

RESILIENCE IN THE FACE OF RISK: INVESTIGATING THE MODERATING EFFECTS OF  
SCHOOL CONNECTEDNESS, EDUCATIONAL COMMITMENT, AND EDUCATIONAL BELIEF  
IN THE CONTEXT OF ADOLESCENT ANTISOCIAL BEHAVIOUR

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Resilience in the Face of Risk: Investigating the Moderating Effects of School Connectedness,  
Educational Commitment, and Educational Belief in the Context of Adolescent Antisocial Behaviour

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**Abstract**

According to the Social Development Model (SDM), social bonds such as one's sense of connection to school can significantly impact antisocial behaviour. The current study provides a cross-sectional analysis of school bonding in relation to antisocial behaviour and peer-related risk in a sample of 111 adolescents. Hierarchical regression analyses were performed to evaluate the dimensions of school bonding (educational commitment, educational belief, school connectedness) as both predictors and inhibitors of antisocial behaviour. Contrary to the SDM, educational commitment was the only significant predictor of antisocial behaviour. Furthermore, preliminary analyses did not support school bonding variables as moderators of peer-related risk. However, subsequent analyses examining moderation by gender revealed that school connectedness is a moderator of deviant peer affiliation for female youth. The results of this study extend previous findings by demonstrating the continued relevance of school-based resilience in high school and by illustrating the specificity of this resilience by gender.

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## Dedication

*This thesis is dedicated to my husband, Stan, whose continued support and encouragement made it all possible.*

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Resilience in the Face of Risk: Investigating the Moderating Effects of School  
Connectedness, Educational Commitment, and Educational Belief in the Context of Adolescent  
Antisocial Behaviour

The emergence and escalation of antisocial behaviour is a significant problem during adolescence (Erikson, Crosnoe, & Dornbusch, 2000; Patterson, DeBaryshe, & Ramsey, 1990). Antisocial acts such as substance use, property damage, and aggression can negatively impact healthy adjustment patterns and put adolescents at risk for a variety of negative outcomes (Patterson et al., 1990). In the short term, adolescents engaging in antisocial behaviour are more likely to experience family conflict, academic difficulties, mental health problems, and peer relationship conflicts than their less deviant peers (Durant, Knight, & Goodman, 1997; French & Conrad, 2001). Furthermore, delinquency and aggression during the teen years are associated with maladaptive outcomes later in life, such as criminality, partner violence, divorce, unemployment, academic failure, depression, and risky sexual behaviour (Farrington, 2001; Miller, Malone, & Dodge, 2010). In addition to the significant personal costs associated with antisocial behaviour, there are also considerable financial costs for the public. Children and adolescents with behavioural problems cost society an average of \$70,000 more than children without behavioural problems over a seven-year period, as a result of greater expenditures in education, justice, and mental health services (Foster & Jones, 2005).

Given the poor outcomes and costs associated with aggression and delinquency in adolescence, there is significant interest in the identification of factors that promote engagement in and maintenance of antisocial behaviour and those that may shift the trajectory for adolescents to more positive outcomes (Fergus & Zimmerman, 2005; Jessor, Vandebos, Vanderryn, Costa, & Turbin, 1995). In the literature, these variables are referred to as risk and resilience factors.

Risk factors are conditions that increase the likelihood of negative outcomes, and resilience factors are variables that decrease or protect against the occurrence of negative outcomes (Fergus & Zimmerman, 2005; Jessor et al., 1995). The inclusion of resilience factors in studies of adolescent development represents a shift in research focus over the last several decades (Miller, Brehm, & Whitehouse, 1998). Early theories of problem behaviour focused largely on risk factors and ignored the role of protective factors (Pollard, Hawkins, & Arthur, 1999). For instance, Hirschi's (1969) social control theory postulates that antisocial behaviour is the result of lowered self-control exhibited by delinquent individuals. Similarly, Aker's social learning theory (1999) posits that individuals who interact with antisocial individuals more frequently are likely to adopt similar behaviour patterns. However, many adolescents exposed to these identified risk factors do not go on to exhibit antisocial behaviour, which suggests that risk factors are not the only relevant factors driving the development of antisocial behaviour (Farrington, 1996). Consequently, risk-based theories alone cannot explain patterns of adolescent development and the incorporation of protective factors is necessary for greater predictive utility (Pollard et al., 1999). One way to investigate risk and resilience variables in parallel is through a risk and resilience framework (Fergus & Zimmerman, 2005). The current study utilizes the Social Development Model (SDM), as a risk and resilience framework to study antisocial behaviour in adolescence. The SDM is one of the only theories of delinquency to incorporate both risk and protective factors in its model (Huang, Kosterman, Catalano, Hawkins, & Abbott, 2001; Miller et al., 1998). Furthermore, the SDM allows for the examination of protective factors at the community level, which have been underemphasized in the literature and may be more amenable to change than individual factors (Fergus & Zimmerman, 2005).

During adolescence, the SDM conceptualizes key areas of risk and resilience as residing externally, within the peer group and the school environment (Catalano & Hawkins, 1996). Research has supported this model, with findings suggesting that deviant peer affiliation is positively correlated with the onset and development of antisocial behaviours for both male and female youth and across high and low risk adolescents (Brendgen, Vitaro, & Bukowski, 2000; Heinze, Toro, & Urberg, 2004). Furthermore, research suggests that when given consistent support from educational providers at school, adolescents can develop a connection to their school that has the potential to protect them from negative peer influences (Crosnoe, Erikson, & Dornbusch, 2002; Dickens, Dieterich, Henry, & Beauvais, 2012; Erikson et al., 2000; Rudasill, Niehaus, Crockett, & Rakes, 2013). The current study will investigate the independent and interactive effects of the risk and resilience factors proposed by the SDM to test the validity of the model with adolescents in high school. Specifically, the relationship between school bonding and antisocial behaviour will be examined and the role of school bonding will be further evaluated as a potential moderator of the association between peer-related risk factors and self-reported antisocial behaviour.

To provide a theoretical frame for the current study, a summary of the contemporary literature pertaining to the development of antisocial behaviour in adolescence will be provided. Following this summary, the SDM will be described, and the role of risk and resilience factors in adolescence will be evaluated (i.e., deviant peer affiliation, susceptibility to peer influence and school bonding). Finally, the overview will conclude with a discussion of the limitations in the literature to be addressed in the current study.

## **Introduction to the Social Development Model (SDM)**

The SDM is an integrative theory of human behaviour developed by Catalano and Hawkins (1996) that has been used to describe a range of antisocial behaviours in adolescence. The SDM was constructed through the combination of several pre-existing theories of delinquency and aggression, including social control theory, social learning theory, and differential association theory, to broadly describe the development of pro-social and antisocial behaviour over the life course (Catalano & Hawkins, 1996; Hawkins & Weis, 1985). The model combines central elements from each of these theories within a developmental framework to provide a comprehensive understanding of antisocial behaviour (Catalano & Hawkins, 1996; Hawkins, Guo, Hill, Battin-Pearson, & Abbott, 2001). The social control component, derived from Hirschi's social control theory (Hirschi, 1969), specifies the units of socialization involved in the onset of antisocial behaviour and the mechanisms through which behaviours are adopted (i.e., bonding to predominant social units) (Catalano & Hawkins, 1996). The social learning component of the model from Aker's social learning theory of delinquency (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979) describes the processes by which behaviours are maintained or diminished through reinforcement in one's environment (Catalano & Hawkins, 1996). The final theoretical contribution, from Sutherland's (1973) differential association theory, accounts for the nature of the behavioural outcome – that is, pro-social or antisocial – based on the predominant social influence (Catalano & Hawkins, 1996). Specifically, according to differential association theory, individuals are exposed to both favorable and unfavorable behaviours through their interactions with others (i.e., differential socialization) (Matsueda, 1982). Following this exposure, subsequent behaviours are adopted based on their perceived acceptance or favorability by other group members (Matsueda, 1982). According to the

differential association theory, acceptance is established based on the frequency, duration, and intensity of the behaviours displayed by group members (Matsueda, 1982). Thus, an individual is likely to become delinquent if they have a greater proportion of friends or associates who endorse delinquent and criminal acts as favorable (Matsueda, 1982). Independently, these theories within the SDM only partially account for the development of antisocial behaviours, but their combination within the model maximizes the predictive utility of the model and allows for the assessment of individual change over time (Catalano & Hawkins, 1996; Hawkins & Weis, 1985).

In the SDM, the salience of a socializing unit (e.g., peer group, parents) depends on one's phase of development, represented by four sub-models of development in the model: early childhood, elementary school, middle school, and high school (Catalano & Hawkins, 1996). These sub-models allow for more precise predictions of future behaviour by accounting for the most relevant risk and resilience factors based on an individual's stage of development (Catalano & Hawkins, 1996). Moreover, although the stages of development are represented within separate sub-models, the full model allows reciprocal feedback between stages to account for the continuity of a behaviour pattern over an individual's lifetime (Catalano & Hawkins, 1996).

### **The Social Development Model (SDM): Socialization Processes**

According to the SDM, socialization to establish a social bond involves four components: opportunities for involvement, skills for participation, engagement with the socializing unit, and reinforcement (Catalano & Hawkins, 1996; Catalano, Oxford, Harachi, Abbott, & Haggerty, 1999; Herrenkohl et al., 2007). Thus, socialization along the pro-social path within the family domain requires perceived opportunities for involvement such as the availability of family activities and the skills to participate in pro-social activities such as the ability to regulate

emotion and to communicate with family members (Kosterman & Hawkins, 1997). In the presence of these primary socializing components, subsequent involvement with the socializing unit must occur for a social bond to develop, and further participation with the socializing unit will depend on the level and consistency of reinforcement provided (Catalano & Hawkins, 1996). Support for the contribution of the socialization elements to the level of social bonding derives from a study by Rivera and McCorry (2007). They evaluated the impact of perceived opportunities, skills, and reward for involvement on self-reported delinquency and substance abuse in a group of adolescents involved in an after-school program. It was found that adolescents who endorsed greater perceived opportunities for involvement, higher rewards for pro-social behaviour, and higher levels of engagement with after-school activity staff displayed the lowest levels of delinquency and substance abuse post intervention (Rivera & McCorry, 2007). This finding supports the relevance of the SDM socialization elements in the development of social bonds, as elevations in these elements corresponded with greater bond strength.

### **The Social Development Model (SDM): Components of a Social Bond**

A social bond is established following successful socialization. According to the SDM, a social bond is comprised of three components: attachment or emotional connection to the social unit, commitment or investment in the relationship, and belief or internalization of the values of social unit (Catalano & Hawkins, 1996). This bond affects subsequent behaviour through its influence on decisions of the bonded individual who will avoid compromising the established relationship by engaging in behaviours that are inconsistent with the social unit (e.g., antisocial behaviours in the case of a pro-social bond). Thus, based on this theoretical framework, an individual's level of commitment, attachment, and belief in a socializing unit, determine the strength of their social bonding and impact their future behaviour. Support for the impact of pro-

social bonding on behaviour in adolescence has been reported for substance abuse (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Lonczak et al., 2001) and aggression (Ayers et al., 1999; Herrenkohl et al., 2007; Huang et al., 2001), the two most prominent forms of antisocial behaviour during this development period. The model has also been successfully applied to behaviours across different genders (Laundra, Kiger, & Bahr, 2002), income groups (Fleming, Catalano, Oxford, & Harachi, 2002), and delinquent offender types (i.e., child onset or adolescent onset) (Herrenkohl et al., 2007).

### **Deviant Peers: Role of Affiliation**

Affiliation with deviant peers has been identified as one of the most consistent risk factors for the onset and maintenance of problem behaviours in adolescence (Ferguson, Swain-Campbell, & Horwood, 2002; Heinze et al., 2004). The impact of deviant peers becomes especially salient during adolescence when individuals spend greater levels of unstructured time with peers outside the home, and when peer groups become more heterogeneous and are more likely to include deviant members (Haynie, 2002; Larson & Richards, 1991; Mounds & Steinberg, 1995). The impact of deviant peers has been reported across a variety of behavioural domains during adolescence, including: academic achievement (Mounds & Steinberg, 1995); drug use (Fergusson et al., 2002; Oxford, Harachi, Catalano, & Abbott, 2000); alcohol use (Akers et al., 1979; Mounds & Steinberg, 1995); smoking (Akers & Lee, 1996); as well as property damage and aggression (Agnew, 1991; Sullivan, 2006; Vitaro, Brendgen, & Tremblay, 2000). The role of the peer group as an influence on behavioural outcomes during adolescence is in line with the developmental trajectory of risk factors outlined by the SDM, which postulates that peers, parents, and teachers are the most relevant social influences during adolescence.

According to the SDM, once a social bond is established with a socializing unit such as the peer group, behaviours and attitudes of the social unit are acquired and sustained through social learning processes (Catalano & Hawkins, 1996). Specifically, deviant peers model antisocial behaviours and offer attitudes that are supportive of delinquent activity; these behaviours and attitudes are subsequently adopted through imitation and modelling based on the perceived benefits or consequences of the behaviours (Akers et al., 1979). Studies comparing interactions of deviant and normative peer groups support the processes of deviancy training described by the social learning perspective. In particular, interactions among deviant peers tend to be more coercive in nature and involve higher levels of negative reciprocity and deviant content than normative peer group interactions (Dishion, Andrews, & Crosby, 1995; Dishion, Nelson, Winter, & Bullock, 2004).

### **Deviant Peers: Role of Proportion of Friends Who are Antisocial**

Consistent with differential association theory, the influence of deviant peers is strengthened by the proportion of deviant peers in one's friendship network rather than the absolute number of deviant acts committed by one's peers (Haynie, 2002). Haynie (2002) suggests that having a higher proportion of antisocial peers in one's peer group is likely to have a greater impact than a peer group with similar levels of deviant and non-deviant peers due to the greater consistency in behaviours modelled. Further support for the impact of the consistency of influence on the strength of peer effects comes from a study by Warr and Stafford (1991). They compared the impact of peer actions and attitudes on self-reported antisocial behaviour in adolescents who were consistently deviant (i.e., both antisocial attitudes and antisocial behaviours) or inconsistently deviant (i.e., antisocial attitudes and prosocial behaviours or vice

versa) and found that peer influence was stronger for adolescents whose behaviours and attitudes were consistent.

In addition to cross-sectional and longitudinal studies, the contribution of deviant peers to problem behaviour is also apparent from studies of behaviour interventions that bring together deviant adolescents (Dishion & McCord, 1999). Specifically, interventions that aim to reduce problem behaviours through group treatment ultimately have been found to have enhancing effects on antisocial behaviour due to the aggregation of deviant peers (Dishion & McCord, 1999). For instance, Dishion, Burraston, and Poulin (2001) developed the Adolescent Transitions Program (ATP), an intervention focused on improving adolescent self-regulation and parenting practices to reduce the level of problem behaviours in adolescence. Over the course of the program, high-risk adolescents were assembled into smaller peer groups and observed for deviancy training or positive reinforcement of deviant acts and discussion (Dishion et al., 2001). Much to the dismay of the authors, the intervention was found to increase problem behaviours post-treatment. Consistent with social learning theory, increased smoking and delinquency post-treatment were positively correlated with observed levels of deviancy training reported by peer mentors during intervention sessions (Dishion et al., 2001). These findings provide support for the role of deviant peers in influencing adolescent antisocial behaviour through the modelling, coercion, and exposure to antisocial discussion topics (Dishion et al., 2001).

Despite the evidence for the association of deviant peer affiliation and antisocial behaviour, the causal role of deviant peers in the development of problem behaviour has been extensively debated in the literature (Vitaro, Brendgen, & Wanner, 2005). Critics argue that underlying characteristics of the individual may partially mediate the selection of peers and thus deviant tendencies present prior to affiliation with deviant peers contribute to both the onset of

delinquency and direct involvement with similarly behaving individuals (Akers, 1999). Regardless of the temporal onset of delinquency, studies controlling for initial levels of delinquency suggest that even for adolescents with a history of delinquent involvement, the peer group can act as a risk factor that may serve to magnify the existing behaviour (Fergusson et al., 2002; Mounst & Steinberg, 1995). For instance, Mounst and Steinberg (1995) found that adolescents who reported more interactions with drug using peers over a one-year interval showed a greater increase in substance use compared to peers with similar levels of prior drug use but lower engagement with deviant peers. Similarly, Van Lier, Vuijk, and Crijnen (2005) assessed the level of deviant peer affiliation in a group of adolescents undergoing an intervention for antisocial behaviour prior to and following the intervention in comparison to a non-treatment control group. The authors found that reductions in antisocial behaviour following the intervention coincided with reductions in deviant peer involvement and peer rejection, suggesting that deviant peers play a role in the maintenance of antisocial behaviour (Van Lier et al., 2005).

### **Limits of Peer Influence**

Despite the significant level of influence held by the peer group and the substantial impact of even infrequent peer interactions on problem behaviours (Brendgen et al., 2000), not all peers are equally influential (Brechwald & Prinstein, 2011). Based on the mechanisms of influence proposed by the SDM, Agnew (1991) investigated several characteristics of deviant peers relevant to the model (e.g., attachment to peers, duration of time spent with peers) and evaluated their impact on the strength of peer influence. Interactions between peer characteristics and the strength of influence were reported, and in the context of serious delinquency, those who were more attached and spent more time with highly delinquent peers, were more likely to adopt

corresponding delinquent behaviour patterns (Agnew, 1991). This suggests potential limitations in the level of risk conferred by deviant peers. Vitaro, Tremblay, Kerr, Pagani, and Bukowski (1997) provide additional support for the existence of moderators of peer influence in their study examining the impact of characteristics of deviant peers on the strength of peer influence. In addition to finding that peers who displayed higher levels of deviance were more influential than moderately deviant peers, the authors discovered that not all individuals were equally susceptible to peer influence (Vitaro et al., 1997). Specifically, in comparison to moderately disruptive males, highly disruptive and non-disruptive males were found to display similar levels of problem behaviour regardless of the behaviour of their associated peers, suggesting that deviant peer affiliation is not equally predictive of problem behaviour for all adolescents (Vitaro et al., 1997). As such, deviant peer affiliation does not account for all the variance in antisocial behaviour and individual factors, such as susceptibility to peer influence may moderate their level of impact.

### **Deviant Peers: Role of Susceptibility**

Susceptibility to peer influence represents an individual's propensity or level of vulnerability towards engaging in problem behaviour in the presence of deviant peers (Erikson et al., 2000). Current evidence suggests that one's vulnerability to peers is as important as deviant peer affiliation in the prediction of problem behaviour (Dielman, Butchart, Shope, & Miller, 1990; Dielman, Shope, Butchart, Campanelli, & Caspar, 1989; Flannery, Vazsonyi, Torquati, & Fridrich, 1994). Furthermore, one's level of susceptibility to peer influence has been found to be predictive of a variety of negative psychosocial outcomes in adolescence, including increased levels of depression and sexual precocity (Allen, Porter, & McFarland, 2006). Given their comparable association with problem behaviour, Miller and colleagues (2010) sought to better

understand the relationship between susceptibility to peer influence and deviant peer affiliation. They conducted a longitudinal study evaluating the independent contributions and the interactions of deviant peer affiliation and susceptibility to peer influence (Miller et al., 2010). They found that one's level of susceptibility to peer influence determined the level of influence instigated by peers; therefore, deviant peers had a greater impact on subsequent behaviour for those individuals with correspondingly higher levels of susceptibility (Miller et al., 2010).

To explain the relative importance of peer influence across different stages of adolescence, studies have begun to investigate the variability in susceptibility to peer influence across age groups (Brechwald & Prinstein, 2011). From these studies a consistent finding of reduced susceptibility to peer influence with increasing age has emerged, where susceptibility is at its highest in early adolescence, and throughout mid to late adolescence there is a linear decline for both male and female youth (Steinberg & Monahan, 2007; Sumter, Bokhorst, Steinberg, & Westenberg, 2009). Based on this stable pattern, the decline in susceptibility to peer influence is thought to reflect a normative pattern of increasing autonomy and psychosocial maturity (Brechwald & Prinstein, 2011; Steinberg & Monahan, 2007; Sumter et al., 2009). The association between maturity and susceptibility to peer influence is further reflected in individual characteristics such as self-control and impulsivity. These traits are thought to reflect internal manifestations of maturity and independence and have also been found to impact susceptibility to peer influence. For instance, Meldrum, Miller, and Flexon (2013) investigated the association of self-control and susceptibility to neutral peer influence in a sample of adolescents, and reported that low self-control evidenced by a failure to consider behavioural consequences of one's actions was associated with greater susceptibility to peer influence. Similarly, increased susceptibility has been associated with greater levels of risk taking, impulsivity, and emotional

autonomy from one's parents (Allen et al., 2006; Bamaca & Umana-Taylor, 2006; Monahan, Steinberg, & Cauffman, 2009). The traits associated with susceptibility to peer influence thus further support the notion that one's vulnerability to peers can be conceptualized as a broad indicator of psychosocial maturity that confers significant risk when present.

### **School Bonding**

Due to the significant proportion of time spent in school, school personnel and teachers are often implicated as important agents of socialization during adolescence (Catalano & Hawkins, 1996). In the SDM this socializing influence is reflected in the form of a bond that serves as a protective factor inhibiting behaviours that would violate societal norms (Catalano & Hawkins, 1996; Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004). The association of school bonding and antisocial behaviour purported by the SDM is well supported in the literature. In middle school, high levels of school bonding have been found to negatively correlate with a range of behaviours including: alcohol and substance abuse, smoking, bullying, stealing, vandalism and weapon carrying (Catalano et al., 2004; Henry & Slater, 2007; Simons-Morten, Crump, Haynie, & Saylor, 1999). Furthermore, the association of school bonding and antisocial behaviour has also been reported in high school for both males and females (Frey, Ruchkin, Martin, & Schwab-Stone, 2009), and across different ethnic groups (Cernkovich & Giordano, 1992).

In addition to the consistency of its impact on behavioural outcomes in adolescence, school bonding levels have been reported to display a consistent pattern of decline with age during the adolescent stage of development (Wang & Dishion, 2012; Wei & Chen, 2010). This decline is thought to reflect the poor fit of the highly structured and emotionally isolating high school context with adolescent desires for emotional support and personal autonomy (Eccles et

al., 1993; Oeslner, Lippold, & Greenberg, 2011; Wang & Dishion, 2012). Due to the association of school bonding with negative outcomes in adolescence, its decline is implicated as a significant risk factor for youth and has spurred the creation of several intervention programs. One such intervention program was developed by Hawkins and colleagues (2001) based on the principles of SDM. The intervention involved training for teachers in cooperative teaching techniques, parent training in behavioural management, and social competence instruction for children in grades 1-4 or grades 5 and 6. Following the initial intervention, the level of school bonding was assessed in addition to a variety of outcomes, such as school performance, misbehaviour, substance use, and sexual activity. At both follow-up assessments (ages 13 and 18), students in both the intervention groups displayed higher school achievement, lower school misbehaviour, reduced sexual activity, and lower substance abuse in comparison to those children in the no treatment control group (Hawkins et al., 2001). These findings further support the association of school bonding with behavioural outcomes in adolescence.

### **School Bonding: The Essential Components**

While there is a strong consensus in the literature regarding the importance of school bonding in relation to adolescent development, there is very little agreement on the definition and measurement of this multidimensional construct (Jimmerson, Campos, & Greif, 2003; Libbey, 2004; Maddox & Prinz, 2003). In their review of the school bonding literature, Jimmerson and colleagues (2003) identified three essential components that contribute to school bonding: an affective component involving attachment, a behavioural element represented by grades or work habits, and a cognitive element represented by a child's expectations or aspirations for the future. This characterization is consistent with the conceptualization of a social bond in the SDM, as a multi-faceted construct, comprised of an emotional connection to

the socialization unit, as well as commitment to and belief in the source represented (Catalano & Hawkins, 1996; Hawkins et al., 2001). While school bonding is recognized to have several underlying components, these components are rarely all evaluated in research (Libbey, 2004). In considering the impact of school bonding on adolescent outcomes, it is important to ascertain both the combined and the individual contributions of each of the identified elements (i.e., affective, behavioural, and cognitive) since evidence suggests that their impact on adolescent outcomes can be vastly different (Crosnoe et al., 2002; Erikson et al., 2000; Jenkins, 1997).

### **School Bonding: The Role of School Connectedness and Educational Commitment**

Two commonly examined components of school bonding are school connectedness and educational commitment (Jimmerson et al., 2003; Libbey, 2004; Maddox & Prinz, 2003). School connectedness reflects the attachment component of school bonding and involves the emotional and interpersonal connection perceived by youth in relation to teachers and other school personnel (Maddox & Prinz, 2003). According to the SDM, individuals with high levels of attachment to school are thought to limit their involvement in deviant behaviour to avoid compromising social relationships with school personnel whose values are incompatible with delinquency (Erikson et al., 2000). In support of this hypothesis, lower self-reported school connectedness has been identified as a strong predictor of health risk and delinquent behaviours among adolescents (Brookmeyer, Fanti, & Henrich, 2006; McNeely & Falci, 2004; Resnick et al., 1997; Wang & Dishion, 2012).

Alternatively, educational commitment refers to an individual's level of involvement in conventional activities pertaining to education and future employment, and is reflected in their goals and aspirations within this domain (Libbey, 2004; Maddox & Prinz, 2003). In keeping with the SDM, the greater one's commitment to conventional activities, the less likely that one would

endanger personal accomplishments and future opportunities with delinquency and misconduct (Erikson et al., 2000). Consistent with this hypothesis, lower levels of educational commitment have been found to significantly predict gang involvement and school-related problem behaviour, such as cheating, non-attendance, and other forms of school misconduct which might compromise one's future (Hill, Howell, Hawkins, and Battin-Pearson, 1999; Jenkins, 1997; Roerser, Eccles, & Sameroff, 2000).

The potential for unique contributions of school connectedness and educational commitment to resilience in adolescence has also been recognized, as these dimensions of school bonding have been found to display disparate effects in the context of peer influence (Erikson et al., 2000). For example, Erikson and colleagues (2000) assessed the direct and indirect contributions of elements of school bonding in relation to delinquency and substance use. Educational commitment as evidenced by grades, time spent on homework, and educational aspirations, was found to have an indirect effect on delinquency through reducing an adolescent's levels of affiliation with deviant peers, thus reducing the risk of delinquent behaviour. Similarly, Roeser and colleagues (2000) reported that adolescents who more strongly valued education and viewed their life goals as more contingent on educational success displayed lower levels of association with deviant peers. These findings are thought to reflect the increased concern among those with high levels of educational commitment to factors which might impact their future plans for educational success (e.g., deviant peers) as proposed by the SDM (Erikson et al., 2000). In contrast to educational commitment, school connectedness was found to have no significant impact on adolescent's level of deviant peer affiliation but to impact delinquency indirectly through the reduction of susceptibility to peer influence (Erikson et al., 2000). Based on these findings it was inferred that adolescents with strong attachments to school personnel are likely to

internalize norms and values and develop a capacity to resist risks for negative influences such as deviant peers internally through a reduced susceptibility to peer influence.

### **School Bonding: A Resilience Factor**

Due to previous findings linking school bonding with reduced deviant peer affiliation and susceptibility to peer influence, it is thought that in addition to its actions as an inhibitor of antisocial behaviour, school bonding may serve as a resilience factor in relation to peer-related risk factors (Crosnoe et al., 2002; Mrug & Windle, 2009; Wang & Dishion, 2012). The first study to evaluate the protective function of school bonding in the context of deviant peers was conducted by Crosnoe and colleagues (2002). Their study examined the protective function of school attachment and educational commitment, relative to the protection obtained from family relationships on delinquency and substance use in the presence of deviant peers. The results indicated that a strong bond with one's teacher and high levels of academic orientation resulted in a reduced association between peer reported and self-reported participation in delinquency and substance use (Crosnoe et al., 2002). This finding suggests that being strongly bonded with one's school may protect against the onset of problem behaviour through reducing the negative impacts of affiliation with deviant peers. Additionally, they compared the protective benefits of school variables and family variables on different problem behaviours and found that in general school related factors were more consistently protective. Specifically, school bonding factors were found to confer similar levels of resilience for all problem behaviours, whereas parenting factors were found to enhance the influence of deviant peers in some behavioural domains (e.g., tobacco use) and reduce the influence in others (e.g., alcohol use) (Crosnoe et al., 2002). Thus, due to the more consistent protection obtained from one's bond to school, and the role of this bond as both a moderator and inhibitor of risk, it is thought to provide a more beneficial source

of protection than family factors during adolescence (Crosnoe et al., 2002). Wang and Dishion (2012) further examined the moderating role of children's school attachment (i.e., teacher support, academic support) on the association of deviant peer affiliation and externalizing behaviours during middle school. They found that the association of deviant peer affiliation and teacher reported problem behaviour was lower for students with higher levels of school attachment (Wang & Dishion, 2012). In spite of these supportive findings, several studies have failed to identify a protective role of school bonding. Cattelino and colleagues (2014) examined educational commitment as a potential moderator of negative peer influence on adolescent risky behaviour over a one year period. However, in comparison to religiosity and health orientation, which were also examined in the study, educational commitment was not found to moderate the impact of deviant peers. Similarly, Mrug and Windle (2009) examined the moderating role of school connectedness on the association of deviant peer affiliation and externalizing behaviour in a longitudinal study. They found that after controlling for initial levels of delinquency there was no significant influence of school connectedness on the link between peer deviancy and later self-reported delinquency. The authors interpreted their discrepant results as the result of their younger elementary school sample, as school is thought to become a more important predictor in later adolescence when the level of connectedness is more variable and useful as a predictor (Mrug & Windle, 2009). In contrast, Dickens and colleagues (2012) investigated the moderating role of school bonding on the association of peer and self-reported substance use for middle school and high school students and found that school bonding only operated as a resilience factor for younger adolescents (i.e., under 16) and not for older adolescents (17-18 year olds).

## **Limitations in the Extant School Bonding Literature**

Based on inconsistencies in previous research, the protective function of school bonding in relation to peer-related risk variables and adolescent antisocial behaviour remains unclear. It may be that certain components of school bonding (i.e., school connectedness, educational belief, and educational commitment) are variably related to the observed resilience. Further, due to the variability in the definition and measurement of school bonding, the components have not been reliably assessed. Finally, based on previous research highlighting less observable routes of protection provided by school bonding (i.e., reduced susceptibility to peer influence), studies emphasizing more direct measures of peer-related risk such as deviant peer affiliation may have failed to capture the extent of resilience provided by school bonding.

In addition to the aforementioned limitations, previous studies have failed to incorporate several variables that may serve to enhance our understanding of the protective role of school bonding. In particular, past studies have emphasized the affective and behavioural components of school bonding as defined by school connectedness and educational commitment, but have excluded cognitive measures of educational belief such as a belief in school rules or the extent to which a child views school procedures as necessary and fair (Erikson et al., 2000). Within the SDM framework, *belief* is an essential component of social bonding, which represents the extent to which an individual has internalized and accepted the values of the socializing unit (Catalano & Hawkins, 1996; Hawkins & Weis, 1985). The absence of educational belief from the resilience literature is notable given that school-related belief and related constructs such as the belief in moral order have previously been associated with lower levels of deviance (Fleming et al., 2002; Free, 2014; Huang et al., 2001; Jenkins, 1997; Lonczak et al., 2001). Furthermore, studies investigating potential moderators of peer influence have revealed that belief in the

family bond or “familism,” contributes significantly to the protection of family bonding through moderating the association of deviant peers and self-reported delinquency (Roosa et al., 2012). Consequently, there is substantial evidence for both the relevance and contribution of belief to school-based resilience, and due to the negative association with antisocial behaviour belief is likely to account for some variance in antisocial behaviour outcomes (Jenkins, 1997).

### **The Present Study**

The literature investigating the protective role of school bonding is inconsistent and existing findings have been scarcely replicated in cross-sectional studies (Marschall-Levesque, Castellanos-Ryan, Vitaro, & Seguin, 2014). Therefore, the goal of the current study is to further evaluate the protective function of school bonding and its underlying components (i.e., educational commitment, school connectedness, educational belief) in terms of its ability to moderate the association of peer-related risk factors, susceptibility to peer influence and deviant peer affiliation, with self-reported antisocial behaviour. In line with previous research, antisocial behaviour will be conceptualized in the present study as delinquency and aggression.

Delinquency will range from minor acts (i.e., skipping school) to more serious offences (i.e., stealing something worth \$25) and aggression will encompass both physical and relational hostility towards others. These behaviours were selected because they are commonly identified in clinical settings as characteristics of antisocial behaviour (Connor, 2002), they have been found to co-occur in adolescent samples (Willoughby, Chalmers, & Busseri, 2004), and they share many of the same risk factors (Barnow, Arndt, & Freyberger, 2005).

The proposed study extends previous research on the moderating role of school bonding in several ways. First, unlike previous studies, the present study will incorporate a measure of educational belief, or the extent to which one accepts the rules and values promoted by the

school, in the overall conceptualization of school bonding (Maddox & Prinz, 2003). Second, the present study incorporates age and gender, as factors that may affect the level of protection conferred by school bonding. Past research has examined the impact of age and gender in relation to school attachment, but has largely ignored its impacts on other elements of school bonding. The investigation of additional factors that may impact the protective influence of school bonding can help us to better understand the diversity of its moderating effects. Finally, through the use of a broad recruitment strategy, the current study seeks to obtain a more heterogeneous sample of youth than previous examinations in this area. Previous studies investigating school bonding have focused their analysis explicitly on school-based samples, and while this methodology offers an efficient means to gather data, it results in exclusion of similar aged individuals not attending school. The failure to include individuals not attending schools such as those who have dropped out likely underrepresents the true variability in school bonding which exists among the adolescent population.

There are two important implications that may come from the results of this study. First, the results of the current study may allow for the identification of specific elements of school bonding that confer resilience against negative peer influence, thus allowing for more focused school-based interventions which intervene on only the most essential elements of bonding (Marschall-Levesque et al., 2014). Second, the outcomes of the proposed study may further contribute to the existing literature examining the role of resilience factors on the frequency of adolescent antisocial behaviour.

### **Research Questions and Study Hypotheses**

- 1.) Do the components of school bonding (school connectedness, educational commitment, and educational belief) significantly predict antisocial behaviour?

It is hypothesized that higher levels of each of the components of school bonding (school connectedness, educational commitment, and school belief) will predict lower levels of antisocial behaviour.

- 2.) Do peer-related risk factors (deviant peer affiliation, and susceptibility to peer influence) predict antisocial behaviour?

It is hypothesized that higher levels of peer-related risk (both deviant peer affiliation and susceptibility to peer influence) will be associated with higher levels of antisocial behaviour.

- 3.) Do the components of school bonding (school connectedness, educational commitment, and educational belief) moderate the impact of peer-related risk factors (deviant peer affiliation and susceptibility to peer influence) on self-reported antisocial behaviour?

It is hypothesized that increases in each of the components of school bonding will predict reduced associations between peer-based risk factors (deviant peer affiliation and susceptibility to peer influence) and antisocial behaviour.

- 4.) In what way is the protective role of school bonding moderated by individual factors?

- a.) Is school connectedness equally protective for both male and female youth?

It is hypothesized that male and female youth will differ in the level of protection conferred from the school bonding dimensions.

- b.) Is the protective effect of school bonding maintained across all ages (14-17)?

It is hypothesized that for younger adolescents the moderating effects of school bonding dimensions will be stronger.

## Method

### Sample

The sample comprised 111 English-speaking adolescents between the ages of 13 and 18, who were recruited over a six-month period from three community agencies and 11 mental health agencies serving youth in Ontario. The agencies were equally representative of urban and rural communities. Over the course of the study, 80 agencies were contacted by email, of which 14 agreed to participate. Reasons for not participating included having too many ongoing research projects, not permitting research related to delinquency and aggression, and not allowing research-related activities at their agency.

In total, 120 adolescents completed questionnaires. However, due to missing data, four participants were removed from the final analysis. An additional five participants were removed due to outliers in the data. Demographic information pertaining to the study participants is presented in Table 1. The mean age of the sample was 15.80 years, and the majority of the sample identified as white and was enrolled in school at the time of the study. Ten participants did not provide information regarding their parents' education and employment. Thus, an SES classification could not be generated for them. One participant did not report their current grade.

A power analysis was conducted using G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007) in order to determine the necessary sample size. This analysis was based on an effect size of .20, obtained from recently published studies for the association between peer-related risk factors and antisocial behaviour. Based this analysis, it was determined that a sample of 89 adolescents was needed in order to achieve power of .95 for the main regression analyses. The current study exceeded the minimum required participants.

Table 1

*Demographic Information about the Study Sample (N=111)*

Variables	Frequency (%)
Race	
White	78 (70.3%)
Asian	8 (7.2)
African	8 (7.2)
Other	17 (15.3)
Gender	
Female	58 (52.3)
Male	50 (45.0)
Other	3 (2.7)
Age	
13	2 (1.8)
14	21 (18.9)
15	22 (19.8)
16	22 (19.8)
17	33 (29.7)
18	8 (7.2)
Currently in school	
Yes	109 (98.2)
No	2 (1.8)
Grade	
9	2 (1.8)
10	26 (23.4)
11	27 (24.3)
12	36 (32.4)
Socio economic status	
Upper	18 (16.2)
Middle	44 (39.6)
Lower	39 (35.1)

## **Procedure**

Ethics approval was obtained from the Ryerson University Ethics Board (Appendix A) and approval to conduct the research was obtained from individual agencies (as required). The questionnaire package was presented online in Qualtrics Research Suite, an online software package, and took approximately 30 minutes to complete.

Following receipt of the approvals, relevant agencies serving youth in Ontario were contacted by email and provided with a brief description of the study. Those agencies that agreed to participate were provided with a recruitment poster (Appendix B), recruitment bookmarks (Appendix C), and a link to the online survey via email. Agencies with limited access to computers were also provided with paper copies of the questionnaire and consent forms to distribute to adolescents.

In the online questionnaire package, a standard consent form (Appendix D) was presented prior to the start of the survey, and participants needed to select the option “yes, I agree” in order to proceed to the survey. At the end of each page of the survey, underneath the “submit” button, participants were informed that after clicking “submit” their responses would be entered in the study even if they closed the survey and chose not to continue.

To assess for responding patterns reflecting social desirability rather than truthful responding, a social desirability questionnaire was included in the questionnaire. To prevent multiple response submissions from the same participant, the survey was constructed so that the link could not be opened more than once on the same browser following survey completion.

After completing the survey, participants could choose to self-identify and provide their email if they wished to receive one hour of community service to use towards their high school completion and to be entered into a draw to win a \$100.00 iTunes gift card. Those interested in

reimbursement were provided with a link to a separate Qualtrics survey where they could enter their name and email information. This ensured confidentiality through the separation of participant's contact information from their survey responses. Participants who elected to receive community service hours were sent a certificate of appreciation with their name and the name of the study's author via email. Following data collection, questionnaires completed in Qualtrics were downloaded onto a computer database and paper questionnaires were mailed to the study author and entered manually into the dataset. Results were analyzed in SPSS Version 22.

## **Measures**

Seven self-report measures were included in the study questionnaire to evaluate levels of school bonding, peer-related risk factors, and antisocial behaviour.

## **Dependent Variables**

**Antisocial behaviour.** Antisocial behaviour was assessed using a 20-item self-report measure adapted from The National Youth Survey Scale (NYS) (Elliot, Huizinga, & Ageton, 1985) by Johnson, Simon, and Conger (2004), with two additional items pertaining to relational aggression from a study by Herrenkohl and colleagues (2007) (Appendix E). Participants were asked to state how frequently they engaged in a variety of aggressive or delinquent acts in the past 12 months on a five-point scale from (1) = "0 times" to (5) = "6 or more times." The scale included 22 items pertaining to delinquency and aggression, and assessed behaviours ranging from minor theft (e.g., "How many times in the past 12 months have you taken something less than 25\$ that didn't belong to you?") to more serious offenses such as engaging interpersonal violence (e.g., "How many times in the past 12 months have you attacked someone with a weapon, trying to seriously hurt him or her?"). In addition to the main scale items, two additional items pertaining to relational aggression were included in the scale in order to better capture

aggression of female participants (e.g., “How many times in the past 12 months have you got back at another student by not letting them into your group of friends”). An overall antisocial behaviour score was created from the sum of the item scores, with higher scores indicating elevated levels of antisocial behaviour. The NYS scale has been used extensively in the literature pertaining to adolescent delinquency and has been found to maintain a strong internal reliability of .85 (Wright, Cullen, & Miller, 2001). Furthermore, although self-report measures are generally viewed as having limited validity, responses on the NYS scale have been found to correspond with official records of offending (Huizinga & Elliot, 1986).

### **Independent Variables**

**Demographic variables.** Demographic information was collected by asking participants to report their gender, current school enrolment status, grade, and race. Socioeconomic status (SES) was calculated using Hollingshead’s two factor Index of Social Position (ISP) which provides an overall ISP based on parent education level and occupational status (Hollingshead, 1957). Participants were asked to provide details about their parent(s)’ occupation title and education level that were then ranked according to Hollingshead’s ISP classification, which ranges from 1 (higher executives, professional degrees) to 7 (unskilled laborers, less than high school) (Hollingshead, 1957). Based on this information a composite ISP score was calculated for each parent using Hollingshead’s social position formula,  $((\text{Occupation score} \times 7) + (\text{Education score} \times 4))$ , and averaged (between two parents when necessary) (Hollingshead, 1971). If both education and occupational status were missing for one parent, an ISP score was not computed. When only one piece of information was missing (e.g., education) but the other was present (e.g., occupational status), an equivalent ranking was provided for the missing category (e.g., a score of 7 in occupation would result in a rating of 7 for education)

(Hollingshead, 1971). The final ISP composite score was classified into three SES categories based on the value range of the social index: 11-27 (upper), 28-43 (middle), and 44-77 (lower).

**School connectedness.** The school connectedness scale developed by Resnick and colleagues for the Adolescent Health Study (SCS; Resnick et al., 1997) (Appendix F) was used to assess school connectedness. The SCS contains six items and provides a measure of perceived connectedness to teachers and other school personnel. The scale contains three items related to general social belonging (e.g., “I feel like I am a part of my school”) and three items pertaining to one’s perception of support from teachers (e.g., “the teachers at my school treat students fairly”). Responses were coded on a five-point rating scale ranging from (1) = “strongly disagree” to (5) = “strongly agree.” In the present study, item number one from the SCS was modified from “I feel close to people at my school” to “I feel close to teachers at my school” for greater specificity. An overall level of school connectedness was calculated from the sum of the five items, where a higher score reflected a greater level of connection to school. The SCS is widely recognized as the best available measure of school attachment and is commonly used in school bonding research studies (Furlong & O’Brennan, 2011). The SCS has also been found to have a high internal reliability with a  $\alpha = 0.75$  (Resnick et al., 1997), and to be positively correlated with the other measures of school attachment, such as the School Support Scale ( $r = .44 - .55$ ) (Furlong & O’Brennan, 2011).

**Educational commitment.** Educational commitment was measured using three achievement related indicators, including: time spent on homework, grades, and educational expectations. These measures of achievement were used previously by Erikson and colleagues (2000) in order to evaluate educational commitment (Appendix G). In the current study, adolescents were asked to report the amount of time they spent on homework each week, ranging

from (0) = “none” to (4) = “four or more hours” and their current (or most recent) grade-point-average by classifying “their grades so far,” as (4) = “mostly A’s” to (0) = “mostly below D.” Finally, educational expectations were assessed through the participant’s endorsement of the highest level of education they expected to achieve, ranging from (0) = “leave school as soon as possible” to (4) = “finish university and take further training.” The score for each indicator was summed to create an overall composite score for educational commitment. Self-reported grades have been found to correlate highly with official grade transcripts, which suggests that this composite is a valid indicator of educational achievement (Dornbusch, Ritter, Mont-Reynaud, & Chen, 1990). This composite measure has previously attained an internal reliability of  $\alpha=.66$  (Erikson et al., 2000).

**Educational belief.** The Belief in School Rules Index developed by Jenkins (1997) (Appendix H) was used to evaluate participant’s overall level of educational belief. This eight-item scale evaluates the extent to which an individual accepts the rules and regulations enforced at school. Participants were asked to rate a series of statements relating to school rules (e.g., “the principal is too strict”, “most school rules are fair”) as true (1) or false (0), and an overall composite score for educational belief was created by summing scores on individual items. In past studies, this index has been found to correlate negatively with engagement in school-related delinquency (e.g., stealing from the teacher, damaging school property), which suggests that it is a valid indicator of one’s level of belief in school policies (Jenkins, 1997). Additionally, Free (2014) reported that the internal consistency of the belief in school rules measure was .69.

**Susceptibility to peer influence.** Susceptibility to peer influence was assessed using an adapted version of the Resistance to Peer Influence scale developed by Steinberg and Monahan (RPI; 2007) (Appendix I). The scale provides a measure of one’s susceptibility to peer influence

through one's responses to a series of scenarios. In the current study, the ten-item scale was adapted for clarity and brevity, based on a previous adaptation by Meldrum and colleagues (2013). Participants were asked to rate a single scenario regarding their response to their peers (e.g., "I go along with my friends just to keep them happy," "I think it's more important to be who I am than to fit in with the crowd (reverse coded)") from (1) = "not true at all" to (4) = "very true." The total susceptibility level was then calculated from the sum of the individual scores divided by 8. Researchers have found this measure to have a high level of internal reliability. For example, Meldrum and colleagues (2013) reported an alpha coefficient of .69. Furthermore, scores on this measure have been found to correlate positively with adolescent impulsivity and risk taking, which is consistent with a low level of resistance to peer influence (Steinberg & Monahan, 2007).

**Deviant peer affiliation.** An adapted version of the National Youth Survey (NYS) questionnaire designed by Johnson et al., (2004) was used to assess deviant peer affiliation level (Appendix J). Participants were asked to report the number of their closest friends who had committed a variety of unlawful and aggressive acts over the previous 12 months using a five-point scale (1=none, 2=few, 3=half, 4=most, 5=all). The delinquent activities ranged from minor level offences such as skipping school, to more serious offences, such as stealing something worth more than \$25. An overall deviant peer affiliation score was created by summing the individual items, with higher scores representing an elevated level of deviant peer affiliation. This measure has previously been found to demonstrate a good internal reliability of  $\alpha = 0.72$  (Johnson et al., 2004).

**Social desirability.** Social desirability was assessed using an abbreviated version of the Marlow-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) (Appendix K),

taken from part C from the original scale (Reynolds, 1982). The abbreviated MCSDS contains a set of 13 forced-choice true and false statements, which have been selected to reflect statements that participants responding in a socially desirable way would endorse (e.g., “I’m always willing to admit when I make a mistake”). A total social desirability score was calculated based on the sum of individual items, ranging from 0 = (low social desirability) to 13 = (high social desirability). The MCSDS has been found to have good psychometric properties. When administered to a college student sample the MCSDS was found to have a test-retest reliability of .89 and an internal reliability level of .76 (Crowne & Marlowe, 1960).

## **Results**

### **Preliminary Analyses**

Due to a significant amount of missing data, four participants who discontinued the survey halfway were removed from the initial data set. As these participants discontinued at different points throughout the survey, their data was deemed missing completely at random (MCAR) and thus appropriate for removal. To address the remaining missing data, missing values were imputed using the maximum likelihood estimate technique. This technique replaces missing values based on the estimated population parameters (Baradali & Enders, 2010). In order to obtain the maximum likelihood estimate the expectation maximization (EM) algorithm method was selected. The EM algorithm is an iterative process for imputing missing values that involves two steps, an E-step and an M-step (Graham, 2009). In the first step of the EM algorithm, the data are read and imputed using a simple regression imputation based on the means, variances, and covariances of the existing data values (Howell, 2008). In the second step, variances, covariances, and means are estimated again using the newly imputed values, which

generates new estimates for missing values. Based on the covariance matrix at this iteration, new regression equations are developed and used to update the initial imputed values in the next iteration of the procedure. This imputation process continues over multiple iterations until the covariance matrix stops changing and a stable set of values emerge (Graham, 2009).

Before implementing the imputation procedure, Little's MCAR (missing completely at random) test was performed as recommended by Howell (2008). In terms of the three school bonding variables, educational commitment, school connectedness, and educational belief, the percentage of missing values ranged from 0.9 to 5.1%, and Little's MCAR test was not significant  $\chi^2(118) = 129.45, p = .22$ . With regard to peer-related risk factor variables, deviant peer affiliation and susceptibility to peer influence, the percentage of missing data ranged from 0 to 6%, and Little's MCAR test was not significant  $\chi^2(233) = 242.97, p = .31$ . Finally, self-reported antisocial behaviour and social desirability were found to have percentages of missing values ranging from 0 to 4.3% and Little's MCAR test was once again not significant  $\chi^2(357) = 358.92, p = .46$ . Thus, based on the analyses of missing values, the missing data are deemed to be missing at random and suitable for imputation (Howell, 2008).

**Descriptive Statistics.** Table 2 displays descriptive information pertaining to the study variables. All the variables were normally distributed and met the assumptions of multivariate normality. Furthermore, most variables included in the study were found to yield internal reliabilities within an acceptable range for subsequent analyses (Kline, 2000). However, it should be noted that the educational belief and susceptibility to peer influence variables obtained reliabilities in the low range, and thus may limit the interpretation of the findings.

Table 2

*Descriptive Statistics Pertaining to Study Variables (N=111)*

Variable	<i>M(SD)</i>	Range	Kurtosis	Skewness	# of items	$\alpha$
<b>School bond Variables</b>						
School Connectedness	21.46 (4.82)	10.00, 30.00	-.18	-.37	6	.82
Educational Commitment	6.16 (3.19)	0.00, 12.00	-1.00	.23	3	.71
Educational Belief	5.58 (1.77)	1.00, 8.00	-.47	-.44	8	.56
<b>Peer-Related Risk Factors</b>						
Deviant Peer Affiliation	29.49 (11.28)	15.0, 60.00	.39	-.51	15	.92
Susceptibility <sup>a</sup>	1.85 (.33)	1.13, 2.75	.03	.50	8	.56
Antisocial Behaviour	32.47 (10.78)	21.96, 63.00	.40	1.10	20	.85
Social Desirability	5.27 (2.67)	0.00, 11.00	-.76	.01	13	.64

*Note.* <sup>a</sup> Refers to susceptibility to peer influence.

**Correlational Analyses.** Table 3 displays the zero-order correlations amongst all covariate, predictor, and outcome variables. A review of these correlations revealed that age was positively correlated with socioeconomic status, and negatively correlated with susceptibility to peer influence. Socioeconomic status was positively correlated with deviant peer affiliation, antisocial behaviour and social desirability. Interestingly, socioeconomic status was negatively correlated with educational commitment, as those reporting higher levels of academic attainment for their parents reported lower academic aspirations for themselves. Social desirability was positively correlated with school connectedness, and as expected social desirability was negatively correlated with antisocial behaviour and deviant peer affiliation.

Antisocial behaviour was significantly correlated with one of the peer-related risk factors, deviant peer affiliation, and was negatively related to all three of the school bonding variables. In terms of the peer-related risk factors, deviant peer affiliation was negatively correlated with educational commitment and school connectedness, and susceptibility to peer influence was negatively correlated with educational belief. Both peer-related risk factors were positively correlated with one another. School connectedness was positively correlated with educational belief and educational commitment. However, educational belief and educational commitment were not significantly correlated with one another.

Table 3

Summary of Correlations among Study Variables (N=111)

Variables	1	2	3	4	5	6	7	8	9	10
1. Age	-									
2. Gender	.13	-								
3. SES	.30**	.04	-							
4. Antisocial Behaviour	-.02	.15	.22*	-						
5. Deviant Peer Affiliation	.00	.18	.25*	.69***	-					
6. Susceptibility <sup>a</sup>	-.19*	-.17	.11	.14	.20*	-				
7. Educational Commitment	-.01	.03	-.52***	-.33***	-.32**	-.02	-			
8. Educational Belief	.13	.03	.07	-.20*	-.13	-.28**	-.10	-		
9. School Connectedness	.12	-.12	-.18	-.37***	-.21*	-.10	.35**	.32**	-	
10. Social Desirability	.17	-.13	.21*	-.35**	-.31**	-.04	.04	.09	.20*	-

Note. <sup>a</sup> Refers to susceptibility to peer influence.

\*  $p < .05$ . \*\*  $p < .01$  \*\*\*  $p < .001$

## **Evaluation of Study Hypotheses**

In order to test the study hypotheses, a series of hierarchical regression analyses were performed. In each regression model, social desirability was controlled for in the first step.

### **Investigation of Predictors of Antisocial Behaviour**

**School Bonding Variables.** It was proposed in hypothesis 1 that school connectedness, educational commitment, and educational belief, would significantly predict decreases in antisocial behaviour. In order to test this hypothesis, a hierarchical regression analysis was performed, whereby social desirability was entered in Step-1 and each of the school bonding variables were entered in Step-2. Table 4 displays the results of these analyses.

Overall, the model was significant and accounted for 28% of the variance in antisocial behaviour [ $F(4,106) = 10.94 p < .001$ ]. In terms of individual predictors, educational commitment made a significant contribution to the level of self-reported antisocial behaviour. However, in contrast with the study hypothesis, educational belief and school connectedness did not account for any additional variance in the level of self-reported antisocial behaviour among adolescents in the study.

**Peer-Related Risk Factors.** It was postulated in hypothesis 2 that both of the peer-related risk factors, susceptibility to peer influence and deviant peer affiliation, would significantly predict increases in antisocial behaviour. To evaluate this hypothesis, a hierarchical regression analysis was performed, in which social desirability was entered in Step-1 and both of the peer-related risk factors were entered in Step-2. The results of this analysis are displayed in Table 5.

The overall model was significant and accounted for 53% of the variability in antisocial behaviour [ $F(2,111) = 44.58 p < .01$ ]. As predicted, the level of deviant peer affiliation was

positively associated with antisocial behaviour. In contrast, the level of susceptibility to peer influence reported by adolescents was not found to be a significant predictor of engagement in antisocial behaviour.

Table 4

*Summary of Hierarchical Regression Analysis Regressing School Bonding Variables on*

*Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	t	95% CI for <i>B</i>
Step 1					
Social Desirability	-1.17	.34	-.29	-3.45**	-1.84,-0.50
Step 2					
School Connectedness	-.39	.22	-.18	-1.83	-0.82, 0.03
Educational Commitment	-.91	.31	-.27	-3.00**	-1.52,-0.31
Educational Belief	-.89	.54	-.15	-1.64	-1.97, 0.19

*Note.* \*\*  $p < .01$

Table 5

*Summary of Hierarchical Regression Analysis Regressing Peer-Related Risk Factors on*

*Antisocial Behaviour (N=111)*

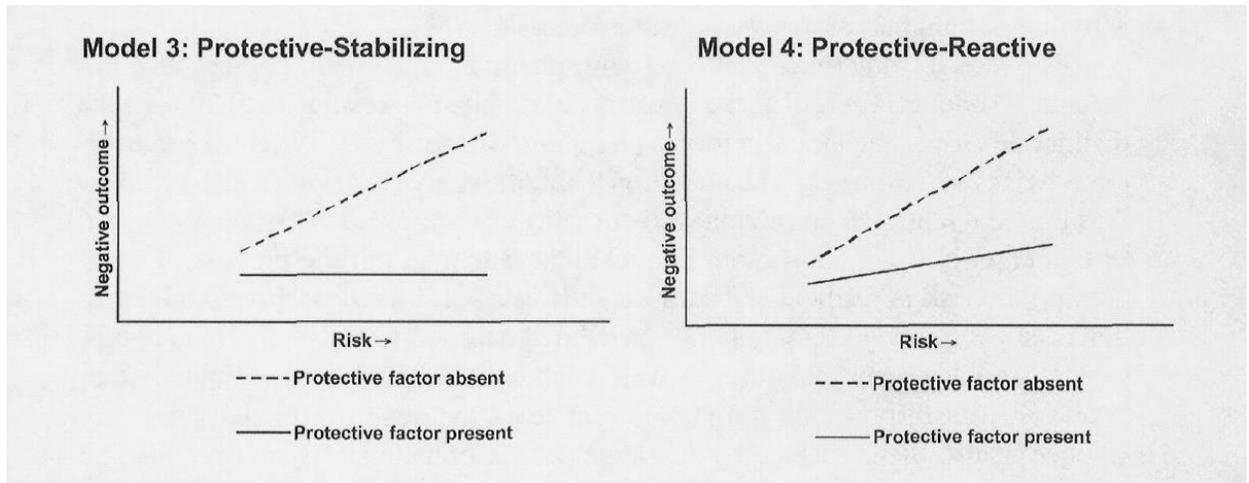
Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	95% CI for <i>B</i>
Step 1					
Social Desirability	-.58	.29	-.14	-1.98*	-1.18,0.00
Step 2					
Deviant Peer Affiliation	.62	.07	.65	8.74***	0.48,0.76
Susceptibility <sup>a</sup>	.28	2.32	.00	.12	-4.33,4.89

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*  $p < .05$  \*\*\*  $p < .001$

## **Evaluation of Potential Moderators of peer-related risk factors**

The remaining hypotheses concerned the evaluation of school bonding variables as potential moderators of the impact of peer-related risk factors on antisocial behaviour. The significance of these moderators was assessed using Dearing and Hamilton's (2006) criteria for analyzing moderator variables in developmental psychology. First, the relevant interaction term in the regression model was assessed for a statistically significant or non-zero effect on the outcome variable. Statistically significant interactions were then analyzed individually to assess their independent contribution to the explained variance ( $R^2$ ) in the model. According to Jessor et al. (1995), a statistically significant increase in explained variance ( $R^2$ ) following entry into the regression model signifies a moderating protective factor. After identifying significant moderators, Dearing and Hamilton (2006) suggest graphing general protective trends to evaluate results. Thus, statistically significant interactions of risk and protective factors were graphed and compared to Fergus and Zimmerman's (2005) protective models (Figure 1) to aid in interpretation of their protective roles.

Fergus and Zimmerman (2005) outline two protective models, in which the identified factors moderate or reduce the effects of risk on a negative outcome. These include the protective-stabilizing model and the protective-reactive model. The protective-stabilizing model displayed on the left side of Figure 1, occurs when the protective factor neutralizes the impact of the risk factor, or eliminates the relationship between the risk factor and the negative outcome when it is present (Fergus & Zimmerman, 2005). Alternatively, the protective-reactive model illustrated on the right side of Figure 1, occurs when the protective factor diminishes but does not eliminate the association of the risk factor and the outcome (Fergus & Zimmerman, 2005).



*Figure 1.* Fergus and Zimmerman's (2005) protective models. Model 3 illustrates the actions of a protective factor that is protective-stabilizing, which acts by neutralizing risk factors. Model 4 illustrates the effect of a protective factor that is protective-reactive, which acts by diminishing the impact of risk factors.

**Moderation by School Bonding Variables.** Hypothesis 3 postulated that school connectedness, educational commitment, and educational belief would moderate the association between the peer-related risk factors and antisocial behaviour. In order to test these hypothesized moderation models, a series of hierarchical regression analyses was performed. Prior to these analyses, centered variables were created for each predictor variable by subtracting the mean from each score. These centered variables were then used to create interaction terms, including: (1) school connectedness X deviant peer affiliation, (2) school connectedness X susceptibility to peer influence, (3) educational commitment X deviant peer affiliation, (4) educational commitment X susceptibility to peer influence, (5) educational belief X deviant peer affiliation, and (6) educational belief X susceptibility to peer influence. The interaction terms and predictor variables were centered in order to avoid potential multicollinearity (Aiken & West, 1991). Next, a separate 3-step hierarchical regression analysis was performed for each 2-way interaction, incorporating lower level main effects. Social desirability was entered in Step-1 of the each hierarchical regression model. Step-2 of the analysis incorporated the centred variables included in the 2-way interaction terms. Finally, in Step-3, the relevant interaction term was inputted. The results of these analyses are displayed in Tables 6-11.

Table 6

*Summary of Hierarchical Regression Analysis using School Connectedness as a Moderator of the Relationship between Deviant Peer Affiliation and Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	95% CI for <i>B</i>
Step 1					
Social Desirability	-.46	.28	-.11	-1.62	-1.02,0.10
Step 2					
Deviant Peer Affiliation (DA)	.57	.07	.60	8.55***	0.44,0.70
School Connectedness (SCS)	-.51	.15	-.23	-3.36**	-0.81,-0.21
Step 3					
DA x SCS	-.02	.01	-.09	-1.33	-0.04,0.01

*Note.* \*  $p < .05$  \*\*  $p < .01$

The first hierarchical regression analysis presented in Table 6 examined school connectedness as a moderator of the association between deviant peer affiliation and antisocial behaviour. The overall model was significant [ $F(4,106) = 32.20, p < .001$ ] and accounted for 53% of the variance in antisocial behaviour. However, the school connectedness X deviant peer affiliation interaction term was not significant as it did not account for any additional variance in antisocial behaviour ( $\Delta R^2 = .01$ ). The second hierarchical regression analysis displayed in Table 7 examined school connectedness as a potential moderator of the relation between susceptibility to peer influence and antisocial behaviour. The overall model was again significant [ $F(4,106) = 7.94, p < .001$ ] and accounted for 20% of the variance in antisocial behaviour, but the school connectedness X susceptibility to peer influence interaction term was not significant and did not explain a significant increase in the variance of antisocial behaviour ( $\Delta R^2 = .01$ ). Therefore, school connectedness was not a significant moderator of the association between susceptibility to peer influence and antisocial behaviour.

Table 7

*Summary of Hierarchical Regression Analysis using School Connectedness as a Moderator of the Relationship between Susceptibility to Peer Influence and Antisocial Behaviour (N=110)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	95% CI for <i>B</i>
Step 1					
Social Desirability	- 1.13	.35	-.28	-3.21**	-1.83, -0.43
Step 2					
Susceptibility <sup>a</sup> (S)	2.93	2.88	.09	1.02	-2.78, 8.63
School Connectedness (SC)	-.65	.20	-.29	-3.21**	-1.05, -0.25
Step 3					
S x SC	.49	.56	.08	.88	-0.61, 1.60

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*\*  $p < .01$

In the third hierarchical regression analysis, displayed in Table 8, educational belief was evaluated as a potential moderator of the association between deviant peer affiliation and antisocial behaviour. The overall model was found to be significant [ $F(4,106) = 27.07, p < .001$ ] and accounted for 49% of the variance in antisocial behaviour. However, the educational belief X deviant peer affiliation interaction term was not significant and did not account for additional variance in antisocial behaviour ( $\Delta R^2 = .00$ ). Thus, educational belief was not a significant moderator of the relation between deviant peer affiliation and antisocial behaviour. In the fourth hierarchical regression analysis, displayed in Table 9, educational belief was evaluated as a potential moderator of the relation between susceptibility to peer influence and antisocial behaviour. The complete model was significant [ $F(4,105) = 4.95, p < .01$ ] and accounted for 13% of the variance in antisocial behaviour, but the educational belief X susceptibility to peer influence interaction was not significant and did not uniquely contribute to the variance in antisocial behaviour ( $\Delta R^2 = .00$ ). Therefore, educational belief was not a significant moderator of the relation between susceptibility to peer influence and antisocial behaviour.

In the final set of analyses, educational commitment was examined as a moderator of the relationship between peer-related risk factors and antisocial behaviour. First, educational commitment was examined as a moderator of the association between deviant peer affiliation and antisocial behaviour, displayed in Table 10. The overall model was significant [ $F(4, 106) = 27.67, p < .001$ ] and accounted for 49% of the variance in antisocial behaviour, but the educational commitment X deviant peer affiliation interaction term was not significant and did not account for a significant amount of variance in antisocial behaviour ( $\Delta R^2 = .00$ ). Thus, educational commitment was not a significant moderator of the association between deviant peer affiliation and antisocial behaviour. Finally, educational commitment was evaluated as a

potential moderator of the relation between susceptibility to peer influence and antisocial behaviour, displayed in Table 11. The overall model was again significant [ $F(1, 105) = 8.09, p < .001$ ] and accounted for 21% of the variance in antisocial behaviour, but the educational commitment X susceptibility to peer influence interaction term was not significant and did not account for any unique variance in antisocial behaviour ( $\Delta R^2 = .00$ ). Therefore, educational commitment was not a significant moderator of the association between susceptibility to peer influence and antisocial behaviour. In summary, contrary to hypothesis 3, none of the school bonding variables was found to significantly moderate the association between the peer-related risk factors and antisocial behaviour.

Table 8

*Summary of Hierarchical Regression Analysis using Educational Belief as a Moderator of the*

*Relationship between Deviant Peer Affiliation and Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	t	95% CI for <i>B</i>
Step 1					
Social Desirability	-.57	.32	-.11	-1.7	-1.18,0.09
Step 2					
Deviant Peer Affiliation (DA)	.60	.07	.63	8.71***	0.47,0.74
Educational Belief (EB)	-.63	.42	-.10	-1.49	-1.47,0.21
Step 3					
DA x EB	-.01	.04	-.01	-.12	-0.08,0.07

*Note.* \*\*\*  $p < .001$

Table 9

*Summary of Hierarchical Regression Analysis using Educational Belief as a Moderator of the Relationship between Susceptibility to Peer Influence and Antisocial Behaviour (N=110)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	95% CI for <i>B</i>
Step 1					
Social Desirability	-1.35	.43	-.31	-3.71***	-2.07,-0.63
Step 2					
Susceptibility <sup>a</sup> (S)	2.82	3.09	.09	.91	-3.30, 8.95
Educational Belief (EB)	-.95	.58	-.15	-1.64	-2.10,0.20
Step 3					
S x EB	.75	1.90	.04	.39	-3.02, 4.51

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*\*\*  $p < .001$

Table 10

*Summary of Hierarchical Regression Analysis using Educational Commitment as a Moderator of the Relationship between Deviant Peer Affiliation and Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	95% CI for <i>B</i>
Step 1					
Social Desirability	-.62	.29	-.15	-2.11*	-1.19,0.04
Step 2					
Deviant Peer Affiliation (DA)	.57	.07	.60	7.86***	0.43,0.72
Educational Commitment (EC)	-.46	.25	-.14	-1.86	-0.96,0.03
Step 3					
DA x EC	-.01	.02	-.02	-.23	-0.05,0.04

*Note.* \*  $p < .05$  \*\*\*  $p < .001$

Table 11

*Summary of Hierarchical Regression Analysis using Educational Commitment as a Moderator of the Relationship between Susceptibility to Peer Influence and Antisocial Behaviour (N=110)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>	<i>t</i>	95% CI for <i>B</i>
Step 1					
Social Desirability	-1.34	.34	-.33	-3.87***	-2.02,-0.65
Step 2					
Susceptibility <sup>a</sup> (S)	4.04	2.82	.12	1.43	-1.57, 9.65
Educational Commitment (EC)	-1.06	.29	-.31	-3.66***	-1.63,-0.49
Step 3					
S x EC	.27	.88	.03	.31	-1.47, 2.02

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*\*\*  $p < .001$

**Moderation by Gender.** Hypothesis 4a postulated that the school bonding variables would moderate the association between peer-related risk factors and antisocial behaviour differently for male and female youth. More specifically, this hypothesis proposed that gender would moderate the impact of the school bonding variables as moderators through moderated moderation (illustrated in Figure 2). In order to evaluate these proposed three-way interactions, a series of 3-Step hierarchical regression analyses were performed using Andrew Hayes' PROCESS Macro in SPSS (Hayes, 2013). In each regression model, Model 3 was first selected, then the primary moderator (i.e., school bonding variable) was entered as *M*, the secondary moderator (i.e., gender) was entered as *W*, and social desirability was entered as a covariate. The PROCESS macro created mean centered values from each of the selected predictor variables, and created 2-way and 3-way interaction terms for use in the regression model. Two separate hierarchical regression analyses were then run for each school bonding variable, one for each peer-related risk factor. Interactions reaching significance at the .05 level were probed using the "pick a point" approach outlined by Hayes (2013), whereby the effect of peer-related risk factors on antisocial behaviour was examined at both levels of the gender dichotomy (female = 2, male = 1). Three participants who identified their gender as "other" were excluded from these analyses.

In the first regression analysis, displayed in Table 12, gender was found to be a significant moderator of the impact of school connectedness on the relationship between deviant peer affiliation and antisocial behaviour. Probing this interaction revealed that, for female youth, school connectedness was a significant moderator of the relation between deviant peer affiliation and antisocial behaviour and for male youth school connectedness was not a significant moderator of this relationship. As illustrated in Figure 3, higher levels of school connectedness

was associated with a weaker association between deviant peer affiliation and antisocial behaviour, and lower levels of school connectedness was associated with a stronger association between deviant peer affiliation and antisocial behaviour. Based on Fergus & Zimmerman's (2005) protective models (illustrated in Figure 1), school connectedness is representative of a protective-reactive factor, where it diminishes but does not eliminate the association of the risk factor and the outcome (Fergus & Zimmerman, 2005). In the second regression analysis, displayed in Table 13, gender was not found to moderate the impact of school connectedness on the relationship between susceptibility to peer influence and antisocial behaviour.

In the third and fourth regression analyses, gender was examined as a secondary moderator of educational belief, displayed in Tables 14-15. Results of these analyses indicated that gender did not significantly moderate the impact of educational belief on the relationship between deviant peer affiliation and antisocial behaviour or the association between susceptibility to peer influence and antisocial behaviour.

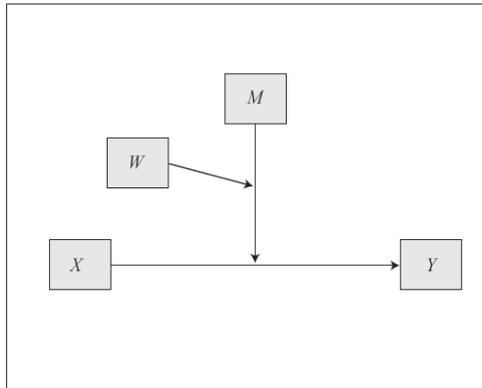
In the fifth and sixth regression analyses, gender was evaluated as a secondary moderator of educational commitment displayed in Tables 16-17. Results of these analyses indicated that gender approached significance in its impact on educational commitment as a moderator of deviant peer affiliation and antisocial behaviour ( $p = .06$ ). However, gender did not moderate the impact of educational commitment on the association between susceptibility to peer influence and antisocial behaviour.

In summary, gender had a significant impact on school connectedness as a moderator of the association between deviant peer affiliation and antisocial behaviour. Specifically, for female adolescents school connectedness acted as a protective-reactive factor against deviant peer

affiliation, as higher levels of school connectedness resulted in a weakened association between deviant peer affiliation and antisocial behaviour.

### Model 3

#### Conceptual Diagram



*Figure 2.* Moderated Moderation Model. This figure demonstrates a moderated moderation model, whereby  $X$  is the predictor variable and  $Y$  is the outcome variable.  $M$  refers to the primary moderator of the relationship between  $X$  and  $Y$ , and  $W$  is the secondary moderator of  $M$  (Hayes, 2013).

Table 12

*Summary of Moderated Moderation Analysis using Gender as a Secondary Moderator of School Connectedness, Deviant Peer Affiliation, and Antisocial Behaviour (N=108)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-.44	.35	-1.26	-1.13, 0.25
Step 2				
Gender (G)	-.80	1.54	.42	-3.85, 2.25
Deviant Peer Affiliation (DA)	.53	.08	6.85***	0.37, 0.68
School Connectedness (SC)	-.45	.17	-2.59*	-0.79, -0.10
Step 3				
G X SC	-.38	.35	-1.10	-1.07, 0.31
DA X G	.19	.14	1.29	-0.10, 0.47
DA X SC	-.00	.01	-.37	-0.03, 0.02
DA X G X SC	-.05	.02	-2.09*	-1.13, 0.25

*Note.* \* $p < .05$  \*\*\* $p < .001$

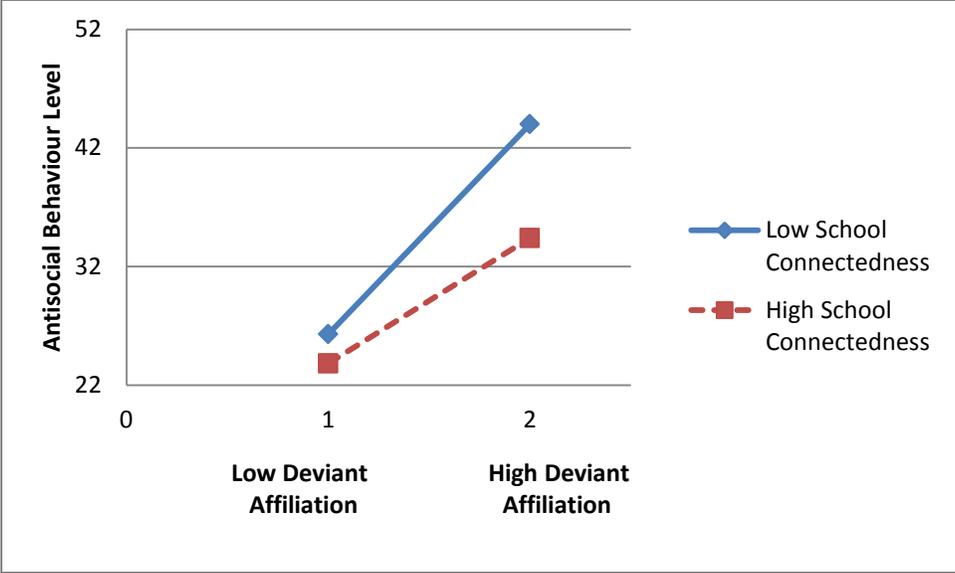


Figure 3. School connectedness moderating the relationship between deviant peer affiliation and antisocial behaviour as reported by female youth (n=58).

Table 13

*Summary of Moderated Moderation Analysis using Gender as a Secondary Moderator of School Connectedness, Susceptibility to Peer Influence, and Antisocial Behaviour (N=107)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-1.03	.40	-2.60*	-1.81, -0.25
Step 2				
Gender (G)	1.33	2.05	.65	-2.74, -0.05
School Connectedness (SC)	-.59	.29	-2.16*	-1.13, 0.07
Susceptibility <sup>a</sup> (S)	3.42	3.25	1.05	-3.02, 9.87
Step 3				
G X SC	-.25	.53	-.46	-1.29, 0.80
S X G	6.97	6.37	1.09	-5.67, 19.62
S X SC	1.12	.72	.82	-0.83, 2.01
S X G X SC	.06	1.40	.04	-2.72, 2.84

*Note.* \*  $p < .05$  *Note.* <sup>a</sup> Refers to susceptibility to peer influence.

Table 14

*Summary of Moderated Moderation Analysis using Gender as a Secondary Moderator of Educational Belief, Deviant Peer Affiliation, and Antisocial Behaviour (N=108)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-.61	.38	-1.58	-1.37,0.15
Step 2				
Educational Belief (EB)	-.52	.40	-1.29	-1.31,0.28
Deviant Peer Affiliation (DA)	.60	.07	9.10***	0.47,0.73
Gender (G)	.54	1.50	.36	-2.43, 3.52
Step 3				
G X EB	-.68	.78	-.86	-2.23,0.88
DA X G	.22	.11	1.99*	0.00,0.44
DA X EB	.02	.03	.53	-0.05,0.08
DA X EB X G	.09	.06	1.45	-0.03, 0.15

*Note.* \*  $p < .05$  \*\*\*  $p < .001$

Table 15

*Summary of Moderated Moderation Analysis using Gender as a Secondary Moderator of*

*Educational Belief, Susceptibility to Peer Influence, and Antisocial Behaviour (N=107)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% for <i>B</i>
Step 1				
Social Desirability	-1.36	.43	-3.17**	-2.21,-0.51
Step 2				
Educational Belief (EB)	-.83	.66	-1.27	-2.14, 0.47
Gender (G)	2.40	2.29	1.05	-2.15, 6.95
Susceptibility to Peer Influence (S)	4.11	3.24	1.36	-2.01, 10.84
Step 3				
G X EB	-2.20	1.32	-1.67	-4.83, 0.42
S X G	5.12	6.52	.78	-7.83, 18.05
S X EB	-.81	1.97	-.41	-4.73, 3.11
S X G X EB	-.60	4.33	-.14	-9.19,7.99

*Note.* \*\*  $p < .01$

Table 16

*Summary of Moderated Moderation Analysis using Gender as a Secondary Moderator of*

*Educational Commitment, Deviant Peer Affiliation, and Antisocial Behaviour (N=108)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-.59	.36	-1.63	-1.29, 0.13
Step 2				
Educational Commitment (EC)	-.25	.27	-.95	-0.79, 0.28
Deviant Peer Affiliation (DA)	.59	.07	8.11***	0.45, 0.73
Gender (G)	-.89	1.69	-.52	-4.25, 2.48
Step 3				
GX EC	-.47	.55	-.86	-1.57, 0.62
DAX G	.16	.12	1.25	-0.09, 0.40
DA X EC	.02	.02	.81	-0.03, 0.07
DA X G X EC	-.09	.05	-1.91	-0.20, 0.00

*Note.* \*\*\*  $p < .001$

Table 17

*Summary of Moderated Moderation Analysis using Gender as a Secondary Moderator of Educational Commitment, Susceptibility to Peer Influence, and Antisocial Behaviour (N=107)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-1.19	.37	-3.17**	-1.93,-0.44
Step 2				
Educational Commitment (EC)	-1.00	.29	-3.47**	-1.57, -0.43
Susceptibility <sup>a</sup> (S)	4.93	2.96	1.67	-0.94,10.81
Gender (G)	2.81	2.03	1.39	-1.22, 6.84
Step 3				
G X EC	.11	.57	.20	-1.02, 1.25
S X G	3.90	5.74	.68	-7.49, 15.30
S X EC	.68	.78	.86	-0.88, 2.23
S X EC X G	1.44	1.50	.96	-1.55, 4.23

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*\*  $p < .01$

**Moderation by Age.** Hypothesis 4b predicted that age would impact the moderating effects of the school bonding variables. As with hypothesis 4a, a series of 3-step hierarchical regression analyses were performed using Andrew Hayes' PROCESS Macro in SPSS (Hayes, 2013) in order to test hypothesis 4b. Social desirability was again used as a covariate, and school bonding variables were entered as primary moderators *M*, but age was entered as the secondary moderator *W* for hypothesis 4b. Two separate hierarchical regression analyses were then run for each school bonding variable, one for each peer-related risk factor.

First, the impact of adolescent age on the role of school connectedness as a moderator was examined, displayed in Tables 18-19. The results of these analyses indicated that age was not a significant secondary moderator of school connectedness in relation to deviant peer affiliation or susceptibility to peer influence and antisocial behaviour.

The second set of analyses examined age as a secondary moderator of educational belief, displayed in Tables 20- 21. The results of these analyses revealed that age did not influence the moderating effect of educational belief on the association of either of the peer-related risk factors and antisocial behaviour.

In the final set of analyses, age was examined as a secondary moderator of educational commitment, displayed in Tables 22-23. The results of these analyses indicated that age does not have a significant impact on the moderating role of educational commitment on deviant peer affiliation and antisocial behaviour or susceptibility to peer influence and antisocial behaviour.

In summary, contrary to hypothesis 4b, adolescent age did not influence the school bonding variables as moderators of the relation between peer-related risk factors and antisocial behaviour.

Table 18

*Summary of Moderated Moderation Analysis using Age as a Secondary Moderator of School*

*Connectedness, Deviant Peer Affiliation, and Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-.51	.35	-1.44	-1.20, 0.19
Step 2				
Age (A)	.43	.77	.60	-0.99, 1.85
School Connectedness (SC)	-.52	.18	-2.87*	-0.88, -0.16
Deviant Peer Affiliation (DA)	.57	.07	7.79***	0.43, 0.72
Step 3				
A X SC	.16	.17	.91	-0.18, 0.49
DA X A	.06	.06	1.11	-0.05, 0.18
DA X SC	-.02	.01	-1.37	-0.05, 0.01
DA X A X SC	.00	.01	.28	-1.20, 0.19

*Note.* \*  $p < .05$  \*\*\*  $p < .001$

Table 19

*Summary of Moderated Moderation Analysis using Age as a Secondary Moderator of School*

*Connectedness, Susceptibility to Peer Influence, and Antisocial Behaviour (N=110)*

Predictor	B	Std. Error	t	95% CI for B
Step 1				
Social Desirability	-1.22	.40	-3.06**	-2.00, -0.43
Step 2				
Age (A)	.64	.79	.81	-0.93, 2.21
School Connectedness (SC)	-.66	.26	-2.53*	-1.17, 0.14
Susceptibility <sup>a</sup> (S)	3.49	3.77	1.55	-1.32, 10.73
Step 3				
A X SC	.24	.23	1.03	-0.22, 0.69
S X A	1.73	3.12	.56	-4.45, 7.19
S X SC	.48	.87	.55	-1.25, 2.21
S X A X SC	-.27	.78	-.35	-1.81, 1.27

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*  $p < .05$  \*\*  $p < .01$

Table 20

*Summary of Moderated Moderation Analysis using Age as a Secondary Moderator of*

*Educational Belief, Deviant Peer Affiliation, and Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-.54	.38	-1.41	-1.29, 0.22
Step 2				
Age (A)	-.06	.72	-.08	-1.48, 1.36
Educational Belief (EB)	-.48	.46	-1.06	-1.39, 0.42
Deviant Peer Affiliation (DA)	.70	.10	7.17**	0.51, 0.89
Step 3				
A X EB	-.09	.35	-.27	-0.79, 0.60
DA X A	.03	.06	.52	-0.08, 0.14
DA X EB	.04	.04	1.00	-0.04, 0.13
DA X A X EB	-.02	.03	-.60	-0.07, 0.04

*Note.* \*\*  $p < .01$

Table 21

*Summary of Moderated Moderation Analysis using Age as a Secondary Moderator of Educational Belief, Susceptibility to Peer Influence, and Antisocial Behaviour (N=110)*

Predictor	B	Std. Error	t	95% CI for B
Step 1				
Social Desirability	-1.44	.39	-3.65***	-2.22, -0.66
Step 2				
Age (A)	.42	1.01	.41	-1.59, 2.42
Susceptibility <sup>a</sup> (S)	4.81	4.28	1.13	-3.67, 13.29
Educational Belief (EB)	-.40	.73	-.55	-1.86, 1.05
Step 3				
AX EB	-.15	.49	-.32	-1.13, 0.82
S X A	1.83	2.77	.66	-3.65, 7.32
S X EB	1.60	2.04	.78	-2.45, 5.65
S X A X EB	1.21	1.21	.99	-1.20, 3.61

Note. <sup>a</sup> Refers to susceptibility to peer influence. \*\*\*  $p < .001$

Table 22

*Summary of Moderated Moderation Analysis using Age as a Secondary Moderator of Educational Commitment, Deviant Peer Affiliation, and Antisocial Behaviour (N=111)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95 % CI for <i>B</i>
Step 1				
Social Desirability	-.61	.35	-1.72	-1.31, 0.09
Step 2				
Age (A)	.10	.67	.15	-1.22, 1.43
Deviant Peer Affiliation (DA)	.58	.08	7.13***	0.42, 0.74
Educational Commitment (EC)	-.47	.27	-1.73	-1.02, 0.07
Step 3				
AX EC	-.00	.20	-.00	-0.40, 0.40
DA X A	.03	.05	.72	-0.06, 0.12
DA X EC	-.00	.03	-.25	-0.06, 0.05
DA X A X EC	.00	.02	-1.72	-1.31, 0.09

*Note.* \*\*\*  $p < .001$

Table 23

*Summary of Moderated Moderation Analysis using Age as a Secondary Moderator of Educational Commitment, Susceptibility to Peer Influence, and Antisocial Behaviour (N=110)*

Predictor	<i>B</i>	<i>Std. Error</i>	<i>t</i>	95% CI for <i>B</i>
Step 1				
Social Desirability	-1.36	.38	-3.59***	-2.12, -0.61
Step 2				
Age (A)	.47	.78	.60	-1.08, 2.03
Educational Commitment (EC)	-1.09	.29	-3.77***	-1.60, 11.32
Susceptibility <sup>a</sup> (S)	4.86	2.26	1.49	-0.70, 10.99
Step 3				
A X EC	.09	.23	.39	-0.37, 0.55
S X A	1.62	2.03	.80	-2.41, 5.64
S X EC	.06	1.01	.06	-1.94, 2.07
S X A X EC	-.53	.90	-.59	-2.33, 1.26

*Note.* <sup>a</sup> Refers to susceptibility to peer influence. \*\*\*  $p < .001$

## **Discussion**

Applying the Social Development Model (SDM) theoretical framework, the current study examined the role of three dimensions of school bonding as potential inhibitors and protective factors in relation to self-reported antisocial behaviour. Previous research has established that low levels of school bonding are associated with increases in problem behaviour during adolescence (e.g., substance use, minor theft) (Catalano et al., 2004; Henry & Slater, 2007; Simons-Morten, Crump, Haynie, & Saylor, 1999). Past studies have also evaluated specific dimensions of school bonding as moderators of negative peer influence but have yielded mixed results. The current study sought to extend previous research evaluating the moderating role of school bonding by examining the relative contribution of each of the three components of school bonding to resilience against peer-related risk factors. Additionally, gender and age were evaluated as secondary moderators to determine if the protective capacity of school bonding varied by age or gender as suggested by previous research (Crosnoe et al., 2002; Liljeberg, Eklund, Fritz, & Klinteberg, 2011; Payne, 2009).

### **School Bonding Variables as Predictors of Antisocial Behaviour**

The first hypothesis evaluated whether the three elements of school bonding as proposed by the SDM (i.e., school connectedness, educational belief, and educational commitment) were predictive of self-reported antisocial behaviour. The results of a hierarchical regression analysis indicated that, despite strong correlations between each school bonding variable and antisocial behaviour, educational commitment was the only significant predictor of self-reported antisocial behaviour.

The finding that educational commitment is predictive of reduced self-reported antisocial behaviour falls in line with the SDM framework and is consistent with previous research findings

(Crosnoe et al., 2002; Jenkins, 1997; Krohn, 1980; Liljeberg et al., 2011). In particular, Jenkins (1997) examined the relative importance of each element of school bonding in relation to school-related delinquency and similarly found that educational commitment was the strongest predictor of school-based delinquency. One possible explanation for the relative importance of educational commitment in relation to antisocial behaviours is that it is the behavioural component of school bonding and thus best reflects the behavioural tendencies of the adolescent. It is unlikely that an individual who devotes a significant amount of time and energy to advancing their educational goals will also involve themselves in activities that might damage these goals. For example, a student who is enrolled in advanced placement courses and is trying to earn a scholarship to university might be more prone to avoid activities like drunk driving or vandalism than a student who does not engage in these pro-social academic activities. Furthermore, educational commitment is also directly related to behaviour outside of school (Hirschi, 1996). Specifically, individuals with higher levels of educational commitment tend to spend a greater portion of time involved in prosocial activities, such as homework completion, and therefore are likely to have less time to engage in delinquent activities (Hirschi, 1996). In contrast, high levels of school connectedness and educational belief may cause individuals to feel guilty about their involvement in delinquent or aggressive endeavors outside of school, but they do not directly interfere with the occurrence of these behaviours. Thus, it is possible that educational commitment emerged as the strongest predictor of antisocial behaviour due its direct connection with antisocial activities.

In contrast with previous research, school connectedness was not found to be a significant predictor of self-reported antisocial behaviour in the current study. In past studies, low levels of connectedness have been found to reliably predict increases in risk-taking, violence,

delinquency, and substance use (Brookmeyer et al., 2006; Chapman, Buckley, Sheehan, Shochet, & Romaniuk, 2011; McNeely & Falci, 2004; Resnick et al., 1997; Wang & Dishion, 2012). The lack of findings regarding school connectedness in the current study may be due to the failure to consider the impact of gender on the predictive utility of school bonding variables, as subsequent analyses investigating gender as a secondary moderator of school bonding yielded significant findings, which are discussed below in the section pertaining to factors affecting moderation. In relation to gender differences, it has been noted that due to gendered socialization processes, male and female youth may follow different pathways towards delinquency and thus there may be differences in the predictive value of various factors (Crosnoe et al., 2002). Female antisocial behaviour is believed to stem more from relationship factors such as attachments with others, as females have been found to demonstrate greater vulnerability and negative outcomes (e.g., depression, stress) in response to relationship difficulties (e.g., rejection from peer group) (Leadbeater, Blatt, & Quinlan, 1995; Liljeberg et al., 2011). Consistent with this notion, several studies examining the impact of school bonding on behavioural outcomes have found that school connectedness and other relationship factors such as parental attachment are stronger predictors of delinquency for female adolescents than male adolescents (Anderson, Holmes, & Ostresh, 1999; Liljeberg et al., 2011). In light of these findings and the results of the current study, school connectedness may only be a relevant contributor to female delinquency, and thus it did not emerge as a general predictor in the current analysis.

### **Peer-Related Risk Factors as Predictors of Self-Reported Antisocial Behaviour**

The second hypothesis examined whether the two peer-related risk factors, deviant peer affiliation and susceptibility to peer influence, were significant predictors of increased antisocial

behaviour. The results of a hierarchical regression analysis revealed that only deviant peer affiliation was a significant predictor of antisocial behaviour.

Deviant peer affiliation is often cited as the most robust predictor of delinquency in adolescence. Thus, its emergence as the strongest predictor of antisocial behaviour in the current study is unsurprising (Ferguson et al., 2002; Heinze et al., 2004). According to the SDM, adolescents who are involved in deviant peer groups are socialized to engage in problem behaviour through peer modelling of delinquency and through the group's endorsement of delinquent acts as favorable (Akers et al., 1979; Catalano & Hawkins, 1996).

The finding that susceptibility to peer influence was not a significant predictor of antisocial behaviour opposes common findings in the existing literature. In past investigations, susceptibility to peer influence has been found to predict increases in antisocial behaviour (Erickson et al., 2000; Monahan et al., 2009; Miller, 2010), and higher levels of susceptibility have been found to strengthen the influence of deviant peers on negative outcomes (Miller, 2010). One explanation for the lack of findings in the current study is that due to issues with low internal consistency and the inclusion of antisocial items, the measure used to evaluate susceptibility to peer influence may not have provided a valid measure of the construct. The standard version of the Resistance to Peer Influence Scale (RPI) developed by Steinberg and Monahan (2007) requires adolescents to rate a series of behavioural descriptions in response to a neutral scenario involving their peers (e.g., I act the same way alone as I do with my friends) in terms of how well the description reflects what they would do. The current study utilized an adapted version of the RPI developed by Meldrum and colleagues (2013) which evaluates overall susceptibility to peer influence. This measure was chosen due to its greater brevity and clarity relative to the original measure. However, in addition to the modified wording, this

adapted measure also incorporates several antisocial scenarios (e.g., I would break the law if my friends said they would) along with the neutral scenarios taken from the original measure.

Researchers examining peer relations have cautioned against the inclusion of antisocial items when evaluating susceptibility to peer influence, as it is felt that peer influence is not always antisocial in nature (e.g., peers may pressure others to do well in school) and thus these items may underestimate levels of susceptibility among pro-social peer groups (Brown, 2004; Steinberg & Monahan, 2007). Consequently, due to the use of the adapted RPI measure in the current study, the level of susceptibility to peer influence may be lower than that obtained in previous studies. Additionally, due to the low internal consistency attained by the RPI measure in the current study, the items on the scale were poorly correlated with one another and thus may not have been evaluating the same latent variable.

Another possible explanation for the aforementioned findings is that the adolescents in the sample may have begun to reach maturity in terms of their level of resistance to peer influence. As noted previously, Steinberg and Monahan (2007) found that by age 14, adolescents begin to gain increasing psychosocial autonomy from their peer group due to the development of impulse control and self-awareness. This process of psychosocial maturity results in the linear growth of self-reported resistance to peer influence, as adolescents with greater impulse control are less prone to follow others without thinking (Steinberg & Monahan, 2007; Sumter et al., 2009). Given the mean age of the current sample was 15.80, it is possible that the current sample has begun to undergo these developmental processes, and thus susceptibility to peer influence may be less of a significant risk factor for antisocial behaviour.

An alternative explanation for the reduced association between susceptibility to peer influence and antisocial behaviour among adolescents in the current sample is their high level of

involvement in antisocial behaviour. In particular, 81% of adolescents in the current sample reported some type of involvement in antisocial behaviour. This level of involvement is much higher than those reported by previous adolescent samples such as Tolan and Thomas (1995), who reported a rate of involvement in antisocial behaviour of 50.3% for male youth and 33.1% for female youth in their sample. As noted previously, Vitaro and colleagues (1997) found that youth who were highly disruptive and delinquent were less susceptible to peer influence. Additionally, Vitulano, Fite, and Rathert (2010) noted that the association between negative peer influence and self-reported delinquency was lower among children reporting higher levels of impulsivity. These authors suggest that in the case of highly delinquent youth, affiliation with deviant peers might be a byproduct rather than a cause of antisocial behaviour, and antisocial behaviour may be less contingent on peer socialization processes (Vitulano et al., 2010). In support of this notion, Meldrum and colleagues (2013) found that self-control moderated the impact of susceptibility to peer influence on self-reported delinquency. In particular, higher levels of susceptibility to peer influence were found to have more negative impacts on adolescents with higher levels of self-control. The authors speculated that due to their more impulsive nature, adolescents with reduced levels of self-control might require lower levels of peer influence to prompt their engagement in antisocial behaviour relative to individuals with high self-control (Meldrum et al., 2013). In the present investigation, the mean level of susceptibility to peer influence was comparable to that reported by adolescents in a study by Meldrum and colleagues (2013). However, in contrast with the study by Meldrum and colleagues (2013) susceptibility levels were not found to predict increases in antisocial behaviour in the current study. Given that increases in antisocial behaviour have been found to correlate with reduced self-control, it is possible that the youth in the current study also exhibit lower levels of

self-control and as such their participation in antisocial behaviour may be less dependent on peer influence.

### **Effects of School Bonding Variables as Moderators of Peer-Related Risk Factors**

The third hypothesis evaluated each dimension of school bonding in terms of their capacity to moderate the association between peer-related risk factors (i.e., deviant peer affiliation and susceptibility to peer influence) and antisocial behaviour. Contrary to the study hypotheses, none of the school bonding variables was found to moderate this association. These results are incongruent with the tenets of the SDM and suggest that school bonding does not function as a resilience factor against peer influence for this sample. One possible explanation for the lack of significant moderation effects is the age of the sample. Previous work evaluating school bonding has largely involved middle school and elementary school samples, whereas the current study involved high school students. As school bonding variables have been reported to decline with age, it is possible that over time the school bond loses its propensity as a protective factor. In support of this notion, Dickens et al. (2012), who examined school bonding in relation to deviant peer affiliation and substance use, found that school connectedness was only a significant moderator of peer influence for adolescents under the age of 16. Thus, it is possible that this pattern of developmental decline impacted the current sample, which may account for the lack of significant moderation.

### **Factors Affecting Moderation**

The first part of hypothesis four investigated whether school bonding variables conferred protection against peer-related risk factors differently for male and female youth. Results of this moderated moderation analysis revealed a three-way interaction with gender, school connectedness, and deviant peer affiliation. Specifically, school connectedness reduced the

negative impact of deviant peers for female youth. Although school connectedness has previously been found to moderate the association of deviant peers and self-reported delinquency among middle school students (Wang & Dishion, 2012; Roosa et al., 2012), the current study is the first to find this relationship with high school students. This unique finding is likely due to the fact that the current analyses took into consideration the role of gender, unlike previous work involving high school-aged samples, which has generally failed to consider gender as a covariate (Liljeberg et al., 2011). Given that the current results suggest that at least one dimension of school bonding affects male and female youth differently, gender should be considered when evaluating its protective utility in any future work.

The finding that school connectedness is more protective for female youth is consistent with feminist theories of delinquency. These theories postulate that female youth are socialized to be nurturing and to value social relationships and should therefore derive more benefit from a caring school community (Payne, 2009). In line with this view, several recent studies examining the impact of perceived social support on adolescent outcomes have found that relationship factors are stronger predictors of outcomes for female youth. For instance, Rueger, Malecki, and Demaray (2010) evaluated the relationship between different forms of social support (i.e., peer, parent, and teacher support) and psychological and academic adjustment outcomes in male and female youth. They found that while both male and female adolescents benefited equally from perceived social support in the short-term, long-term findings showed that social support was only predictive of positive outcomes for female youth. Similarly, Crosnoe et al. (2002) found that in relation to self-reported substance use, female youth derived significantly more protection from deviant peer affiliation through relationship factors (e.g., teacher support) in comparison to male youth.

In contrast to the findings for female youth, none of the school bonding variables were found to be protective against negative peer influence for male youth. This suggests that although high levels of educational commitment may initially deter male adolescents from engaging in antisocial behaviour, the protective benefits of school bonding are lost in the context of high peer-related risk. This finding is generally consistent with the existing literature, which has largely failed to find support for school-based resilience in high school samples (Cattellino et al., 2014; Dickens et al., 2014). One possible explanation for the absence of school-based resilience for male youth in the current study is that school bonding factors were not examined in relation to specific types of deviant behaviour (e.g., alcohol use, smoking, property offences). Recent evidence suggests that school bonding variables may garner protection to male adolescents differently based on the nature of the antisocial behaviour. Specifically, Crosnoe et al. (2002) examined the moderating role of school bonding variables on the relationship between deviant peer influence and five forms of adolescent deviance (alcohol use, marijuana use, illegal drug use, tobacco use, and general delinquency). It was found that school bonding variables effectively reduced the negative impact of deviant peer affiliation on minor forms of delinquency for male youth (e.g., petty theft), but these variables were found to be less effective in relation to illegal substance use (Crosnoe et al., 2002). Thus, if substance use and general delinquency had been included as separate outcomes in the current study, school-based resilience might have been found for male adolescents.

The second part of hypothesis four examined whether age affected the protective functions of the school bonding variables. Results revealed that contrary to the study hypothesis, age did not significantly impact the protective role of the components of school bonding. This finding is unexpected given that previous research has shown a linear decline in school bonding

with increasing age (Oeslner et al., 2011; Simons-Morton et al., 1999; Wang & Dishion, 2012). It is possible that the lack of moderation by age in the current study is the result of the more limited age range of the sample. As outlined above, the decline of protective value in school connectedness is thought to occur after its peak in middle school years (Wang & Dishion, 2012). Therefore, the exclusion of younger middle school students in the current sample may have reduced the variability in school bonding due to age.

### **Limitations**

The present thesis has several limitations that warrant further discussion. First, all of the study variables were gathered through adolescent self-report. This leads to common method variance, which results in inflated correlations (Fields, 2009). Second, the use of adolescent self-report data might have limited the validity of the findings. In particular, asking adolescents to report on their perception of a friend's involvement in antisocial behaviour may result in the false consensus effect, whereby adolescents overestimate the similarity between their behaviour and that of their peers (Ross, Greene, & House, 1977). Due to this phenomenon, previous studies incorporating self-report measures have been found to inflate the power of peer influence (Wilcox & Udry, 1986). Unfortunately, due to the online nature of the current study, it was not possible to integrate additional indicators of peer affiliation in conjunction with the self-report measures. However, social networking methods, such as the social-cognitive map (SCM) procedure would be a valid way to supplement adolescent self-report in future studies (Neal & Neal, 2013).

Third, due to the cross-sectional nature of the current study, the directionality of the observed relationships is unclear. For instance, it is uncertain whether low levels of school bonding are a cause or a consequence of frequent antisocial behaviour. It also is unknown

whether students in the current sample were undergoing the developmental decline in school bonding that is typically reported in middle school samples. A longitudinal study investigating risk and protective factors would account for within-subject variability and would allow for a better understanding of the directionality of the observed effects.

Fourth, despite the broad-based sampling approach utilized in the recruitment of participants, a large portion of the recruitment sites were children's mental health centres. Therefore, youth who participated in this study may have had a higher prevalence of mental health problems compared to strictly school-based samples. Given that common features of mental illness (e.g., emotional distress and suicidality) have been found to predict lower levels of school bonding, and due to the high rate of antisocial behaviour reported by the current sample, the findings may be unique to at-risk adolescents. Future research should attempt to replicate this study's findings in a lower risk sample to evaluate the generalizability of the results.

Finally, another limitation of the study is the low internal consistency obtained across several study measures. Often researchers require measures to reach an internal consistency of at least .70 before running subsequent analyses to ensure greater consistency in their results (Field, 2009). Given that the included measures have previously obtained internal consistencies within an acceptable range, it is possible that the online nature of data collection in the current study limited their validity. In particular, online data collection methods limit the extent to which the researchers can control data collection procedures (e.g., clarifying survey questions, observing participants during survey completion). This lack of control increases the variability in testing conditions and increases the level of inconsistency in participant responding (Suter & Klein, 2007). For instance, when completing surveys online rather than in a lab setting, it is possible for participants to be engaged in other online activities at the same time (e.g., responding to emails,

checking social media). This division of attention can limit their level of concentration on the task and can affect their ability to respond to the questions as instructed. Additionally, in a lab, participants can obtain clarification regarding questions they are unsure of, but with an online survey, participants do not have this option and are more likely to guess if they are unsure. In the future, researchers could attempt to incorporate greater experimental control into online survey administration with adolescents, by adding prompts for completion of missing items and by adding help tabs to allow for clarification of difficult questions.

### **Clinical Implications**

The findings from the current study have several clinical implications. One of the major findings is that educational commitment emerged as the most relevant component of school bonding in the prediction of antisocial behaviour. Given that a large number of mental health agencies participated in the study and youth in the study reported high levels of antisocial behaviour, this finding provides a possible direction for narrowing the focus of school-based interventions for at-risk adolescents. Specifically, the current finding suggests that school-based interventions focused on delinquency prevention should target the enhancement of academic aspirations among high school students.

The results of the current study also highlight the importance of school connectedness as an important factor in mitigating the negative impacts of peer influence among female youth. School connectedness represents a key area of resilience for female adolescents and thus a potential area of future intervention. School-based interventions might seek to enhance overall school connectedness among female high school students by addressing the negative changes associated with the transition to high school. As noted previously, Eccles et al. (1993) attribute the negative school bonding outcomes associated with school transitions to the mismatch

between the developmental needs of the students and the opportunities provided to them at school. Therefore, one way to enhance school connectedness may be to increase the developmental fit of the school to meet the needs of the adolescent.

### **Future Directions for Research**

Despite the vast amount of research examining the role of school bonding in the development of antisocial behaviour, very little is understood about its role as a protective factor. To enhance the knowledge base of this area of study, a number of suggestions are provided for future research endeavors. A major contributor to the lack of understanding regarding school bonding is the diversity of measures and terms that have been used to describe it. Such diversity means that researchers regularly evaluate elements of this multifaceted construct (e.g., school attachment, school engagement), but never consistently examine the construct as a whole (Jimmerson et al., 2003; Libbey, 2004; Maddox & Prinz, 2003). In the future, researchers should seek to develop standardized measures of the dimensions of school bonding, or alternatively integrate the dimensions to create a single measure of the construct. This would help to establish greater consistency within the broader literature and would greatly inform school-based interventions.

The failure to consider the impact of gender is another contributor to the uncertainty surrounding school-based resilience. While school bonding has been investigated by many as a general protective factor, few have examined the variability in its effects by gender (Payne, 2009). In the current study, school connectedness was found to only act as a protective factor for female adolescents. It is therefore possible that the impacts of the dimensions of school bonding are only evident when examined by gender. Future research should incorporate gender as

covariate in their evaluations of school-based resilience, as this may reveal protective relationships that were not previously observed.

In addition to gender, other variables may impact the level of protection conferred by the dimensions of school bonding. Future research examining school-based resilience could examine other potential moderators of school bonding variables. The PROCESS Macro in SPSS by Andrews Hayes will facilitate researchers examining moderated moderation models. For example, parenting practices have been found to have a significant impact on levels of school bonding; it is therefore possible that students exposed to certain family environments may derive more benefit from school-based resilience (Simons-Morton & Chen, 2009).

Lastly, the strength of school bonding varies over the course of adolescence, but few researchers have examined these developmental changes in high school samples (Rudasill et al., 2013). Consequently, it is unclear whether this developmental trend continues throughout high school or whether the linear decline in school bonding reaches a plateau. In order to gain a better understanding of the development of school bonding and its associated outcomes, more longitudinal research involving high school-aged samples is needed. For instance, a study evaluating school bonding levels at the start of high school and reevaluating these levels at the beginning of each new school year would provide valuable information regarding the trajectory of school bonding among high school students.

### **Summary**

The findings of the present study support the utility of the school bonding dimensions purported by the SDM in explaining antisocial behaviour of high school students. Among the current sample, educational commitment emerged as the strongest school-based predictor of antisocial behaviour, and deviant peer affiliation was found to be the strongest peer-related

predictor. In terms of school-based resilience, school connectedness emerged as a moderator of the negative impact of deviant peer affiliation on antisocial behaviour. However, this moderating relationship was only significant when examined for female youth, as school connectedness was not found to buffer the impact of deviant peer affiliation for the overall sample. These results suggest that school bonding is a relevant area of resilience for high school students, but that the specific source of resilience is dependent on the gender of the individual.

## Appendix A

**RYERSON UNIVERSITY**  
RESEARCH ETHICS BOARD

To: Monique Tremblay  
Psychology

Re: REB 2014-213: Resilience in the face of risk: Investigating the moderating effect of school connectedness, educational commitment, and educational belief in the context of adolescent antisocial behaviour

Date: August 11, 2014

Dear Monique Tremblay,

The review of your protocol REB File REB 2014-213 is now complete. The project has been approved for a one year period. Please note that before proceeding with your project, compliance with other required University approvals/certifications, institutional requirements, or governmental authorizations may be required.

This approval may be extended after one year upon request. Please be advised that if the project is not renewed, approval will expire and no more research involving humans may take place. If this is a funded project, access to research funds may also be affected.

Please note that REB approval policies require that you adhere strictly to the protocol as last reviewed by the REB and that any modifications must be approved by the Board before they can be implemented. Adverse or unexpected events must be reported to the REB as soon as possible with an indication from the Principal Investigator as to how, in the view of the Principal Investigator, these events affect the continuation of the protocol.

Finally, if research subjects are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research.

Please quote your REB file number (REB 2014-213) on future correspondence.

Congratulations and best of luck in conducting your research.



Lynn Lavallée, Ph.D.  
Chair, Research Ethics Board

## Appendix B

RYERSON UNIVERSITY

Department of Psychology  
Faculty of Arts

# PARTICIPANTS NEEDED FOR RESEARCH IN ADOLESCENT DEVELOPMENT

We are looking for volunteers between the ages of 14 and 17 to participate in an online survey about adolescent development.



Participation in this study will involve the completion of a confidential online survey which you can complete from the privacy of your own home.

For participating in this study you will receive:

**One hour of community service and entry into a draw to win a \$100.00 iTunes gift card!**

For more information about this study, or to volunteer for this study, please contact:

Monique Tremblay

Psychology Department

or visit the following survey link:

(<http://tinyurl.com/Youth-Resilience>)

Visit:  
<http://tinyurl.com/Youth-Resilience>

Or  
Email:  
[monique.tremblay@psych.ryers.on.ca](mailto:monique.tremblay@psych.ryers.on.ca)

## Appendix C

RYERSON UNIVERSITY

### Department of Psychology

#### Participants needed for a study on Adolescent Development

Participation will involve the completion of a confidential online survey that you can complete from the privacy of your own home.



**For participating,  
you will receive:**

**One hour of  
community  
service  
+  
Entry into a draw  
to win a \$100.00  
iTunes gift card!**

To participate visit  
<http://tinyurl.com/Youth-Resilience>  
or email

**monique.tremblay@  
psych.ryerson.ca**

## Appendix D

The logo for Ryerson University, featuring the text "RYERSON UNIVERSITY" in white capital letters on a blue rectangular background with a yellow vertical bar on the right side.

Department of Psychology  
Faculty of Arts

**Study Title:** Resilience in the face of risk: Investigating the moderating effect of school connectedness, educational commitment, and educational belief in the context of adolescent antisocial behaviour

### **Survey Consent Form**

**You are being invited to participate in a research study. Before you agree to participate you must read this Consent Form so that you understand what your participation will involve.**

### **Investigators**

You are being asked to participate in a research study being done by Monique Tremblay, from the Psychology Department at Ryerson University. The results of this study will be used for her Master's thesis. As well, the results of the study may be written up for presentation at a conference or for publication in a professional journal. If you have any questions or concerns about the research, please contact Monique Tremblay at [monique.tremblay@psych.ryerson.ca](mailto:monique.tremblay@psych.ryerson.ca) or her faculty supervisor, Dr. David Day at [dday@psych.ryerson.ca](mailto:dday@psych.ryerson.ca) or telephone 416.979.5000 x 7104.

### **What is the study about?**

This study is about school bonding, that is, the emotional connection you may have to your school. School bonding has been found to be related to some things young people do, such as using drugs or alcohol, getting into fights, or doing other kinds of antisocial behaviours. This study will help us better understand how school bonding and adolescent problems are related.

### **What will you have to do?**

If you choose to participate, you will be asked fill out a number of questionnaires to the best of your ability. The questionnaires should take you between 40-60 minutes to complete. The questions will ask about many different things, including, the way you think and feel about yourself and about your behaviour. Some examples of these things are whether you or your friends have participated in certain behaviours such as getting into fights, selling drugs, or driving without a license, as well as some things about your participation at school and about your relationships with your teachers. You will also be asked about your feelings about yourself, such as, whether you feel you have good qualities or whether you feel useless sometimes. Some sample questions include, "How many hours do you typically spend on homework per week?;" "Since school started have you had trouble getting along with your teachers?;" "Have you had alcohol?;" and "Have you run away from home?"

### **Do you Have a choice?**

YES. You do not have to participate if you don't want to, or, even if you agree now, you can skip any questions or stop at any time without consequences simply by closing the webpage. However, if you exit the webpage, any information that you have already entered will be recorded and will contribute to the

study. Your name will not be connected to the research at all and your participation will be kept private. If you begin the questionnaire and wish to have a break at any point, you may return to the point where you left off for up to a week using the same computer and browser (e.g., google chrome, safari, etc.) that originally brought you to the questionnaire. After the one week period, data from your incomplete questionnaire will be recorded and entered into the study.

### **Are there any risks?**

The potential risk of harm in this study is very low. Some of the questions on this survey may seem personal and might make you may feel uncomfortable or embarrassed. If you feel uncomfortable at any time while completing any questions on the questionnaire, you may skip the item(s) or stop the questionnaire by closing the webpage. If you become upset and would like to talk to someone after completing the questionnaire, please consider contacting your family doctor for help or contacting Kid's Help Phone at 1-800-668-6868 or [www.kidshelpphone.ca](http://www.kidshelpphone.ca). Additionally, the Children's Mental Health Ontario (CMHO) website provides contact information for crisis service providers across Ontario at <http://www.kidsmentalhealth.ca/>.

\* Please note that Kid's Help Phone and Children's Mental Health Ontario are independent of this study and Ryerson University.

### **Are there rewards for participating?**

YES. To thank you for completing our questionnaire, you will receive one hour of community service to put towards your high school completion, and you can choose to be entered in a draw to win a \$100.00 iTunes gift card. You will be able to enter into this draw and receive the community service hour even if you do not finish survey questions.

### **Are there benefits?**

You will receive no direct benefits for participating in this study, but the results of this study may allow us to help other adolescents in the future.

Some of the ways this research can help future adolescents, include:

It may help us understand the importance of support provided by teachers in schools.

It allows us to learn about adolescent development.

It may help us inform the development of school-based programs for adolescents at-risk.

### **Is it confidential?**

YES. All your responses to the survey questions will remain private throughout the study. This means that your responses to the questionnaire will not be connected to your name or other personal information and all the data and contact email addresses collected will be kept in password-protected files on the researcher's computer at Ryerson University to be stored for 10 years following the completion of the study. All paper-based files will be stored in a locked filing cabinet in a locked office at Ryerson University, and these files will be destroyed (shredded) after entry into the study database. You will only be asked to provide your name and email address in order to collect community service hours and to be entered into the draw. Only the study's researchers will be able to see this information and any presentation or publication of the results will be reported as part of the overall findings; no person's identity will ever be revealed as part of this study.

**Is it voluntary?**

YES. Participation in this study is voluntary, which means that you can decide whether to participate for this study or not. By completing the survey and selecting “submit” at the end of the survey you are demonstrating your consent to participate and allowing your information to be used in this study. If you decide to volunteer to participate in this study, you can still stop at any time without consequence. You may also choose not to answer any question(s) and still remain in the study.

\*If you have questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information [rebchair@ryerson.ca](mailto:rebchair@ryerson.ca).

**Agreement:**

Your signature below indicates that you have read the information in this agreement and have had a chance to ask any questions you have about the study. Your signatures also indicate that you agree participate in the study and have been told that you can change your mind and withdraw consent to participate at any time.

You have been told that by signing this consent agreement you are not giving up any of your legal rights.

\_\_\_\_\_

Signature of Participant

\_\_\_\_\_

Date

\_\_\_\_\_

Signature of Investigator

\_\_\_\_\_

Date

## Appendix E

### Adolescent Behaviour Scale

The following questions ask about your participation in a variety of activities. **How many times in the past 12 months** have you engaged in the following acts? (Select one answer for each question).

Question	Never	Once	2-3 Times	4-5 Times	6 or More Times
Run away from home?	1	2	3	4	5
Taken something worth less than \$25 that didn't belong to you?	1	2	3	4	5
Taken something worth more than \$25 that didn't belong to you?	1	2	3	4	5
Cut classes, or stayed away from school without permission?	1	2	3	4	5
Beat up on someone or fought someone physically because he or she made you angry (other than just playing around)?	1	2	3	4	5
Been drunk in a public place?	1	2	3	4	5
Snatched someone's purse or wallet without hurting her or him?	1	2	3	4	5
Driven a car when drunk?	1	2	3	4	5
Purposely damaged or destroyed property that did not belong to you?	1	2	3	4	5

<b>Question</b>	<b>Never</b>	<b>Once</b>	<b>2-3 Times</b>	<b>4-5 Times</b>	<b>6 or More Times</b>
Broken into or tried to break into a building just for fun or to look around?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Taken a car or other vehicle without the owner's permission, just to drive around?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Broken into or tried to break into a building to steal or damage something?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Thrown objects such as rocks or bottles at people to hurt or scare them?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Attacked someone with a weapon, trying to seriously hurt him or her?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Sold illegal drugs such as pot, grass, hash, LSD, cocaine, or other drugs?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Used a weapon, force, or strong arm methods to get money or things from someone?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Set fire to a building or field or something like that for fun?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

<b>Question</b>	<b>Never</b>	<b>Once</b>	<b>2-3 Times</b>	<b>4-5 Times</b>	<b>6 or More Times</b>
Snuck into a movie, ballgame, or something like that without paying?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Gotten into trouble for driving a car without a license?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Gotten a ticket for speeding or other traffic violations in a car?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Got back at another student by not letting them into your group of friends?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Told lies about other students to make other kids not like them?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

## Appendix F

### School Connectedness Scale

The following questions ask about your **feelings related to your school**. Please select the answer that best describes you (select only one answer for each question).

Question	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
I feel close to the teachers at my school.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
I feel like I am a part of my school.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
I am happy to be at my school.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Teachers at my school treat students fairly.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Question	Never	Just a Few Times	About Once a Week	Almost Everyday	Everyday
Since school started how often have you had trouble getting along with your teachers?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Question	Not at all	Very Little	Somewhat	Quite a Bit	Very Much
How much do you feel your teachers care about you?	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

## Appendix G

### Educational Commitment

The following questions ask about your beliefs regarding your education. Please select the option that best describes you (please circle only one answer for each question).

***\*If you are not currently in school, please refer to the most recent time when you were in school\****

- 1.) Which of the following best describes your grades in high school so far?
  - Mostly A's
  - About half A's and half B's
  - Mostly B's
  - About half B's and half C's
  - Mostly below D
  
- 2.) Considering your situation, what is the highest level that you EXPECT to go in school?
  - Leave school as soon as possible
  - Graduate high school
  - Attend college
  - Attend University
  - Finish university and take further training  
(e.g., Medical, Law, Graduate school, etc.)
  
- 3.) How many hours do you typically spend on home work each week?
  - None
  - 1-2 hours
  - 2-3 hours
  - 3-4 hours
  - 4 or more hours

## Appendix H

### Educational Belief Measure

The following questions pertain to the rules and regulations at your current school (or the last school you went to). Please **select the option that best describes your thoughts** on school rules (select only one answer).

*\*If you are not currently in school, please refer to the most recent time when you were in school\**

1	Most school rules are fair.	<b><u>TRUE</u> or <u>FALSE</u></b>
2	The principal is too tough and strict.	<b><u>TRUE</u> or <u>FALSE</u></b>
3	Students are treated fairly.	<b><u>TRUE</u> or <u>FALSE</u></b>
4	Rules are too strict.	<b><u>TRUE</u> or <u>FALSE</u></b>
5	The principal is fair most of the time.	<b><u>TRUE</u> or <u>FALSE</u></b>
6	The punishments are the same no matter what.	<b><u>TRUE</u> or <u>FALSE</u></b>
7	Teachers are too strict.	<b><u>TRUE</u> or <u>FALSE</u></b>
8	All student ethnic groups are treated the same.	<b><u>TRUE</u> or <u>FALSE</u></b>

## Appendix I

### Susceptibility to Peer Influence Measure

The following questions ask about your interactions with your friends. Please **select the option that best describes you**. (Select only one answer for each question).

	<b>Not at all True</b>	<b>Somewhat True</b>	<b>True</b>	<b>Very True</b>
I go along with my friends just to keep them happy.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I think it's more important to be who I am than to fit in with the crowd.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I would do something that I know is wrong just to stay on my friend's good side.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I would break the law if my friends said they would.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I will say my true opinion in front of my friends, even if I know they will make fun of me because of it.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I take more risks when I am with my friends than when I am alone.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I act the same way when I am alone as I do when I am with my friends.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I say things I don't really believe because I think it will make my friends respect me more.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

## Appendix J

### Deviant Peer Affiliation Measure

The following questions ask about **how many of your friends participate** in a variety of activities. In the past 12 months how many of your “close” friends have ....

Question	None	Few	Half	Most	All
Run away from home?	1	2	3	4	5
Skipped school without an excuse?	1	2	3	4	5
Purposely damaged or destroyed property that did not belong to them?	1	2	3	4	5
Stolen something worth less than \$25?	1	2	3	4	5
Stolen something worth more than \$25?	1	2	3	4	5
Taken a motor vehicle such as a car or motorcycle, for a ride without the owner’s permission?	1	2	3	4	5
Hit someone with the idea of hurting them?	1	2	3	4	5
Attacked someone with a weapon or with the idea of seriously hurting him or her?	1	2	3	4	5
Used a weapon, force, or strong arm methods to get money or other things from people?	1	2	3	4	5
Used tobacco (cigarettes)?	1	2	3	4	5
Used Alcohol (beer, wine, vodka, etc.)?	1	2	3	4	5
Used illegal drugs such as marijuana, hashish, LSD, cocaine, downers, crack, etc.?	1	2	3	4	5
Use prescription drugs for fun or to get “high”?	1	2	3	4	5
Used inhalants such as solvents, gasoline, rush, or glue?	1	2	3	4	5
Used nonprescription drugs for fun or to get “high”?	1	2	3	4	5

## Appendix K

### Social Desirability Scale

The following questions ask about your reactions and **feelings about a number of situations**. Please circle the answers that best describes you.

1	It is sometimes hard for me to go on with my work if I am not encouraged.	<b><u>TRUE</u> or <u>FALSE</u></b>
2	I sometimes feel resentful when I don't get my way.	<b><u>TRUE</u> or <u>FALSE</u></b>
3	On a few occasions, I have given up doing something because I thought too little of my ability.	<b><u>TRUE</u> or <u>FALSE</u></b>
4	There have been many times when I felt like rebelling against people in authority, even though I knew they were right.	<b><u>TRUE</u> or <u>FALSE</u></b>
5	No matter who I'm talking to, I am always a good listener.	<b><u>TRUE</u> or <u>FALSE</u></b>
6	There have been occasions when I took advantage of someone.	<b><u>TRUE</u> or <u>FALSE</u></b>
7	I'm always willing to admit when I make a mistake.	<b><u>TRUE</u> or <u>FALSE</u></b>
8	I sometimes try to get even rather than forgive and forget.	<b><u>TRUE</u> or <u>FALSE</u></b>
9	I am always courteous, even to people who are disagreeable.	<b><u>TRUE</u> or <u>FALSE</u></b>
10	I have never been irked when people expressed ideas very different from my own.	<b><u>TRUE</u> or <u>FALSE</u></b>
11	There have been times when I was quite jealous of the good fortune of others.	<b><u>TRUE</u> or <u>FALSE</u></b>
12	I am sometimes irritated by people who ask favors of me.	<b><u>TRUE</u> or <u>FALSE</u></b>
13	I have never deliberately said something that hurt someone's feelings.	<b><u>TRUE</u> or <u>FALSE</u></b>

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