



© 2015 Association for Child and Adolescent Mental Health. This is the peer reviewed version of the following article: Oldfield, J., Humphrey, N. and Hebron, J. (2016). The role of parental and peer attachment relationships and school connectedness in predicting adolescent mental health outcomes. *Child Adolesc Ment Health*, 21: 21–29. doi:10.1111/camh.12108, which has been published in final form at <http://dx.doi.org/10.1111/camh.12108>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving.

Attachment Relationships Predicting Mental Health

**The Role of Parental and Peer Attachment Relationships and School
Connectedness in Predicting Adolescent Mental Health Outcomes**

Jeremy Oldfield¹, Neil Humphrey², & Judith Hebron²

¹Department of Psychology, Manchester Metropolitan University, UK

²Manchester Institute of Education, University of Manchester, UK

Corresponding author:

Dr. Jeremy Oldfield

Department of Psychology

Manchester Metropolitan University

Birley Building

53 Bonsall Street,

Manchester,

M15 6GX

Running header: Attachment Relationships Predicting Mental Health

Attachment Relationships Predicting Mental Health

Abstract

Background - Adolescent attachment relationships with parents and peers and the sense of connectedness with the schools attended have been established as salient predictors of psychological wellbeing. Few studies, however, have assessed the relative importance of each attachment or connectedness relationship and how they interrelate to influence mental health outcomes. **Method** – 203 adolescents (11-16 years) completed self-report measures of parental and peer attachment (*Inventory of Parental & Peer Attachment – Revised*; Gullone & Robinson, 2005); school connectedness (*Psychological Sense of School Membership*; Goodenow, 1993); conduct problems, emotional symptoms, and prosocial behaviour (*Strengths and Difficulties Questionnaire*; Goodman, 1997). **Results** - Multiple regression analyses demonstrated that more insecure parental attachment (although not peer attachment or school connectedness) predicted conduct problems and emotional difficulties. Peer attachment and school connectedness were significant predictors of prosocial behaviour, whereas parental attachment was not. A mediational analysis revealed that peer attachment and school connectedness both mediate the relationship between parental attachment and prosocial behaviour. No significant moderation effects of either peer attachment or school connectedness on the relationship between parental attachment and mental health outcomes were found. **Conclusions** - Different attachment and connectedness relationships, although related, predict adolescent mental health outcomes in distinct ways. Improving parental attachment may have particular salience in reducing negative behaviours such as conduct problems and emotional difficulties, whereas improving peer attachment and school connectedness could be important for the display of prosocial behaviour.

Key practitioner message

- Adolescents with more secure attachment to parents and peers and enhanced school connectedness display better mental health outcomes.
- Improving adolescents' attachment to parents may be particularly influential in reducing conduct problems and emotional difficulties.
- The relationship between parental attachment and prosocial behaviour is partially mediated through peer attachment and school connectedness; therefore, these relationships may be of particular importance when attempting to increase the display of prosocial behaviour.
- Improving peer attachment or sense of school connectedness is unlikely to be sufficient to overcome the mental health difficulties associated with insecure parental attachment.

Key words: Adolescence, parental attachment, peer attachment, school connectedness, mental health,

The Role of Parental and Peer Attachment Relationships and School Connectedness in Predicting Adolescent Mental Health Outcomes

Mental health problems, such as conduct problems and emotional difficulties displayed in adolescence, have long-term and pervasive effects into adulthood (Coleman et al., 2009; Scott, Knapp, Henderson, & Maughan, 2001). A key goal of research in this field has been to establish some of the potential influences on these problems as a means of informing more effective prevention strategies. One line of research has investigated the effects of different adolescent attachment relationships not only with parents, but also with their peers and schools they attend as possible predictors of psychological wellbeing (Arthur et al., 2002; Formoso, Gonzales, & Aiken, 2000; Laible, Carlo, & Raffaelli, 2000).

Attachment relationships can be defined as a “lasting psychological connectedness between human beings” (Bowlby, 1969, p. 194). These relationships initially form in infancy with the individual’s primary caregiver. However, during adolescence a transition occurs wherein the individual becomes less dependent upon his or her parents and searches for more autonomy, and in doing so is able to integrate multiple bonds into their attachment organisation (Steinberg, 2005). Adolescent parental attachment nevertheless remains an important relationship, with parents still being sought in times of stress even into young adulthood (Allen, 2008).

As adolescents become increasingly autonomous, they begin to transfer their dependencies from their parents onto their peers (Allen, 2008). These relationships begin to develop attachment characteristics, as adolescents seek out peers as their primary sources of intimacy and social support (Laible, 2007). These relationships

Attachment Relationships Predicting Mental Health

serve as safe havens, providing a secure base and emotional support (Zeifman & Hazan, 2008).

Adolescents also begin to form meaningful connections with the schools they attend. This sense of connectedness can be defined as “the extent to which students feel personally accepted and respected, included and supported by others in the school social environment” (Goodenow, 1993, p.80). This relationship involves the individual forming a meaningful sense of belonging with school (Diaz, 2005). It is not regarded as an individual’s attachment to any educational process in general, but rather his or her sense of connectedness with the school attended (Johnson, Crosnoe, & Thaden, 2006).

Adolescent attachment relationships and mental health outcomes

Attachment to parents and peers and a sense of school connectedness are important relationships in the life of most adolescents. Research has begun to highlight the salience that these relationships have upon mental health outcomes. The evidence is fairly conclusive - more insecure attachments to parents are linked with more severe conduct problems and aggressive behaviour (e.g. Formoso et al., 2000; Laible et al., 2000), and a heightened likelihood of developing emotional difficulties such as depressive and anxious symptomology (Allen, Porter, McFarland, et al., 2007). On a more positive note, adolescents with secure attachments to their parents have demonstrated more prosocial behaviour such as being sympathetic and emotionally aware, (Laible, Gustavo, & Roesch, 2004; Laible, 2007).

Peer attachment also holds some influence over mental health outcomes, with more insecure attachments associated with conduct-related problems such as delinquency (McElhaney, Immele, Smith, & Allen, 2006), emotional difficulties such

Attachment Relationships Predicting Mental Health

as heightened levels of depression (Nickerson & Nagle, 2005), and decreased empathy and prosocial behaviour (Laible et al., 2004).

The general consensus concerning school connectedness is that deficits in this area are associated with higher levels of behaviour problems (e.g. Frey, Ruchkin, Martin, & Schwab-Stone, 2009; Loukas, Ripperger-Suhler & Horton, 2009), and more severe emotional symptoms such as depression and suicidal ideation (Millings, Buck, Montgomery, Spears, & Stallard, 2012; Govender, Naicker, Meyer-Weitz, Fanner et al., 2013). There is also some evidence to suggest that higher levels of connectedness to school are associated with positive adaptation and being less negatively influenced by stressful experiences (Becker & Luthar, 2002).

Interrelationship of attachments

It has been fairly well established that parental and peer attachments and school connectedness each have at least some influence upon adolescent mental health. Less is known however, about their *relative* importance in predicting different mental health outcomes. Only a handful of studies have included different attachment or connectedness relationships within the same piece of research with a mental health construct as the outcome (e.g. Millings et al., 2012; Laible et al., 2000). The majority of this evidence suggests that parental attachment is the strongest predictor; more than school connectedness in influencing depression (Shochet, Homel, Cockshaw, & Montgomery, 2008), and more than peer attachment in influencing conduct problems (Formoso et al., 2000). Others however, have argued that although parental and peer attachment serve similar functions in influencing adolescent mental health, peer rather than parental attachment is more important (Laible et al., 2000). Furthermore,

Attachment Relationships Predicting Mental Health

Millings et al. (2012) have demonstrated the importance of peer attachment in adolescence to be more salient than school connectedness in predicting low mood.

It is during adolescence that individuals begin to transfer their dependencies from their parents onto their peers (Allen, 2008). Friendships during adolescence become increasingly important and meaningful, with these relationships having significant effects on subsequent behaviour (Wilkinson, 2008). Further research is clearly warranted in this area to extend our understanding of the relative strength of parental and peer attachment and school connectedness in exploring different mental health outcomes.

A further issue within this field that remains unanswered is how these attachment and connectedness relationships interrelate to predict mental health outcomes. According to Attachment Theory (Bowlby, 1969), the development of an internal working model in infancy will guide adolescent behaviour in new and ambiguous situations providing a foundation on which to base all further relationships (Bretherton & Munholland, 2008). Adolescents more securely attached to their parents are therefore predisposed to other more secure attachment relationships in the future, such as with peers and the schools they attend. If attachments remain stable, it could be hypothesized that parental attachment influences peer attachment and school connectedness, and it is these relationships that are associated with mental health.

There is dispute as to whether the influence parental attachment has upon mental health outcomes is direct or indirect, i.e. being mediated through attachment in another domain, (Shochet et al., 2008). There is some evidence for social relationships in one domain mediating the effects of social relationships in other domains. The relationship between poorer parental attachment and greater depressive symptoms is partially mediated by lower levels of school connectedness (Shochet et

Attachment Relationships Predicting Mental Health

al., 2008). The effects of poorer parental attachment upon drug use was also shown to be mediated by lower levels of school connectedness and involvement with friends who use drugs (Henry, 2008), and for female students, the relationship between more secure parental attachment and higher levels of life-satisfaction was partially mediated by more secure peer attachment (Ma & Huebner, 2008). Under certain circumstances, attachment variables may have an influence directly on mental health outcomes – however, in some cases the effect is mediated through another attachment or connectedness relationship. Further research would therefore be beneficial on the possible mediation effects of parental and peer attachment and school connectedness on mental health outcomes.

It is also possible that a moderation effect could exist within this field, i.e. that one attachment relationship could overcome or compensate for the negative effects associated with a different insecure attachment on a mental health outcome. Parental attachment, peer attachment and school connectedness may be independent from one another and operate across different ecological levels, with each relationship acting as an independent risk or protective factor, which ultimately impinges on adolescent mental health outcomes, and resilience. These relationships may well interact to predict developmental outcomes (Bronfenbrenner 2005), with a possibility of a more secure attachment within a particular ecological level moderating for an insecure attachment within a different level, and therefore compensating for the predicted negative effect on mental health.

The possibility of a moderation effect of attachment relationships or whether they are independent and function in an additive manner requires further research (Shochet et al., 2008). Wilkinson (2004) argues that adolescents may experience differences in security levels of their attachment and connectedness relationships and

Attachment Relationships Predicting Mental Health

those who report poorer attachment with their parents may turn to their peers (or even their school) to fulfil their attachment needs. Some studies have supported the moderation effect: for example, McElhane et al. (2006) found that attachment organisation could act as a moderator in the relationship between current friendship quality and delinquency. Nonetheless, Shochet et al. (2008) found no moderation effect between either parental attachment or school connectedness in overcoming depressive symptoms.

Current Study

In light of the preceding literature review, the aims of the current study were twofold: first, to investigate the concurrent influences of parental and peer attachment and school connectedness in predicting different indices of mental health (conduct problems, emotional difficulties and prosocial behaviour) during adolescence. Few studies have assessed the *relative* importance of each of these unique attachment/connectedness relationships on influencing *different* mental health constructs, and to our knowledge, parental attachment, peer attachment and school connectedness have not all been included together within a single study to predict conduct problems, emotional difficulties and prosocial behaviour.

Second, to investigate the interrelationship of different attachment and connectedness relationships and their influence on mental health outcomes: i.e. to assess how these variables work together and whether there is evidence of a mediation or moderation effect. Specifically, to assess whether the relationship that parental attachment has with mental health outcomes is mediated through peer attachment or school connectedness, and whether these relationships can compensate for the

Attachment Relationships Predicting Mental Health

possible detrimental effects insecure parental attachment may have upon mental health outcomes.

Analyses of influences on adolescent mental health must take into account the effects of age and gender as possible confounds. This is because males generally display more conduct related problems than females (Duchesne & Larose, 2007), with the inverse being true for emotional symptoms (Liu, 2006) and prosocial behaviour, (Laible et al., 2004). Research has also demonstrated that older adolescents display more delinquent type behaviours (Dornbusch, Erickson, Laird, & Wong, 2001) and emotional symptoms (Laible et al., 2000) than younger adolescents. Accordingly, within the present study these variables are added into the model as covariates.

Method

Design

The study utilised a cross-sectional, natural variation survey design. The explanatory variables were parent and peer attachment and school connectedness, with age and gender included as covariates. The response variables were three key indices of adolescent mental health: conduct problems, emotional symptoms and prosocial behaviour.

Sample

An opportunity sample of 203 adolescents attending a single mainstream high school in the North West of England took part in the research. The age range of the sample was 11 to 16 years, and comprised 108 male (M 13.18 years, SD 1.31) and 95 female participants (M 13.19 years, SD 1.20).

Materials

Attachment Relationships Predicting Mental Health

The *Inventory of Parent and Peer Attachment, Revised* (IPPA-R) is a self-report inventory that assesses adolescents' perceptions of their relationships with parents and peers (Gullone & Robinson, 2005). It contains 28 parent items, and 25 peer items rated on a three-point Likert scale (1- *never or almost never true*; 2- *sometimes true*; 3- *always or almost always true*). Participants respond to the parental attachment scale according to the parent who has the greatest perceived influence on them; and when answering the peer attachment questionnaire they were asked to provide answers regarding their best friend(s). A score is calculated for *trust* (10 parental items, 10 peer items), *communication* (10 parental items, 8 peer items) and *alienation* (8 parental items, 7 peer items) constructs separately, with a global attachment score calculated by adding *trust* and *communication* then subtracting *alienation*. The possible range of scores for the parental attachment scale is -4 to 52, and for peer attachment from -3 to 47, with higher scores indicating more secure attachments. Acceptable internal consistency of the instrument has been reported with Cronbach's Alpha values between .68 and .86 for parent and peer attachment across the three sub-domains (Gullone & Robinson, 2005). High construct validity has also been reported (Gullone & Robinson, 2005), and Armsden & Greenberg, (1987) demonstrated excellent test-retest reliability for parental attachment (.93) and peer attachment (.86.) at three weeks.

The *Psychological Sense of School Membership* (PSSM) is a self-report survey that assesses child and adolescent perceptions of attachment or connectedness to school (Goodenow, 1993). It contains 18 items rated on a five-point Likert scale (ranging from 1 - *not at all* to 5 - *completely true*). Scores are averaged across the 18 items and range from 1-5, with higher scores indicating a stronger sense of connectedness to school. The PSSM has been reported to have high internal

Attachment Relationships Predicting Mental Health

consistency (.88), and good test-retest reliability after 4 weeks ($r = .78$; Hagborg, 1998).

The *Strengths and Difficulties Questionnaire* (SDQ) is a widely used measure of adolescent mental health. The questionnaire can be used as a self-report for adolescents and measures three mental health constructs under investigation in this study: *conduct problems*, *emotional symptoms* and *prosocial behaviour*. Each construct is measured with 5 items rated on a three-point Likert scale (0 - *not true*; 1 - *somewhat true*; or 2 - *certainly true*). Total scores for each construct range from 0-10, with higher scores indicating more severe conduct problems, more severe emotional symptoms and greater levels of prosocial behaviour. Internal consistency across the different constructs of the SDQ and across different informants (self-report, teacher, parent) has been found to be satisfactory (Cronbach's Alpha mean of .73). Test-retest stability after 4 to 6 months was found to be .62 (Goodman, 2001).

Procedure

Randomly counterbalanced survey packs containing the IPPA-R, PSSM, and SDQ were distributed to participants during school form time¹ by the teacher. Students in groups of around 30 read the briefing instructions and signed a consent form to confirm willingness to participate. Participants were given approximately 30 minutes to complete the surveys. They were aware that this was a university study and the head teacher had agreed to act *in loco parentis*. Ethical approval for this study was granted by the Research Integrity Committee at the School of Education at the University of Manchester.

¹ Form time is the setting in which teachers record attendance and make announcements to pupils

Results

The descriptive statistics relating to participants' self-reported scores on parental and peer attachment and school connectedness, as well as conduct problems, emotional difficulties and prosocial behaviour (alongside normative values for these measures), are shown in Table 1.

<< Insert Table 1 here >>

Participants in the present study rated themselves as having more secure attachments with parents and peers, and poorer school connectedness compared with the normative values for these three constructs. There were also variations between the present study and the standardised norms on the measures of the mental health outcomes. Participants in the present study rated themselves as having more severe conduct problems and emotional difficulties and poorer prosocial behaviour compared with the normative values.

Bivariate correlations between the various explanatory and response variables are provided in Table 2. The degree of attachment security to parents and peers and the level of school connectedness were positively associated with prosocial behaviour, and inversely associated with conduct problems and emotional difficulties.

<<Insert Table 2 here >>

Hierarchical multiple regression analyses were carried out on the data in order to demonstrate how much variance in the dependent variables (conduct problems, emotional difficulties, prosocial behaviour) could be accounted for by the predictor variables (parental and peer attachment and school connectedness) after controlling for gender and age. For each of the subsequent models the demographic variables were added in step 1, with the attachment/ connectedness measures added in step 2, (see Table 3).

Attachment Relationships Predicting Mental Health

For model 1 (conduct problems) a significant model emerged in step 2, $F(5, 197) = 12.080, p < .001$. The R square value .235 indicates the predictors in the model account for 24% of the variance in conduct problems, indicative of a medium effect (Cohen, 1992). After controlling for the demographic variables, only parental attachment emerged as a significant predictor, with more secure parental attachments associated with decreases in conduct problems, (β $-.389, p < .001$).

For model 2 (emotional symptoms) a significant model emerged, $F(5, 197) = 4.976, p < .001$. The R square value .112 indicates the predictors in the model account for 11% of the variance in emotional symptoms, indicative of a small effect (Cohen, 1992). After controlling for the demographic variables, only parental attachment emerged as a significant predictor, with more secure parental attachments associated with decreases in emotional difficulties (β $-.243, p < .01$).

For model 3, (prosocial behaviour) a significant model emerged, $F(5, 197) = 17.357, p < .001$. The R square value .306 indicates the predictors in the model account for 31% of the variance in prosocial behaviour, indicative of a medium effect (Cohen, 1992). After controlling for the demographic variables, two significant predictors emerged: peer attachment and school connectedness. There was a relationship between more secure peer attachment (β $.224, p < .01$) and school connectedness (β $.187, p < .01$) and increases in prosocial behaviour. A comparison of the strength of predictors shows that peer attachment was the stronger of the two significant predictors in the model.

<< Insert Table 3 here >>

Mediation Analyses

In the current study the aim was to assess whether the relationship between parental attachment and mental health outcomes could be mediated by either peer

Attachment Relationships Predicting Mental Health

attachment or school connectedness. The mediation effects were assessed according to the principles recommended by Hayes (2013), and using the PROCESS macro for SPSS. This resulted in three mediational analyses: parental attachment was added as the independent variable (with gender and age being covariates); the mediators were peer attachment and school connectedness; the outcomes were conduct problems, emotional difficulties or prosocial behaviour.

The results revealed that only one significant mediation model emerged. After controlling for the effects of the demographic variables the relationship between parental attachment and prosocial behaviour was mediated by both peer attachment and school connectedness. As can be seen from table 4, parental attachment indirectly influenced prosocial behaviour through its effects on the mediator variables of peer attachment and school connectedness.

Higher levels of parental attachment were related to higher levels of peer attachment ($a^1 = 0.214, p < 0.001$) and school connectedness ($a^2 = 0.025, p < 0.001$). Higher levels of peer attachment ($b^1 = 0.058, p = 0.003$) and school connectedness ($b^2 = 0.609, p = 0.007$) were related to higher levels of prosocial behaviour, whilst controlling for parental attachment.

A bias-corrected bootstrap confidence interval for the indirect effects of peer attachment ($ab^1 = 0.013$) and school connectedness ($ab^2 = 0.151$), both based on 10,000 bootstrap samples, was entirely above zero (0.004 – 0.025) for peer attachment and for school connectedness (0.024 – 0.033), indicating a significant mediation effect. There was no evidence that parental attachment influenced prosocial behaviour directly when accounting for the effects peer attachment and school connectedness. ($c' = 0.007, p = 0.637$).

<< Insert Table 4 here >>

Moderation Analysis

The final set of analyses aimed to test for a moderation effect - moderator variables affect the strength of the relationship between the independent variable and the outcomes variable. Therefore by increasing the strength of the moderator variable (i.e. peer attachment or school connectedness) the initial relationship observed between the independent variable (parental attachment) and the outcome (mental health) would change.

In the current study, the aim was to assess whether poor parental attachment (which was hypothesised to predispose an individual to more negative mental health outcomes) could be moderated by either more secure peer attachment or more secure school connectedness. In order to test for moderation effects the procedures were undertaken in accordance with the principles set out by Hayes (2013) and using the PROCESS macro for SPSS. Three moderation analyses were conducted: in each case parental attachment was the independent variable (with gender and age added as covariates); the moderators were peer attachment and school connectedness; and the outcome was conduct problems, emotional difficulties or prosocial behaviour. Within each model the interaction effects were non-significant. This indicates that improving peer attachment or school connectedness does not overcome the negative influences on mental health associated with an insecure parental attachment relationship.

Discussion

The results demonstrate that more secure parental and peer attachment and a greater sense of school connectedness significantly correlated with lower levels of conduct problems and emotional difficulties, and enhanced prosocial behaviour.

Attachment Relationships Predicting Mental Health

When all attachment domains were included within a multiple regression model, only more secure parental attachment was associated with less severe conduct problems and emotional difficulties (peer attachment and school connectedness were non-significant within these models). More secure peer attachment and greater levels of school connectedness was associated with heightened levels of prosocial behaviour (with peer attachment being the most powerful), whereas parental attachment was non-significant within this model. The mediation analyses revealed two significant results – peer attachment and school connectedness both mediated the relationship between parental attachment and prosocial behaviour. No evidence of a moderation effect on any variable was found.

The current study supports the commonly held view that more insecure parental, and peer attachments and lower school connectedness are associated with higher levels of conduct problems, emotional difficulties and better prosocial behaviour in adolescence (Allen, et al., 2007; Anderman, 2002; Laible et al., 2000). However, when these attachments are included in the same regression model not all of them are associated with the mental health outcome in a direct manner. Only parental attachment was significantly associated with conduct problems and emotional difficulties. This study therefore supports the view of the salience of parental attachment when exploring conduct problems and emotional difficulties and is in agreement with a number of other studies within this area (e.g. Allen et al., 2007; Formoso et al., 2000). Peer attachment and school connectedness were non-significant predictors in these models, and their effects diminish in the presence of parental attachment. This evidence is at odds with previous research arguing for the importance of these relationships in predicting mental health outcomes, (Laible et al., 2000; McElhaney et al., 2006; Shochet et al., 2008). The disparity in findings here

Attachment Relationships Predicting Mental Health

may reflect the fact that different attachment and connectedness domains were included within these studies. Nevertheless, it is the authors' contention that in order to achieve a reliable estimate of how attachment and connectedness relationships influence mental health, it is important to include parental and peer attachment and school connectedness within the same study.

The current research demonstrated that both peer attachment and school connectedness, but not parental attachment, significantly contributed to the explained variance in prosocial behaviour for adolescents. This is a surprising finding, although it resonates with Laible et al. (2004) who suggested that peer relationships (unlike parental relationships) are based upon more equality and reciprocity, which in turn lead to increased opportunities for perspective taking and the development of empathetic skills. This proposed pathway could therefore account for the findings within the prosocial model. Importantly, school connectedness also contributed to explaining variance in prosocial behaviour, and this is supportive of research demonstrating that those with a higher sense of school connectedness are more likely to engage in prosocial behaviours (e.g. Diaz, 2005).

The mediation analyses revealed that the relationship first observed between parental attachment and prosocial behaviour is in fact mediated by peer attachment and school connectedness. This suggests that a certain amount of the influence that parental attachment has upon prosocial behaviour in adolescence is indirect, and that part of it can be explained by peer attachment and school connectedness relationships. This evidence provides support for a number of previous studies which have demonstrated that attachment and connectedness relationships can - and do - act as mediators between a different attachment and connectedness relationship and mental health outcomes, (Ma & Huebner, 2008; Shochet et al., 2008). Although these studies

Attachment Relationships Predicting Mental Health

did not investigate the same variables as the present study, taken together they illustrate the importance of considering possible mediational effects within attachments. In the moderation analyses no significant effects were noted, suggesting that deficiencies in parental attachment for an adolescent cannot be overcome, or compensated for, by social relationships in different domains.

Limitations and Ideas for Further Study

The use of a correlational design in this study means it is not possible to determine the direction of the effects observed. Secure attachments were related to better mental health; however it is not clear whether poorer attachment preceded problem behaviour, or whether those who displayed poorer mental health found it more difficult to form attachment relationships. Some researchers have suggested that the relationships between attachment security and mental health are bi-directional (Laible, 2007), although longitudinal studies are needed to substantiate this claim. In a similar vein, the non-probability sampling technique used in this study means that generalization can only be cautiously inferred. Therefore, future research should aim to use a probability sample to explore whether these findings can be replicated.

This study utilised self-report measures for data collection. While these measures are commonly used to assess attachment relationships (Shochet, et al. 2008), they can be open to reporting bias. This may have been an issue in the present study where normative values for the attachment constructs measured were fairly different from the current study's sample. In some cases these difference equated to large effect sizes (i.e. for parental attachment and school connectedness), although this may in fact reflect the relatively small sample sizes used in the normative values for the IPPA-R (n=163) and PSSM (n= 454).

Attachment Relationships Predicting Mental Health

Finally, despite being beyond the scope of the present study, using a multi informant approach, which includes teacher, peer and parental reports across multiple school contexts, would add value to the research base.

A number of conceptual criticisms have emerged surrounding the legitimacy of the attachments and school connectedness measured. Parental and peer attachment have been criticised for not being true attachment relationships, as they are not necessarily dyadic in nature (Bowlby, 1969). Parental attachment may encompass two distinct dyadic relationships (i.e. an individual's relationship with his/her father and mother); and peer attachment may involve more than an individual's relationship with a single best friend, to include the relationships with all peers. In an attempt to minimise any potential biases the present study provided instructions to participants to answer for the parent that most influenced them and their best friend. There is also considerable debate in the literature regarding school connectedness in terms of problems in its measurement and definition (Hill & Werner, 2006). Doubts have been raised whether school connectedness is actually measuring an adolescent's connectedness to education in general over the specific school they attend (Johnson et al., 2006). Clearly a sense of connectedness to a school is qualitatively different from the relationships an adolescent forms with either parents or peers. Nonetheless, schools play a significant part in the life of adolescents, and the relationship they have with their place of study involves a meaningful connection and sense of belonging (Diaz, 2005).

Implications

The present study has found that an adolescent's attachment to parents, peers and sense of connectedness to their school is significantly associated with mental

Attachment Relationships Predicting Mental Health

health outcomes. This study adds to the relatively sparse literature in the area and highlights the importance of acknowledging multiple attachment and connectedness relationships beyond infancy that influence mental health outcomes.

The implications that arise from this study need to be considered in light of the fact the current study adopted a cross sectional design, where the direction of the relationship between the social relationships explored and mental health outcomes cannot be inferred. Further longitudinal research would add weight to the potential implications arising from this study.

Different attachment relationships - although related - are likely to influence adolescent mental health in distinct ways in terms of the display of conduct problems, emotional difficulties and prosocial behaviour. Therefore, intervention strategies should be tailored to specific areas. For example, as the relationship between adolescent parental attachment and both conduct problems and emotional problems is strong, attempts should be made to provide parents with the tools needed to enable them to become a more effective support for their child. Attachment Based Family Therapy (Diamond Siqueland & Diamond, 2003) is an intervention which aims to improve perspective taking and problem solving abilities (characteristics of secure attachment relationships) and has been well validated (*ibid.*), and so could be promoted for the families of adolescents struggling in this area.

Peer attachment and school connectedness were particularly associated with higher levels of prosocial behaviour in adolescents. Schools should therefore encourage strong peer relationships by promoting group work, cooperative working, peer tutoring, and activities that involve students working together. Interventions such as Promoting Alternative Thinking Strategies (PATHS; Kam, Greenberg & Kusche, 2004) could potentially be beneficial in this regard. Improving the quality of the

Attachment Relationships Predicting Mental Health

relationships between the adolescent and school staff, creating or promoting a caring and supportive community, and encouraging extra-curricular activities would also help to improve an adolescent's sense of connectedness to school.

As no moderation effects were realised for either peer attachment or school connectedness, interventions should be tailored at each of these domains of social relationship, with the aim of improving mental health outcomes.

Conclusions

The goal of the present study was to investigate the individual and combined relationships that parental and peer attachment and school connectedness have upon adolescent mental health. The findings in this study demonstrated that adolescents who have more secure relationships with parents, peers and schools experience a range of better mental health outcomes. It is therefore more likely that these individuals will be able to fulfil their potential and play a more positive role in society. In establishing such findings the present study provides more evidence for the importance of forming multiple secure attachments and connectedness relationships during adolescence.

Acknowledgements

The authors have declared that they have no competing or potential conflicts of interest. All authors share responsibility for the final version of the work and attest to integrity and accuracy of data analysis. No external funding was utilised for this study.

References

- Allen, J. P. (2008). The attachment system in adolescence. In J. Cassidy & P. Shaver (Eds), *Handbook of attachment: Theory research and clinical applications*, (2nd ed), (pp. 419-435). London: Guilford Press.
- Allen, J. P, Porter, M., McFarland, C, McElhaney, K. B. & Marsh, P. (2007). The relation of attachment security to adolescents' paternal and peer relationships, depression, and externalizing behavior. *Child Development*, 78, 1222 – 1239.
- Anderman, E. M. (2002). School effects on psychological outcomes during adolescence. *Journal of Educational Psychology*, 94, 795-809.
- Armsden, G. C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological wellbeing in adolescence. *Journal of Youth & Adolescence*, 16, 427–454.
- Arthur, M. W., Hawkins, J. D., Pollard, J. A., Catalano, R. F., & Baglioni, A. J. J. (2002). Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors. *Evaluation Review*, 26, 575– 601.
- Becker, B. E., & Luthar, S. S. (2002). Social emotional factors affecting achievement outcomes among disadvantaged students: Closing the achievement gap. *Educational Psychologist*, 37, 197-214.
- Bowlby, J. (1969). *Attachment and loss: Vol I. Attachment*. London: Pimlico.
- Bretherton, I., & Munholland, K. A. (2008). Internal working models in attachment relationships: Elaborating a central construct. In J. Cassidy & P. Shaver (Eds), *Handbook of Attachment: Theory Research and Clinical Applications*, (2nd ed), (pp. 102-127). London: Guilford Press.

Attachment Relationships Predicting Mental Health

- Bronfenbrenner, U. (2005). *Making human beings human: Biological perspectives on human development*. London: Sage.
- Cohen, J. (1992). Quantitative methods in psychology: A power primer. *Psychological Bulletin*, *112*, 155-159.
- Colman, I., Murray, J., Abbott, R., Maughan, B., Kuh, D., Croudace, T., & Jones, P. (2009). Outcomes of conduct problems in adolescence: 40-year follow-up of national cohort. *British Medical Journal*, *338*, 1-10.
- Diamond, G., Siqueland, L., & Diamond, G. M. (2003). Attachment-based family therapy for depressed adolescents: Programmatic treatment development. *Clinical Child & Family Psychology Review*, *6*, 107-128.
- Diaz, J. D. (2005). School attachment among Latino youth in rural Minnesota. *Hispanic Journal of Behavioral Sciences*, *27*, 300-318.
- Dornbusch, S. M., Erickson, K. G., Laird, J., & Wong, C. A. (2001). The relation of family and school attachment to adolescent deviance in diverse groups and communities. *Journal of Adolescent Research*, *16*, 396-422.
- Duchesne, S., & Larose, S. (2007). Adolescent parental attachment and academic motivation and performance in early adolescence. *Journal of Applied Social Psychology*, *37*, 1501-1521.
- Formoso, D., Gonzales, N. C., & Aiken, L. S. (2000). Family conflict and children's internalizing and externalizing behavior: Protective factors. *American Journal of Community Psychology*, *28*, 175-199.
- Frey, A., Ruchkin, V., Martin, A., & Schwab-Stone, M. (2009). Adolescents in transition: School and family characteristics in the development of violent behaviors entering high school. *Child Psychiatry & Human Development*, *40*, 1-13.

Attachment Relationships Predicting Mental Health

- Goodenow, C. (1993). The psychological sense of school membership among adolescents: Scale development and educational correlates. *Psychology in the Schools, 30*, 79–90.
- Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire (SDQ). *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1337-1345.
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology & Psychiatry, 38*, 581-586.
- Govender, K., Naicker, S., Meyer-Weitz, A., Fanner, J., Naidoo, A., & Penfold, W. (2013). Associations between perceptions of school connectedness and adolescent health risk behaviors in South African high school learners. *Journal of School Health, 83*, 614 – 622.
- Gullone, E., & Robinson, K. (2005). *The inventory of parent and peer attachment-revised (IPPA-R) for children: A psychometric investigation. Clinical Psychology & Psychotherapy, 12*, 67-79.
- Hagborg, W. J. (1998). An investigation of a brief measure of school membership. *Adolescence, 33*, 461-468.
- Hayes, A. F. (2013). *Introduction to mediation, moderation and conditional process analysis: A regression-based approach*. London: The Guildford Press.
- Henry, K. L. (2008). Low prosocial attachment, involvement with drug-using peers, and adolescent drug use: A longitudinal examination of mediational mechanisms. *Psychology of Addictive Behaviour, 22*, 302-308.
- Hill, L. G., & Werner, N. E. (2006). Affiliative motivation, school attachment and aggression in school. *Psychology in the Schools, 43*, 231-246.

Attachment Relationships Predicting Mental Health

- Johnson, M. K., Crosnoe, R., & Thaden, L.L. (2006). Gendered patterns in adolescent's school attachment. *Social Psychology Quarterly*, 69, 284-295.
- Kam, C. M., Greenberg, M. & Kusche, C. (2004). Sustained effects of the PATHS curriculum on the social and psychological adjustment of children in social and psychological adjustment of children in special education. *Journal of Emotional & Behavioral Disorders*, 12, 66-78.
- Laible, D. J., Carlo, G., & Raffaelli, M. (2000). The differential relations of parent and peer attachment to adolescent adjustment. *Journal of Youth & Adolescence*, 29, 45-59.
- Laible, D. J., Gustavo, C., Roesch, S. C. (2004). Pathways to self-esteem in late adolescence: The role of parents and peer attachment, empathy and social behaviours. *Journal of Adolescence*, 27, 703-716.
- Laible, D. (2007). Attachment with parents and peers in late adolescence: Links with emotional competence and social behaviour. *Personality & Individual Differences*, 43, 1185-1197.
- Liu, Y. (2006). Paternal/maternal attachment, peer support, social expectation of peer interaction, and depressive symptoms. *Adolescence*, 41, 705-721.
- Loukas, A., Ripperger-Suhler, K., & Horton, K., (2009). Examining temporal associations between school connectedness and early adolescent adjustment. *Journal of Youth and Adolescence*, 38, 804-812.
- Ma, C. Q., & Huebner, E. S. (2008). Attachment relationships and adolescents' life satisfaction: some relationships matter more to girls than boys. *Psychology in the Schools*, 45, 177-190.

Attachment Relationships Predicting Mental Health

- McElhaney, K. B., Immele, A., Smith, F.D., & Allen J. P. (2006). Attachment organization as a moderator of the link between friendship quality and adolescent delinquency. *Attachment & Human Development*, 8, 33 – 46.
- Millings, A., Buck, R., Montgomery, A., Spears, M., & Stallard, P. (2012). School connectedness, peer attachment, and self-esteem as predictors of adolescent depression. *Journal of Adolescence*, 35, 1061-1067.
- Nickerson, A. B., & Nagle, R. J. (2005). Parent and peer attachment in late childhood and early adolescence. *The Journal of Early Adolescence*, 25, 223-249.
- Scott, S., Knapp, M., Henderson, J., & Maughan, B. (2001). Financial cost of social exclusion: Follow up study of antisocial children into adulthood. *British Medical Journal*, 323, 191.
- Shochet, I. M., Homel, R., Cockshaw, W. D., & Montgomery, D. T. (2008). How do school connectedness and attachment to parents interrelate in predicting adolescent depressive symptoms? *Journal of Clinical Child & Adolescent Psychology*, 37, 676-681.
- Steinberg, L. (2005). *Adolescence*. New York: McGrawHill.
- Wilkinson, R. B. (2004). The role of parental and peer attachment in the psychological health and self-esteem of adolescents. *Journal of Youth and Adolescence*, 33, 79–493.
- Wilkinson, R. B. (2008). Development and Properties of the Adolescent Friendship Attachment Scale. *Journal of Youth Adolescence*, 37, 1270–1279.
- Youthinmind (n.d.). *Information for researchers and professionals about the strengths and difficulties questionnaire*. Retrieved from <http://www.sdqinfo.org> accessed June 2014.

Attachment Relationships Predicting Mental Health

Zeifman, D., & Hazan, C. (2008). Pair bonds as attachments: reevaluating the evidence. In J. Cassidy & P. Shaver (Ed's), *Handbook of Attachment: Theory Research and Clinical Applications*, (2nd edn), (pp. 436–455). New York: Guildford Press.

Attachment Relationships Predicting Mental Health

Table 1. Mean and Standard Deviations for Explanatory and Response Variables with Standardised Norms and Effect Size Comparisons.

Measure	Variable	Range of possible scores	Present Study <i>M (SD)</i> (<i>n</i> = 203)	Norms <i>M (SD)</i>	Effect size ² difference (Cohen's <i>d</i>)
IPPA-R	Parental Attachment	-4 - 52	35.56 (9.14)	21.70 (8.71) ³	1.55 (Large)
	Peer Attachment	-3 - 47	29.85 (8.13)	26.45 (7.94)	0.42 (Small)
PSSM	School Connectedness	1-5	3.24 (0.65)	3.86 (0.72) ⁴	0.90 (Large)
SDQ	Conduct Problems	0-10	3.41 (1.86)	2.2 (1.7) ⁵	0.68 (Medium)
	Emotional difficulties	0-10	3.81 (2.26)	2.8 (2.1)	0.46 (Small)
	Prosocial behaviour	0-10	6.61 (2.11)	8.0 (1.7)	0.73 (Medium)

² Effect size differences were calculated using Cohen's *d*, between current sample descriptive statistics and norms for these questionnaires. According to Cohen (1992) ≥ 0.20 equates to a small effect, ≥ 0.5 to a medium effect and ≥ 0.8 to a large effect

³ Sample norms as reported by Gullone & Robinson, (2005); *n* = 163

⁴ Sample norms as reported by Goodenow, (1993); *n* = 454

⁵ Sample norms as reported by Youthmind, (n.d.) <http://www.sdqinfo.org>; *n*=4228

Attachment Relationships Predicting Mental Health

Table 2. Bivariate Correlations between Explanatory and Response Variables in the Current Study.

	1	2	3	4	5	6	7	8
1. Parental Attachment	-	.305**	.306**	-.451**	-.242**	.232**	-.149*	.169*
2. Peer Attachment	-	-	.406**	-.292**	-.128*	.444**	.014	.463**
3. School Connectedness	-	-	-	-.239**	-.149*	.334**	-.085	.126
4. Conduct Problems	-	-	-	-	.315**	-.178*	.047	-.199**
5. Emotional Difficulties	-	-	-	-	-	.153*	-.129	.065
6. Prosocial behaviour	-	-	-	-	-	-	-.116	.426**
7. Age	-	-	-	-	-	-	-	.002
8. Gender (Male -0; Female -1)	-	-	-	-	-	-	-	-

* = $p < .05$, ** = $p < .01$.

Attachment Relationships Predicting Mental Health

Table 3: Hierarchical Multiple Regression Models Assessing the Effects of Attachment Variables upon Mental Health Outcomes

Model 1: Conduct Problems			Model 2: Emotional Difficulties			Model 3: Prosocial Behaviour		
Predictor variables	ΔR^2	⁶ β	Predictor variables	ΔR^2	β	Predictor variables	ΔR^2	β
Step 1	0.042*			0.021			0.195***	
Gender		-0.199***	Gender		0.065	Gender		0.426***
Age		0.048	Age		-0.129	Age		-0.117
Step 2	0.193***			0.091***			0.111***	
Parental Attachment		-0.389***	Parental Attachment		-0.243**	Parental Attachment		0.031
Peer Attachment		-0.126	Peer Attachment		-0.106	Peer Attachment		0.224**
School Connectedness		-0.038	School Connectedness		-0.051	School Connectedness		0.187**
Total R^2	0.235***			0.112***			0.306***	

* = $p < .05$, ** = $p < .01$, *** = $p < .001$

⁶ Statistics reported are standardised beta values

Attachment Relationships Predicting Mental Health

Table 4: Regression Coefficients, Standard Errors, and Model Summary information for the mediator model of peer attachment and school connectedness on prosocial behaviour.

Antecedent	Consequent								
	<i>M</i> ¹ (Peer Attachment)			<i>M</i> ² (School Connectedness)			<i>Y</i> (Prosocial Behaviour)		
	<i>Coeff</i>	<i>SE</i>	<i>p</i>	<i>Coeff</i>	<i>SE</i>	<i>p</i>	<i>Coeff</i>	<i>SE</i>	<i>P</i>
Constant	14.856	5.874	0.012	2.552	0.508	< 0.001	4.266	1.592	0.008
X (Parental Attachment)	0.214	0.055	< 0.001	0.025	0.005	< 0.001	0.007	0.015	0.637
<i>M</i> ¹ (Peer Attachment)	-	-	-	-	-	-	0.058	0.019	0.003
<i>M</i> ² (School Connectedness)	-	-	-	-	-	-	0.609	0.222	0.007
Gender	6.868	0.999	< 0.001	0.087	0.086	0.314	1.240	0.284	< 0.001
Age	0.316	0.340	0.427	-0.017	0.034	0.622	-0.168	0.102	0.101
	<i>R</i> ² = 0.270 <i>F</i> (3, 199) = 24.514, <i>p</i> < 0.001			<i>R</i> ² = 0.139 <i>F</i> (3, 199) = 10.705, <i>p</i> < 0.001			<i>R</i> ² = 0.306 <i>F</i> (5, 197) = 17.357, <i>p</i> < 0.001		