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## **Strengthening Anti-bullying Research: An Investigation into the Misuse of Dichotomous Variables**

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Effective strategies for addressing school bullying are underpinned by the findings of anti-bullying research. However the latter is plagued with methodological issues including the use of: (a) uni-dimensional approaches when assessing multi-dimensional concepts; (b) unsound measurement instruments whereby the psychometric properties of the measures employed have not been demonstrated; and (c) dichotomous variables with quantitative and continuous data, all contribute to questionable conclusions. The purpose of the present investigation was to examine these issues. A longitudinal causal model was used to examine the relations of secondary school students' ( $N = 2289$ , Males = 901) bullying and victimisation scores over two time periods (Time 1 and Time 2). Results suggest bullying and victimisation are mutually reinforcing constructs and that the use of dichotomous variables to explore relations systematically underestimates the size of the relation between the constructs considered in this investigation.

“Evaluation is central to good practice and ensuring an evidence-based approach to school safety.”  
Australian National Safe Schools Framework Policy and Procedures (Student Learning and Support Services Taskforce, 2003, p. 11).

Strong and rigorous evaluation is key to accurately deciphering what aspects of anti-bullying research inform effective intervention. However, a number of methodological issues have dominated school bullying research over the past 20 years including: (a) utilising uni-dimensional approaches to assess multi-dimensional concepts; (b) the use of measurement instruments which have not demonstrated sound psychometric properties; and (c) the dichotomisation of continuous variables. These methodological concerns lead to less accurate results and impede progress in bullying research. To highlight these current methodological issues in bullying research, previous studies by the current authors (Finger, Marsh, Craven, & Parada, 2005; Marsh, Parada, Craven, & Finger, 2004) have demonstrated sound psychometric qualities using multi-dimensional constructs and have compared dichotomous methods to continuous methods of analysis. The aim of the present study is to provide an overview of current methodological practices employed in bullying research, offer alternative approaches and test longitudinally the causal relation of bullying and victimisation. In particular, the focus of enquiry is on the method of data collection most widely used in research on bullying: self-report questionnaires.

### *Background to School Bullying*

Bullying is an aggressive behaviour that is a growing and significant problem in many schools around the world, including Australia (Healey, 2001). Bullying is an intentional hurtful action and involves a complex interplay of dominance and social status (Sutton, Smith, & Swettenham, 1999). Bullying involves a power imbalance between the bully and victim whereby the victim is unable to defend themselves from the bully (Rigby, 2001). This power imbalance and the fact that bullying behaviours are repeated over time are what differentiate bullying from other forms of aggressive behaviour (Schuster, 1996).

Bullying can take the form of direct and indirect aggression and is considered to be made up of three types (Crick, et al., 2001; Lowenstein, 1977):

1. *Physical* bullying and victimisation involves behaviours where the perpetrator directly physically attacks the victim by way of punching, hitting and/or stealing money from the victim;
2. *Verbal* bullying and victimization refers to direct or indirect comments aimed at the victim. Verbal bullying is intended for the effect of intimidation, humour and/ or humiliation of the victim among the peer group, and can include behaviours such as making rude remarks, jokes, threats and name-calling about the victim; and
3. *Social* bullying and victimisation, is a form of indirect aggression, which involves psychological harm and manipulation of the social system (Björkqvist, Lagerspetz, & Kaukiainen, 1992). Social bullying can take the form of rumour spreading, backbiting and/or social exclusion within the peer group.

All three types are congruent with the definition that the bully intentionally harms the victim, repeatedly, in order to feel superior within the social context, physically, verbally and/ or socially.

Bullying is a social phenomena whereby 85% of bullying incidents have been found to involve peers (Atlas & Pepler, 1998). Peer group training for students has often been employed as a major component of anti-bullying intervention (e.g. Menesini, Codecasa, Benelli & Cowie, 2003; Stevens, Van Oost, & De Bourdeauhuij, 2000). Interventions for peer groups may include: social skills training, peer support, negative reinforcement of inappropriate behaviour and positive reinforcement for pro-social behaviour, training in helping the victim, and seeking help from teachers. Reinforcement of peers works by tapping individual student's self-concept. According to the Social Interaction Model, a subset of Social Identity Theory, individuals categorise themselves into certain groups to which they belong, giving them the opportunity to compare their group and themselves to other groups and other individuals at the school. This enables individuals to discern their own positions within the social hierarchy (Parada & Craven, 2002). If bullying is positively reinforced by the peer group and perceived by individuals to improve their position in the social hierarchy of the school, categorisation of oneself into a group that is of high status and exclusive, is likely to enhance one's sense of popularity. Studies such as Crick and Dodge (1994) support the view that desirable outcomes of aggressive behaviour are expected by those who use aggressive means. It seems logical then to consider peer reinforcement of bullying behaviours, and the influence of the social group as having an effect and being related to an individual's self-concept (Parada & Craven, 2002). Self-concept has been recognised as an important component of bullying and victimisation (e.g. Johnson & Lewis, 1999; Randall, 1996). Hinkley, Marsh, Craven, McInerney, and Parada (2002) state that an individual's social identity is an "integral and important" part of that person's self-concept.

Self-concept is "the way individuals perceive themselves in relation to the world and the social interactions in which they are involved" (Ha, 2002, p. 1). Shavelson, Hubner, and Stanton (1976) established that the self is made up of a myriad of constructs. They developed a multi-dimensional approach to self-concept and proposed a model of self-concept beliefs that range from academic competence to non-academic domains that are hierarchically organised. This model led to valuable instrument developments and effective research in psychology of the self (Craven, Marsh, & Debus, 1991; Marsh, & Craven, 1997). A well-recognised international self-concept instrument for school aged children, the Self-Description Questionnaire II (Marsh, 1990), has supported the multi-dimensional structure of self-concept and shown that self-concept cannot be adequately understood if a uni-dimensional approach is employed (Byrne, 1984; Marsh, & Shavelson, 1985).

### *Uni-Dimensional Approaches to Assess Multi-Dimensional Concepts*

Many studies suggest the existence of three types of bullying and victimisation – physical, verbal and social (e.g. Björkqvist, Lagerspetz, & Kaukiainen, 1992; Crick et al., 2001; Rigby & Slee, 1999; Salmivalli, Kaukiainen, & Lagerspetz, 2000). However, current popular instruments tend to use a 'global' single-item measure for bullying (e.g. "How often have you taken part in bullying another student(s) at school in the past couple of months?"; Solberg & Olweus, 2003) and victimisation (e.g. "How often have you been bullied at school in the past couple of months?"; Solberg & Olweus, 2003). Single-item measures tend to be frequency estimates such as never, frequently, often; or reference periods such as 'once a week', 'more than once per week' (Solberg & Olweus, 2003) and yield scores that are statistically high in variance. As bullying research has advanced, more researchers have realised the importance of measuring the three types of bullying and victimisation. Extra items have been added to instruments as indicative of these types (e.g. Peterson & Rigby, 1999). Peterson and Rigby (1999) analysed 5 behavioural items (hurtful names; unpleasantly teased; hit or kicked; threatened; and left out of things) to measure different bullying types. However, no study had until 2004 (Marsh, Parada, Craven, & Finger, 2004) adequately documented the specific 3-factor structure.

An attempt by Björkqvist, et al., (1992) used Exploratory Factor Analysis to examine the 3 factor structure for 8 and 15 year olds. For the 8-year-old participants, they extracted 3 factors: Relational Aggression, Direct Aggression, and Social Withdrawal. However, direct aggression was not differentiated between physical and verbal types. When analysing the 15-year-old cohort, Björkqvist, et al., (1992) extracted 4 factors: Relational Aggression, Direct-Physical Aggression, Direct-Verbal Aggression and Social Withdrawal whereby the direct aggression factor was differentiated into direct-physical and direct-verbal. However, the lack of factor structure replication between the two samples and the lack of consistency in measuring bullying and victimisation behaviours (only eight items were used in both cohorts) highlights that any inferences drawn from such a study should be done so with caution. There is a need for confirmatory factor analysis (CFA) to be performed to test specific a priori theories (in the case of bullying and

victimisation: physical, verbal and social factors) about a specific set of structures (Hills, 2002) of bullying and victimisation. Furthermore, a composite higher-order factor structure measure (bullying and victimisation) using those scores from the 3 factor structure for types of bullying and victimisation may yield a more consistent global measure of bullying and victimisation, as opposed to using a separate global measure.

The Adolescent Peer Relations Instrument (Bullying and Target/ Victimisation: APRI-B and -T; Parada, 2000) is the only bullying and victimisation instrument that the authors are aware of which has been empirically supported as a robust measure of bullying and victimisation, in addition to a measure of all 3 types of behaviour (Marsh et al., 2004). Using confirmatory factor analysis and reliability psychometric evaluations of the APRI-B and APRI-T with a sample of approximately 4000 students in Years 7 to 11 drawn from 8 Catholic High Schools, Marsh et al. (2004) found support for the first-order a priori 6-factor structure (three types of bullying and victimisation: Physical, Verbal, Relational), and additionally, a higher-order a priori 2-factor structure of total bullying and victimisation (Bully, Victim). Due to the strong nature of this instrument, this measure has now been translated into Norwegian where the popular Olweus measure has previously dominated.

### *Unsound Measurement Instruments*

Using single-item instruments to measure existing a priori factor theories has repeatedly been coupled with additional methodological inconsistencies within school bullying research. Inconsistencies include comparing items that are measured on different or unrelated scales (and without standardisation of scores), as well as comparing single-item measures to multi-item measures.

#### *Ahmed and Braithwaite (2004)*

An example of a recently published Australian study by Ahmed and Braithwaite (2004) use 5 items to categorise students into bully, victim, bully/victim and non-bully/non-victim groups (see Table 1 for an overview of the 5 bully/victim items used). Although these items were used together during administration, a number of inconsistencies were apparent: (a) no item was measured using the same response scale (i.e. self-report bullying was measured on a 5-point scale; parent-rating of bullying measured using 4-point scale; self-report victimisation was measured on a 6-point scale; and parent-rating of victimisation was measured on a 7-point scale); (b) items were not measured on equal continuous poles (i.e. self-report bullying poled to 'several times a week'; parent-rating of bullying poled to 'more than once'; self-report and parent-rating victimisation poled to 'most days'); and (c) there were inconsistent item numbers for self-report bullying and victimisation (i.e. self-report bullying was measured using 2 global measures whereas self-report victimisation only consisted of 1).

*Table 1: Overview of the 5-item Bullying and Victimisation Measure*

Bully/ Victim Item	Measure	Number of Items	Item	Response Scale	Scale Measurement
Bullying	Self-report	2	"how often have you, on your own, bullied someone during the last year"; and "how often have you been part of a group that bullied someone during the last year"	5-point scale	'never' to 'several times a week'
Bullying	Parent-rating	1	"how often has your child been accused of being a bully during the last year"	4-point scale	'don't know', 'never', 'it has happened' and 'more than once'
Victimisation	Self-report	1	how often they have been bullied during the last year	6-point scale	'never' to 'most days'
Victimisation	Parent-rating	1	"how often has your child been bullied in the last year"	7-point scale	'don't know', 'never' to 'most days'

These discrepancies raised further issues when all items were analysed during transition into categories of bully, victims etc. Categorisation into each group, was based on separate criteria. For a student to be categorised as a: (a) *Non-bully/ Non-victim*, they must report 'never' to all 5 items; (b) *Bully*, they must report 'once or twice' or more for the self-report bully items and 'more than once' or 'it has happened' on the parent-rating. However, it is *not* stated that they must meet a criteria of 'never' on the self-report or parent-rating of victimisation; (c) *Victim*, they must report 'every now and again' or more for self-report and parent-ratings of victimisation. However, it is *not* stated that they must meet a criteria of 'never' on the self-report or parent-rating of bullying; and (d) *Bully/Victim*, they must meet the criteria of 'every now and again' or more for all victimisation measures, 'more than once' or 'it has happened' on the parent-rating of bullying, and 'once or twice' or more for the self-report bullying items.

Ahmed and Braithwaite (2004) further performed discriminant function analysis which demonstrated 22% of the Victim group were misclassified as being members of the Bully group and 22% of the Bully group were misclassified as being part of the Victim group. Additionally, 39% of participants in total were incorrectly classified. The authors were aware "there were problems with their original grouping" (p. 49) when misclassification results of the bully group appeared, and proposed the explanation for these discrepancies were "some victims might have subtle ways of bullying which they either did not report or were not aware of" (p. 49). These subtle differences may not have been tapped by the global measures used and may be tapped using a measure of the 3 types of bullying and victimisation. Additionally, these subtle differences may not have been tapped due to the process of dichotomisation of variables during the classification process (see discussion below). Instrumentation used in this study were based on the well-used Rigby and Slee Peer Relations Questionnaire (PRQ; Peterson & Rigby, 1999). However, it is not clear which items in the Ahmed and Braithwaite (2004) study were new and which were taken from the PRQ. Although the study was undoubtedly well intentioned, robust instrumentation may have yielded different and stronger support for their results.

Coupling a comparison of single and multi-item measures with instruments measured on different and unrelated scales, creates a multitude of statistical problems including high variability and a lack of reliability or validity. Conclusions based on these types of results should be addressed with caution.

#### *Dichotomous Variables with Quantitative and Continuous Data*

The bulk of bullying research is made up of continuous and quantitative variables using measures of self-report, peer-report and teacher-report data (e.g. Ahmed & Braithwaite, 2004; Solberg & Olweus, 2003; Roland & Galloway, 2002; Stevens, Van Oost, & Bourdeaudhuij, 2000). This data is most often analysed by dichotomisation to produce results (e.g. Ahmed & Braithwaite, 2004; Solberg & Olweus, 2003; Roland & Galloway, 2002). However, MacCallum, Zhang, Preacher and Rucker (2002) have identified the fallacies associated with dichotomising variables. In a comprehensive analysis of dichotomisation, they demonstrate how dichotomisation of continuous and quantitative variables leads to: (a) loss of effect size and statistical significance; (b) distortion of effects; (c) the potential of researchers to overlook non-linear relationships; and (d) differences between variables that existed *prior* to dichotomisation are considered as *equal* when dichotomised. With these inherent methodological weaknesses of dichotomisation, MacCallum et al. (2002) conclude, that these methods should not be practiced unless "vigorously justified" (p. 22). In the case of bullying research 'vigorous justification' has not been the case. When data analysing bullying and victimisation is dichotomised, children are unavoidably categorised. Examples include being categorised as bullies, victims, and those not involved. The underlying concept of these categories places the child, as opposed to the behaviour, into a bully, victim, or non-involved group.

Categorisation further assumes these groups are stable over time (e.g. Salmivalli, Lappalainen & Lagerspetz, 1998) and that problem behaviours will always be problem behaviours (Conway, 2001). However, bullying is a complex human phenomenon that cannot simply be analysed using classification methods. For example, Ma (2001) proposes that bullying and victimisation are reciprocal in nature, where involvement in bullying contributes to being victimised, and where being a target of bullying contributes to later using bullying behaviours. The interrelation of bullying and victimisation is not new and has often been recognized in categorisation research with the classification of a child into the bully-victim group (Solberg & Olweus, 2003). However, the processes of bullying and victimisation are more complex than a bully-victim category can describe. Problems and discrepancies of relevant cut-off points such as 1.00, .75, .67 or another standard deviation from the mean (Solberg & Olweus, 2003) cause inconsistent methodological practices between research and underestimate the reciprocal relation between bullying and victimisation. An accurate depiction of the reciprocal nature between bullying and victimisation (including subtle relations) can only be



tested using un-cut continuous scores. As such the use of dichotomous bully and victimisation scores in school bullying research is questionable, with uncut continuous scores leading to more precise results.

### *Aims and Hypothesis*

The above three issues are important concerns for school bullying research. To further examine these issues two interrelated studies were devised to comprise the present investigation. The aim of Study 1 was to theoretically review the most popular bully/victim instruments and highlight the use of (a) utilising uni-dimensional approaches to assess multi-dimensional concepts; (b) the use of measurement instruments which have not demonstrated sound psychometric properties; and (c) the dichotomisation of continuous variables, within these instruments. The research question posed was, to what extent are the methodological issues present in existing popular bullying instrumentation. A further aim is to compare the psychometric properties and other characteristics of popular instruments to an alternative new psychometrically robust bully/victim measure, the Adolescent Peer Relations Instrument (APRI; Parada, 2000). It is hypothesised that the APRI will be a robust measure of multidimensional facets of bullying and victimisation in comparison to popular instruments.

The aim of Study 2 was to further examine the issue of dichotomisation. Study 2 will investigate whether the reciprocal nature of using bullying behaviours and being victimised can be successfully measured without classification or dichotomising variables using Structural Equation Modelling. Two hypotheses were tested (1) a reciprocal relation will be found between bullying and victimisation, such that bullying and victimisation will be positively correlated with each other at Time 1 and Time 2; (2) a reciprocal effect of bullying and victimisation will be found such that using bullying behaviours at Time 1 will lead to being victimised at Time 2 and being victimised at Time 1 will contribute to using bullying behaviours at Time 2.

## **Study 1**

### *Method*

#### *Design, Procedure and Participants*

The 3 most internationally recognised instruments in bullying research will be theoretically compared with the new instrument, The Adolescent Peer Relations Instrument (Parada, 2000) to examine the issues of (1) utilising uni-dimensional approaches to assess multi-dimensional concepts; (2) using measurement instruments which have not been demonstrated with sound psychometric properties; and (3) dichotomising continuous variables. Whilst all instruments use a myriad of additional items (such as attitudes towards bullying and perception of school climate), Study 1 is concerned only with those items which correspond to using bullying behaviour and being targeted by bullying.

#### *Instruments*

*Olweus Bullying Inventory* (Solberg & Olweus, 2003) is a popular self-report bully/victim questionnaire with one global measure each for bullying and victimisation (measured on a 5-point scale) as well as 8 separate items that measure 4 types of bullying and victimisation (physical, verbal, social and sexual) using a 5-point scale.

*Salmivalli Participant Role Questionnaire* (Salmivalli, Lappalainen, & Lagerspetz, 1998) is a popular self-report and peer-report measure of 5 subscales: bully, assistant, reinforcer, defender, and outsider (measured on 3-point scale). This questionnaire is used to categorise participants into these roles as well as the role of 'no clear role' when a participant scores equally on 2 or more categories or where the score is below the mean for all subscales. A separate scale was used to measure victimisation (a participant was categorised as a victim when 30% or more classmates named them as a victim, regardless of membership into any other group). There is no category for bully/victim.

*Rigby and Slee Peer Relations Questionnaire* (Peterson & Rigby, 1999) is a popular self-report instrument consisting of one global measure each for bullying and victimisation. An additional 5 items were included to measure 5 types of bullying (hurtful names, unpleasantly teased, hit or kicked, threatened and left out of things; measured on a 3 point scale).

*The Adolescent Peer Relations Instrument* (APRI; Parada, 2000) is a self-report 18-item measure specifically designed to measure 3 types of bullying behaviours (Physical, Verbal, and Relational; APRI-B), 3 types of victimisation/ targeting (Physical, Verbal, and Relational; APRI-T) as well as to generate Total-bullying and Total-victimisation scores (overall mean scores for each). The terms Bully and Victim are used in the present investigation to denote Total-Bullying and Total-Victimisation, respectively. A high score in these subscales designate frequent bullying behaviour (APRI-B) and frequent experiences of victimisation (APRI-T), whereas low scores designate bullying or victimisation that is not as frequent. These subscales are measured on a six-point response scale (1 = 'Never' to 6 = 'Everyday').

### *Results and Discussion*

Study 1 was designed to examine to what extent the methodological issues are present in existing popular bullying instrumentation and to analyse the first hypothesis that the APRI will be a robust measure of multidimensional facets of bullying and victimisation in comparison to popular instruments. Table 2 represents the review of bully and victimisation measures for all instruments. The first three instruments are the popular measures and the fourth instrument is the alternative measure for bullying and victimisation.

Relating to the first methodological issue of using uni-dimensional approaches to assess multi-dimensional concepts, popular instruments have been known to use a global measure of bullying and victimisation, with additional separate measures for the types of bullying and victimisation. For example the Olweus Bullying Inventory has 8 items measuring four types (physical, verbal, social and sexual) and the Rigby and Slee Peer Relations Questionnaire has 5 items measuring 5 types (hurtful names, unpleasantly teased, hit or kicked, threatened and left out of things). However, neither of these instruments has supported the 3 factor structure for types of bullying and victimisation. Alternatively, the APRI uses 18 items to measure 3 types of bullying and victimisation (supported by the strong factor loadings and psychometric properties as found in Marsh et al., 2004). The 18 items of the APRI can also be used to generate a total (global alternative) measure of bullying and victimisation.

The second methodological issue involved the use of instruments without demonstrated sound psychometric properties. For example, the global bullying and victimisation items within the Rigby and Slee Peer Relations Questionnaire are measured on a prevalence period using specified time periods (i.e. 'weekly') yet the 5 item type of victimisation measure is a 3-point scale measured as a subjective frequency ('never', 'sometimes' and 'often'). It is evident that a lack of consistency in response scales exists within the Peer Relations Questionnaire. Conversely, the APRI continually uses a 6-point prevalence specified time period ('never' to 'everyday') for all types of bullying and victimisation, and because these items are used for the Total bullying and Total victimisation scores, the total scores are hence measured on the same response scale and matched on the same time period.

The third methodological issue of dichotomisation in bullying research is often employed. The Salmivalli Participant Role Questionnaire advocates the use of cut-off scores to classify students into participant roles: bully, assistant, reinforcer, defender, outsider, no clear role and victim. The Olweus Bullying Inventory also advocates dichotomisation, however, Solberg and Olweus (2003) highlight that careful consideration for relevant cut-off scores needs to be taken into account and should be considered with the chosen definition of bullying. The APRI scale on the other hand does not advocate dichotomisation of variables and the scale can be used without the use of cut-off scores.

As hypothesised, the APRI scale is the only instrument in comparison to the most well-known measures, which has overcome the following methodological concerns (1) utilising uni-dimensional approaches to assess multi-dimensional concepts; (2) using measurement instruments which have not been demonstrated with sound psychometric properties; and (3) dichotomising continuous variables. All popular instruments on the other hand include one or more methodological issues. APRI is a psychometrically robust instrument which consistently measures the 3 types of bullying and victimisation while also calculating the total bully/ total victim scores. This instrument provides a sound base for which future researchers can employ. The APRI will thus be used to analyse the third important issue of dichotomisation in Study 2.

*Table 2: Review of Bullying and Victimization Measures for Popular Instruments*

Instrument	Measures	Dichotomisation Advocated	Global Bullying Item	Global Victimisation Item	Measure for Three Types	Overview
Popular Instrument: <i>Owens Bullying Inventory</i> , new 1996 version	<ul style="list-style-type: none"> <li>• Self-report</li> <li>• 1 global measure each of bullying and victimisation</li> <li>• 7 items corresponding to types of bullying and victimisation</li> <li>• Global item reliabilities were .87 for bullying and .88 for victimisation.</li> </ul>	Advocate dichotomisation and highlight careful consideration for relevant cut-off scores	“How often have you taken part in bullying another student at school in the past couple of months?”	“How often have you been bullied at school in the last couple of months?”	8 items regarding how often particular (physical, verbal, social and sexual) bullying occurred	<ul style="list-style-type: none"> <li>• Separate global and type items</li> <li>• Global items measured on 5-point scale ranging from ‘only once or twice’ to ‘several times a week’.</li> <li>• Not clear what scale the 8 items measuring type use.</li> <li>• Advocates dichotomisation</li> </ul>
Popular Instrument: <i>Salmivalli Participant Role Questionnaire</i>	<ul style="list-style-type: none"> <li>• Peer-report and Self-report</li> <li>• 22 items measure 5 subscales plus ‘no clear role’ subscale.</li> <li>• Reliability alpha range from .84 to .94 for each group;</li> <li>• Factor analysis found 3 factors: (1) defender; (2) outsider; and (3) bully, reinforcer and assistant.</li> </ul>	Advocates categorisation.. Questionnaire designed for categorisation.	None	None	5 subscales, standardised by class (bully; assistant; reinforcer; defender; outsider); 22 items create these categories, plus no clear role category. Separate victimisation scale.	<ul style="list-style-type: none"> <li>• Instrument built on dichotomising and categorising participant scores.</li> <li>• Items measured on 3-point scale (‘never’, ‘sometimes’ and ‘often’).</li> </ul>
Popular Instrument: <i>Rigby &amp; Slee Peer Relations Questionnaire</i>	<ul style="list-style-type: none"> <li>• Self-report</li> <li>• 1 global measure each of bullying and victimisation</li> <li>• 5 items correspond to 5 types of bullying</li> <li>• Reliability of 5 item Victim scale: alpha coefficient of .85/.86)</li> </ul>	Does not discourage dichotomisation	Global measure. Unclear how many indices scale has and what exact question asked.	Global measure. Unclear how many indices scale has and what exact question asked.	5 item Victim scale measures 5 types of victimisation on a 3-point scale (never, sometimes and often).	<ul style="list-style-type: none"> <li>• Separate global and type items</li> <li>• Not clear what global items measured on but unlikely to be the same as measure of types because they are measured on different scales (i.e. global measured on periods such as ‘weekly’, whereas types measured as vague frequency ‘never’, ‘sometimes’ and ‘often’).</li> </ul>
Alternative Instrument: <i>Parada Adolescent Peer Relations Instrument (APRI)</i>	<ul style="list-style-type: none"> <li>• Self-report</li> <li>• 18 items</li> <li>• Reliability of 3 factor structure for bully and victim ranged from .83 to .92; reliability of total bully and total victim scores were .93, .95 respectively.</li> </ul>	Does not encourage dichotomisation	Total Bullying measure calculated from mean Type of Bullying items	Total Victimization measure calculated from mean Type of Victimization	18 items comprise 3 types of bullying and victimisation.	<ul style="list-style-type: none"> <li>• Total scores based on type items.</li> <li>• All items measured on same scale.</li> <li>• Does not encourage dichotomisation.</li> </ul>

## Study 2

### *Method*

#### *Design and Procedure*

The present investigation consists of results from the Adolescent Peer Relations Instrument (Bullying and Target/ Victimization) administered on two occasions: Time 1 (T1) data was completed during the start (March), and Time 2 (T2) during the middle (July), of the school year. Teachers who were formally trained, administered the instruments. The instrument and causal path model was used to test the mutually reinforcing relations between Bully and Victim scale scores measured at T1, and Bully and Victim scale scores measured at T2.

#### *Participants*

A representative sample of students between Year 7 and 11 was drawn from six Catholic Secondary Schools in the Western Sydney Region. Responses to the questionnaires were manually assessed for unusual patterns and unreliable data. Participants deemed to have responded inappropriately, were deleted. Additionally, for consistency in hypothesis testing, respondents were matched so that only participants who completed both T1 and T2 data were included for analysis, leaving a total of 2289 participants (901 males, 1388 females; 651 year 7s, 558 year 8s, 479 year 9s, 415 year 10s, and 186 year 11s).

#### *Instruments*

The Adolescent Peer Relations Instrument (APRI; Parada, 2000): *see Study 1 Instruments.*

#### *Statistical Analysis: Structural Equation Modelling*

One structural equation model was conducted with LISREL 8 (Joreskog, & Sorbom, 1993) using maximum likelihood estimation (Byrne, 1998; Loehlin, 1987) and listwise deletion (because there were almost no missing data). Analyses were based on a measurement of the Bully and Victim variables, collected at T1 and again at T2. The model was fully saturated in that scale scores were used and all parameters were estimated so that the focus was on size, direction, and statistical significance of individual parameter estimates, rather than goodness of fit. One model was used to evaluate whether Time 1 Bully correlated with Time 1 Victim scores, as well as longitudinal causal ordering to evaluate whether T1 variables effect T2 variables, beyond the effects of other T1 variables (see Marsh, Byrne, & Yeung, 1999; see also Marsh, Parada, Yeung, & Healey, 2001). Model 1 evaluated the effect of a) T1 Bully on T2 Victim beyond that explained by T1 Victim; and b) T1 Victim on T2 Bully beyond that explained by T1 Bully. Standardized path coefficients evaluated in Model 1 explain the extent to which a change (measured in standard deviations) in one variable (the source variable) produced a change in another variable (the observed variable) while all other variables were held constant (Loehlin, 1987).

#### *Results: Structural Equation Models (SEM):*

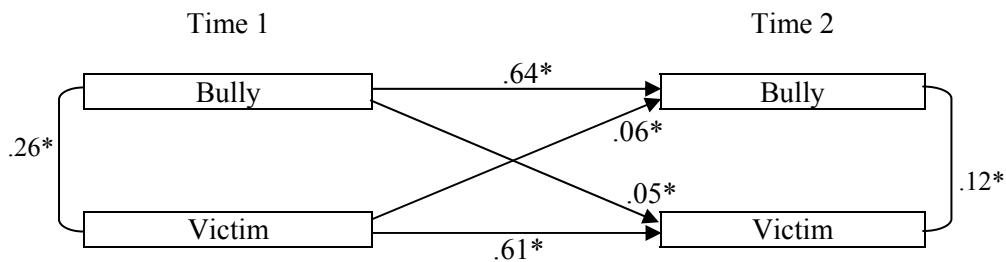
Bully and Victim scale scores were analysed to examine the overall contribution of bullying and victimisation to each other. The longitudinal causal model of the relations between Bully and Victim was performed using 1 structural equation model (SEM). The model relates to distinct hypotheses undertaken as outlined in the introduction.

#### *Model 1: The Mutually Reinforcing Nature of Bullying and Victimization*

Model 1 (see Figure 1) investigates the relationship between Bully and Victim scores at Time 1 (T1) and at Time 2 (T2). The modest correlation found between Bully and Victim (.26,  $p < .001$ ) at T1, together with the positive residual correlations between Bully and Victim (.12,  $p < .001$ ) at T2 (after controlling for T1 scores), indicate the use of bullying at any one time may also involve being victimised at that time, supporting the hypothesis that self-report bullying and victimisation will be positively correlated with each other at Time 1 and also at Time 2. Crucially, the statistically significant residual correlation between Bully and Victim at T2 indicates the two constructs were more positively correlated at T2, beyond what could be explained in terms of the positive correlations between bullying and victimisation at T1.

Model 1 also investigates the impact of Bully and Victim at T1 on Bully and Victim at T2. This model is critical to pursuing the numerous studies showing that Bullying and Victimization are not antithetical roles and may actually be positively correlated. More importantly, the further analysis pursued here, goes beyond the previous significant positive correlations found, evaluating the hypothesis that Bully and Victim have mutually reinforcing effects on each other over time.





*Figure 1:* Standardised coefficients for Model 1 of T1 Bully and Victim, predicting Bully and Victim at T2.  
 \*  $p < .05$

Results for Model 1 show support for the hypothesis that bullying behaviours at Time 1 will lead to being victimised at Time 2 and being victimised at Time 1 will contribute to using bullying behaviours at Time 2. The strongest path coefficients, as expected, were those running from T1 Bully to T2 Bully (.64), and T1 Victim to T2 Victim (.61). Using bullying at T1 is indicative of a high tendency of using and increasing the use of bullying at T2 and similarly, those who are victimised at T1, were more likely to be victimised at T2. However, these stability coefficients show that individual differences are only reasonably stable over time.

The most important paths in Model 1 in relation to the a priori hypothesis are the small, but statistically significant and positive path coefficients leading from T1 Bully to T2 Victim (.05,  $p < .05$ ) as well as the small, but statistically significant and positive path coefficients leading from T1 Victim to T2 Bully (.06,  $p < .05$ ). These paths suggest that being victimised at T1 resulted in the use and increased use of bullying behaviours at T2, more than can be explained in terms of T1 Bully. Similarly, using bullying at T1 resulted in increased victimisation at T2, more than can be explained by T1 Victim. This means being a bully at T1 may lead an individual to become victimised at T2, and being a victim at T1 may lead an individual to use bullying in their interactions with peers at T2. This important finding of the direct positive connections between bullying behaviours and victimisation over time, illustrates that bullies and victims are not homogenous subgroups. Rather, the Bully and Victim roles are mutually reinforcing patterns of behaviour, such that the occurrence of one leads to the other. This has extensive implications for both interventions that aim to decrease bullying in schools, and for the future direction of bullying research.

### General Discussion

The first hypothesis the APRI will be a robust measure of multidimensional facets of bullying and victimisation in comparison to popular instruments was supported in Study 1. This is of particular concern due to the wide-spread use of the popular instruments which all consist of one or more methodological issues. The modification of popular instruments by later researchers may also lead to further more serious methodological implications as witnessed in the Ahmed and Braithwaite (2004) study. The three issues: (a) utilising uni-dimensional approaches to assess multi-dimensional concepts; (b) the use of measurement instruments which have not demonstrated sound psychometric properties; and (c) the dichotomisation of continuous variables, are important concerns for bully research and have implications for school bullying interventions and future research.

The crucial third issue was examined in more detail within Study 2. Results here supported hypotheses that self-report bullying and victimisation will be positively correlated with each other at Time 1 and also at Time 2; and that using bullying behaviours at Time 1 will lead to being victimised at Time 2 and being victimised at Time 1 will contribute to using bullying behaviours at Time 2 respectively. Although these causal relations may appear small, the results of the present study show that bullying does contribute significantly to being victimised and that victimisation does contribute significantly to bullying at a later stage. Furthermore, subtle relations can be detected. This finding together with the statistically significant correlations (particularly the high residual correlations found at T2 after accounting for T1 effects) between bullying and being victimised demonstrate a complex mutually reinforcing relation.

Important limitations of the present study must also be addressed. For Study 1, it was difficult to gain access to original instruments and find adequate explanations of the popular instruments. Hence it was difficult to gain full explanations of some key methodological aspects. For example it was not clear what the global measure of the Rigby and Slee Peer Relations Questionnaire was, and what scale this was measured

on. Finer analysis and comparison of all instrument aspects were thus not possible. However, where possible, the most important aspects were examined.

A number of implications for both future research and intervention programs are evident from findings of the present study. While the present study offered initial exploration into the causal relations between bullying, victimisation and self-concept, future research could further explore these longitudinal (greater than four months) causal relations. Clearly the results also suggest that dichotomising bullies and victims fails to account for the full complexity of the mutually reinforcing nature of these constructs which has important implication for both interventions that aim to decrease bullying in schools and for future research.

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### References

- Ahmed, E. & Braithwaite, V. (2004) Bullying and victimization: Cause for concern for both families and schools. *Social Psychology of Education*, 7, 35-54.
- Atlas, R. S., & Pepler, D. J. (1998). Observations of bullying in the classroom. *The Journal of Educational Research*, 92(2), 86-99.
- Björkqvist, K., Lagerspetz, K. M. J., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior*, 18, 117-127.
- Byrne, B. M. (1984). The general/academic self-concept nomological network: A review of construct validation research. *Review of Educational Research*, 54, 427-456.
- Byrne, B. M. (1998). *Structural equation modelling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications and programming*. Mahwah, NJ: Erlbaum.
- Conway, R. (2001). Encouraging positive interactions. In P. Foreman (Ed.), *Integration and Inclusion in Action* (pp.311-359). Southbank Victoria: Nelson Thomson Learning.
- Craven, R. G., Marsh, H. W., & Debus, R. (1991). Effects of internally focused feedback and attributional feedback on the enhancement of academic self-concept. *Journal of Educational Psychology*, 83, 17-26.
- Crick, N. R., & Dodge, K. A. (1994). A review of reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 115(1), 74-101.
- Crick, N. R., Nelson, D. A., Morales, J. R., Cullerton-Sen, C., Casas, J. F., & Hickman, S. E. (2001). Relational victimisation in childhood and adolescence: I hurt you through the grapevine. In J. Juvonen, A. Nishina, & S. Graham (Eds.), *Peer harassment in school: the plight of the vulnerable and victimized* (pp. 196-214). New York: Guilford.
- Finger, L. R., Marsh, H. W., Craven, R. G. & Parada, R. H. (2005). *Is categorisation best practice for school bully research? An investigation into the process of dichotomisation*. Paper presented at the University of Western Sydney College of Arts, Education and Social Sciences Research Conference, October, 2005, Sydney.
- Ha, T. (2002). *The Impact of Age and Menarche on the Development of Current and Future Self-Concepts of Adolescent Girls*. Paper presented at the 2<sup>nd</sup> International Biennial Conference of Self-Concept Research, August, 2002, Sydney
- Healey, J. (2001). Bullying and Youth Violence. *Issues in society*, v. 154
- Hills, A. M. (2002). *Foolproof guide to statistics using SPSS*. {On-line}. World Wide Web: <http://www.uws.edu.au/learn/psychology/hills/statistics.htm>
- Hinkley, J. W., Marsh, H. W., Craven, R. G., McInerney, D. M., & Parada, R. (2002). Social Identity and Navajo high school students: is a strong social identity important in the school social context? In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), *Online Readings in Psychology and Culture*

(Unit 3, Chapter 5), (<http://www.wwu.edu/~culture>), Center for Cross-Cultural Research, Western Washington University, Bellingham, Washington USA.

- Joreskog, K. G., & Sorbom, D. (1996). *LISREL 8: Structural equation modelling with the SIMPLIS command language*. Chicago: Scientific Software International.
- Loehlin, J. C. (1987). *Latent variable model: an introduction to factor, path, and structural analysis*. Hillsdale, NJ: Lawrence Erlbaum.
- Lowenstein, L. F. (1977). Who is the bully? *Home and School*, 11, 3-4.
- Ma, X. (2001). "Bullying and being bullied: To what extent are bullies also victims?" *American Educational Research Journal*, 38(2), 351-370.
- MacCallum, R. C., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the practice of dichotomization of quantitative variables. *Psychological methods*, 7(1), 19-40.
- Marsh, H. W. (1990). *Self Description Questionnaire (SDQ) II: A theoretical and empirical basis for the measurement of multiple dimensions of adolescent self-concept: An interim test manual and a research monograph*. San Antonio, TX: The Psychological Corporation (Republished in 1992, Publication Unit, SELF Research Centre, University of Western Sydney.).
- Marsh, H. W., Byrne, B. M., Yeung, A. S. (1999). Causal Ordering of Academic Self-concept and Achievement: Reanalysis of a Pioneering Study and Revised Recommendations. *Educational Psychologist*, 34, 155-167.
- Marsh, H. W., & Craven, R. (1997). Academic self-concept: Beyond the dustbowl. In G. Phye (Ed.), *Handbook of classroom assessment: Learning, achievement, and adjustment* (pp. 131-198). Orlando, FL : Academic Press.
- Marsh, H. W., Parada, R. H., Craven, G. R., & Finger, L. R. (2004). In the looking glass: A reciprocal effects model elucidating the complex nature of bullying, psychological determinants and the central role of self-concept. In C. S. Sanders & G. D. Phye (Eds.), *Bullying: implications for the classroom* (pp. 63-109). Orlando, FL: Academic Press.
- Marsh, H. W., Parada, R. H., Yeung, A. S. & Healey, J. (2001). Aggressive School Troublemakers and Victims: A Longitudinal Model Examining the Pivotal Role of Self-concept. *Journal of Educational Psychology*, 93(2), 411-419.
- Marsh, H. W. & Shavelson, R. (1985). Self-concept: Its multifaceted, hierarchical structure. *Educational Psychologist*, 20, 107-125.
- Menesini, E., Codecasa, E., Benelli, B., & Cowie, H. (2003). Enhancing children's responsibility to take action against bullying: Evaluation of a befriending intervention in Italian middle schools. *Aggressive Behavior*, 29(1), 10-14.
- Parada, R. H. (2000). *Adolescent Peer Relations Instrument: A theoretical and empirical basis for the measurement of participant roles in bullying and victimisation of adolescence: An interim test manual and a research monograph: A test manual*. Publication Unit, Self-concept Enhancement and Learning Facilitation (SELF) Research Centre, University of Western Sydney.
- Parada, R. H. & Craven, R. (2002). *Beyond Bullying Secondary Schools Program: Consultant's handbook*. Publication Unit, Self-concept Enhancement and Learning Facilitation (SELF) Research Centre, University of Western Sydney.
- Peterson, L., & Rigby, K. (1999). Countering bullying at an Australian secondary school with students as helpers. *Journal of Adolescence*, 22(4), 481-492.



- Rigby, K. (2001). *Stop the bullying: a handbook for schools*. Camberwell: Australian Council for Educational Research.
- Rigby, K., & Slee, P. T. (1999). Suicidal ideation among adolescent school children, involvement in bully-victim problems, and perceived social support. *Suicide and Life-Threatening Behavior*, 29(2), 119-130.
- Roland, E., & Galloway, D. (2002). Classroom influences on bullying. *Educational Research*, 44(3), 299-312.
- Salmivalli, C., Lappalainen, M., & Lagerspetz, K. M. J. (1998). Stability and change of behaviour in connection with bullying in schools: A two-year follow-up. *Aggressive Behavior*, 24, 205-218.
- Salmivalli, C., Kaukiainen, A., & Lagerspetz, K. M. J. (2000). Aggression and sociometric status among peers: do gender and type of aggression matter? *Scandinavian Journal of Psychology*, 41(1), 17-24.
- Schuster, B. (1996). Rejection, exclusion and harassment at work and in schools: an integration of results from research on mobbing, bullying, and peer rejection. *European Psychologist*, 1(4), 293-317.
- Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Validation of construct interpretations. *Review of Educational Research*, 46, 407-441.
- Solberg, M. E., & Olweus, D. (2003). Prevalence estimation of school bullying with the Olweus Bully/Victim Questionnaire. *Aggressive Behavior*, 29(3), 239-268.
- Stevens, V., Van Oost, P., & De Bourdeaudhuij, I. (2000). The effects of an anti-bullying intervention programme on peers' attitudes and behaviour. *Journal of Adolescence*, 23(1), 21-34.
- Student Learning and Support Services Taskforce (2003). *National Safe Schools Framework*. Carlton South Victoria: MCEETYA. Retrieved April 20, 2005, from <http://www.mceetya.edu.au/pdf/natsafeschools.pdf>
- Sutton, J., Smith, P. K., & Swettenham, J. (1999). Bullying and 'theory of mind': a critique of the 'social skills deficit' view of anti-social behaviour. *Social Development*, 8(1), 117-127.