Pilot evaluation of an adolescent risk and injury prevention programme incorporating curriculum and school connectedness components

R.L. Chapman*[1], L. Buckley[1], M. Sheehan[1], I.M. Shochet[2]

[1]Centre for Accident Research & Road Safety – Qld, Queensland University of Technology, Kelvin Grove, Qld, 4059 Australia

[2]School of Psychology and Counselling, Queensland University of Technology, Kelvin Grove, Qld, 4059 Australia

*Correspondence to R.L. Chapman. Email rl.chapman@qut.edu.au

Abstract

School connectedness is an important protective factor for adolescent risk-taking behaviour. This study examined a pilot version of the Skills for Preventing Injury in Youth (SPIY) programme, combining teacher professional development for increasing school connectedness (connectedness component) with a risk and injury prevention curriculum for early adolescents (curriculum component). A process evaluation was conducted on the connectedness component, involving assessments of programme reach, participant receptiveness and initial use, and a preliminary impact evaluation was conducted on the combined connectedness and curriculum programme. The connectedness component was well received by teacher participants, who saw benefits for both themselves and their students. Classroom observation also showed that teachers who received professional development made use of the programme strategies. Grade 8 students who participated in the SPIY programme were less likely to report violent behaviour at six-month follow-up than were control students, and trends also suggested reduced transport injuries. The results of this research support the use of the combined SPIY connectedness and curriculum components in a large-scale effectiveness trial to assess the impact of the programme on students' connectedness, risk-taking and associated injuries.

Keywords: school connectedness; adolescents; injury; risk-taking

Pilot evaluation of an adolescent risk and injury prevention programme incorporating curriculum and school connectedness components

School connectedness, defined as 'the extent to which students feel personally accepted, respected, included and supported by others in the school social environment' [1], has been repeatedly identified as an important protective factor in adolescent development. Increased school connectedness is associated with higher levels of school retention, fewer depressive symptoms, and reductions in risk-taking behaviours [2-4]. Consistently, research reveals links between increased school connectedness and reduced alcohol use, violence, delinquent behaviours and also, external to the school setting, transport risks. For example, research has shown that higher levels of school connectedness are strongly related to students' delayed initiation of cigarette smoking, alcohol and marijuana use, delinquency and violent behaviour [3], and that school connectedness is a stronger protective factor than family connectedness for acting out behaviours, including substance use, absenteeism, delinquency and transport risks [5]. Extending beyond risk behaviours to associated outcomes, a recent study has shown that 13-14 year old students' self-reported connectedness was negatively associated with transport-related risk behaviours, such as riding with dangerous and drink-drivers, as well as associated transport injuries [6].

Students' connectedness to school declines throughout adolescence, particularly following the transition to high school [7, 8]. As the link between reduced connectedness and escalation of risk behaviours has become established, interventions targeting this factor have begun to be developed and evaluated. In a comprehensive review of programmes to reduce problem behaviours, Freiberg and Lapointe [9] reported that the most successful moved beyond a disciplinary focus to building connectedness and caring relationships within the school. Programmes such as the Child Development Project, Seattle Social Development Project, Raising Healthy Children, and Gatehouse Project have all targeted increases in

school connectedness, with some demonstrated successes in improving students' connectedness as well as reducing risk-taking behaviour [10-17]. Many of these programmes are, however, complex and time consuming, involving widespread school change, and may be difficult to implement in schools with limited resources or capacity for widespread school reorganisation.

Working within these limitations, there may be some scope for teacher-focused connectedness interventions to be implemented as part of curriculum-based prevention programmes. For example, the German Information + Psychosocial Competence = Protection (IPSY) programme is primarily a curriculum-based life skills intervention; however it also focuses on connectedness through its incorporation of teacher training in interactive teaching methods [18]. An evaluation of IPSY demonstrated positive effects on students' connectedness and reduced alcohol use. This programme was however targeted at elementary school students and had a narrow focus on substance use. There has been no documented research into the effects of training for teachers in connectedness issues as part of curriculum programmes targeting secondary school students, or on programmes targeting a broader range of risk-taking behaviours or injury outcomes.

Interventions targeting both individual attitude and personal and peer behaviour change through the school curriculum, as well as increased social protection through teacher professional development for enhanced student connectedness, align with a conceptual framework proposed by Jessor and colleagues [19]. This framework outlines the importance of key protective factors for adolescent health including having salient controls (e.g. friends actively intervening to reduce risk), having models of positive and safer behaviour (e.g. friends who engage in fewer risks) and an environment of support (e.g. a school where teachers encourage connections and support).

The aim of the current research was to examine a school connectedness version of the Skills for Preventing Injury in Youth (SPIY) programme. The connectedness component was designed to develop an environment of teacher and school support for early adolescents receiving the personal and peer curriculum-based component of the programme. The curriculum component has been evaluated [20-21] and this paper will focus on the process evaluation and initial impact of the connectedness intervention and the linkage between the two components.

SPIY curriculum component

The SPIY curriculum component is an eight-week curriculum-integrated unit designed to prevent and reduce harm associated with risk-taking and injury among Grade 8 students (aged 13-14 years). Health or Pastoral Care teachers trained in programme delivery teach the lessons as part of their class curriculum. Pastoral Care classes, which are run by qualified high school teachers from various departments under the guidance of a Pastoral Care coordinator, focus on the social and emotional wellbeing of all students. In the schools in which this research was conducted, Pastoral Care classes are compulsory for all Grade 8 students, and typically incorporate programmes focusing on, for example, resilience, study and life skills, and leadership.

The SPIY curriculum component targets risk-taking behaviours including risky bicycle, motorcycle and car use, riding as a passenger with risky drivers, interpersonal violence, and alcohol use. The primary aims of the SPIY curriculum are to increase safer behaviours, including actively intervening in and reducing peers' involvement in risk, decrease individual risk-taking, and increase perceptions of injury severity and preparedness to help friends through first aid training.

The SPIY curriculum incorporates 8 weekly, 50 minute lessons based around presentation of a risk-taking injury scenario, designed to provide the opportunity for practical

application of skills to situations relevant to the target audience. Multiple activities are designed with the scenarios, including discussions and role plays, using behaviour change techniques from Cognitive Behaviour Theory. Curriculum activities are also based on the Theory of Planned Behaviour [22], which outlines a set of target constructs for change that are posited to predict behaviour [see 20-21 for further information]. Process and short-term impact evaluations indicated that the curriculum component was able to be implemented as designed and that participating students reported fewer risk-taking behaviours following the programme than control students [20-21].

Prior to implementing the SPIY curriculum, teachers attend a Professional Development (PD) session to promote consistency in standardised delivery across schools. This session provides a significant opportunity for further training of teachers in related topics to enhance the delivery and potential impact of the programme, including school connectedness.

SPIY connectedness component

The development of the connectedness component drew upon Jessor et al.'s framework of protection and risk [19], and was based on the identified need to support individual attitude and behaviour change, as targeted by the SPIY curriculum, with complementing social and contextual protection. A caring and connected school context, including the presence of supportive adults and peers, also aligns with the SPIY curriculum aims of increasing safer behaviours, and actively supporting friends' to reduce their risk involvement.

The SPIY connectedness component was informed by a review of the school connectedness literature [23], students' self-report data on connectedness and injury [6], and teachers' perspectives gained from interviews. A workshop was developed to align with best practice recommendations for effective teacher PD, including active learning, appropriate

targeting and timing of sessions, encouragement of supportive professional networks, and provision of follow-up information [24-25]. The connectedness session also drew upon content from the Resourceful Adolescent Programme for Teachers (RAP-T) [26]. RAP-T is part of the Resourceful Adolescent Programme (RAP), which is endorsed as an evidence-based programme by the Australian Commonwealth Government [27].

The connectedness component is a half-day Professional Development (PD) workshop for teachers of SPIY, delivered in conjunction with the SPIY curriculum training to form a full day programme. The PD is designed to provide teachers with strategies to increase students' connectedness to school, and specifically to enhance student-teacher relationships, and increase students' sense of belonging, inclusion and support within the school context. Through increasing students' connectedness, the programme aims to reduce their involvement in risk-taking behaviours, including transport risks, violence and alcohol use, as well as their associated injuries. As such, it includes content on the problem of injury and risk-taking in adolescence, definitions and theories of school connectedness, and the way in which connectedness is related to students' behaviour. Approximately one-third of the training time is spent on these topics and associated activities, while the remaining two-thirds focuses on strategies for promoting connectedness, and identifying teachers' own relevant strategies and methods for putting these into practice. The strategies for increasing connectedness that are discussed within this programme fall under a model that incorporates encouragement of warmth and empathy in interactions, fostering student inclusion, focusing on student strengths, and creating an environment of equity and fairness within the class and wider school context.

The connectedness component is a manualised programme involving presentations and interactive participation through discussions and workbook activities. The workshop also features extensive discussion regarding incorporation of connectedness strategies into the

goals and associated activities of the SPIY curriculum. The SPIY curriculum lesson plans provide an opportunity to refresh and reinforce the PD content, and approximately one month following participation teachers are emailed a booster summary and worksheet, which facilitates further teacher discussion and implementation of connectedness strategies into the SPIY curriculum.

Objectives

The primary objective of this study was to understand processes associated with implementation of the connectedness component, including reach, participants' receptiveness, and teachers' initial use of connectedness strategies within their classes. A further objective was to describe the initial impact of the connectedness + curriculum SPIY programme on participating students' connectedness to school, risk-taking behaviours (including violence, transport risks and alcohol use) and associated injuries.

Method

Participants and procedures

Teachers and Grade 8 students from five secondary schools in Canberra, Australia participated in the research. Three schools were randomly assigned as programme and two as control schools. Within the programme condition, two schools implemented the SPIY curriculum and connectedness components, while one implemented just the connectedness component. The two control schools acted as curriculum-as-usual comparisons, and were provided with the programme components at the conclusion of the research.

A sixth school was initially recruited to implement just the SPIY curriculum component, with the intention of being able to compare the schools implementing the programme components alone with those implementing both components in combination. The number of students for whom parental consent was obtained within the sixth school was

however too small to enable comparisons (30 Grade 8 students had parental consent at baseline; 27.0% response rate) and therefore this condition was dropped from the research.

Prior to the commencement of the research, ethical approval was obtained from the university ethics committee, the Education Department, and school principals. Written consent was obtained from teachers for participation in questionnaires, focus groups and for classroom observation. Active parental and students' own consent was obtained for participation in questionnaires. All students who returned a parental consent form, regardless of the status of consent, were entered in a class draw to win a $20 music voucher.

Teachers

Nineteen of the 21 Health or Pastoral Care teachers (11 female) from the three programme schools completed a brief questionnaire immediately following participation in the PD. Additionally, approximately eight weeks following their participation (following SPIY curriculum delivery), 14 of the 21 teachers (nine female) participated in focus groups of approximately 45 minutes duration, which were audio recorded with teachers' permission.

Observer rating

A single trained, independent observer, blinded to condition allocation, attended six Grade 8 Health or Pastoral Care lessons in the three programme schools following the PD. Only programme school classes were observed as a measure of connectedness programme implementation. The observer was asked not to contribute to lessons, but sat at the back of class and completed a detailed checklist based on that used by Reeve and colleagues [28].

Students

Grade 8 students in all five schools completed questionnaires in class prior to programme implementation, and also at six months post implementation. Only students with active parental consent who were present on data collection days were asked to participate (44.2% response rate at baseline; 43.9% at follow up). At follow-up, the mean age of students

was 13.6 years (*SD* = 0.5). Data from students in the connectedness only school were excluded from the impact analysis; due to small numbers for comparisons (41 students completed a survey at baseline; 32.0% response rate).

A total of 77 students in the two curriculum + connectedness programme schools (56% male) completed a baseline questionnaire. At follow-up, 92 students (51% male) completed the questionnaire. In the two control schools, 196 students (46% male) completed a baseline questionnaire, and 207 (50% male) completed the follow-up.

Measures

Process evaluation

A process evaluation enables understanding of critical issues that can inform the improved, ongoing implementation of an intervention. The measures of process evaluation used in this study were taken from several described by Baranowski and Stables [29], including programme reach, participant receptiveness, and initial use.

Reach Programme reach was assessed through the researchers' examination of 'depth' (components of the PD received by the teacher participants) and 'spread' (number of teacher participants receiving the PD).

Participant receptiveness Participants' receptiveness was examined through teacher questionnaire and focus group data. Questionnaire items asked teachers to rate the connectedness PD in terms of, for example, its relevance, usefulness and importance. Items such as 'I would recommend this programme to other teachers' were rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). Teachers were also asked to rate their knowledge of school connectedness, both before and after the programme (1 = Basic to 5 = Extensive).

Teacher focus groups, conducted eight weeks following the PD, focused on programme perceptions and benefits. Prompts included, 'What were your perceptions of the

SPIY connectedness workshop?' and 'What barriers and benefits do you see to using the strategies presented in the workshop?' Data were transcribed verbatim, and analysed using thematic analysis [30]. Coding involved repeated reading and the use of an inductive approach to identify themes progressively [31]. Data were examined and categorised based on key words and phrases, and labelled codes were grouped within corresponding themes.

Initial use Use of the PD content was assessed using observation data. The observer rated indicators relating to teachers' involvement in the class (e.g. teachers' knowledge of students), students' engagement (e.g. participation), and use of additional connectedness strategies as covered in the PD and drawn from the RAP-T programme [26]. The checklist also provided space for the observer to provide additional comments for each category.

Impact evaluation

Programme impact was assessed using student questionnaire data. Measures included in the student questionnaire were:

Injury The Extended Adolescent Injury Checklist (E-AIC) [32] is a self-report measure of the types of injuries experienced and the circumstances in which they occurred. Student answer 'yes' or 'no' to whether they had each of a list of injuries in the past three months. Included are five transport-related injuries (e.g. injured while riding as a passenger in a car, riding a bicycle), and four violence-related injuries (e.g. injured in a physical fight, being physically attacked).

Risk-taking The Australian Self-report Delinquency Scale (ASRDS) [33] with modifications by Western and colleagues [34] is a self-report measure of risk-taking behaviour. Students answer 'yes' or 'no' to whether they had engaged in risk behaviours in the last three months. Included are nine items related to transport risk-taking behaviour (e.g. ridden in a car with a drink driver, ridden a bicycle without a helmet), and four relating to violence risk behaviours (e.g. fight, weapon use).

Alcohol use The Australian School Students Alcohol and Drugs Survey (ASSAD) [35] is a measure of alcohol use and experience. One item of this scale was used, which asked students to indicate how often in the past three months they had drunk a glass or more of an alcoholic drink. Students were coded as having drunk alcohol if they answered 'a few times' or more frequently, and having not drunk alcohol if they answered 'never'.

School connectedness The Psychological Sense of School Membership scale (PSSM) [1] provides a total connectedness score from 18 Likert-type scaled items. Items such as 'I feel like a real part of this school' are rated on a 4-point scale (1 = 'almost never or never' to 4 = 'almost always or always').

Results

Process evaluation

Reach

As a measure of spread, the PD facilitator recorded that all Grade 8 teachers (n=21) from the targeted departments within programme schools participated in at least some of the workshop components. In terms of depth, 19 of the 21 teachers received all components of the PD as specified in the standardised delivery manual. One teacher left the PD one hour prior to completion of the four-hour session, due to classroom scheduling. A second teacher left half an hour prior to completion, due to external commitments. All teachers received a workbook, however, which these teachers were asked to read in their own time, as well as an email with a summary and worksheet approximately one month following the session.

Participant receptiveness

Teacher questionnaire Teachers agreed strongly with statements including that the connectedness PD was relevant, that it was useful to them, and that they would recommend it to other teachers. For example, 94.7% of the teachers agreed or strongly agreed with the statement, 'I will use most of the information presented in this programme', and all agreed or

strongly agreed with the statement, 'I would recommend this programme to other teachers'. Figure I shows the mean ratings from the 19 participating teachers regarding perceptions of the programme.

Teachers' self-rated knowledge of school connectedness also significantly increased from before to after the programme, with a paired samples t-test showing that mean level of knowledge following the connectedness PD (M = 4.65) was significantly higher than knowledge prior to the PD (M = 3.41) ($t(16) = -6.13$, $P < .001$).

Focus groups Themes extracted from the focus group data along with example quotes are shown in Table I. Overall, teachers commented on benefits of the connectedness PD, for example, *'It creates awareness around it too, because it's not something that…I remember being told or being taught to do it all'*, and *'It's nice to be able to put a positive spin on the risk, like to actually think about connecting'*. Several comments also suggested that teachers enjoyed the opportunity to get together as a group and share their skills and knowledge. Participants also provided specific feedback on programme content, and acknowledged both the opportunity to learn about students' risk-taking and injury as well as strategies for enhancing connectedness to impact on these outcomes. For example, teachers had positive feedback regarding the content on developing connectedness strategies, which they saw as something they could take ownership of outside of the usual curriculum; '*(the PD) looked at connectedness and that but it was more away from the curriculum which was good, which gave us more ownership'*, and also had positive perceptions of the workbook, which many suggested they would use again; *'I definitely would have a look over it, you know, if the school connectedness and that came up, I'd have a read through for sure'*. As well as benefits to themselves, teachers identified some positive impacts for student behaviour that had the potential to arise from the programme, for example *'If they were to do something like this…from Year 5, onwards, I think that would significantly reduce the kind of risk-taking*

that they do', as well as some impact on teacher practice; *'I could see a difference in Pastoral Care compared to last year... (the teachers were) more interactive in their PC classes'*.

Teachers did indicate that they, as Health and Pastoral Care teachers, already had good relationships with their students (for example, *'Health and PE teachers are already doing a lot of connectedness stuff'*) and therefore some teachers did not believe that the PD impacted on their teaching style, *'(many of us) have a good relationship with kids anyway'*. These teachers did however still see value in the PD and several commented that it was either a useful refresher for them, or that it would be useful for all school staff, including teachers in other faculties and those just commencing their teaching careers; *'I think if you were a teacher though that was maybe new, didn't have that kind of connection with the kids it might be a really good resource for them to have'*.

Overall, the teachers also indicated that the connectedness PD was a useful addition to the SPIY curriculum training, as it allowed a greater insight into and perspective of injury and its determinants; *'Some (of the connectedness work) is handy to do before delivery of the (curriculum) programme, to give them a different perspective'*. Despite this, however, one teacher failed to see an overt link between the PD on connectedness strategies and the SPIY curriculum, *'Connectedness is a good concept. Don't really know how it connected with the programme, though'.* Additionally, despite the booster summary and worksheet sent to participants approximately four weeks following the session, several teachers indicated that it was *'hard to keep momentum'* and that as time progressed following the session, teachers *'might have forgotten'* the content and strategies presented.

Initial use

Observations of programme school classes were made using a detailed observation proforma, with spaces available for qualitative observer comments. Table II shows the

primary themes of observation, the specific indicators assessed, and some examples of observations made in programme classes.

Overall, each of the observations returned positive comments relating to teacher involvement and connectedness indicators in programme schools, indicating that teachers were using strategies presented in the SPIY connectedness PD. Additionally, comments on students' engagement in the same classroom were positive, as rated through observations of their attention, effort and participation. It is not known, however, if the findings of these observations resulted from participation in the SPIY connectedness PD, as observations were not undertaken prior to participation or among control school classes.

Impact evaluation

Risk-taking behaviour and injury

The majority of students did not report risk-taking or injuries at baseline; 64.3% reported no transport risk behaviours, 88.5% reported no violence risk behaviours, 69.4% reported no transport-related injuries, and 87.3% reported no violence-related injuries. These variables were coded as dichotomous, reflecting (a) participation in at least one of the risk-taking behaviours or experience of at least one of the injuries, or (b) none of the risk-taking behaviours or injuries. Table III shows the proportion of students who reported at least one of the transport risk behaviours, violence risk behaviours, transport injuries, and violence injuries, as well as alcohol use, by condition and time. This table also shows the change in these proportions from baseline to follow-up.

Baseline differences in outcome variables by condition were initially examined. No significant differences were found between programme and control school students for any of the outcome variables. To assess the impact of the programme on risk-taking and injury, five separate binary logistic regression analyses were conducted with participation in risks or experience of injuries at follow-up as the dependent variable (DV), condition (programme or

control) as the independent variable (IV), and participation in risks or injuries at baseline entered as a covariate. Table IV shows the findings of the logistic regression analyses.

Participation in SPIY significantly predicted violence risk-taking behaviour at follow-up, after controlling for baseline differences in violence. Self-reports of violence risks reduced among programme school students, and increased among control students, from before to after the SPIY programme. At follow up, control school students were 5.3 times more likely to report violence risk-taking than intervention school students, relative to the baseline rate. No other analyses were significant; however examination of Table III shows that the results for transport injuries were also trending in this direction.

School connectedness

Overall, school connectedness scores decreased significantly from baseline to follow-up for both programme (M = 3.08, SD = 0.53 at baseline, M = 2.87, SD = 0.50 at follow up, $p < .01$) and control school students (M = 3.19, SD = 0.46 at baseline, M = 3.01, SD = 0.55 at follow up, $p < .001$). To assess the effect of the programme on school connectedness, an analysis of covariance (ANCOVA) was conducted with school connectedness score at follow-up as the DV, condition as the IV, and school connectedness score at baseline entered as a covariate. This analysis showed no difference by condition in school connectedness ($F(1) = 1.52$, $P = .220$).

Discussion

The aim of this study was to examine a pilot version of the Skills for Preventing Injury in Youth programme, by conducting a process evaluation of the SPIY connectedness component, and an initial impact evaluation of the combined curriculum and connectedness components. Prior to this study, there had been no documented research into the implementation of school connectedness strategies as part of injury prevention programmes. This is however an important area of research, as school connectedness is a significant

protective factor for adolescent risk-taking, including risks that have serious injury outcomes. Most previously evaluated school connectedness programmes, with the exception of IPSY [18], have involved widespread school change as a means of improving students' connectedness [e.g. 10-17]. The SPIY connectedness component was developed as a teacher PD programme to be implemented in conjunction with the SPIY curriculum, and this study involved a small-scale pilot to understand processes surrounding its implementation as well as initial impact.

Process evaluation

Effective process evaluations are critical in that they provide information regarding future development and implementation of programmes [36]. The process evaluation measures used in the current study included reach, participant receptiveness, and initial use [29].

Records of participant attendance suggest that programme reach was widespread. Scheduling training at times accessible to most teachers, particularly within school hours, is important. Recruitment into the PD was also facilitated by the Heads of Department, who expressed the importance of attendance and encouraged staff participation. Gaining acceptance and approval at an administrative level has been shown to be critical to the successful implementation of school-based programmes [36]. Overall, teachers had positive perceptions of the SPIY connectedness component and indicated that their knowledge of school connectedness increased. Teachers' receptiveness and support has also been shown to be an important factor associated with successful implementation of school-based programmes [37]. The use of a measure asking participants' to rate their own knowledge of connectedness may, however, have an associated social desirability bias. An objective measure would have provided a more reliable means of knowledge change.

Self-report measures of participant receptiveness indicated that overall, teachers were engaged in and enjoyed the PD; however they do not provide an understanding of teachers' use of the programme content in their subsequent teaching. This was addressed through independent observations. Observation checklist comments suggested that participants made use of programme strategies that were evident in their teaching and class involvement, and students' engagement in the lessons. There were limitations associated with the observation component of the research, however, including the use of only qualitative data due to a small sample size, and a lack of observations made before programme implementation or in control classes. As such, these results should be viewed in conjunction with the other process evaluation measures. For example, data from the teacher focus groups suggests that some changes in teacher practices were noted; however this data also reveals that maintenance of teacher knowledge and change following the programme proved difficult for some.

Within the focus groups overall, teachers had positive feedback regarding the PD, and indicated some potential benefits for themselves and students. Many teachers did, however, perceive the programme as being more relevant for staff with fewer skills than they already possessed. Several teachers suggested that the PD may be particularly appropriate for newly appointed teachers who *'didn't have that kind of connection with the kids'*, or even for the *'whole of school'*, to capture new teachers. All participants reported that they would recommend the connectedness PD to others, which suggests that recruitment of the whole school staff may be an option, particularly as groups of teachers participate and encourage others to attend future sessions.

The participants in this research (Health and Pastoral Care teachers) already saw themselves as having positive relationships with students. The Health teachers' primarily taught all Grade levels of Health and Physical Education, while Pastoral Care teachers' specialty areas covered all departments. Those who express interest in taking Pastoral Care

lessons may however be those most interested in developing connected relationships with their students. Despite a large body of research existing on teacher-student relationships [e.g. 38-39], there is none documented regarding teachers from various departments and the differing kinds of connections they have with their students. Future research may seek to understand the nature of Health and Pastoral Care teachers' relationships with their students, as compared with teachers of different subject areas.

Teacher participants primarily indicated that the link between connectedness and the SPIY injury prevention curriculum was positive, in that the PD gave them a better perspective and increased awareness of curriculum delivery methods and means of increasing adolescent protection. Many teachers had not before thought of their students' risk-taking and injury from the perspective of their connectedness to school; '*but (now) you go, oh yeah, you're actually not connected at school'*. The PD session prior to SPIY curriculum delivery appears to be a critical teachable moment, which enables teachers to think about their students' risk-taking and injury from a new perspective and develop strategies to enhance delivery of the SPIY curriculum content. Although primarily positive, one teacher indicated that they did not see a clear link between the PD and curriculum programme, and additional feedback suggested some difficulties in sustaining '*momentum'* for use of PD strategies as time progressed following the session. Although booster material was sent approximately four weeks following the session, the current evaluation did not incorporate assessment of this material and therefore suggests the need for future research to address its effectiveness and possibilities for sustaining changes in classroom practice.

Impact evaluation

An initial impact evaluation showed that, overall, there was a trend toward reduced or consistent risk-taking and injury following participation in the SPIY programme, as opposed to overall increases observed among the control school students. Students' participation

significantly predicted reduced violence risk-taking six months following implementation. There were, however, no other significant changes, although the small sample size in this pilot study limits the power available to detect significant effects.

Supporting the results of previous research [e.g. 7-8], students' connectedness to school decreased over time. This demonstrated decline throughout adolescence indicates the need for intervention. The current programme, however, did not impact on school connectedness scores. Students' connectedness to school, which incorporates cognitive, affective and behavioural components including motivations and expectations, feelings about teachers and peers, and involvement in school activities [40], may however require a longer process of change than is measurable in six months. Further research is needed to determine the potential longer-term impact of the SPIY programme on students' connectedness to school. The SPIY connectedness component was also delivered as PD workshops for teachers within specific teaching departments. A number of items on the PSSM reflect a more whole-of-school approach to student wellbeing. Future research is needed to further establish the degree of intervention required to impact on connectedness, which could incorporate cost-benefit analyses of teacher PD activities as compared with more complex whole-of-school strategies, which have proven effective in increasing connectedness in previous research [e.g., 10-17].

Limitations and future research

While the current findings are promising, they must be considered in the light of some limitations. The SPIY programme was implemented in a small number of schools with correspondingly small sample sizes. Additionally, there was a low response rate, leading to the exclusion of connectedness and curriculum only conditions. As such, we were unable to assess the impact of the programme on individual risk-taking behaviours or to conduct analyses by sex, or to examine the impact of specific programme components. For example,

we were unable to determine if the reduction observed among programme school students in self-reported violent behaviour was due to the impact of the SPIY curriculum, connectedness component, or a combination of the two components. Additionally, with so few schools, school effects could not be determined, and clustering effects were not examined. This was a pilot evaluation, however, with the view to assess processes and initial impact. Future research on the effects of this programme should incorporate additional schools and larger sample sizes, and incorporate cluster randomisation.

While small, the current response rate is not unusual. The active parental consent process frequently required for school-based research typically results in student participation rates ranging from 30% to 60% [41]. There may be some non-response bias present in the current results however, as students' who participate in a greater number of risk-taking behaviours are less likely to participate in research requiring active parental consent [41]. A number of strategies were used in the current study to encourage the return of parent consent forms, including continued contact with the school and the use of a class draw for those returning the form. Wolfenden and colleagues' [41] research however suggests a number of additional strategies that may be used in future research, including direct contact with parents and reminder contacts.

Conclusions

Previous research and the results of the current pilot study have shown that connectedness to school declines throughout adolescence, at the same time as risk-taking behaviour and injuries are increasing [7-8]. The consistent relationship between school connectedness and risk-taking supports the need for injury prevention programmes to continue to target this important protective factor. The incorporation of connectedness strategies within curriculum-based programmes for injury prevention may be an important means of facilitating change.

The results of this study provide valuable information regarding design and implementation of school connectedness programmes for risk and injury prevention. For example, further research may address specific groups of teachers that should be targeted. Considering teachers' perceptions and the positive results of whole-of-school interventions, it may be that PD on enhancing students' connectedness should be delivered across all school staff. Teachers also indicated that they appreciated the PD as a rare opportunity to take time out with others to share knowledge and ideas that may improve their practice. Future training may therefore build on this positive aspect by focusing more on skill and knowledge sharing among participants as a means of increasing teacher connectedness with each other, as well as facilitating development of connectedness strategies for their students.

The results of this pilot research have shown promise for the SPIY programme as a means of adolescent risk and injury prevention, as well as for the future design and implementation of the SPIY connectedness component. This research also support the use of the combined SPIY connectedness and curriculum components in a large-scale effectiveness trial to further assess programme impact on students' connectedness, risk-taking and associated injuries.

References

1. Goodenow C. The Psychological Sense of School Membership among adolescents: Scale development and educational correlates. *Psychol Schools* 1993; **30;** 79-90.

2. Bond L, Butler H, Thomas L *et al.* Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *J Adolesc Health* 2007; **40,** 357.e359-357.e318.

3. Dornbusch S, Erickson K, Laird J *et al.* The relation of family and school attachment to adolescent deviance in diverse groups and communities. *J Adolescent Res* 2001; **16**; 396-422.

4. Shochet IM, Smyth T, Homel R. The impact of parental attachment on adolescent perception of the school environment and school connectedness. *Aust NZ J Fam Ther* 2007; **28;** 109-18.

5. Resnick M, Harris L, Blum R. The Impact of caring and connectedness on adolescent health and well-being. *J Pediat Child Health* 1993; **29;** S3-9.

6. Chapman RL, Buckley L, Sheehan MC *et al.* The impact of school connectedness on violent behavior, transport risk-taking behavior, and associated injuries in adolescence. *J Sch Psychol* 2011; **49;** 399-410.

7. Monahan K, Oesterle S, Hawkins JD. Predictors and consequences of school connectedness: The case for prevention. *The Prev Researcher* 2010; **17;** 3-6.

8. Whitlock J. *Places to Be and Places to Belong: Youth connectedness in School and Community.* NY: ACT for Youth, Cornell University, 2004.

9. Freiberg HJ, Lapointe JM. Research-based programs for preventing and solving discipline problems. In: Evertson CM, Weinstein CS (eds). *Handbook of Classroom Management: Research, Practice and Contemporary Issues.* Mahway, NJ: Erlbaum, 2006, 735-86.

10. Battistich V, Schaps E, Watson M *et al.* Effects of the Child Development Project on students' drug use and other problem behaviors. *J Prim Prev* 2000; **21;** 75-99.

11. Battistich, V, Schaps E, Wilson N. Effects of an elementary school intervention on students' "connectedness" to school and social adjustment during middle school. *J Prim Prev* 2004; **24;** 243-62.

12. Hawkins JD, Catalano RF, Kosterman R *et al.* Preventing adolescent health-risk behaviors by strengthening protection during childhood. *Arch Pediatr Adolesc Med* 1999; **153;** 226-34.

13. Hawkins JD, Catalano RF, Morrison DM *et al.* The Seattle Social Development Project: Effects of the first four years on protective factors and problem behaviors. In: McCord J, Tremblay RE (eds). *Preventing Antisocial Behavior: Interventions from Birth through Adolescence*. NY: Guilford Press, 1992, 139-61.

14. Hawkins JD, Guo J, Hill KG *et al.* Long-term effects of the Seattle Social Development intervention on school bonding trajectories. *Appl Dev Sci* 2001; **5;** 225-36.

15. Catalano RF, Haggerty KP, Oesterle S *et al.* The importance of bonding to school for healthy development: Findings from the Social Development Research Group. *J Sch Health* 2004 **74;** 252-61.

16. Catalano RF, Mazza JJ, Harachi TW *et al.* Raising healthy children through enhancing social development in elementary school: Results after 1.5 years. *J Sch Psychol* 2003; **41;** 143-64.

17. Patton G, Bond L, Butler H *et al.* Changing schools, changing health? Design and implementation of the Gatehouse Project. J *Adolesc Health* 2003; **33;** 231–9.

18. Wenzel V, Weichold K, Silbereisen RK. The life skills program IPSY: positive influences on school bonding and prevention of substance misuse. *J Adolesc* 2009; **32;** 1391-401.

19. Jessor R, Turbin MS, Costa FM, Dong Q, Zhang H, Wang, C. Adolescent problem behavior in China and the United States: A cross-national study of psychosocial protective factors. *J Res Adolesc* 2003; **13**; 329-60.

20. Buckley L, Sheehan M. A process evaluation of an injury prevention school-based program for adolescents. *Health Educ Res* 2009; **24;** 507-19.

21. Buckley L, Sheehan M, Shochet I. Short-term evaluation of a school-based adolescent injury prevention program: Determining positive effects or iatrogenic outcomes. *J Early Adolescence* 2010; **30;** 834-53. 22. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991; **50**; 179-211.

23. Chapman RL, Buckley L, Sheehan M *et al*. School-based programs for increasing connectedness and reducing risk behavior: A systematic review. *Educ Psychol Rev* 2013; **25**(1); 95-114.

24. Garet MS, Porter AC, Desimone L *et al.* What makes professional development effective? Results from a national sample of teachers. *Am Educ Res J* 2001; **38;** 915-45.

25. Ingvarson L, Meiers M, Beavis A. Factors affecting the impact of professional development programs in teachers' knowledge, practice, student outcomes and efficacy. *Educ Policy Analysis Arch* 2005; **13;** 1-26.

26. Shochet IM, Wurfl A. *Resourceful Adolescent Program for Teachers (RAP-T): A Program for Teachers to Promote School connectedness in Teenagers.* Brisbane, Australia: School of Psychology and Counselling, Queensland University of Technology, 2006.

27. Shochet IM, Dadds MR, Holland D *et al.* The efficacy of a universal school-based program to prevent adolescent depression. *J Clin Child Psychol* 2001; **30;** 303-15.

28. Reeve J, Jang H, Carrell D *et al.* Enhancing students' engagement by increasing teachers' autonomy support. *Motiv Emotion* 2004; **28;** 147-69.

29. Baranowski T, Stables G. Process evaluations of the 5-a-Day projects. *Health Educ Behav* 2000; **27;** 157-66.

30. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006; **3;** 77-101.

31. Hsieh H, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005; **15;** 1277-88.

32. Chapman RL, Buckley L, Sheehan MC. The development of the extended adolescent injury checklist (E-AIC): A measure for injury prevention program evaluation. *Youth Studies Aust* 2011; **30;** 49-58.

33. Mak AS. A self-report delinquency scale for Australian adolescents. *Aust J Psychol*, 1993; **45;** 75-9.

34. Western JS, Lynch M, Ogilvie E *et al.* Offending behaviours: Situated choices and consequences. In: Western, JS, Lynch M, Ogilvie E (eds). *Understanding Youth Crime: An Australian Study*. Hants, England: Ashgate, 2003, 23-44.

35. White HR, Hayman J. *Australian Secondary School Students' Use of Alcohol in 2005. National Drug Strategy Monograph Series no. 58.* Canberra: Australian Government Department of Health and Ageing, 2006.

36. Melde C, Esbensen F, Tusinski K. Addressing program fidelity using onsite observations and program provider descriptions of program delivery. *Eval Res* 2006; **30;** 714-32.

37. Fagan AA, Mihalic S. Strategies for enhancing the adoption of school-based prevention programs: lessons learned from the Blueprints for Violence Prevention replications of the Life Skills Training Program. *J Community Psychol* 2003; **31;** 235-53.

38. Hamre BK, Pianta RC. Student–teacher relationships. In: Bear GC, Minke KM (eds). *Children's Needs III: Development, Prevention, and Intervention*. Washington, DC: National Association of School Psychologists, 2006, 59-71.

39. Wentzel KR. Students' relationships with teachers. In: Meece JL, Eccles JS (eds). *Handbook of Research on Schools, Schooling and Human Development.* New York: Routeledge, 2010, 75-91.

40. Jimerson SR, Campos E, Greif JL. Toward an understanding of definitions and measures of school engagement and related terms. *The California School Psychologist* 2003; **8;** 7-27.

41. Wolfenden L, Kypri K, Freund M, Hodder R. Obtaining active parental consent for school-based research. *Aust NZ J Pub Health* 2009; **33;** 270-5.

Funding

This work was supported by the NRMA ACT Road Safety Trust.

Acknowledgements

The authors would like to acknowledge Cate Rawlinson for her observation work, the teachers and students at the participating schools, and the support of the NRMA ACT Road Safety Trust.

Figure I. *Participant receptiveness: Teachers' self-report ratings of SPIY Connectedness training*

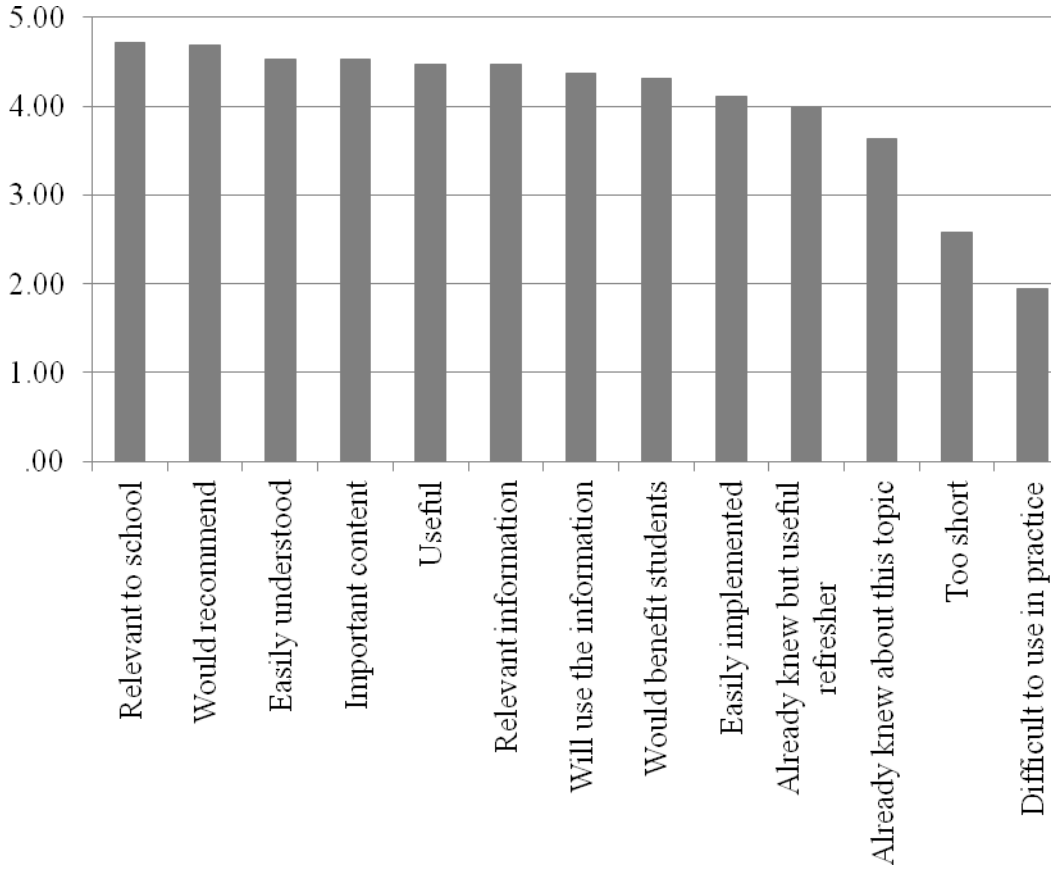

Table I. *Participant receptiveness: Themes and example quotes of teachers' perceptions of SPIY Connectedness training*

Themes	Example of themes
Benefits of programme	I think the best thing about it for me was it was probably one of the first times we've actually been able to get out as all Year 8 Pastoral Care teachers and talk about a few little things. And by one of us saying, 'oh this works for so and so', and they're like 'oh well I don't find that, I find this', and everyone can make their own connectedness as teachers.
Programme content	The interesting thing for me was looking at the number of kids who are high risk takers, like it was the injuries...you just go, oh that's right, like making that connection
Positive impact of programme	It's another way of identifying certain students that you would normally gloss over or not really worry about. You look at all our boys' injuries that are stupid or hospitalised and you just go, oh it's just those boys, but (now) you go, oh yeah you're actually not connected at school. So it's, you know, then taking on another thing from there...how do I get them connected at school?
Targeted teachers have good student relationships	This is an awesome thing and doing it in PE is the right thing, because I genuinely believe that we, our whole staff, have such good relationships with the school here, and if they're going to listen to anyone they will listen to us, and I guess I don't feel like I connected any more with the students after doing this than I did before, yet I still think this is an excellent thing
Would benefit	Would be good to have…with those that don't have those skills, but

other teachers	you can't single out. Would be good to have it whole of school.
Positive addition to SPIY curriculum	It gave me a massive opportunity; the thing that the kids loved most was to talk about all the stupid things I'd done and injuries…And I think that was probably the most valuable thing because in our other health units I don't think you know we've really had the chance to talk about that sort of stuff.

Table II. *Initial use: Themes, indicators and example comments made during observations of intervention classes following SPIY Connectedness training*

Themes	Indicators	Example of observer comments
Teachers' involvement	Enjoyment of class	Used students' names and directed questions at particular students. Teacher attentive. Appeared to like class.
	Knowledge of students	Knew students by name. Teacher spent time walking through class and did engage in conversation with individual students.
	Language	Used colloquial language - age appropriate; presented concepts in easy to understand terms.
Student engagement	Attention	Teacher used scenario to immediately engage. Used voice tone to sustain attention and interest. Used phrases like "lets switch on and concentration guys" Teacher revisited ideas several times; students would then add extra information.
	Effort	Teacher initiated responses from class constantly. Very confident teacher used humour to draw students in. Students put in effort in return.
	Participation	Lots of students participated in discussion at different points. Students told stories about their experiences.
Additional connectedness indicators	Consistency in praise and discipline	Misbehaviour quickly acknowledged and corrected. Used statements such as "Guys I love the discussion but hands up or else it gets out of control". Teacher

	used jokes and laughed at students' funny interjections and incorporated them into the discussion. Consistently praised on-task focus.
Interest in all students	Focus on all students, e.g. "Hey guys what about this?" Questions addressed to all students. Didn't particularly draw in quiet students directly.
Request for student input	Authoritative voice tone. Interactive, sat on desk at front of class, encouraged detailed responses with questioning. Lots of direct instructions. Respectful.
Group activities and discussions	Group learning encouraged. Got students to stand up and demonstrate and practice activities: 'Talk us through step by step what you do'.

Table III. *Proportion reporting risk behaviours and injuries, baseline (BL) and follow up (FU), by condition*

	% BL	% FU	% Change
Intervention			
Risk-taking			
At least one transport risk behaviour	38.2	39.3	1.1
At least one violence risk behaviour	10.5	8.3	-2.2
Drunk a glass of alcohol	16.0	28.0	12.0
Injury			
At least one transport injury	35.1	29.1	-6.0
At least one violence injury	18.9	19.8	0.9
Control			
Risk-taking			
At least one transport risk behaviour	34.7	42.9	8.2
At least one violence risk behaviour	11.9	25.6	13.7
Drunk a glass of alcohol	11.3	26.2	14.9
Injury			
At least one transport injury	28.9	33.7	4.8
At least one violence injury	10.4	14.2	3.8

Table IV. *Impact evaluation: Logistic Regression Analyses predicting risk-taking and injury by condition*

Variable	*B* (*SE*)	Wald	OR (95% CI)	*P*
Risk-taking				
Any transport risk behaviour	0.32 (0.39)	0.66	1.37 (0.64, 2.93)	.415
Any violence risk behaviour	1.81 (0.78)	5.34	6.12 (1.32, 28.46)	.021
Alcohol use	-0.53 (0.52)	1.06	0.59 (0.21, 1.62)	.303
Injury				
Any transport injury	0.35 (0.41)	0.75	1.42 (0.62, 3.17)	.387
Any violence injury	-0.06 (0.56)	0.01	0.94 (0.32, 2.79)	.908

Note. Reference category is Intervention group. OR = odds ratio, odds for control vs. intervention group.CI = confidence interval. Wald= Wald statistic. *B* = regression coefficient. *SE* = standard error.