do not belong in a regular classroom and should be dealt with by special services personnel (Hardman & Smith, 2003; Schumm & Vaughn, 1992).
In addition, teachers' belief that student disruptive behaviour stems from child and parent factors could result in teachers blaming or rejecting a misbehaving student and cause the student to respond with additional disruptive behaviour (Karasawa, 1995). Alternatively, such attributions could cause teachers to feel they have no influence or impact on behaviour, putting them at a higher risk of experiencing burnout (Hastings & Bham, 2003). Unfortunately, teacher attitudes and attributions can be resistant to change (Hayes, Hindle, & Withington, 2007).

**Commonly Used Classroom Behaviour Management Strategies**

In the absence of teacher training and practical information on classroom management approaches, teachers are often left to their own devices to manage disruptive behaviour. Under such circumstances, they most often resort to coercive and punitive disciplinary practices (Brophy, 1996; Brophy & McCaslin, 1992; Hamre & Pianta, 2001; Lannie & McCurdy, 2007; Maag, 2001; Martens & Meller, 1990; Smith, 1983; Thomas et al., 2006) including reprimands, detention, penalty or response cost, and suspension (Hardman & Smith, 2003). Teachers rarely use positive reinforcement as a behaviour management strategy (Brophy & McCaslin, 1992; Brophy, 1996; Maag, 2001; Hardman & Smith, 2003).

Teachers’ discipline techniques are sometimes prone to being overly harsh or out of line with the degree of misbehaviour. This commonly occurs when teachers perceive that a particular student’s misbehaviour will lead other students in the class to misbehave, thereby causing the teacher to be more punitive for minor infractions (Johnson & Fullwood, 2006). When teachers respond in this manner, students may feel that the teacher is unreasonable, leading to resistance or defiance, damaged teacher-student relationships, and power struggles (Emmer, 1994; Fields, 2004). Hyman & Perone (1998) found that teachers commonly use verbally abusive language, such as sarcastic comments, ridicule or name-calling, with problem students resulting in intensification of disruptive behaviour. Indeed, as noted in previous
sections, teachers’ tendency to target particular misbehaving students for classroom discipline and attention can sometimes lead to an increase in the severity of their misbehaviour. Interestingly, despite their over-use of punitive strategies, studies examining teacher preferences have found that teachers actually greatly prefer positive rather than negative classroom behaviour management strategies (Alderman & Nix, 1997; Elliot, Witt, Galvin, & Peterson, 1984; Reimers, Wacker, & Koepppl, 1987).

**Reactive Classroom Discipline Techniques**

Classroom behaviour management strategies that utilize punishment can be thought of as reactive, in that these disciplinary strategies are implemented after the occurrence of undesirable student behaviour, often with the goal of terminating or reducing the undesirable behaviour. As previously noted, some of the most common strategies used by teachers are reprimands, penalty or response cost, time-out, detention, and suspension.

**Reprimands.** A reprimand is a verbal statement indicating disapproval of student behaviour (Acker & O’Leary, 1988). Reprimands are the most frequently used classroom discipline technique (Abramowitz, O’Leary, & Rosen, 1987) and, when used properly, are effective in reducing disruptive classroom behaviour in the short term (Abramowitz et al., 1987; Acker & O’Leary, 1988; Pfiffner & O’Leary, 1987). However, to be effective, reprimands should be delivered immediately after a response (Abramowitz & O’Leary, 1990), be unemotional and brief (Rosen, O’Leary, Joyce, Conway, & Pfiffner, 1984; Abramowitz, O’Leary, & Futtersak, 1988), outline an alternative behaviour (Kounin, 1977), and should be consistently strong in intensity, rather than increase in strength over time (Abramowitz et al., 1988).

Observations suggest that over-use of reprimands in the classroom can result in an aversive student reaction towards the teacher (Smith & Misra, 1992; Thomas, Presland, Grant,
Furthermore, teacher reprimands can sometimes be reinforcing for students who seek teacher attention. In these cases, use of reprimands can actually increase the frequency of disruptive, attention-seeking behaviour (Smith & Misra, 1992). Reprimands may be used so frequently by teachers because they serve as negative reinforcement for the reactive behaviour of the teacher – that is they may result in an immediate cessation of child disruptive behaviour following the reprimand, providing the teacher with some temporary respite from the problem behaviour (Bear, 1998).

Response cost. Response cost usually entails a penalty or loss of privilege contingent on the performance of an undesirable response (Reid, 1999). In the classroom, response cost is most often used in simple token economy systems where a student loses a point for exhibiting disruptive behaviour, or when privileges such as recess or computer time are taken away for misbehaviour (Smith & Misra, 1992). Response cost can be effective as a reductive technique in the management of disruptive behaviour (DuPaul, Guevremont, & Barkley, 1992; Pfiffner, O’Leary, Rosen, & Sanderson, 1985; Sullivan & O’Leary, 1990). However, it does have several limitations. In a classroom setting, response cost in the form of the taking away of privileges for misbehaviour is often not effective given that loss of a privilege cannot always be applied to a behaviour each time it occurs (Kazdin, 2001). For example, a teacher cannot take away a given recess time more than once. Moreover, students who frequently misbehave may lose all points or tokens and have nothing further to lose if they continue to exhibit disruptive behaviour (Morgan & Jensen, 1988). Furthermore, the taking away of privileges can sometimes increase student frustration and anger potentially causing their misbehaviour to escalate. For these reasons, response cost has been found to be most effective when it is combined with token reinforcement (Bierman, Miller, & Stabb, 1987; Kelley & McCain, 1995; Reid 1999).
**Time-out.** Time-out from reinforcement generally involves the removal of any kind of positive reinforcement, usually through exclusion or removal of the disruptive student from regular classroom activities (Kazdin, 2001). Time-out strategies have been found to be an effective strategy for managing classroom behaviour (Turner & Watson, 1999), however there are many limitations and deleterious consequences associated with this strategy, particularly with seclusionary time-out (i.e., the complete withdrawal of a student from the classroom). Removal of the student from regular class activities reduces the opportunities for the student to receive positive reinforcement for alternative prosocial behaviours, and instead may supply the student with the opportunity that isolation provides to engage in other maladaptive behaviour (Kazdin, 2001). Moreover, isolation from regular classroom activities can exclude the student from critical learning opportunities and academic instruction, which may adversely impact their achievement (Arcia, 2007; Sugai & Horner, 2008). Furthermore, time-out can actually increase the frequency of disruptive behaviour if the student is seeking escape from academic demands or other aversive aspects of the classroom (Atkins et al., 2002; Kazdin, 2001; Skiba & Peterson, 2000). Time-out procedures, and more specifically seclusionary time-out, are frequently misused and overused by teachers (Barbetta, Norona, & Bicard, 2005; Raffaele Mendez & Knoff, 2003). These strategies are inherently reinforcing for teachers as removal of disruptive students provides the teacher with a reprieve from troublesome behaviour (Barbetta et al., 2005; Maag, 2001; Ryan, Peterson, & Rozalski, 2007).

**Suspensions.** There has been a sharp increase in suspension rates in Australia, the United Kingdom, and North America in the past decade indicating an increase in the use of suspension as a behaviour management strategy (Dupper & Bosch, 1996; Vulliamy & Webb, 2000). Of particular concern is the fact that repeated suspensions are often used as a “pushout” strategy to permanently remove “troublemakers” from the school system via expulsion or
dropout (Bowditch, 1993; Arcia 2007). Not surprisingly, school suspension has consistently been found to be a good predictor of later school dropout (Skiba & Peterson, 2000).

There is little research to suggest that “zero tolerance” or exclusionary discipline strategies, such as suspensions and expulsions, are effective methods of reducing disruptive behaviour in the schools (Skiba & Peterson, 2000). In fact, schools that frequently utilize “zero tolerance” approaches to behaviour management have been found to be less safe than schools that infrequently use “zero tolerance” approaches (Skiba & Peterson, 2000).

**General disadvantages and limitations associated with punitive strategies.** Punitive and reactive strategies are widely used by teachers because they are often associated with instant, albeit short-term, decreases in disruptive behaviour (Sugai & Horner, 2002). However, when used in isolation of reinforcement systems and skill-building strategies, such techniques are often ineffective and counterproductive (Newcomer & Lewis, 2004; Sugai & Horner, 2008). There has been a wealth of research demonstrating the disadvantages and negative side effects of punishment-based behaviour management strategies (Skiba & Peterson, 2000). They have been found to exacerbate rather than reduce disruptive and maladaptive behaviour (Mayer, 1995; Mayer, Butterworth, Mastrapktitis, & Sulzer-Azaroff, 1983; Sugai & Horner, 2008). Use of these strategies fosters classroom environments of authoritarian control where teachers become models of punitive and aversive patterns of interaction (Martin, Sugarman, & McNamara, 2000).

Punitive classroom discipline has also been found to elicit feelings of resentment and retaliation from students, causing them to react with more maladaptive behaviour (Bear, 1998; Hyman, 1997; Martens & Meller, 1990). Students may habituate to some consequences and require progressively harsher consequences to produce reductive effects (Skiba & Peterson, 2000). Increased rates of student maladaptive behaviour and consequent elevated attempts by teachers to control behaviour through more intense punitive strategies can permanently damage the
teacher-student relationship (Bear, 1998) and may cultivate coercive teacher-student interaction patterns (Emmer, 1994; Shores, Gunter, & Jack, 1993; Sugai & Horner, 2008). Finally, unlike proactive strategies, punitive behaviour management strategies fail to teach students prosocial, alternative forms of behaviour, given that the emphasis is exclusively on teaching students how not to behave (Bear, 1998; Lake, 2004; Martin et al., 2000; Mayer, 2002).

**Proactive Classroom Behaviour Management**

Proactive behaviour management strategies are designed to prevent the onset of disruptive behaviours by focusing on building prosocial student behaviours rather than on terminating problem behaviour (Mayer, 2001). Research has consistently demonstrated that proactive classroom behaviour management approaches result in reductions in classroom disruption and increases in student learning and on-task behaviour (Colvin, Kameenui, & Sugai, 1993; Gettinger, 1988; Good & Brophy, 1994; Mayer et al., 1983; Taylor-Greene et al., 1997; Ysseldyke, & Christenson, 1994). An early study by Kounin (1977) found that the primary tactic that differentiated effective from ineffective teachers was use of strategies that prevented the occurrence of behaviour problems in the classroom, and their immediate management of minor problem behaviour before it escalated into more significant difficulties. Thus, proactive behaviour management can be viewed as a cornerstone of effective teaching. The many advantages of proactive classroom management, along with the concerns related to reactive strategies, have led many government and community organizations as well as a number of leading researchers to recommend and advocate for the adoption of more proactive approaches to behaviour management in the schools (Sugai & Horner, 2002).

**A Conceptual Model of Proactive Behaviour Management**

Ducharme (1999) proposed a conceptual model of proactive behaviour management that classifies proactive strategies into two main categories: moderating strategies and remedial
strategies.

**Moderating strategies.** Moderating strategies are those that produce short-term reductions or improvements in disruptive or maladaptive behaviours. These strategies generally ameliorate rather than remediate problem behaviour, but can render the child's behaviour more amenable to remedial intervention. Ducharme (1999) outlined three categories of moderating approaches: stimulus control procedures, ecological approaches, and behavioural rapport.

**Stimulus control procedures.** Stimulus control procedures (also known as antecedent procedures) involve the presentation of classroom conditions that are associated with desirable behaviour, and the removal of classroom conditions associated with undesirable or aberrant behaviour. The goal of antecedent procedures is to prevent and/or reduce disruptive behaviour and increase on-task behaviour in the classroom by manipulating antecedent, proximal and observable factors that can sometimes trigger problem behaviour in the classroom. For example, moving frequently-misbehaving students from the back of the classroom where they are not easily monitored by the teacher to the front of the class can reduce the likelihood of disruptive behaviour. The use of antecedent procedures can promote a classroom environment that is positive, predictable, and highly motivating (Kern & Clements, 2007; Sugai, Horner, & Gresham, 2002). Some common examples of antecedent procedures used in the classroom are altering seating arrangements (Wheldall, Morris, Vaughan, & Ng, 1981), using high-probability requests (Ardoin, Martens, & Wolfe, 1999; Lee, Belfiore, Scheeler, Hua, & Smith, 2004), offering choices to students (Vaughn & Horner, 1997), easing transitions between tasks, and maintaining some awareness of all students in the class (Kounin, 1977). Importantly, antecedent strategies can be used in a manner that addresses the needs of most of the students in the class, not just those who frequently act out (Kern & Clemens, 2007).
Antecedent strategies can be highly beneficial to teachers due to their potential for prevention of problem student responses and their often immediate positive effects (Kern & Clemens, 2007). The primary challenge with these techniques is that, as with all moderating approaches, they typically result in only short term effects, with the benefits of antecedent modifications commonly dissipating as soon as use of the strategy is terminated.

**Ecological approaches.** Sometimes, classroom disruptive behaviour occurs independent of any discernable antecedent stimuli. Under these conditions, other factors that are not proximal or easily apparent may be impacting student behaviour. Strategies designed to manage such factors have been referred to as ecological procedures (e.g., Ducharme, 2000). Relevant ecological factors include physiological factors related to internal states or basic needs, such as hunger, thirst, pain, and sleep deprivation. Emotional factors such as abuse, discord in the family, conflict with family and peers, and over or under-stimulation can also be categorized here. Ecological factors can alter the effectiveness of positive or negative reinforcement, thereby impacting the probability of disruptive behaviour. Furthermore, ecological factors can affect the perceived aversiveness of classroom situations that are typically tolerable to the student. For example, a student may find a given academic task to be much more aversive when they are tired, making escape a much more powerful reinforcer, and increasing the likelihood of any problem behaviour that will allow the student access to such an outcome. By adjusting ecological variables that can be modified in the classroom (e.g., providing a hungry student with a snack), and demonstrating sensitivity for ecological variables that cannot be altered (e.g., reducing task demands for a student who arrives to school exhausted and sleepy), teachers can prevent the occurrence of disruptive classroom behaviour.

**Rapport building.** The importance of establishing a positive therapeutic relationship has been well-documented in the psychotherapy literature (Gurman & Messer, 1995). As previously
discussed, a positive and warm teacher-student relationship is a protective factor for at-risk students and is associated with a wide range of factors related to positive school adjustment (Brooks, 1994; Hamre & Pianta, 2005, 2006; Pianta & Steinberg, 1992; Pianta, et al., 1995). A study by Corrigan (2006) found that teachers’ use of play-based rapport building strategies resulted in improved child compliance with teacher requests. Similarly, Allday & Pakurar (2007), found that a simple, student-specific greeting from a teacher upon the students’ entry into the classroom, improved student on-task behaviour by an average of 27% (from a mean of 45% to a mean of 72%). Thus, rapport building strategies can predispose a student with challenging behaviour to cooperate with the requests and curriculum requirements of the teacher.

**Remedial strategies.** Remedial strategies involve the teaching of adaptive skills that are incompatible with or replacements for maladaptive behaviour and that allow students to cope more effectively with problem situations. These strategies produce long-term reductions in disruptive behaviour because the student is provided with alternative skills and behaviours that are more efficient than problem responses in meeting their needs, thereby rendering aberrant behaviour unnecessary. Ducharme (1999) outlines two main categories of remedial approaches: functional equivalence and errorless remediation.

**Functional equivalence.** Functional equivalence involves the teaching of an adaptive response that has the same function or purpose (i.e., leads to the same class of reinforcement) as a disruptive response. This strategy is based on the principle that topographically different behaviours (either prosocial or antisocial) can provide access to the same desired outcome (Carr, 1988). For example, calling out in class and raising one’s hand are different methods of obtaining the same outcome: recruiting teacher attention.

To teach a functionally equivalent adaptive behaviour, an assessment must first be undertaken to identify the outcomes or reinforcers that are frequently attained by the disruptive
behaviour. Once this assessment is completed, a more prosocial or adaptive alternative behaviour that results in the same class of reinforcement is selected and taught. If the adaptive alternative behaviour is more efficient and effective in providing access to the desired outcome, the maladaptive behaviour will become nonessential and will cease to be performed. To extend the previous example, if a teacher purposefully ceased to provide attention for calling out behaviour in class, but instead provided positive attention for a more appropriate behaviour such as student hand raising, then the calling out behaviour would diminish in frequency since it no longer provided the student with the desired outcome (i.e., teacher attention). In their review of the literature on teaching adaptive alternative strategies for recruiting teacher attention, Alber and Heward (2000) found that functional equivalence strategies were effective for students from preschool to high school.

One limitation of functional equivalence is that it cannot be used when the desired outcome of a maladaptive behaviour is inappropriate, counter-productive, or harmful to the student. For example, many classroom disruptive behaviours are motivated by escape from unpleasant situations or aversive demands such as school work. It would not be appropriate, productive, or beneficial to teach a disruptive student a more prosocial method of avoiding school work and class instruction. In these situations, errorless remediation strategies are more appropriate means of managing behaviour.

**Errorless remediation.** Errorless remediation (Ducharme, Atkinson, & Poulton, 2000; Ducharme, 2008) strategies are based on errorless teaching principles developed by behavioural researchers in the 1960s (e.g., Sidman & Stoddard, 1967; Terrace, 1966a, 1966b; Touchette, 1968). They are focused on teaching children to tolerate conditions in their environment that were previously associated with problem responses. Thus, a student is taught to endure and manage difficult everyday classroom circumstances, such as working independently on an
assignment, without exhibiting disruptive behaviours that would typically provide them with escape from these conditions. The key to errorless remediation approaches is graduation. Conditions associated with disruptive behaviour are very gradually introduced to the student at a rate that they can tolerate, and reinforcement is provided for successful adaptation to the slowly increasing demands. In an errorless approach, disruptive behaviours are treated like “errors”, and the goal is to rearrange the environment to prevent these errors by gradually, almost imperceptibly increasing demand so that the student continues to succeed with the work even as the challenge increases.

This approach requires assessment of conditions associated with varying probabilities of disruptive behaviour. A hierarchical classification of conditions most to least likely to be associated with desirable behaviour is then developed, and in the initial stages of intervention, the student is presented with a high proportion of conditions associated with desirable behaviour. Gradually over time, conditions associated with problem behaviour are reintroduced in a hierarchical progression, at a rate that ensures that disruptive behaviours remain at “near-errorless” levels.

Studies examining the effectiveness of errorless remediation strategies have found them to be highly effective in improving child compliance in the home (Ducharme et al., 2000) as well as in the classroom (Ducharme & Di Adamo, 2005). Errorless remediation strategies have also been found to be an effective means of increasing the on-task behaviour of students with conduct difficulties (Ducharme & Harris, 2005). Furthermore, errorless remediation strategies often result in other improvements in behaviours not specifically targeted for intervention (Ducharme, 1996; Ducharme et al., 2000; Ducharme & Drain, 2004; Ducharme & Popynick, 1993; Ducharme, Popynick, Pontes, & Steele, 1996).
Errorless remediation techniques are well-suited to the classroom setting, often comprising elements of good teaching practices. For example, a student may initially be provided with intensive scaffolding (e.g., prompting, one-on-one support) from the teacher, that is slowly reduced until the student is able to work independently without supports from the teacher. The initial provision and gradual withdrawal of these supports reduces the likelihood of student problem behaviour and the dependence of the student on teacher assistance.

**Praise as a Reinforcement Strategy in Proactive Behaviour Management**

Praise in the classroom involves a verbal statement indicating approval of student behaviour. Both functional equivalence and errorless remediation strategies utilize reinforcement in the form of praise as one method of facilitating prosocial change in student behaviour. With functional equivalence approaches, praise is often used as a method of ensuring that desirable outcomes follow prosocial responding. For example, prosocial behaviours such as raising one's hand before speaking out in class, are identified and/or prompted and students are provided with enthusiastic praise and acknowledgement for performing those desirable behaviours, while less adaptive behaviours such as calling out in class, are ignored. With errorless remediation approaches, conditions are designed in a way that maximizes student success, and praise is often used as a means of recognizing student accomplishment. Typically with this approach, a high ratio of positive to negative statements are used, and praise and acknowledgement are provided for prosocial responding even when that responding requires extensive scaffolding.

Research has consistently demonstrated that verbal praise provided to students when they are engaged in appropriate behaviour increases the likelihood of that behaviour in the future (Alberto & Troutman, 2009; Hester et al., 2009; Kern & Clemens, 2007). For maximal effectiveness, praise should be behaviour-specific, with the teacher identifying the desirable
behaviour performed by the student (Chalk & Bizo, 2004; Hattie & Timperley, 2007; Stormont, Smith, & Lewis, 2007; Kern & Clemens, 2007). A study by Sutherland, Wehby, & Copeland (2000) examined the impact of increased behaviour-specific praise on the behaviour of a class of students with emotional and behaviour disorders. Results indicated that as the rate of specific praise statements administered by the teacher increased, so did the on-task behaviour of the students. Interestingly, praise does not need to be delivered directly to a student to be effective, as it can be vicariously reinforcing (Bear, 2010; Kazdin, 1973, 1977, 1979; Kern & Clemens, 2007). In other words, students who witness another student being praised for a particular behaviour, are more likely to model that same behaviour in the future. For praise to act as a vicarious reinforcer however, praise also needs to be provided to peers, at least intermittently, when they model the desired behaviour (Ollendick, Dailey, & Shapiro, 1983).

Research on the relative effectiveness of praise suggests that it “is possibly the most fundamental tool available to teachers and arguably the most powerful and meaningful for pupils” (Hayes et al., 2007, pp. 162). Verbal praise has been found to have a greater effect size for increases in motivation than either tangible reward or no reward (Cameron & Pierce, 1994). Furthermore, research suggests that there is a positive relationship between teacher praise and positive student self-appraisal over time (Montague & Rinaldi, 2001).

Despite its many benefits and ease of use, research has consistently found that teachers rarely use praise in the classroom as a behaviour management strategy (Beaman & Wheldall, 2000; Sutherland, Wehby, & Yoder, 2002) and are especially unlikely to provide praise to students with disruptive behaviour problems (Kern & Clemens, 2007; Shores et al., 1993; Sutherland & Wehby, 2001). When praise is delivered to such students, it is provided mainly for correct academic responses, rather than for desired classroom behaviour or appropriate social interaction (Beaman & Wheldall, 2000; Sutherland et al., 2000; Sutherland, et al., 2002; Van
Acker, Grant, & Henry, 1996; Lannie & McCurdy, 2007). Furthermore, research indicates that teachers do not spontaneously increase their delivery of praise statements when disruptive classroom behaviour is reduced and on-task behaviour is increased, nor do they reliably increase their delivery of praise after receiving instruction on the benefits of doing so (Lannie & McCurdy, 2007; Sutherland et al., 2000). Instead, only overt student behaviour such as calling out or correct academic responding is likely to elicit a teacher response (Lannie & McCurdy, 2007). Teacher praising for appropriate passive student responding such as on-task behaviour and listening quietly, requires direct intervention through feedback (Sutherland et al., 2000), self-evaluation (Sutherland & Wehby, 2001), and goal-setting (Martens, Hiralall, & Bradley, 1997).

**School–Wide Positive Behavior Support**

Although there is a general paucity of research on empirically evaluated behaviour management programs or interventions in the schools, one approach has been widely researched and empirically validated: school-wide positive behaviour support (SWPBS).

SWPBS is a comprehensive multilevel approach to managing behaviour and creating safe, prosocial school environments (Horner & Sugai, 2000; Sugai & Horner, 2002). This program utilizes a school-based, team problem-solving approach and is based on a three-tiered conceptualization of school support. The first tier represents primary prevention, whereby all students in the school are targeted and support is provided in the form of the teaching of a small number of specific behavioural expectations. Reinforcement for appropriate student behaviour is provided, along with consistent consequences for behavioural infractions. This first tier of intervention is targeted at students who are generally well prepared for school, and it is estimated to meet the behavioural and social needs of 80 to 90% of students in the school.

The second tier represents secondary prevention, whereby students identified as being at-risk are targeted and more intensive support is provided in the form of social skills instruction,
mentoring, tutoring, and a host of other interventions. This second tier of intervention is estimated to meet the needs of 5 to 10% of the students in the school.

The third tier represents intensive support targeted at students with significant longstanding behavioural, emotional, and social difficulties. Typically at this level, functional behaviour assessments are conducted and interventions are tailored to the needs of specific students. These latter interventions are estimated to meet the needs of 1 to 5% of the school population (George, et al., 2007; Kern & Manz, 2004). Six key features of SWPBS are: school-wide rules for prosocial behaviour; teaching of school-wide rules; reinforcement of appropriate, prosocial behaviour; consequences for misbehaviour; use of data to steer decision making; and administrative support at the school and district level (Horner et al., 2004).

Research on SWPBS has suggested its efficacy in reducing student problem behaviour (Colvin et al., 1993; Lewis, Sugai, & Colvin, 1998; Metzler, Biglam, Rusby, & Sprague, 2001; Nelson, Colvin, & Smith, 1996; Taylor-Greene et al., 1997). One of the advantages of SWPBS is its foundation in empirically validated principles of learning and behaviour (Kern & Manz, 2004). However, a host of disadvantages and limitations of this approach have been noted (Kern & Manz, 2004). First, SWPBS’s reliance upon partnership-driven methodologies makes it extremely difficult to evaluate its internal validity, as these partnerships are different for each school and consequently, the specifics of the interventions recommended by these partnerships will vary. Moreover, these partnerships make experimental research of the model quite difficult, as key aspects of experimental design are frequently not attainable (i.e., comparison groups, randomization, and replication). To partially address this issue, Kern and Manz (2004) advocate for the development of certain core concepts in SWPBS that are consistent across interventions and thus can be monitored for integrity. In this way, the partnership or team of a given school
can modify components of implementation and execution of an intervention, but the core elements of the intervention would remain constant.

Another limitation of SWPBS is that the great majority of evaluation studies conducted rely solely on office discipline referrals as the outcome measure of program effectiveness (Kern & Manz, 2004). As a result, no information is available with regard to the impact of SWPBS on teacher skills, prosocial student behaviour, minor disruptive behaviour, or student perceptions of school climate and safety (Kern & Manz, 2004). In addition, the use of office discipline referrals as a sole measure of student behaviour requires that busy school staff and administrators reliably record every incident that causes a student to be sent to the office. Dependence on this nonstandardized measure of behaviour collected by a wide variety of sources can introduce significant error into data collection procedures. Moreover, it is unclear what office discipline referrals are actually measuring, given that there is no evidence that a consistent, clear connection exists between student misbehaviour and the issuing of such referrals (Kern & Manz, 2004). Presumably teachers differ in their tolerance of disruptive classroom behaviour as well as their use of office discipline referrals as a strategy for managing classroom misbehaviour.

While there is evidence for the effectiveness of SWPBS in ameliorating disruptive student behaviour, this complex multi-level approach poses several practical challenges for public school systems. SWPBS is a labour intensive approach, requiring the constant collaboration of multiple professionals to deliver a variety of interventions of varying intensity to the student body as a whole. Such an approach requires significant organization and is prohibitively expensive and time intensive, making it impractical for use in busy public schools that lack extensive resources. Moreover, teachers generally prefer interventions that are brief and easy to implement (Reimers et al., 1987).
Interventions In Public School Systems

Even when supported by government mandates, the success rate for implementation of intervention programs in the schools is generally very low (Berends, Bodilly, & Kirby, 2002; Berman, 1981; Gottfredson et al., 2000). Some researchers argue that ensuring program implementation in schools is often more challenging than creating and designing an appropriate intervention (Foxx, 1996; Noell et al., 2000). Time restrictions, teacher resistance, administrative “red tape”, and budgetary constraints are some of the challenges inherent in working in school settings (Gottfredson et al., 2000; Wilson-Brewer, Cohen, O'Donnell, & Goodman, 1991). For these reasons, any intervention implemented in a public school setting should be relatively simple, focused, take little time to learn, and be easy-to-implement with demonstrated effectiveness in reducing classroom disruptive behaviour (Berger, 1982; Cook, Landrum, Tankersely, & Kauffman, 2003; Gottfredson et al., 2000; Kratochwill & Van Someren, 1985; Lannie & McCurdy, 2007; Malouf & Schiller, 1995; Reimers et al., 1987; Wheldall & Merrett, 1987).

Given that the majority of disruptive behaviour occurs in classrooms rather than in other parts of the school (Algozzine et al., 2008), that the teacher-student relationship is a protective factor for at-risk children (Hamre & Pianta, 2005, 2006; Pianta & Steinberg, 1992), and that teachers lack training but are very eager to learn about classroom behaviour management (Pilarski, 1994; Padeliadu & Patsiodimou, 2000; Purcell & Seifert, 1982; Tulley & Chiu, 1995), intervention focused on teacher behaviour in the classroom rather than on the entire school system may be the most efficient strategy for producing meaningful changes in student behaviour.

In recent years, there has been a increased focus on the classroom environment and more specifically, on what qualities or characteristics make for effective teaching, given that a
growing number of studies of statewide programs have found that classrooms are the greatest source of variance in terms of what students learn while they attend school (Nye, Konstangopoulos, & Hedges, 2004; Pianta & Hamre, 2009). Research has found that differences in teachers' implementation of classroom programs and interventions are the primary factor determining student outcomes (Domitrovich & Greenberg, 2004; Pianta & Hamre, 2009). Teachers are the frontline workers of the school, spending a large proportion of their time interacting directly with students and acting as parental surrogates as well as primary transmitters of socialization and culture (Johnson & Fullwood, 2006). Teacher-focused (i.e., classroom based) interventions may be far more cost efficient, less comprehensive, and thus more practical for implementation in busy public schools. In-service teacher-training approaches present as the simplest most cost-efficient teacher-focused method of intervention.

**In-Service Teacher Training**

Reviews of the effectiveness of in-service teacher training (e.g., Duke & Jones, 1984; Stage & Quiroz, 1997) indicate that this type of intervention can produce significant positive changes in teacher and student behaviour. Teacher training programs vary widely in scope, from brief and targeted interventions to long-term and comprehensive approaches. They also vary widely in terms of target student population, with some programs targeting individual students, others focusing on classrooms, and yet other programs, such as SWPBS, targeting entire schools or school systems. These strategies are ideal for school settings since they can often be incorporated into the regular functioning of the school (e.g., teacher professional development days) and are not as labour-intensive or time-intensive for trainers as are more direct, hands-on interventions.

As previously mentioned, many government and community organizations and leading researchers advocate for the adoption of more proactive approaches to behaviour management in
the schools (Hunter, 2003; Lewis & Sugai, 1999; Sugai & Horner, 2002; Walker, 2004).

Wheldall & Merrett’s (1992) positive teaching is an example of a teacher-training program designed to prevent disruptive behaviour at the classroom level. Teachers were taught a narrow range of discrete classroom behaviour management skills over a period of six, one-hour training sessions. Results indicated average increases of on-task student behaviour ranging from 10 to 20%, as well as significant increases in teacher’s use of praise and decreases in teacher’s use of reprimands.

**Critical Components of In-Service Teacher Training**

**Use of performance-based strategies.** Studies examining the effectiveness of various techniques used in in-service teacher training programs highlight the importance of performance-based strategies. Common examples of performance-based strategies are role-playing, modelling, and feedback. Didactic training, although essential, has been found to be ineffective in altering teacher behaviour when used in isolation (Allen & Forman, 1984; Reid & Parsons, 2000). Instead, a combination of didactic and performance-based training strategies has been found to be most effective (Reid, Parsons, & Green, 1989). Similarly, Merrett & Wheldall (1984) highlight the need for teacher training to be both theoretical and practical.

**Treatment integrity and follow-up feedback.** Intervention implementation or treatment integrity is the degree to which the trained teacher actually implements or practices the skills or intervention as planned (Moncher & Prinz, 1991). As previously mentioned, the success rate for implementation of intervention programs in school settings is generally very low (Berends et al., 2002; Berman, 1981; Gottfredson et al., 2000). Schools and school staff vary in the extent to which they are willing or able to implement a given program or intervention (Botvin, Baker, Filazzola, & Botvin, 1990; Botvin, Batson et al., 1989; Botvin, Dusenbury, James-Ortiz, & Kerner, 1989; Gottfredson et al., 2000). Numerous studies have demonstrated
the effectiveness of various follow-up procedures in enhancing teachers’ implementation of interventions (Codding, Feinberg, Dunn, & Pace, 2005; Mortenson & Witt, 1998; Noell et al., 2005; Noell, Gresham, & Gansle, 2002; Noell, Witt, Gilbertson, Ranier, & Freeland, 1997; Witt, Noell, LaFleur, & Mortenson, 1997). Performance feedback in particular, has been found to be highly effective in maintaining treatment integrity (Mortenson & Witt, 1998; Noell, Gresham et al., 2002). In many evaluations of treatment integrity in the schools, the initial rate of intervention implementation is often high, but decreases gradually over time (Noell, Duhon, Gatti, & Connell, 2002). Generally, the introduction of performance feedback strategies has been associated with significant improvements in treatment integrity (Noell, Duhon, et al., 2002). A study conducted by Sutherland, Wehby and Copeland (2000) found that high rates of behaviour-specific praise provided by teachers to behaviour disordered students occurred only in response to observer performance feedback.

The American Psychological Association (APA) has developed criteria for evaluating evidence based or empirically validated interventions. According to the APA, in order to make valid conclusions about treatment effectiveness, it is imperative to evaluate both student outcomes and treatment integrity (Hagermoser Sanetti, Luiselli, & Handler, 2007). In other words, evaluations of the effectiveness of in-service teacher training programs on reducing disruptive classroom behaviour must not only examine changes in student behaviour, but also must examine ongoing teacher behaviour. Despite this requirement, integrity data are rarely collected in intervention studies (Little et al., 2002). As previously discussed, the use of office discipline referrals as the sole outcome measure in SWPBS represents a major limitation of this approach as these data provide no indication of treatment integrity (Kern & Manz, 2004). The most reliable measures of treatment integrity in school settings are those obtained from direct observation of specific target behaviours of those responsible for intervention implementation.
(Pianta & Hamre, 2009). Unfortunately, obtaining such detailed, time and labour-intensive information in school settings is often prohibitive.

**The Present Study**

The present study was undertaken to evaluate the effects on teacher skills and student behaviour of an in-service teacher training program in proactive classroom behaviour management. The focus of the study was on training teachers in the use of strategies to prevent disruptive behaviour in their classrooms, and to facilitate the development of positive teacher-student interactions. The training program was designed to be brief and inexpensive, consisting of one four-hour workshop that comprised a combination of didactic and performance-based training methods. The general content of the program included a discussion of factors that contribute to student disruptive behaviour, an examination of concerns with use of reactive approaches, and specific performance-based training in various proactive moderating and remedial approaches to managing disruptive classroom behaviour. To maximize the impact of the brief training, each teacher received three brief follow-up feedback sessions.

An evaluation of the effects of the teacher training program on teachers’ use of classroom behaviour management strategies and on the on-task and off-task behaviour of the most disruptive students in each classroom was conducted. Observations of teacher skill use also allowed for the collection of treatment integrity data. Both rating scale measures and direct observations of student and teacher behaviour were used to evaluate program effectiveness. Several research questions were posed in this study:

1. Will teacher training result in an increase in teachers’ use of proactive behaviour management strategies?

2. Will teacher training result in a decrease in teachers’ use of reactive, punitive behaviour management strategies?
3. Will student on-task behaviour increase following teacher training?

4. Will student self-reports of behavioural difficulties decrease following teacher training?

5. Will teachers’ self-reported levels of efficacy increase following training, given the anticipated enhancement in their repertoire of classroom behaviour management strategies?

6. Will teachers’ self-reported perceptions of the frequency and severity of various student problem behaviours decrease following training?

7. Will teachers’ self-reported use of reactive strategies decrease following training?

8. Will teachers’ self-reported use of proactive strategies increase following training?

9. Will teachers’ self-reported attributions for student misbehaviour transform from attributions that are stable and internal to the student, to those that are more unstable and external to the student?

10. Will teachers’ self-reported emotional reactions to student misbehaviour become less negative?
Methods

Ethical Approval

Ethical approval for this study was granted by the Ethics Review Office of the University of Toronto, as well as the External Research Review Committee of the Toronto District School Board (TDSB).

Setting of the Study

The study was conducted in a large, JK to Grade 8 urban elementary school of approximately 440 students and 32 teachers (including music, physical education, and all special education teachers), in downtown Toronto. The school is located in a community of predominantly government and low-income housing. The school population is highly diverse. A high proportion of students are immigrants, or come from families who have recently immigrated to Canada. More than 65% of the student population comes from homes where English is not the first language and approximately 20% have been living in Canada for 5 years or less. The school has a variety of specialized academic programs to support student learning including ESL programs, Special Education, Integrated International Languages, African Studies, and French programs. A variety of International Languages programs are taught at the school, reflecting the broad diversity of the student body. Special education classes include a junior behaviour program and a learning disability program. The school also houses a day treatment classroom run by a local mental health agency (a 19 week program for students aged 6 to 8 with severe behaviour disorders).

Participants

Recruitment of teachers. The current study was designed in response to requests from teachers and the Principal at the school for training in the proactive model utilized in the school’s day treatment classroom and overseen by the professor supervising this research. Thus, a
number of teachers were able to observe aspects of the proactive model and its impact on student behaviour firsthand; they were enthusiastic about learning the model and applying it in their own classrooms.

Following ethical approval from both the University of Toronto and the TDSB, an information meeting was held for teachers at the school to describe the in-service teacher training study in greater detail, including a brief overview of the proactive model, observational methods, and responsibilities of participants. Each teacher was provided with an information letter and a teacher consent form. Teachers were encouraged to take home the information letter and review the information before making a decision about participation.

**Teachers.** Sixteen teachers participated in the study, with two additional teachers attending workshops (one in Group 3 and one in Group 4) but not participating. Of the 16 teachers, 10 were general education teachers, 3 were special education teachers, 2 were French teachers, and 1 was an advanced ESL teacher. Teachers were placed into four groups based on when they were available to attend the scheduled workshops. Groups 1 and 2 began the study in the first term of the school year, while Groups 3 and 4 began the study in the second term. Information relating to the grade or program taught and the gender of the participant teachers is listed in Tables 1 and 2.

**Recruitment of students.** Participant teachers were asked to select two students in their classroom who presented with challenging behaviour management difficulties and whose parents had been contacted in the past regarding these concerns. Participant teachers made the initial contact with the parents of these students and described the project to them via telephone. Teachers were provided with a recruitment script for contacting parents/guardians that briefly outlined the in-service teacher training program and associated research project. If parents expressed interest in having their child participate in the study, a project description was sent
home to parents and their consent was obtained to have the researcher contact them directly to describe the project in greater detail. Parents interested in participation after reviewing the project description and speaking with the researcher were then asked to review and sign a consent form. Once consent was obtained from parents, the primary investigator met individually with students to obtain their assent for participation in the study. If parents or students declined participation in the study, another parent/child was contacted for possible recruitment to the study until at least two student participants for each teacher had been enlisted. The only exception was the teacher of the advanced ESL class (Teacher M), who was unable to identify students with challenging behaviour, given that a requirement of enrolment in that program was academic success and no problem behaviour. Thus, no students in that classroom were recruited. An information letter describing the project was sent home to all parents of students who were not directly participating in the research (i.e., their teacher was a participant, but the student was not observed).

**Students.** Twenty-two students participated in the study. Sixteen were observed in the classroom of only one of the participant teachers, while five were observed in the classrooms of two participant teachers (i.e., students 4, 5, 9, 13, and 14) and one was observed in the classrooms of three participant teachers (i.e., student 8). Information relating to the gender and grade or program of the participant students is listed in Tables 1 and 2.

With regard to participant withdrawal, the parent of one of Teacher A's students withdrew consent for reasons unrelated to the study, leaving Teacher A with only one student participant. In addition, one of Teacher N's students was admitted into a special program after data collection had begun and was not in Teacher N's classroom often enough for study participation.
Table 1

Participant Teachers’ and Students’ Grade/Program and Gender: Groups 1 and 2

<table>
<thead>
<tr>
<th>Group</th>
<th>Teacher Gender</th>
<th>Grade/Program</th>
<th>Student Gender</th>
<th>Student Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher A</td>
<td>M</td>
<td>Grade 1</td>
<td>Student 1</td>
<td>M</td>
</tr>
<tr>
<td>Teacher B</td>
<td>F</td>
<td>Grade 6</td>
<td>Student 2</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 3</td>
<td>M</td>
</tr>
<tr>
<td>Teacher C</td>
<td>F</td>
<td>Grade 7</td>
<td>Student 4c</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 5c</td>
<td>M</td>
</tr>
<tr>
<td>Teacher D</td>
<td>F</td>
<td>Grade 8</td>
<td>Student 6</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 7</td>
<td>M</td>
</tr>
<tr>
<td>Teacher E</td>
<td>F</td>
<td>Junior French</td>
<td>Student 8e</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 9e</td>
<td>F</td>
</tr>
<tr>
<td>Group 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher F</td>
<td>F</td>
<td>Grade 1</td>
<td>Student 10</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 11</td>
<td>F</td>
</tr>
<tr>
<td>Teacher G</td>
<td>F</td>
<td>Grade 4</td>
<td>Student 12</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 13g</td>
<td>F</td>
</tr>
<tr>
<td>Teacher H</td>
<td>M</td>
<td>Grade 5</td>
<td>Student 8h</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 9h</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 14h</td>
<td>F</td>
</tr>
<tr>
<td>Teacher I</td>
<td>F</td>
<td>Junior Special Ed</td>
<td>Student 8i</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 14i</td>
<td>F</td>
</tr>
<tr>
<td>Teacher J</td>
<td>F</td>
<td>Intermediate Special Ed</td>
<td>Student 15</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student 16</td>
<td>M</td>
</tr>
</tbody>
</table>

Note. Students who were observed in multiple classrooms are denoted by a lowercase letter following their numeral. The lowercase letter indicates which teacher’s classroom they are being observed in.
### Table 2

**Participant Teachers’ and Students’ Grade/Program and Gender: Groups 3 and 4**

<table>
<thead>
<tr>
<th>Group</th>
<th>Teacher</th>
<th>Teacher Gender</th>
<th>Grade/Program</th>
<th>Student</th>
<th>Student Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 3:</td>
<td>Teacher K</td>
<td>M</td>
<td>Grade 7</td>
<td>Student 17</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Student 18</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Teacher L</td>
<td>F</td>
<td>Primary Special</td>
<td>Student 13l</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Student 19</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Teacher M</td>
<td>F</td>
<td>LEAP (advanced ESL)</td>
<td>Student 20</td>
<td>M</td>
</tr>
<tr>
<td>Group 4:</td>
<td>Teacher N</td>
<td>F</td>
<td>Grade 4</td>
<td>Student 21</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Teacher O</td>
<td>F</td>
<td>Grade 8</td>
<td>Student 22</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Teacher P</td>
<td>F</td>
<td>Intermediate French</td>
<td>Student 4p</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Student 5p</td>
<td>M</td>
</tr>
</tbody>
</table>

*Note.* Students who were observed in multiple classrooms are denoted by a lowercase letter following their numeral. The lowercase letter indicates which teacher’s classroom they are being observed in.

### Research Design

A multiple baseline across groups design was used, with time-series observational measurement throughout baseline and treatment. In this design, the baseline phase was initiated simultaneously for Groups 1 and 2 in term one of the school year, while the baseline phase was initiated simultaneously for Groups 3 and 4 in term two of the school year. Initiation of treatment was time-lagged sequentially across groups, with Group 1 receiving treatment one week before Group 2, and Group 3 receiving treatment one week before Group 4. With this design, the internal validity of the intervention is demonstrated if a similar pattern of change
(e.g., increases in teachers' use of proactive behaviour management strategies) occurs for participants only after treatment is introduced. Rating scale and questionnaire measures were administered before and after treatment to examine the social validity of treatment outcomes, and to provide additional evidence of treatment effects.

**Measures**

**Observers.** Seventy-nine percent of classroom behavioural observations were conducted by a research assistant who was blind to treatment conditions; 21% were conducted by the author. For the purposes of inter-observer agreement, 24% of all sessions were coded simultaneously by both observers, with the author acting as secondary observer.

**Observational measures of teacher skill implementation.** Observations of teachers' use of behaviour management strategies in the classroom served as the primary measure of the study. The research design involved time-series repeated observational measurements over time, which also permitted extensive evaluations of treatment integrity, or the extent to which teachers implemented the strategies they were taught in teacher training. A coding system was designed to measure the frequency of occurrence of various classroom behaviour management skills targeted in the teacher-training program (see Appendix A). Frequencies of reactive classroom behaviour management strategies were also measured. Three overall categories of teacher behaviour were observed: two categories of proactive teacher behaviours (reinforcement and antecedent strategies) and one category of reactive teacher behaviour.

**Reinforcement.** This category incorporated all positive teacher behaviour directed towards students in response to desirable student behaviour and comprised two teacher behaviours: praise and reward. *Praise* was defined as non-tangible verbal or non-verbal recognition of desirable student behaviour. Some examples included saying “good job”, “nice listening”, “thank you for ignoring that disruption”, patting a student on the back, and giving a
student a high five. *Reward* was defined as tangible verbal or non-verbal recognition of desirable student behaviour, including offers of tangible rewards or privileges for desirable student behaviour. Some examples of this category included saying “if you keep working quietly you can have five extra minutes for recess”, and providing tokens, treats, or privileges for prosocial student behaviour.

**Antecedent behaviours.** This category was defined as positive teacher behaviour directed at increasing desirable student behaviour and/or decreasing undesirable student behaviour through use of antecedent strategies and comprised three teacher behaviours: prompt, building rapport, and priming for transition. The *prompt* code was used whenever the teacher impelled the student(s) to perform a desirable behaviour using a verbal, gestural, modelling, or physical prompt. An outright request or demand was not considered a prompt. Some examples included pointing to a question in a textbook to get the student to start working, scaffolding a student response such as “The capital city of Canada is O..”, or saying “what’s the first thing we do when we come in for recess?” while modelling the act of hanging up a coat on a hook. The *building rapport* code was used whenever the teacher engaged the student(s) in conversation about a topic of interest to the student or about the student’s life. The *priming for transition* code was used whenever the teacher provided the student(s) with verbal or non-verbal warning or signal of impending transition. Some examples included altering a schedule on the board, and telling the students “you have three minutes left to work on this activity”.

**Reactive responses.** This category incorporated all teacher responses directed towards stopping undesirable student behaviour and was comprised of five teacher behaviour categories: reprimand, time-out, withdrawal of privilege, threats, and other. *Reprimand* was coded each time a teacher responded to student behaviour with a negative statement (e.g., “be quiet while you do your work”, “stop talking to your friend!”). *Time-out* was coded whenever the teacher
sent a student to work in a separate location in the classroom or outside of the classroom in response to disruptive student behaviour, with the goal of removing that student from the ongoing activity of the class. *Withdrawal of privilege* was defined as the removal of tangible rewards or privileges in response to undesirable student behaviour (e.g., removing tokens for noncompliance, keeping a student in for recess for talking in class, and reducing computer time for being off-task). *Threats* was coded whenever teachers threatened students with negative consequences in their attempt to terminate aversive or disruptive student behaviour (e.g., threatening to cancel physical education if the students don't stop talking, threatening to call a parent if a student doesn't stop misbehaving). *Other* was coded whenever teachers expressed any other type of negative response to student behaviour not included in the first four categories, including facial or gestural responses (e.g., frowning, glaring), putting the student’s name on the blackboard, making derogatory personal comments about the student, and making negative remarks about a student’s behaviour to other students.

**Observational measure of student task-related behaviour.** An interval coding system was designed to measure the task-related behaviour of two students in each of the participant teachers’ classrooms (see Appendix B). For each student, the coding of student task-related behaviour occurred during 8 minute sessions, while they were in the participant teacher’s classroom. Each student was observed in 10 second intervals, and after each interval, was coded as being engaged in one of four categories of task-related behaviour. The four overall categories of student task-related behaviour that were coded were: on-task non-disruptive behaviour, on-task disruptive behaviour, off-task non-disruptive behaviour, and off-task disruptive behaviour.

**On-task behaviour.** The on-task behaviour codes were used whenever the student was observed following teacher instructions, complying with teacher requests, or attending to teacher or task. This category comprised two student behaviours: on-task non-disruptive behaviour and
on-task disruptive behaviour. *On-task non-disruptive behaviour* was coded whenever the student was observed attending to teacher or task without disrupting their peers or the teacher. *On-task disruptive behaviour* was coded whenever the student was observed attending to teacher or task, while also exhibiting behaviours that were disruptive to the teacher or class. This category was added to the coding system after initial classroom observations revealed that a number of students obtained negative teacher attention for disruptive behaviours even as they were meeting the expectations of the classroom and attending to task. Some examples of this category included humming or making noises while working independently, tapping the desk while listening to a lesson, making comments to peers while working on an assignment, and lightly kicking a peer’s chair while attending to task.

**Off-task behaviour.** The off-task behaviour codes were used whenever the student was observed not following teacher instructions, complying with teacher requests, or attending to teacher or task. This category comprised two student behaviours: off-task non-disruptive behaviour and off-task disruptive behaviour. *Off-task non-disruptive behaviour* was coded whenever the student was observed to be inattentive to teacher or task without exhibiting any behaviours that were outwardly disruptive to the teacher or to peers, for example, staring into space during a lesson or during independent work and doodling on a paper instead of working independently on language work. Although this type of behaviour is not disruptive to teacher or peers, it can impede the learning and academic achievement of the target student. *Off-task disruptive behaviour* was coded whenever the student was observed to be not attending to teacher or task while exhibiting behaviours that were disruptive to the teacher or class. Some examples of this category included speaking out of turn, calling out during a lesson, speaking with classmates during work time, walking around the classroom, and all types of physical aggression against others.
**Inter-observer agreement.** Inter-observer agreement was calculated for teacher and student observational data coded simultaneously by both independent observers. These sessions represented 24% of coding sessions, including a random selection of sessions from baseline, post-training, and probes.

**Teacher skills.** Percentage of agreement for teacher skills was calculated by comparing the two observers' frequency counts for each of the 10 types of teacher behaviour. Agreement was defined as both observers independently coding the same specific teacher behaviour. Cases in which only one of the two observers reported observing a teacher behaviour were considered a disagreement. The ratios for each of the 10 teacher behaviours were then combined to calculate an overall percentage of agreement for the session. Agreement for teacher skill implementation ranged from 78% to 100%, with an average of 92%. As a guideline, inter-observer agreement should be over 80% (Kazdin, 2001).

**Student task-related behaviour.** Given that student task-related behaviour data was categorical in nature and that observers had to select one of the four categories of behaviour for each interval (i.e., a forced-choice coding system, in contrast with the frequency recording used for teacher behaviour), Cohen's kappa was used to calculate inter-observer agreement. Cohen's kappa is a coefficient that represents the proportion of inter-observer agreement, after chance agreement is taken into account (Cohen, 1960; Watkins & Pacheco, 2000). In the present study, Cohen's kappa was used for student task-related behaviour because it takes into account any chance agreement that may occur as a result of the "forced-choice" interval coding system. With respect to student task-related behaviour, the average coefficient obtained was .86, with a range of .54 to 1.00. As a guideline, coefficient values ranging between .40 to .60 are indicative of fair agreement, those ranging between .60 to .75 are indicative of good agreement, and those above .75 indicate excellent agreement (Watkins & Pacheco, 2000).
**Teacher report measures.** Four questionnaires were completed by participant teachers prior to teacher training and at the completion of data collection. These questionnaires were adapted from a questionnaire package developed for a study on teacher efficacy by Gordon (2001). For each of the questionnaires, with the exception of the Teacher Efficacy Scale, teachers were asked to complete the questionnaires while considering the students in their classroom that particular school year. This instruction was provided to facilitate a more accurate pre and post comparison of questionnaire data, as well as to provide teachers with a clear frame of reference when responding to questionnaire items.

**The Teacher Efficacy Scale.** The Teacher Efficacy Scale is a 16-item questionnaire requiring teachers to rate on a 6-point scale the degree of their agreement or disagreement with a variety of statements relating to teacher efficacy. Scores on this measure can range from 16 to 96, with higher scores signifying higher teacher efficacy. The Teacher Efficacy Scale was developed and validated by Gibson and Dembo (1984) to measure two aspects of Bandura's construct of self-efficacy (Bandura, 1977): self-efficacy expectation and outcome expectation. Self-efficacy expectation is defined as the belief of individuals that they have the "capabilities to organise and execute the courses of action required to produce given attainments" (Bandura, 1997, p.3). Outcome expectation is defined as an individual's assessment of the probable consequences of his or her actions (Brouwers & Tomic, 2003). The Teacher Efficacy Scale initially comprised 30 items and factor analyses of these items yielded 2 factors, which Gibson & Dembo (1984) interpreted as corresponding to Bandura's self-efficacy and outcome constructs. These 2 factors were conceptualized by Gibson & Dembo (1984) as personal teaching efficacy (PTE) and teaching efficacy (TE) respectively (Brouwers & Tomic, 2003). Personal teaching efficacy was believed to reflect "teachers' evaluation of their abilities to bring about positive student change" (Gibson & Dembo, 1984, p. 570), while teaching efficacy was thought to reflect
"the degree to which teachers believed the environment could be controlled, that is, the extent to which students can be taught given such factors as family background, IQ, and school conditions" (Gibson & Dembo, 1984, p. 570). Subsequent analyses of the 30 item scale revealed acceptable reliability coefficients from only 16 items, with 9 items loading on the PTE factor and 7 items loading on the TE factor. This shortened version of the Teacher Efficacy Scale is the most frequently used measure of teacher efficacy, and was used in the current investigation. Gibson and Dembo's (1984) analysis of the internal consistency reliabilities of the 16 item measure yielded Cronbach's alpha coefficients of .78 for the PTE factor, .75 for the TE factor, and .79 for the total scale. The existence of 2 factors has been corroborated by other researchers, with alphas ranging from .75 to .81 for the PTE factor and .64 to .77 for the TE factor (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

**The Student Behaviour Scale.** The Student Behaviour Scale is a 10-item behaviour checklist, empirically derived by Loney & Milich (1982) from the abbreviated Conners Teacher Rating Scale (Conners, 1969), which is designed to measure teacher perceptions of the severity and frequency of student problem behaviour. The scale requires teachers to rate on a 4-point scale the degree of various student problem behaviours observed in their classroom. Scores on this measure can range from 0 to 30, with higher scores signifying higher frequency and severity of student problem behaviours. In developing this scale, Loney & Milich (1982) selected items from the abbreviated Conners that best differentiated inattentive, impulsive, and overactive behaviours (called IO behaviours) from oppositional, defiant, and rule-breaking behaviours (called OD behaviours). The 10-item scale includes a 5-item IO subscale, and a 5-item OD subscale (Waschbusch & Willoughby, 2008). The scale is most often referred to as the Inattention/Overactivity with Aggression (IOWA) Conners Rating Scale. Internal consistency coefficient alpha values for the two subscales of the IOWA were .87 for the IO scale, and .83 for
the OD scale, with test-retest reliability of .87 and .85 respectively (Loney & Milich, 1982). Subsequent research has continued to discover high reliability and validity of the IOWA (Atkins, Pelham, & Licht, 1988; Atkins, Pelham, & Licht, 1989; Johnston & Pelham, 1986; Nolan & Gadow, 1994; Waschbusch & Willoughby, 2008). An additional item was added to this measure that required teachers to rate on a 4-point scale the degree of student aggression observed in their classroom.

*The Intervention Strategies Questionnaire.* The Intervention Strategies Questionnaire is a 26-item questionnaire requiring teachers to rate on a 5-point scale the frequency with which they use a variety of classroom behaviour management strategies. The scale was developed by Gordon (2001) and comprises three subscales: rewards (13 items), negative consequences (9 items), and severe punishment (4 items). The possible range of scores is different for each of the subscales: 0 to 52 for the rewards subscale, 0 to 36 for the consequences subscale, and 0 to 16 for the severe punishment subscale. Higher scores on a subscale signify more frequent use of that type of strategy. Factor analyses conducted by Gordon (2001) confirmed the presence of these three factors.

*The Teacher Attribution and Affect Scale.* The Teacher Attribution and Affect Scale is an 11-item questionnaire developed by Gordon (2001) that contains two sections, each incorporating a 5-point scale. One section requires teachers to rate the degree to which they believe certain factors are responsible for student problem behaviour (5 items), while the other section requires teachers to rate the extent of their affective reactions to a variety of student problem behaviour (6 items).

*Student report measure.* Only one questionnaire, the Behavior Assessment System for Children - Second Edition, Self-Report of Personality (BASC2-SRP) was completed by
participant students aged eight years or older, prior to teacher training and at the completion of data collection.

**BASC2-SRP.** The Behavior Assessment System for Children - Second Edition (BASC2; Reynolds & Kamphaus, 2004) is a standardized, norm-referenced instrument designed to assess the behaviours and self-perceptions of individuals aged 2 to 25. The BASC2 is a multi-method and multidimensional assessment tool, providing a triangulated view of a student's behavioural functioning by taking into account behavioural ratings and observations by teachers and parents, self-ratings, and background information and history. The primary goal of the BASC2 is to facilitate the differential diagnosis and educational classification of emotional and behavioural disorders, as well as to assist with determinations of programming assistance eligibility, overall program planning and evaluation. There are five components to the BASC2, however, the current investigation utilized only an abbreviated version of the Self-Report of Personality (SRP).

The SRP form of the BASC2 comprises two sections. In the first section, students rate a variety of statements describing their thoughts, feelings, and actions according to whether they agree or disagree with these statements. In the second section, students rate the frequency with which they experience or engage in certain thoughts, feelings, or activities (i.e., never, sometimes, often, almost always). There are three versions of the SRP based on the age of the respondent: child (age 8 to 11); adolescent (age 12 to 21); college (age 18 to 25). The child and adolescent versions of the BASC2 - SRP were used in the current investigation. Students younger than eight years of age did not complete the SRP. Students who had difficulty reading the SRP had the individual items and possible responses read to them by the examiner until the student understood the task and was able to discriminate the different response options on their own. The BASC2 - SRP can be scored on three types of scales, derived from factor analyses:
primary scales, composite scales, and content scales. Raw scores on the BASC2-SRP are converted to T-scores and percentile ranks. Standard scores can be separated by age, gender, or clinical status.

The BASC2-SRP was standardized in the United States based on 3400 ratings from the general population and 1527 ratings from clinical samples. Analyses of the internal consistency of the BASC2 yielded coefficient alphas mainly in the .90s for the composite scales and .80s for the individual scales across all three forms (parent, teacher, self-report) in both the general and clinical samples. Test-retest reliability of the BASC2 was demonstrated over 8 to 70 day intervals, with correlations ranging from .71 to .84 for the SRP form. Validity of the BASC2 was demonstrated by comparing the various forms of the BASC2 to several related behavioural assessment tools. Generally, correlations between subscales were high (in the .70s and .80s) when they addressed similar content. Specifically, with respect to the SRP form, correlations with other measures were generally moderate to strong (Reynolds & Kamphaus, 2004).

A shortened version of the BASC2 was administered to students in which items relating to atypicality, anxiety, depression, locus of control, somatization, relations with parents, and personal adjustment were removed, as these areas were not within the scope of interest of the present study.

Data Analysis

Observational measures. As previously mentioned, a multiple baseline across groups design was utilized in the current study, with time-series observational measurement throughout baseline and treatment. As is most common with single-case designs, visual analysis of graphical displays of observational data was used to examine possible intervention effects in individual and group data (Busk & Marascuilo, 1992). The primary strategy that guides visual analysis in determining whether a given intervention is successful is some graphical
demonstration that changes in behaviour occurred when, and only when, the intervention was implemented (Kazdin, 2001). To achieve this aim, graphical displays of observational data are examined to assess the magnitude of change, the rate of change, and the variability of behaviour (Kazdin, 2001; Parsonson & Baer, 1992).

The magnitude of change is assessed by examining changes in mean behaviour and level (i.e., discontinuity of responding) across the phases of study. The rate of change is assessed by analyzing changes in slope or trend across phases, as well as the immediacy of the change following introduction of the intervention. The variability of data or the degree to which behaviour fluctuates within and across phases is also examined (Kazdin, 2001; Horner et al., 2005). Immediate changes in behaviour following introduction of the intervention, large changes in mean behaviour across phases, and trends conforming to those predicted following introduction of the intervention are all good indicators of an effect (Horner et al., 2005).

In multiple-baseline designs, change is also evaluated across different baselines, to examine whether change occurs only when the intervention is introduced in sequence with each of the groups receiving intervention (Kazdin, 2001). Thus, a time-series wait-list control group comparison is made such that the baseline levels of one group of participants are compared to the concurrent post-training levels of another group of participants.

The use of parametric statistical analyses to examine overall trends in the data was precluded due to the impact of serial dependency and autocorrelation effects that are present to some extent in all repeated-measures designs. Autocorrelation is problematic for traditional inferential statistics because it violates one of the core assumptions upon which these statistics are based, that of independence between observations (Jensen, Clark, Kircher, & Kristjansson, 2007; West & Hepworth, 1991). Specifically, significant positive autocorrelations are associated with underestimates of Type I errors, while significant negative autocorrelations are associated
with overestimates of Type I errors (Jensen et al., 2007). Some researchers have argued that
dparametric statistical analyses are permitted in single-case studies where a preliminary test of
autocorrelation results is non-significant (Busk & Marascuilo, 1992; Krishef, 1991; Richards,
Taylor, Ramasamy, & Richards, 1999). However, research has shown that autocorrelations are
significantly underestimated in small sample sizes. Since the power to detect a nonzero
autocorrelation is dependent on the sample size, most single-case studies lack sufficient numbers
of observations required for the statistical power to conclude that the autocorrelations obtained
are nonexistent or negligible (Busk & Marascuilo, 1988; Busk & Marascuilo, 1992; Gorman &
Allison, 1996; Suen & Ary, 1987). Generally, inferences made regarding the existence or
magnitude of autocorrelation or serial dependency is dubious with sample sizes less than 50
(Busk & Marascuilo, 1988). For these reasons, some researchers advocate for the use of time-
series statistical analyses, randomization tests, or nonparametric tests in analyzing single-case
research (Busk & Marascuilo, 1992; see Appendix C for discussion of time-series statistical
analyses, randomization tests and percentage of non-overlapping data).

Nonparametric statistical tests make no assumptions about the nature or specific form of
a distribution from which data is drawn (Norman & Streiner, 2000). Nonparametric procedures
can be used with smaller sample sizes, and are appropriate for examining time-series data when
statistical time-series analysis techniques are ruled out (Busk & Marascuilo, 1992; Edgington,
1992; Fisch, 2001). Specifically, the Wilcoxon Signed Rank Test evaluates differences between
paired, repeated, or matched scores, with a focus on whether the scores differ significantly
(Green & Salkind, 2003). It is often used as an alternative to the paired t-test (Norman &
Streiner, 2000). Given the relatively small sample size of the current study (with the number of
data points per participant ranging from 17 to 35), the effect of serial dependency inherent in the
data, and the lack of assumptions about the distribution of the behaviours of interest in the
general population, parametric statistical analyses were ruled out. Instead, the Wilcoxon Signed Rank Test was used to analyze differences in overall mean pre-training and mean post-training scores. Thus, each participant’s mean pre-training and post-training score for each of the behaviours of interest was entered into analysis.

Teacher and student report measures. Due to the relatively small sample size of the current study and the skewed nature of the distribution of the data, the Wilcoxon Signed Rank Test was used to analyze all pre-post questionnaire data for both teachers and students.

Procedure

All observation sessions were conducted during regular school hours throughout the course of regular classroom activities and consisted of approximately 10 minutes of observation of teacher behaviour, and approximately 8 minutes of observation of student behaviour. Observations occurred Monday through Friday, in both the morning and afternoon. Thus, teachers and students were observed while engaged in a variety of classroom activities and academic subjects during different times of the day. The only exception to this were teachers and students in specialized programs such as French Language Instruction, where the scheduling of these programs was predetermined to occur only on certain days and times. During observations, coders did not interact with teachers and students in any way. They entered the classroom at a prearranged time and sat in a chair that had been set up for them.

Baseline. This phase occurred before teachers had received training in proactive classroom behaviour management. Teachers were instructed to teach and interact with the class in their typical manner. During baseline, a few of the teachers privately requested assistance or advice from the observers. On these occasions, teachers were encouraged to bring their questions, concerns, and particular issues with them for discussion to the teacher training workshops.
**Teacher training.** Teacher training consisted of a single four-hour workshop that took place at the school library on a Saturday morning, as per the preference of the participant teachers. Training was led by the professor supervising the current investigation, who was also the consulting psychologist to the day treatment program located in the school, and was co-facilitated by the author. The training workshop was conducted one week after the initiation of baseline for Groups 1 and 3, and two weeks after initiation of baseline for Groups 2 and 4. Teachers who attended the workshop were asked to refrain from discussing the content of the training with nonparticipant teachers and with participant teachers who had not yet attended the workshop.

The content of the workshop was taught using a combination of didactic training, modelling, role-playing, and performance feedback. Thirteen core principles of behaviour management were introduced during the workshop, embedded in a more general overview of reactive and proactive approaches to classroom behaviour management. These principles were grouped according to five overall categories: antecedent approaches, ecological approaches, behavioural rapport approaches, replacement skill approaches, and errorless approaches. Several of the 13 core principles or skills were modelled for the teachers by the trainers. With many strategies, the teachers themselves engaged in role-play activities that provided them with practice of the core skills. Typically, during modelling activities, teachers were asked to identify the skill being demonstrated and at times, to provide solutions to modelled situations based on the 13 core principles (i.e., applying their new knowledge and skills to deal with typical student problem behaviour encountered in the classroom). At the end of the workshop, teachers were provided with a handout containing all 13 of the core principles taught.

**Post-training.** Following the workshop training, observation sessions were conducted as in baseline. During post-training, performance feedback was provided on three occasions for
each participant teacher. In these instances, the author conducted observations as usual, then met briefly with the teacher, or in a few cases (when time did not allow for a meeting) sent an email providing them with feedback on their use of classroom behaviour management strategies. All performance feedback was provided in the same format: first, the teacher was praised for performing some skill well and/or encouraged to continue performing that skill, and second, a suggestion was made to the teacher about a skill they could try in the future or a skill they could work to improve. Attempts were made to provide the teacher with specific examples of situations observed in their classroom as a basis for the recommendations made. The first performance feedback session was provided approximately one week after training for teachers in all groups. The second session was provided three weeks after training for Groups 1 and 4, and two weeks after training for Groups 2 and 3. The final session was provided seven weeks after training for Group 1, six weeks after training for Group 2, four weeks after training for Group 3, and five weeks after training for Group 4. All variations in timing of feedback sessions were due to scheduling difficulties. The duration of the post-training phase was nine weeks for Groups 1 and 2, and eight weeks for Groups 3 and 4 (not including school holidays).

**Follow-up probes.** Approximately 4 to 6 follow-up observations were conducted several weeks after the completion of the post-training phase. These observation sessions were conducted in the same way as during baseline and post-training phases. An exception was Teacher N who had no follow-up observations due to maternity leave. Follow-up probes began five weeks after the completion of the post-training phase for Groups 1 and 2, and two weeks after post-training for Groups 3 and 4. Follow-up probes ended 17 weeks after the completion of the post-training phase for Groups 1 and 2, 8 weeks after the completion of the post-training phase for Group 3, and 7 weeks after the completion of the post-training phase for Group 4. The duration of the follow-up phase was shorter for Groups 3 and 4 because their participation in the
study began in term two of the school year (i.e., January) and follow-up sessions necessarily ended before the school year was over.
Results

Results relating to observational measures are presented first, followed by self-report measures. Within each of these sections, teacher data precedes student data.

Teacher Skill Implementation

Teacher skill implementation data are presented below according to each of the three categories of behaviour: reinforcement, antecedent behaviours, and reactive responses. Data for each category of behaviour will be examined at the individual, group and overall level.

At the individual level, data for each outcome variable is represented in time-series graphs for each teacher (organized by group), for all baseline, post-training, and follow-up sessions. In these graphs, sessions for which teachers received feedback are denoted by square data points, whereas all other sessions are denoted by circular data points.

At the group level of data analysis, group mean frequencies for each outcome variable, for every session across all phases of the study, are presented in time-series graphs. The group graphs are presented to make general trends in the data more apparent. To prevent distortion of group trends, sessions within groups which contained only one data point (i.e., data was collected for only one teacher in the group on that day) are omitted from the group graphs, as means could not be calculated for those sessions. Given the diversity of teachers with respect to grade or program taught, and the inflexibility of some of their schedules (especially French and Special Education teachers), this procedure resulted in the omission of 13 sessions from Groups 1 and 2, 20 sessions from Group 3 and 17 sessions from Group 4. Thus, group graphs are meant only as an approximation of overall group trends (all teacher session data points are included in the individual graphs and in statistical analyses).

At the overall level of data analysis, the overall mean frequency of specific teacher behaviours per session, across all groups of teachers was calculated for baseline, post-training,
and follow-up. Box plots were also used to depict the distribution of the mean baseline, post-training, and follow-up data for all participants, for each of the outcome variables. The line inside each box represents the median of the distribution, while the bottom and top edges of the box fall at the lower and upper quartiles (25\textsuperscript{th} and 75\textsuperscript{th} percentile, respectively). Thus, the middle 50\% of the distribution is contained within the box (i.e., the interquartile range, or IQR). The vertical lines or t-bars that extend from the box, called the whiskers, depict the minimum and maximum data points of the distribution, and can extend to a maximum of 1.5 times the IQR. Data points that fall outside 1.5 IQR are depicted outside of the whiskers as outliers (Norman & Streiner, 2000). Outliers in the present study are classified as high outliers (i.e., the participant’s score fell well above that of the other participants) or low outliers (i.e., the participant’s score fell well below that of the other participants). In addition to box plots, results of the Wilcoxon Signed Rank Test are presented. This test was conducted to test the significance of the difference between mean baseline and mean post-training scores, and mean baseline and follow-up scores, for each of the outcome variables.

Reinforcement. The frequency of reinforcement for each teacher (organized by group), for all baseline, post-training, and follow-up sessions is presented in time-series graphs in Figures 1, 2, and 3. Although there is considerable variability within and between subjects, there appears to be a clear and immediate increase in the frequency of reinforcement following the teacher training for most participants.

Graphs of group mean frequency of reinforcement per session, across each of the three phases of the study are depicted in Figure 4. In these graphs, an upward shift in the mean frequency of reinforcement immediately following teacher training is evident. Although considerable variability is apparent within and between groups, post-training sessions appear to be associated with higher mean values than do baseline sessions for all four groups of
participants. Between-group comparisons of effects clearly indicate that increases in reinforcement occurred only after the introduction of teacher training. Thus, Group 1 showed mean increases in the frequency of reinforcement before Group 2, and only after teacher training, and Group 3 showed mean increases in reinforcement before Group 4, and only after teacher training. Moreover, increases in the frequency of reinforcement appear to be maintained at 5 weeks to 17 weeks follow-up for Groups 1 and 2, 2 weeks to 8 weeks follow-up for Group 3, and 2 weeks to 7 weeks follow-up for Group 4.

The overall mean frequency of teacher reinforcement per session across all teachers was 3.82 in baseline, 8.91 during post-training, and 7.73 during follow-up. The box plots for the mean frequency of teacher reinforcement in baseline, post-training, and follow-up are presented in Figure 5. Visual inspection of the box plots clearly indicates higher levels of reinforcement in post-training as compared with baseline, and to a lesser extent, higher levels of reinforcement in follow-up as compared with baseline. Teacher A is identified as a high outlier in the baseline phase of the study, however this teacher’s baseline data exhibited an overall declining trend, suggesting a gradual decrease in his average frequency of reinforcement over time, prior to the teacher training. The box plots also reveal that Teacher L is a high outlier with respect to mean follow-up levels of reinforcement. Teacher L was one of only five teachers overall whose mean frequency of reinforcement increased from post-training to follow-up.

The results of the Wilcoxon Signed Rank Test indicated a significant overall baseline to post-training difference in the mean level of reinforcement, \( z = -3.46, p < .01 \). A Wilcoxon Signed Rank Test was also conducted to more closely examine the longer term impact of the teacher training, revealing a significant overall baseline to follow-up difference in the mean level of reinforcement, \( z = -3.18, p < .01 \).
Figure 1. Teacher frequency of reinforcement per session across all study phases for Group 1.
Figure 2. Teacher frequency of reinforcement per session across all study phases for Group 2.
Figure 3. Teacher frequency of reinforcement per session across all study phases for Group 3 and Group 4.
Figure 4. Group mean frequency of reinforcement per session across all study phases.
Antecedent behaviours. The frequency of antecedent behaviours for each teacher (organized by group), for all baseline, post-training, and follow-up sessions are presented in time-series graphs in Figures 6, 7, and 8. Considerable variability within and between subjects is evident in these data, although there appears to be a general increase in the frequency of antecedent behaviours following the teacher training for most of the teachers.

Graphs of group mean frequency of antecedent behaviours per session across each of the three phases of the study are depicted in Figure 9. In these graphs, an upward shift in the mean frequency of antecedent behaviours following teacher training, is evident for all groups. Although there is considerable variability within and between groups, post-training sessions seem to be associated with higher mean values of antecedent behaviours than are baseline sessions for all four groups of participants. Between group comparisons of effects suggest that
increases in antecedent behaviours occurred only after the introduction of teacher training. Visual analysis of the follow-up data indicates that increases in antecedent behaviours appear to be maintained at 5 weeks to 17 weeks follow-up for Groups 1 and 2, 2 weeks to 8 weeks follow-up for Group 3, and 2 weeks to 7 weeks follow-up for Group 4.

The overall mean frequency of teacher antecedent behaviour per session across all teachers was 1.75 in baseline, 4.60 in post-training, and 5.70 in follow-up. The box plots for the mean teacher antecedent behaviours for baseline, post-training, and follow-up are presented in Figure 10. Visual inspection of the box plots clearly reveals higher levels of antecedent behaviours in post-training as compared with baseline, and an even more pronounced difference between follow-up and baseline.

The results of the Wilcoxon Signed Rank Test indicated a significant overall baseline to post-training difference in the mean level of antecedent behaviours, $z = -3.52, p < .01$, as well as a significant overall baseline to follow-up difference in the mean level of antecedent behaviours, $z = -3.35, p < .01$. 
Figure 6. Teacher frequency of antecedent behaviours per session across all study phases for Group 1.
Figure 7. Teacher frequency of antecedent behaviours per session across all study phases for Group 2.
Figure 8. Teacher frequency of antecedent behaviours per session across all study phases for Groups 3 and 4.
Figure 9. Group mean frequency of antecedent behaviours per session across all study phases.
Reactive responses. The frequency of reactive responses for each teacher (organized by group), for all baseline, post-training, and follow-up sessions are presented in time-series graphs in Figures 11, 12, and 13. Data for Teacher E and Teacher P are displayed on a larger scale to accommodate their comparatively higher levels of reactive responding. Although variability within and between subjects is evident in these data, there appears to be an overall general decrease in the frequency of reactive responses following the teacher training. Most teachers exhibited an immediate decrease in reactive responses following training, with the exception of Teachers D and L, who showed extremely low levels of reactive responding in baseline, creating a floor effect that prevented further improvement.

Graphs of group mean frequency of reactive responses per session, across each of the three phases of the study are depicted in Figure 14. In these graphs, the decrease in mean
frequency of reactive responses following teacher training is evident. Between group comparisons of effects suggest that decreases in reactive responding occurred only after the introduction of teacher training, regardless of when that training occurred. Furthermore, reductions in reactive responding appear to be maintained at 5 weeks to 17 weeks follow-up for Groups 1 and 2, 2 weeks to 8 weeks follow-up for Group 3, and 2 weeks to 7 weeks follow-up for Group 4.

The overall mean frequency of teacher reactive responses per session, across all teachers was 7.08 in baseline, 1.49 in post-training, and 1.23 in follow-up. The box plots for the mean teacher reactive responses in baseline, post-training and follow-up are presented in Figure 15. Visual inspection of the box plots clearly indicates lower levels of reactive responding in post-training as compared with baseline, and in follow-up as compared with baseline.

The results of the Wilcoxon Signed Rank Test indicated a significant overall baseline to post-training difference in the mean level of reactive responses, \( z = -3.36, p < .01 \), as well as a significant overall baseline to follow-up difference in the mean level of reactive responses, \( z = -3.23, p < .01 \).
Figure 11. Teacher frequency of reactive responses per session across all study phases for Group 1.
Figure 12. Teacher frequency of reactive responses per session across all study phases for Group 2.
Figure 13. Teacher frequency of reactive responses per session across all study phases for Groups 3 and 4.
Figure 14. Group mean frequency of reactive responses per session across all study phases.
Figure 15. Distribution of the mean frequency of reactive responses during baseline, post-training, and follow-up.

Student Task-Related Behaviour

Student task-related behaviour data is presented below according to each of the four categories of behaviour: on-task non-disruptive behaviour, on-task disruptive behaviour, off-task non-disruptive behaviour, and off-task disruptive behaviour. As with the teacher skill implementation data, data for each category of behaviour will be examined at the individual level, the group level and the overall level.

At the individual level, data for each outcome variable is displayed in time-series graphs for each student (organized by group and teacher), for all phases of the study. At the group level of data analysis, group mean percentage of task-related behaviour, for each session across all phases of the study, are presented in time-series graphs in order to make general trends in the data more apparent. To prevent distortion of trends, sessions within groups which contained
only one data point (i.e., data was collected for only one student in the group on that day) were omitted from the group graphs as group means for those sessions could not be calculated. This resulted in the omission of five sessions for Group 1, one session for Group 2, seven sessions for Group 3, and seven sessions for Group 4. Thus, as with teacher data, group graphs for student behaviours are meant only as an approximation of overall group trends (all student session data points are included in individual graphs and statistical analyses).

At the overall level of data analysis, the mean frequency of student behaviour per session across all students, regardless of group, was calculated for baseline, post-training, and follow-up. Box plots were also constructed to illustrate the distribution of the mean baseline, post-training, and follow-up data for all participant students, for each of the outcome variables. In addition, results of Wilcoxon Signed Rank Tests are presented. This analysis was conducted to test the significance of the difference between mean baseline and mean post-training scores, and mean baseline and follow-up scores, for each of the four outcome variables.

**On-task non-disruptive behaviour.** The percentage of on-task non-disruptive behaviour for each student (organized by group and teacher), for all baseline, post-training, and follow-up sessions is presented in time-series graphs in Figures 16 to 21. The letter preceding each student's label on individual graphs denotes that student's teacher (e.g., O - Student 21 indicates that data for Student 21 was obtained while in Teacher O's classroom). Although considerable variability within and between subjects is evident in these data, there appears to be an increase in the percentage of on-task non-disruptive behaviour following teacher training for most students. Visual inspection of the individual graphs reveals a general trend of higher levels of on-task non-disruptive behaviour in post-training as compared with baseline, with a few exceptions.
Graphs of group mean percentage of on-task non-disruptive behaviour for each session, across all phases of the study are depicted in Figure 22. A visual inspection of these graphs reveals improvements in mean percentage of on-task non-disruptive behaviour following teacher training for each group of students. Between group comparisons of effects suggest that increases in on-task non-disruptive behaviour occurred only after the introduction of teacher training. Moreover, visual inspection of the follow-up data suggests that increases in on-task non-disruptive behaviour appear to be maintained at 5 weeks to 16 weeks follow-up for Groups 1 and 2, and at 2 weeks to 6 weeks follow-up for Groups 3 and 4.

The overall mean percentage of on-task non-disruptive behaviour per session, across all students was 42.48% in baseline, 72.44% in post-training, and 70.94% in follow-up. The box plots for the mean student on-task non-disruptive behaviour are presented in Figure 23. A visual inspection of the box plots reveals higher levels of on-task non-disruptive behaviour in post-training, as compared with baseline, and higher levels of on-task non-disruptive behaviour in follow-up as compared with baseline. Student 19 is identified as a high outlier in the baseline phase of the study, indicating that her mean baseline percentage of on-task non-disruptive behaviour was significantly higher than that of the other students, and quite high overall (with 100% being the highest possible value). Such high levels of on-task non-disruptive responding in baseline creates a ceiling effect that leaves little room for improvement in post-training.

The results of the Wilcoxon Signed Rank Test indicated a significant overall baseline to post-training difference in the mean percentage of on-task non-disruptive behaviour, $z = -4.68$, $p < .01$. A significant overall baseline to follow-up difference in the mean percentage of on-task non-disruptive behaviour, $z = -4.62$, $p < .01$, was also found. Because the student data were confounded, with some students acting as multiple participants due to their presence in more than one classroom (and therefore appearing more than once in the data), Wilcoxon Signed
Rank Tests were performed again, with all student multiples removed from the data. Thus, all data belonging to Students 4, 5, 8, 9, 13, and 14 were removed, leaving 16 students remaining in the database. Results of these more circumscribed analyses revealed similar results: a significant overall baseline to post-training difference in the mean percentage of on-task non-disruptive behaviour, \( z = -3.46, p < .01 \), and a significant baseline to follow-up difference in the mean percentage of on-task non-disruptive behaviour, \( z = -3.41, p < .01 \).
Figure 16. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c.
Figure 17. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e.
Figure 18. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h.
Figure 19. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 2, Students 14h to 16.
Figure 20. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 3.
Figure 21. Percentage of on-task non-disruptive behaviour per session across all study phases for Group 4.
Figure 22. Group mean percentage of on-task non-disruptive behaviour per session across all study phases.
On-task disruptive behaviour. The percentage of on-task disruptive behaviour for each student (organized by group and teacher), for all baseline, post-training, and follow-up sessions is presented in time-series graphs in Figures 24 to 29. Data for Student 16 is displayed on a larger scale to accommodate a comparatively higher percentage of on-task disruptive behaviour. As can be seen in Figures 24 to 29, there is considerable variability within and between subjects. No consistent trends in the data are discernable overall, with a few students appearing to exhibit an overall decrease in the level of on-task disruptive behaviour in post-training as compared with baseline, a few showing an increase, and several showing no obvious change.

Graphs of group mean percentage of on-task disruptive behaviour for each session, across all phases of the study are depicted in Figure 30. In these graphs, consistent trends in the
data are difficult to discern, with only the Group 1 data showing a decrease in this behaviour following teacher training.

The overall mean percentage of on-task disruptive behaviour per session across all students was 14.74% in baseline, 10.82% in post-training, and 12.40% in follow-up. The box plots for the mean student on-task disruptive behaviour are presented in Figure 31. The box plots reveal that the mean percentage of on-task disruptive behaviour was lower during post-training than baseline. To a lesser extent, the follow-up data were also lower than baseline for this behaviour.

The results of the Wilcoxon Signed Rank Test indicated a significant overall baseline to post-training difference in the mean percentage of on-task disruptive behaviour whether all students were included in the analysis, \( z = -2.07, p < .05 \), or only non-multiple students, \( z = -2.74, p < .05 \). In contrast, the results of the Wilcoxon Signed Rank Test conducted on baseline and follow-up data, revealed that the difference between these means was not significant whether all students were included in the analysis, \( z = -1.09, p = .27 \), or only non-multiple students, \( z = -1.76, p = .08 \).
Figure 24. Percentage of on-task disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c.
Figure 25. Percentage of on-task disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e.
Figure 26. Percentage of on-task disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h.
Figure 27. Percentage of on-task disruptive behaviour per session across all study phases for Group 2, Students 14h to 16.
Figure 28. Percentage of on-task disruptive behaviour per session across all study phases for Group 3.
Figure 29. Percentage of on-task disruptive behaviour per session across all study phases for Group 4.
Figure 30. Group mean percentage of on-task disruptive behaviour per session across all study phases.
Figure 31. Distribution of the mean percentage of on-task disruptive behaviour for baseline, post-training, and follow-up.

Off-task non-disruptive behaviour. The percentage of off-task non-disruptive behaviour for each student (organized by group and teacher), for all baseline, post-training, and follow-up sessions is presented in time-series graphs in Figures 32 to 37. Data for Students 14i and 13l are displayed on a larger scale than the others to accommodate their comparatively higher percentage of off-task non-disruptive behaviour. Considerable variability within and between subjects is evident in Figures 32 to 37. Consistent trends are difficult to discern in the individual data with some students showing decreases in off-task non-disruptive behaviour, some showing increases, and others no obvious change.

Graphs of group mean percentage of off-task non-disruptive behaviour for each session, across all phases of the study are depicted in Figure 38. A visual inspection of these graphs suggests a decrease in the mean percentage of off-task non-disruptive behaviour in post-training
as compared with baseline for Group 2, and to a lesser extent, Group 4. No changes are apparent for Group 1 or Group 3. Visual inspection of the follow-up data suggests that increases in on-task non-disruptive behaviour appear to be maintained at two weeks to six weeks follow-up for Group 2.

The overall mean percentage of off-task non-disruptive behaviour per session across all students was 17.74% in baseline, 10.42% in post-training, and 10.35% in follow-up. The box plots for the mean student off-task non-disruptive behaviour are presented in Figure 39. The box plots reveal that the mean percentage of off-task non-disruptive behaviour was lower during post-training as compared with baseline, and was even lower during follow-up.

A significant overall baseline to post-training difference in the mean percentage of off-task non-disruptive behaviour was found whether all students were included in the analysis, $z = -3.77$, $p<.01$, or only non-multiple students, $z = -2.43$, $p<.05$. Moreover, a significant overall baseline to follow-up difference in the mean percentage of off-task non-disruptive behaviour was found when all students were included in the analysis, $z = -2.96$, $p<.01$, but not when only non-multiple students were included in the analysis, $z = -1.82$, $p=.07$. 
Figure 32. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c.
Figure 33. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e.
Figure 34. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h.
Figure 35. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 2, Students 14h to 16.
Figure 36. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 3.
Figure 37. Percentage of off-task non-disruptive behaviour per session across all study phases for Group 4.
Figure 38. Group mean percentage of off-task non-disruptive behaviour per session across all study phases.
Off-task disruptive behaviour. The percentage of off-task disruptive behaviour for each student (organized by group and teacher), for all baseline, post-training, and follow-up sessions is presented in time-series graphs in Figures 40 to 45. Data for Students 5c, 19, and 21 are displayed on a larger scale to accommodate their comparatively higher percentage of off-task disruptive behaviour. Despite the substantial variability within and between subjects, there appears to be an overall decrease in the percentage of off-task disruptive behaviour following the teacher training for most students.

Graphs of group mean percentage of off-task disruptive behaviour for each session, across all phases of the study are depicted in Figure 46. A visual inspection of these graphs clearly reveals a downward shift in the mean percentage of off-task disruptive behaviour immediately following teacher training for each group of students, as well as a general decrease

*Figure 39.* Distribution of the mean percentage of off-task non-disruptive behaviour for baseline, post-training, and follow-up.
in the overall levels of off-task disruptive behaviour in post-training as compared to baseline.

Furthermore, inspection of the follow-up data suggests that decreases in off-task disruptive behaviour generally appear to be maintained at 5 weeks to 16 weeks follow-up for Groups 1 and 2, and at 2 weeks to 6 weeks follow-up for Groups 3 and 4.

The overall mean percentage of off-task disruptive behaviour per session across all students was 24.73% in baseline, 6.04% in post-training, and 6.04% in follow-up. The box plots for the mean student on-task disruptive behaviour are presented in Figure 47 and reveal lower levels of off-task disruptive behaviour in post-training and follow-up as compared with baseline.

The results of the Wilcoxon Signed Rank Test indicated a significant overall baseline to post-training difference in the mean percentage of off-task disruptive behaviour whether all students were included in the calculation, $z = -4.70$, $p < .01$, or only non-multiple students, $z = -3.52$, $p < .01$. Similarly, a significant overall baseline to follow-up difference in the mean percentage of off-task disruptive behaviour was found whether or not student multiples were included in the calculations, $z = -4.55$, $p < .01$ and $z = -3.29$, $p < .01$, respectively.
Figure 40. Percentage of off-task disruptive behaviour per session across all study phases for Group 1, Students 1 to 5c.
Figure 41. Percentage of off-task disruptive behaviour per session across all study phases for Group 1, Students 6 to 9e.
Figure 42. Percentage of off-task disruptive behaviour per session across all study phases for Group 2, Students 10 to 9h.
Figure 43. Percentage of off-task disruptive behaviour per session across all study phases for Group 2, Students 14h to 16.
Figure 44. Percentage of off-task disruptive behaviour per session across all study phases for Group 3.
Figure 45. Percentage of off-task disruptive behaviour per session across all study phases for Group 4.
Fig. 46. Group mean percentage of off-task disruptive behaviour per session across all study phases.
Figure 47. Distribution of the mean percentage of off-task disruptive behaviour for baseline, post-training, and follow-up.

Teacher Report Measures

Box plots are utilized to visually display the distribution of values for pre- and post-training teacher questionnaire data. In addition, Wilcoxon Signed Rank Tests were conducted to test the significance of differences between pre- and post-training teacher questionnaire data. Note that Teacher K did not complete the Teacher Efficacy Scale or the Student Behaviour Scale in their entirety, and was therefore not included in any of the analyses relating to these two measures. The descriptive statistics for the pre- and post-training teacher questionnaire data as well as the results of the Wilcoxon Signed Rank Tests are summarized in Table 3. Box plots relating to each of the sub-scales are presented in Figures 48 to 55.

Of the 17 subscales and items on the teacher report questionnaires, only 4 demonstrated significant change from pre- to post-training. Teachers reported significantly less student
inattention and overactivity following training, however there was no change in reported levels of student oppositional and defiant behaviour. In terms of intervention strategies used, teachers reported significantly higher use of rewards in post-training as compared with pre-training, but there was no change in their reported use of negative consequences or severe punishment. While there were no significant differences in teachers' reported feelings about their students from pre-training to post-training, they did report feeling more confident about their ability to manage student misbehaviour following their training. Finally, in terms of teachers' attributions regarding student behaviour, the only significant difference between pre-training and post-training reports was that following training, teachers perceived student misbehaviour as being more temporary rather than chronic.
### Table 3

*Descriptive Statistics and Results of Wilcoxon Signed Rank Test for Teacher Questionnaires*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Pre-Training</th>
<th>Post-Training</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher Efficacy:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>M</td>
<td>SD</td>
<td>Range</td>
<td>M</td>
</tr>
<tr>
<td>Teacher Efficacy:</td>
<td>68.53</td>
<td>7.27</td>
<td>52-84</td>
<td>70.53</td>
</tr>
<tr>
<td><strong>Student Behaviour:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inattention/Overactivity</td>
<td>7.93</td>
<td>2.60</td>
<td>3-13</td>
<td>6.53</td>
</tr>
<tr>
<td>Oppositional/Defiant</td>
<td>4.07</td>
<td>2.46</td>
<td>0-9</td>
<td>4.40</td>
</tr>
<tr>
<td><strong>Intervention Strategies:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rewards</td>
<td>35.94</td>
<td>7.43</td>
<td>22-47</td>
<td>39.62</td>
</tr>
<tr>
<td>Negative Consequences</td>
<td>14.69</td>
<td>6.51</td>
<td>5-26</td>
<td>13.50</td>
</tr>
<tr>
<td>Severe Punishment</td>
<td>5.75</td>
<td>2.52</td>
<td>3-12</td>
<td>5.06</td>
</tr>
<tr>
<td><strong>Teacher Affect:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>3.06</td>
<td>1.29</td>
<td>1-5</td>
<td>2.56</td>
</tr>
<tr>
<td>Pity</td>
<td>2.94</td>
<td>1.06</td>
<td>1-5</td>
<td>2.94</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>2.69</td>
<td>1.58</td>
<td>1-5</td>
<td>2.50</td>
</tr>
<tr>
<td>Confidence</td>
<td>3.88</td>
<td>0.81</td>
<td>2-5</td>
<td>4.31</td>
</tr>
<tr>
<td>Guilt</td>
<td>2.13</td>
<td>1.36</td>
<td>1-5</td>
<td>1.81</td>
</tr>
<tr>
<td>Liking</td>
<td>4.81</td>
<td>0.54</td>
<td>3-5</td>
<td>4.69</td>
</tr>
<tr>
<td><strong>Teacher Attributions:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td>2.94</td>
<td>1.00</td>
<td>1-4</td>
<td>3.31</td>
</tr>
<tr>
<td>Stability</td>
<td>3.19</td>
<td>1.05</td>
<td>1-5</td>
<td>3.69</td>
</tr>
<tr>
<td>Controllability</td>
<td>2.94</td>
<td>0.85</td>
<td>1-4</td>
<td>2.75</td>
</tr>
<tr>
<td>Intentionality</td>
<td>3.69</td>
<td>1.01</td>
<td>1-5</td>
<td>4.00</td>
</tr>
<tr>
<td>Expectancy</td>
<td>1.56</td>
<td>0.73</td>
<td>1-3</td>
<td>1.69</td>
</tr>
</tbody>
</table>

*Note.* *p < .05.*
Figure 48. Distribution of teachers reported levels of teacher efficacy prior to and following the teacher training.

Figure 49. Distribution of teachers reported levels of student inattentive/overactive behaviour difficulties prior to and following the training.
Figure 50. Distribution of teachers reported levels of student oppositional/defiant behaviour difficulties prior to and following the training.

Figure 51. Distribution of teachers reported use of rewards as a classroom behaviour management strategy prior to and following the training.
**Figure 52.** Distribution of teachers' reported use of negative consequences as a classroom behaviour management strategy prior to and following the training.

**Figure 53.** Distribution of teacher's reported use of severe punishment as a classroom behaviour management strategy prior to and following the training.
Figure 54. Distribution of teachers' responses to items relating to teacher affect on the Teacher Attribution and Affect Scale.
Figure 55. Distribution of teachers’ responses to items relating to teacher attributions on the Teacher Attribution and Affect Scale.
Student Report Measures

Box plots are utilized to visually display the distribution of values for pre- and post-training student questionnaire data. In addition, Wilcoxon Signed Rank Tests are conducted to test the significance of any difference between pre- and post-training student questionnaire data. The descriptive statistics for the pre- and post-training student questionnaire data as well as the results of the Wilcoxon Signed Rank Tests are summarized in Table 4. Box plots relating to each of the sub-scales are presented in Figures 56 to 63.

Only one of the nine sub-scales administered demonstrated significant change from pre-to post-training. Students did not report any changes in their attitudes to teachers or school, nor to their feelings of social stress or sense of inadequacy. Similarly, students did not report changes in their attention or hyperactivity levels. With respect to personal adjustment, there was a significant increase from pre- to post-training, in students' reported levels of self-reliance (when only non-multiple students were included in the calculation), although there were no changes in their reported levels of self-esteem or interpersonal relations.
Table 4

*Descriptive Statistics and Results of Wilcoxon Signed Rank Test for Student Questionnaire*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Pre-training</th>
<th>Post-training</th>
<th>$z^a$</th>
<th>$p$</th>
<th>$z^b$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>Range</td>
<td>$M$</td>
<td>$SD$</td>
<td>Range</td>
</tr>
<tr>
<td>School Problems:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude to School</td>
<td>47.44</td>
<td>8.75</td>
<td>37-69</td>
<td>46.78</td>
<td>7.16</td>
<td>38-63</td>
</tr>
<tr>
<td>Attitude to Teachers</td>
<td>56.06</td>
<td>12.94</td>
<td>40-95</td>
<td>55.00</td>
<td>10.20</td>
<td>40-80</td>
</tr>
<tr>
<td>Social Stress</td>
<td>48.56</td>
<td>5.35</td>
<td>37-61</td>
<td>48.33</td>
<td>6.99</td>
<td>37-61</td>
</tr>
<tr>
<td>Sense of Inadequacy</td>
<td>47.56</td>
<td>6.34</td>
<td>39-64</td>
<td>48.83</td>
<td>6.53</td>
<td>38-64</td>
</tr>
<tr>
<td>Inattention/Hyperactivity:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention Problems</td>
<td>52.78</td>
<td>5.96</td>
<td>43-62</td>
<td>54.44</td>
<td>8.15</td>
<td>41-69</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>51.56</td>
<td>6.50</td>
<td>35-63</td>
<td>52.83</td>
<td>8.71</td>
<td>36-73</td>
</tr>
<tr>
<td>Personal Adjustment:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal Relations</td>
<td>53.78</td>
<td>5.90</td>
<td>39-62</td>
<td>52.78</td>
<td>4.45</td>
<td>42-59</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>53.78</td>
<td>7.07</td>
<td>34-61</td>
<td>53.17</td>
<td>8.79</td>
<td>30-59</td>
</tr>
<tr>
<td>Self-Reliance</td>
<td>47.94</td>
<td>8.09</td>
<td>30-67</td>
<td>49.78</td>
<td>8.58</td>
<td>26-59</td>
</tr>
</tbody>
</table>

*Note.* All students were included in calculations of pre- and post-training descriptive statistics. $N = 18$.

$z^a$ = the result of the Wilcoxon Signed Rank Test with all students included in the calculation.

$z^b$ = the result of the Wilcoxon Signed Rank Test with only non-multiple students included in the calculation.

*p < .05.*
Figure 56. Distribution of students' T-scores on the Attitude to School scale of the BASC2-SRP.

Figure 57. Distribution of students' T-scores on the Attitude to Teachers scale of the BASC2-SRP.
Figure 58. Distribution of students' T-scores on the Social Stress scale of the BASC2-SRP.

Figure 59. Distribution of students' T-scores on the Sense of Inadequacy scale of the BASC2-SRP.
Figure 60. Distribution of students’ T-scores on the Attention Problems scale of the BASC2-SRP.

Figure 61. Distribution of students’ T-scores on the Hyperactivity scale of the BASC2-SRP.
Figure 62. Distribution of students’ T-scores on the Interpersonal Relationships scale of the BASC2-SRP.

Figure 63. Distribution of students’ T-scores on the Self-Esteem scale of the BASC2-SRP.
Figure 64. Distribution of students' T-scores on the Self-Reliance scale of the BASC2-SRP.
Discussion

The present study was undertaken to evaluate the effectiveness and impact on both teacher and student outcomes of a brief teacher training program in proactive classroom behaviour management. The training was designed to be efficient and cost-effective. Results indicated that every teacher demonstrated some improvement in classroom management skills, including increases in use of reinforcement and/or antecedent strategies, and/or reductions in use of reactive responses to student problem behaviour. Similarly, the data indicate that the majority of students benefitted in some way from their teacher's training, demonstrating increases in on-task non-disruptive behaviour, and/or decreases in disruptive and off-task behaviour.

Visual and statistical analyses of group and overall teacher data revealed significant increases in the use of reinforcement and antecedent strategies, reported use of rewards as an intervention strategy, reported levels of confidence in their ability to manage student misbehaviour, and a shift in perception of student misbehaviour as being more temporary than chronic. Significant decreases in teacher reactive responses and reported levels of student inattention and overactivity were also demonstrated. With respect to students, visual and statistical analyses of group and overall data revealed increases in student on-task non-disruptive behaviour and reported levels of self-reliance. Student disruptive and off-task behaviour were significantly reduced.

Teacher Skill Implementation

Reinforcement. As with all other observational data in this study, individual time-series data trends were more difficult to interpret than group and overall data due to intra- and inter-participant variability. However, some general trends in the data were apparent. Prior to teacher training, most teachers exhibited low levels of reinforcement, with the exception of Teacher A, who demonstrated unusually high levels of reinforcement early on in baseline with a generally
decreasing trend throughout that phase. Following teacher training, overall rates of teacher reinforcement rose substantially, and were generally maintained throughout treatment, representing a mean increase of 5.1 reinforcement strategies per session across all teachers. High levels of reinforcement were also maintained at follow-up.

An increase in reinforcement was anticipated following the training session, given that the use of positive reinforcement was highlighted during teacher training as the foundation of effective proactive classroom behaviour management. Nevertheless, the gains obtained in the current study are impressive given the brief duration of teacher training and the importance of reinforcement in increasing student motivation and on-task behaviour (Cameron & Pierce, 1994; Kern & Clemens, 2007; Sutherland et al., 2000). The dramatic post-training increase in the use of reinforcement by the one teacher who did not exhibit the skill prior to teacher training (i.e., Teacher D), was particularly compelling. These results provide evidence that reinforcement strategies can be incorporated by teachers into their daily repertoire of classroom behaviour management skills following a brief teacher training workshop.

**Antecedent behaviours.** Teachers’ use of antecedent strategies prior to teacher training was relatively limited, with an overall mean of 1.8 per session across all teachers. Following teacher training, overall rates of antecedent strategy use rose significantly, with a mean increase of 2.8 antecedent behaviours per session. Such gains appeared to be maintained throughout follow-up, and some teachers even evidenced continued improvements in their use of antecedent strategies during this phase. In particular, Teachers D and J did not exhibit any antecedent behaviours prior to teacher training, but both of these teachers exhibited solid and stable improvements in their use of these strategies following teacher training, suggesting that, along with reinforcement strategies, antecedent behaviour management strategies can become part of teachers’ classroom management repertoire after a brief teacher-training workshop. These
results are encouraging given that such skill enhancement was achieved without intensive teacher support or extensive feedback.

Reactive responses. In accordance with research suggesting that teachers most often use coercive and punitive discipline practices in their attempts to manage classroom behaviour (Brophy, 1996; Hamre & Pianta, 2001; Lannie & McCurdy, 2007; Maag, 2001; Thomas et al., 2006), reactive discipline strategies were the most frequently used behaviour management strategy by teachers in the present study. Prior to teacher training, these strategies occurred at a mean frequency of 7.1 reactive responses per session. During post-training, the use of reactive responses declined significantly, with a mean decrease of 5.6 responses per session. In fact, reactive responses became the least used classroom behaviour management strategy, falling below the average use of reinforcement and antecedent strategies. These results are encouraging given research suggesting that teachers generally approve of the use of positive reinforcement, but can be resistant to decreasing their use of reactive approaches to managing student problem behaviour (Borg & Ascione, 1982; Merrett and Wheldall, 1984). Given that low rates of punitive discipline strategies are necessary for the development of a warm teacher-student relationship, the types of changes achieved in this study may have set the stage for improved teacher-student interactions that can serve as a protective factor for children at risk for school failure (Hamre & Pianta, 2005, 2006; Pianta & Steinberg, 1992). It is important to note that such a substantial decline in the use of reactive discipline strategies could have been due, in part, to teachers' increased use of more proactive strategies following teacher training. This may have led to improvements in student behaviour that rendered the use of such reactive strategies unnecessary.

Maintenance of Effects. In the present study, teachers appeared to maintain procedural integrity for proactive skill use throughout post-training and follow-up. This is a notable finding
given research indicating that with most school-based interventions, the initial rate of intervention implementation is often high, but tends to decrease gradually over time (Noell, Duhon et al., 2002). These maintenance results were likely due to the efficacy of the teacher training session in conjunction with the teacher feedback sessions that occurred after training. The feedback sessions may have prompted teachers to continue using skills acquired in training or provided them with a sense of being supported in their efforts to bring about change in their classrooms, thereby encouraging perseverance in their efforts. The present findings are consistent with research demonstrating that performance feedback is highly effective in maintaining treatment integrity (Mortenson & Witt, 1998; Noell, Duhon et al., 2002; Sutherland et al., 2000).

**Student Task-Related Behaviour**

**On-task non-disruptive behaviour.** Prior to teacher training, most students exhibited relatively low levels of on-task non-disruptive behaviour. Following the training workshop there was a distinct, immediate increase in the percentage of desirable student responding that was generally maintained throughout post-training. Overall, student on-task, non-disruptive behaviour in post-training represented a mean increase of 30% per session over baseline levels, higher than the 10 to 20% increase reported in Wheldall & Merrett’s 6 hour teacher training program (Wheldall & Merrett, 1992). Moreover, increased rates of on-task, non-disruptive behaviour were generally maintained throughout follow-up. Research suggests that the normative rate of on-task behaviour in the classroom is between 75% to 90%, with rates below 60% to 70% requiring some form of intervention (Lee et al., 1999; Lloyd & Loper, 1986; Witt, VanDerHeyden, & Gilbertson, 2004). Based on these figures, the students in the present study could be categorized as having rates of on-task behaviour that were in need of intervention before teacher training (i.e., 42.5%), even when both disruptive and non-disruptive forms of on-
task behaviour were summed together (i.e., 57.2%). Following teacher training, these students had improved to the extent that their on-task behaviour could be categorized as not in need of intervention, based solely on their level of on-task non-disruptive behaviour (i.e., 72.4%). Moreover, they would be classified as typical if both disruptive and non-disruptive forms of on-task behaviour were summed together (i.e., 83.3%). Thus, the mean increase in the rate of on-task non-disruptive behaviour from baseline to post-training was both clinically and statistically significant.

**On-task disruptive behaviour.** Individual data relating to on-task disruptive behaviour were difficult to interpret, as no clear trends in the data were discernable. Group graphs were also relatively difficult to interpret, with only Group 1 evidencing clear decreases in on-task disruptive behaviour. Overall, on-task disruptive behaviour was reduced by a mean of 3.9% per session, from baseline to post-training. Statistical tests revealed that the small post-training decline in mean rates of on-task disruptive behaviour was significant. Unfortunately, these small reductions in on-task disruptive behaviour were generally not maintained during follow-up.

Most research examining student task-related behaviour does not distinguish between disruptive and non-disruptive on-task behaviour. In the present study, these two types of on-task behaviour were distinguished as separate categories of behaviour after initial classroom observations revealed that a number of students obtained negative teacher attention for disruptive behaviours even as they were meeting the expectations of the classroom and attending to task. The results of the current study suggest that these two behaviours may indeed be distinct, given that they were affected quite differently by the current teacher training intervention. Specifically, on-task disruptive behaviour appears to be much more resistant to change than on-task non-disruptive behaviour, and both forms of off-task behaviour.
This is an important finding that may shed some light on data relating to the rigidity of teacher perceptions and attributions about student problem behaviour. It is possible that the persistence of student on-task disruptive behaviour makes it difficult for teachers to accurately assess the degree of positive change in student problem behaviour following implementation of proactive classroom behaviour management strategies. For example, such persistence of disruptive student behaviour may lead to more negative teacher views of intervention effectiveness, the students’ ability to change their behaviour, and/or their own ability to effect change in the classroom.

In the present study, on-task disruptive behaviour was the least observed behaviour during baseline, but was the second most observed behaviour during post-training and follow-up (after on-task non-disruptive behaviour). Perhaps initially, teachers were most concerned with reducing student off-task behaviour given that these behaviours compromised teaching and impinged upon student learning. Once student off-task behaviour had been substantially reduced following teachers’ implementation of proactive classroom behaviour management strategies, student on-task disruptive behaviour may have become a more obvious problem to teachers. Moreover, the lack of noticeable improvement in this category of student behaviour despite teachers’ concerted efforts to utilize their new skills may have led to teacher frustration.

In addition, teachers may have been unclear on how to deal with on-task disruptive behaviours, given that students continued to remain on task when they occurred. For example, some teachers may have praised students for being on-task while students were tapping their desk or humming out loud, and could have accidentally reinforced the disruptive behaviour. Alternatively, teachers may have reacted to student on-task disruptive behaviour with negative consequences, thereby reducing student on-task behaviour and/or providing unnecessary attention (i.e., inadvertent reinforcement) for disruptive behaviour. The current teacher training
program did not directly address on-task disruptive behaviour, but instead focussed on proactive behaviour management skills that could be applied to all types of student behaviour. It may be beneficial to directly teach strategies for dealing with student on-task disruptive behaviour in future teacher training programs.

**Off-task non-disruptive behaviour.** Rates of off-task non-disruptive behaviour were relatively low in the study’s sample of participant students, even during baseline, with a mean of 17.7% per session. Although such a low frequency does not leave a lot of room for reduction, these behaviours decreased by 7.3% per session from baseline levels, a statistically significant finding based on analyses of group and overall data. While trends were not clear for all individuals or for every group, there was also some indication that these reductions were maintained in follow-up.

**Off-task disruptive behaviour.** Prior to teacher training, off-task disruptive behaviour was the second most observed student behaviour, with a mean of 24.7% per session. Analyses of group and overall data revealed a distinct, immediate decrease in the percentage of off-task disruptive behaviour following teacher training that was generally maintained throughout post-training, representing a significant overall mean decline of 18.7% per session over baseline levels. These reduced rates of off-task disruptive behaviour were also generally maintained throughout follow-up, and represented such an improvement that off-task disruptive behaviour became the most infrequently observed student behaviour in both post-training and follow-up. Thus, the mean decrease in the rate of off-task disruptive behaviour from baseline to post-training was clinically significant in addition to being statistically significant. This finding is noteworthy given that student disruptive behaviour (including disrespect, non-compliance, swearing, and excessive noise) is often cited as being of greatest concern to teachers (Bibou-Nakou et al., 2000; Little et al., 2002; Wheldall & Merrett, 1988) and constitutes the most
frequent reason for disciplinary referral (Algozzine et al., 2008; Imich, 1994). Thus, the teacher training program utilized in the present study was effective in that it successfully trained teachers to ameliorate the most disturbing types of student problem behaviour in the classroom.

**Teacher Report Measures**

Analyses of pre- and post-training teacher questionnaires revealed significant increases in teachers’ reported use of rewards as an intervention strategy, reported levels of confidence in their ability to manage student misbehaviour, and a shift in teachers’ views of student misbehaviour toward more temporary rather than chronic. Significant decreases in reported levels of student inattention and over-activity were also noted. No other aspects of teacher perceptions and attributions underwent significant change from pre-training to post-training.

The results of the present study are consistent with Guskey’s (2002) model of teacher change, which suggests that teachers’ beliefs and attitudes are more resistant to change than is their behaviour, since change in beliefs and attitudes occurs only after teachers are able to evaluate the impact of their behaviour change on student learning and behaviour. Thus, changes in teacher attitudes, beliefs, and perceptions occur well after teachers have modified their behaviour or implemented new strategies in the classroom, and the direction of that change (if there is change at all) is dependent on whether, or to what extent students’ learning and behaviour has been altered. In the present study, teachers’ classroom behaviour management approach changed significantly, producing a considerable positive impact on student behaviour. Evaluations of teacher report measures suggest that some teacher perceptions and attributions did in fact change, perhaps in response to the changes in student behaviour that teachers were able to observe firsthand in their classrooms (e.g., significant decrease in reported levels of student inattention and overactivity). It is possible that a sufficient period of time had not yet passed for teachers’ perceptions to undergo significant and broad change. Alternatively, as previously
discussed, the persistence of student on-task disruptive behaviour may have made it more difficult for teachers to accurately assess the actual degree of positive change in student problem behaviour, leading to a less positive view of the effects of treatment.

Guskey (2002) suggests that regular teacher feedback regarding the impact of their efforts (i.e., altered classroom disciplinary practices) on student behaviour and learning is necessary to maintain teachers’ use of newly learned skills and to facilitate desired change in teachers’ attitudes, beliefs, and attributions. As already discussed, teacher feedback sessions likely facilitated the longer term maintenance of teacher skill use that was seen in the present study. These feedback sessions could also have facilitated the small changes in teacher perceptions of student misbehaviour that were observed in the present study, providing teachers with evidence of immediate changes in student behaviour stemming directly from their own behaviour management practices.

**Student Report Measures**

Analyses of students' pre- and post-teacher training BASC2-SRP questionnaires revealed a significant increase in students' reported levels of self-reliance. No other scale or subscale evidenced significant change, despite the considerable improvements that were observed in students' actual task-related classroom behaviour. This was particularly surprising with respect to students’ self-reports of inattention and hyperactivity, the subscales on the BASC2 that intuitively are most closely related to on-task and off-task classroom behaviour. While teachers' perceptions of student inattention and hyperactivity changed significantly from baseline to post-training, students' self-reports of these behaviours did not. There are several potential explanations for this finding. Perhaps students did not notice changes in their task-related classroom behaviour. It may also be the case that their increased level of on-task behaviour did not impact their subjective feelings of internal difficulties with attention, focus, restlessness, or
hyperactivity. Alternatively, changes in student attitudes and self-perceptions may follow a pathway similar to teacher self-perceptions, in that alterations are slow to occur after actual changes in behaviour. That is, students' attitudes, beliefs, and self-perceptions may be altered only after they have had sufficient time to evaluate the impact of their behaviour change on their academic, social, or interpersonal functioning (time that was not available in the present research). Unlike teachers who were directly targeted for intervention, the student participants in the present study did not receive any formal training and thus were less likely to find behavioural improvements as salient as would teachers.

Although students may not have been aware of changes in their own behaviour, one might expect that they would notice substantial changes in their teachers' classroom disciplinary style and view the teachers more favourably. This was not the case however, as students' self-reported attitude to teachers did not change significantly over the course of the study. Again, it may be that such change is a slow process and enough time may not have elapsed between administrations of the pre/post questionnaires for alterations in students’ attitudes, beliefs, and perceptions to have occurred.

The finding of a significant increase in students' reported levels of self-reliance (a BASC2 measure that assesses self-confidence and independence) from pre- to post-training suggests that improved on-task behaviour provided students with the opportunity to experience more independence from teachers and to work for long periods of time without teacher assistance. Moreover, significant increases in teachers’ use of reinforcement for on-task behaviour in the classroom from pre- to post-training likely fostered student pride in their improved work ethic and independent learning skills.
Implications of the Research

The most encouraging result of the study was that a relatively brief and inexpensive in-service teacher training program was able to effect substantial positive change in teachers and students in a large, ethnically diverse, urban school with high levels of socioeconomic disadvantage. Such change is remarkable given that the characteristics and demographics of the school and the student body would typically be classified as hard-to-serve, and in need of intensive intervention and support. The current study demonstrated that positive change is possible in even the most at-risk student population with relatively little time commitment and cost and without the need for intensive teacher support.

The present study also demonstrated that student behaviour can be improved by targeting teachers for intervention rather than directly targeting students or the entire school community. Moreover, the training appeared to be successful for a wide range of teachers, including those teaching in different grades, programs, and subject-areas. Unlike more complex and expensive interventions (e.g., SWPBS), the in-service teacher training model that was used in the present study was designed to be inexpensive, brief, user-friendly and easy to implement in public school systems that already frequently utilize in-service teacher training. Moreover, the feedback to teachers used in the present study would require only limited support from special services personnel (i.e., school psychologists) who are already in the role of providing teacher consultation. Thus, most public school boards already have the infrastructure needed to implement such a training program in their schools.

The increase in teacher use of proactive classroom behaviour management strategies and improvements in student behaviour observed in the present study likely led to broader positive outcomes that were not directly measured. For example, research suggests that high rates of student on-task behaviour are associated with academic development and achievement (Lee et
al., 1999; Wheldall & Merrett, 1992; Wigle & Wilcox, 1996). Moreover, low rates of off-task and disruptive student behaviour are associated with reduced teacher stress and reactivity, improved teacher-student relationships, and enhanced teacher job satisfaction (Bru, et al., 2002; Byrne, 1994; Fields, 2004; Hastings & Bham, 2003; Hughes et al., 1999; Hughes & Kwok, 2006; Jenkins and Keating, 1998; Lowenstein, 1991; Silver et al., 2005). Decreased rates of student off-task and disruptive behaviour also decreases the likelihood of a range of possible adverse student outcomes that have been found to be associated with high rates of disruptive behaviour (Coie et al., 1991; Ialongo, Vaden-Kiernan, & Kellam, 1998; Schiff & BarGil, 2004; Shinn et al., 1987; Stage & Quiroz, 1997).

The results of the present study demonstrate how student problem behaviour can be effectively managed in the classroom without the use of reactive strategies. Teachers’ increased use of proactive classroom behaviour management strategies and decreased use of reactive strategies resulted in dramatic improvements in student on-task, non-disruptive behaviour and significant reductions in student off-task and disruptive behaviour. These changes in student behaviour may have been due in part to the reduced need of students to exhibit problem behaviours focused on escape or avoidance of challenging or unpleasant classroom conditions, given that the teacher had effectively constructed a more positive and supportive environment after training. Moreover, improvements in student behaviour may have obviated the need for punitive consequences. The findings of the present study are consistent with research demonstrating the association between a proactive approach to classroom behaviour management and reductions in classroom disruption, enhanced student learning, and increases in student on-task behaviour (Colvin et al., 1993; Good & Brophy, 1994; Mayer et al., 1983; Swinson & Harrop, 2001; Taylor-Greene et al., 1997; Ysseldyke & Christenson, 1994).
The significant decline in teachers’ use of reactive classroom behaviour management strategies was a compelling finding given the association between the use of reactive, punitive disciplinary practices and a host of adverse student and teacher outcomes. Specifically, punitive disciplinary strategies have been found to exacerbate rather than reduce disruptive and maladaptive behaviour, can foster classroom environments of authoritarian control where teachers become models of punitive and aversive patterns of interaction, and can permanently damage the teacher-student relationship and cultivate coercive teacher-student interaction patterns (Bear, 1998; Emmer, 1994; Martin et al., 2000; Mayer, 1995; Mayer et al., 1983; Shores et al., 1993; Skiba & Peterson, 2000; Sugai & Horner, 2008). Conversely, the increase in teachers’ use of more proactive classroom behaviour management strategies provided them with more opportunities to model prosocial patterns of interaction and to praise students for prosocial and on-task behaviour.

**Limitations of the Research and Future Directions**

**Participants.** One limitation of the present investigation relates to participants. Specifically, the teacher participants in the study were self-selected in that all of the teachers volunteered to receive teacher-training and be observed over the course of the school year. Several of these teachers were familiar with the work of the clinical psychologist supervising the study through his work in the day treatment classroom in the school. Furthermore, all of the teachers attended an information meeting before volunteering to participate that provided some basic details about the study, including a brief overview of the proactive model on which the teacher training was based. It is possible that only teachers who identified with the proactive model and/or approved of the strategies they observed being used in the day treatment classroom volunteered to participate. Research suggests that teachers are more likely to learn and to implement strategies that they view as being most consistent with their beliefs, perceptions,
style, expectations, and capacities (Hunter, 2003; Scott & Nelson, 1999). Given that we did not measure participant teachers’ attitudes regarding preferred classroom management approaches, and collected no information from teachers who had the opportunity but did not participate, it is unknown whether this factor impacted the positive teacher outcomes that occurred.

One area of future research may be to examine the effectiveness of utilizing school special services personnel, such as school psychologists or social workers, rather than researchers, to provide both teacher training and feedback. Such a study would involve a more pyramidal approach in which the researchers provide training to special services staff who then become the primary source of behavioural consultation to the teachers. Given that these staff are already embedded in the school system, have likely developed relationships with teaching staff and administration, and are available long-term for consultation, they would be ideal for ensuring maintenance of the training effects in a cost-effective manner.

**Design of the research.** One of the primary limitations of the present study was the small number of baseline sessions observed. This shortcoming was primarily due to several setbacks in both term 1 and term 2 of the school year, which significantly delayed the start of data collection. For example, some teachers delayed completing pre-training teacher questionnaires and student recruitment was challenging, given that parent consent, student assent, and student pre-training questionnaires had to be completed before students could participate. Notwithstanding our preference for more baseline data, we felt an ethical obligation to avoid further delay in the initiation of the teacher training program, given the potential benefits for the school and teachers’ intense need for behavioural support. Although the present observational data were generally easy to interpret, future research should include a larger number of baseline sessions to provide a clearer demonstration of pre-training teacher and student behaviour.
Another shortcoming of the present study involves the pre-post (non-experimental) use of teacher and student questionnaires. Given the absence of an experimental control for the baseline to post-training statistical comparisons, the contribution of potential confounding variables could not be ruled out. Thus, any significant findings relating to questionnaire measures must be viewed with caution.

**Measures.** The inclusion of several additional measures relating to student outcomes would have provided the researchers with important information on the impact of changes in teacher classroom behaviour management on student functioning. For example, research has demonstrated the association between disruptive behaviour problems and less academic engagement time, lower grades, and poor performance on standardized tests (Shinn et al., 1987; Stage & Quiroz, 1997). Conversely, research has also consistently found on-task student behaviour to be associated with academic progress and achievement (Lee et al., 1999; Wheldall & Merrett, 1992; Wigle & Wilcox, 1996; Ysseldyke et al., 1994). Thus a measure of student academic progress or achievement would have provided one of the most direct measures of improved academic functioning and school success.

Another useful measure that was not included in the present research is the number of office discipline referrals for participant students. Although there are several disadvantages associated with use of office discipline referrals as the primary measure of student problem behaviour (leading us to use a range of more comprehensive and objective measures), this outcome measure is frequently used in research examining the effectiveness of school-based behaviour interventions and initiatives. For example, researchers examining SWPBS commonly use office discipline referrals as the sole outcome measure of program effectiveness for students (Kern & Manz, 2004). Thus, use of this data source would allow for a more direct comparison of the results of the current study with those in the literature.
Similarly, the inclusion of measures of teacher stress and job satisfaction would have provided a more thorough picture of the effects of the intervention on teacher emotional well-being, given that difficulties managing disruptive students has been found to be one of the leading causes of teacher burnout, as well as teacher turn-over and attrition (Billingsley et al., 1993; Brownell et al., 1997; Byrne, 1994; Hastings & Bham, 2003; Ingersoll, 2001; Lowenstein, 1991; Wisniewski & Gargiulo, 1997). Levels of teacher stress may undergo change once student behaviour has improved. Moreover, use of pre-training measures of teacher stress and job satisfaction would have the additional benefit of assisting researchers in identifying teachers most in need of intensive support. Furthermore, given the potentially slow rate of change of teacher beliefs, attitudes, and perceptions seen in other research studies, future research should also include follow-up measures of these variables, several months after training and feedback has ended.

In future studies, it may be informative to include teacher demographic information, particularly previous training in classroom behaviour management, years of experience, and interest in obtaining behaviour management skills. Teachers generally report receiving little training, whether pre-service or in-service, in classroom behaviour management (Barrett & Davis, 1995; Kauffman, 1999; Kauffman & Wong, 1991; Kellam, 1999, Tidwell et al., 2003) and indicate an interest in and need for such training (Hardman & Smith, 2003; Maag & Katsiyannis, 1999; Padeliadu & Patsiodimou, 2000). In the present study, it would have been beneficial to determine whether teacher demographic variables were associated with teacher willingness to participate in training and whether they predicted training outcomes.

Finally, inclusion of a measure of the quality of teacher-student relationship would be beneficial in studies like the present one, given the importance of such rapport in facilitating favourable student outcomes (Bru, et al., 2002; Conner et al, 2005; Goodenow, 1993; Hughes, et
al., 1999; Hughes & Kwok, 2006; Jenkins and Keating, 1998; Midgley et al., 1989; Silver et al., 2005). Such measurement would have allowed the examination of potential changes in the quality of teacher-student relationships following teacher training, and whether such change was related to improved student outcomes.

Despite the limitations of the present study, preliminary results regarding the effectiveness of a brief in-service teacher training program on proactive classroom behaviour management is very encouraging. The training resulted in significant improvements in both teachers’ behaviour management skills and student on-task behaviour. Perhaps the best measure of the success of the intervention was the dramatic reduction observed in student disruptive behaviour that commonly leads to office discipline referral. The present study demonstrates how a relatively brief, focused intervention can have a widespread impact on classroom dynamics and student functioning. Future research will allow for a more in-depth analysis of the effect of this teacher training approach on teacher, student, and school-wide outcomes.
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Ysseldyke, J., & Christenson, S. (1994). *TIES-II: The instructional environment system-II. A system to identify a student's instructional needs*
### Appendix A

**Sample Classroom Observation Coding Form: Teacher Behaviour**

Teacher ID#: ___________ Date of Session: ______________ Coder: ____________

Classroom Activity Observed: ___________________________ □ IOR Session

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<th>REACTIVE RESPONSES</th>
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<td>Reward</td>
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Appendix B

Sample Classroom Observation Coding Form: Student Behaviour

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Classroom Activity Observed: _____________________________  □ IOR Session

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<th>OFF-TASK BEHAVIOUR</th>
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Appendix C

Statistical Analysis of Single-case Repeated Measures Data

Time series analyses are statistical procedures in which single-case repeated measures data is transformed to remove autocorrelation prior to the performance of statistical tests (Busk & Marascuilo, 1992). A number of time-series techniques have been developed for use with AB and ABAB time series designs, such as the Interrupted Time-Series Experiment (ITSE; Gottman, 1981) and the Autoregressive Integrated Moving Average (ARIMA; Box & Jenkins, 1976; Gottman & Glass, 1976; Gottman, 1981). Unfortunately, these models are complex to understand, are quite laborious to perform, and require relatively high numbers of observations for each phase of study, which in some cases may be very difficult to obtain, particularly when it may be unethical to delay intervention (e.g., in situations where the behaviour may be harmful to self or others) in order to collect sufficient baseline observations for analyses (Gorman & Allison, 1996). Generally, 35 or more observations per phase are required to run time-series analyses (Busk & Marascuilo, 1992). Even randomization tests, which are far simpler to understand and perform than time-series analyses, require at least 10 to 15 observations per phase in order to obtain stable estimates of autocorrelation (Busk & Marascuilo, 1992).

One method of time-series analysis that was developed for statistical analysis of interrupted time-series with small sample sizes was Crosbie’s (1993; 1995) ITSACORR. ITSACORR is a modification of the ITSE program, which provides better estimates of intervention effects for smaller sample size time-series data, and is relatively easy to perform (Gorman & Allison, 1996). Unfortunately, ITSACORR has been strongly criticised, along with ITSE, for misleading intervention effect estimates, problems with the omnibus $F$ statistic, and problems with software (Huitema, 2004). As a result, Huitema (2004) has recommended that,
regardless of sample size, the ITSE and ITSACORR methods should not be used. The ITSACORR program is no longer available for use.

The percentage of data points that do not overlap in adjacent phases, also called the percentage of non-overlapping data points (PND), is sometimes calculated as a measure of “tangibility” or “convincingness” of the effect of an intervention (Jensen et al., 2007; Scruggs, Mastropieri, & Castro, 1987. PND is often used in meta-analyses of single-subject experimental designs as an indication of effect size (Schlosser, Lee, & Wendt, 2008). PND is calculated by dividing the number of data points in the intervention phase that exceeded the lowest or highest point in baseline, depending on the desired effect, by the total number of data points in the intervention phase (Chafoules, Riley-Tillman, & Sugai, 2007; Jensen et al., 2007). PND does not correct for autocorrelations or trends, and these are not considered in its calculation (Jensen et al., 2007; Strain, Kohler, & Gresham, 1998).

A disadvantage of PND is that it has unknown reliability, since its sampling distribution is unknown (Parker, Hagan-Burke, & Vannest, 2007). Moreover, it has a ceiling effect which can make it difficult to compare the degree of change between two interventions, since the statistic does not provide any indication of how far from baseline the intervention data lie, only what percent of that data is above or below baseline (Riley-Tillman & Burns, 2009). Another weakness of PND is that it ignores all baseline data except for the most extreme data point, which because of its extremity, can sometimes be unreliable and can skew the conclusion reached by calculations of PND (Parker et al., 2007; Strain et al., 1998). Despite these disadvantages, PND is commonly used and recommended as a supplement to visual analysis, since it is generally consistent with visual inspection conclusions, is easy to calculate, and there is a reduced bias with small samples of data (Campbell, 2004; Parker et al., 2007; Scruggs & Mastropieri, 1998).
Research into the effectiveness of the PND approach, have found it to be a conservative measure of intervention effect in comparison with other techniques such as ITSACORR (Vegas, 2001), and is less affected by autocorrelation effects for shorter data series (Manolov & Solanas, 2008). Generally, a PND score of 90 or more is considered highly effective, while scores ranging between 70 to 90 are moderately effective, those ranging between 50 to 70 are questionably effective, and those less than 50 are ineffective (Scruggs, Mastropieri, Cook, & Escobar, 1986).

To correct for some of the limitations of PND, some researchers advocate calculating Percentage of All Non-Overlapping Data (PAND), an alternative to PND which uses all data from baseline in its calculation, and can be translated to actual effect sizes: Pearson’s Phi and Phi² (Parker et al., 2007). However, a relatively equal distribution of data among study phases is necessary to compute PAND, and it cannot be computed with less than 20 or 25 data points, with a minimum of 5 in each cell of the 2X2 table (Parker et al., 2007; Riley-Tillman & Burns, 2009). PAND has the same ceiling effect as PND (Parker et al., 2007). Given that the data in the current study has an unequal distribution of data, with the number of post-training data points greatly outweighing the number of pre-training data points, and there are less than 25 data points for a number of participants, PAND was ruled out for use in the current investigation.

In the current study, calculations of PND were initially conducted with the data set, however, PND’s sensitivity to outliers in the data greatly skewed the calculations and made the results unreliable. Moreover, because PND does not take into account overall trends in data, calculations of PND in the current study frequently underestimated or overestimated the effects of the teacher training. For example, in examining trends in teachers’ use of reinforcement, the calculation of PND would not take into account declining trends in baseline data (i.e., PND would only include the highest baseline data point), and in such cases where a decline in
baseline was present, PND ultimately lead to underestimates of the effectiveness of the teacher training. For these reasons, PND was not used as a method of analyzing observational data.