



The quality of parent/child relationships in adolescence is associated with poor adult psychosocial adjustment



Alessandra Raudino, David M. Fergusson*, L. John Horwood

Christchurch Health and Development Study, Department of Psychological Medicine, University of Otago, Christchurch, PO Box 4345, Christchurch, New Zealand

A B S T R A C T

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This study used data gathered over the course of a New Zealand longitudinal study ($N = 924$) to examine the relationships between measures of parental bonding and attachment in adolescence (age 15–16) and later personal adjustment (major depression; anxiety disorder; suicidal behaviour; illicit drug abuse/dependence; crime) assessed up to the age of 30. Key findings included: 1) There were significant ($p < 0.05$) and pervasive associations between all measures of attachment and bonding and later outcomes. 2) Structural equation modelling showed that all measures of bonding and attachment loaded on a common factor reflecting the quality of parent/child relationships in adolescence. 3) After adjustment for covariates there were modest relationships ($\beta = 0.16$ – 0.17) between the quality of parent/child relationships in adolescence factor and later adjustment. The study findings suggest that the quality of parent/child relationships in adolescence is modestly related to later psychosocial functioning in adulthood.

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There has been long-standing interest into the associations between parental bonding and attachment in childhood and subsequent mental health and adjustment (Allen, Moore, Kuperminc, & Bell, 1998; Blatt, Wein, Chevron, & Quinlan, 1979; Bowlby, 1977; Hagerty, Williams, Coyne, & Early, 1996; Henderson, 1977; Lyons-Ruth, 1996). A growing body of evidence suggests that children and young people who are exposed to impaired parental relationships are at increased risks of a wide range of adverse outcomes including anxiety, depression, and antisocial personality (Armsden, McCauley, Greenberg, Burke, & Mitchell, 1990; Enns, Cox, & Clara, 2002; Papini & Roggman, 1992; Reti et al., 2002; Ying, Lee, & Tsai, 2007). These findings are consistent with a body of theorising that dates back to Bowlby (1969, 1973, 1980) that the nature and quality of attachment experiences in childhood are important determinants of the individual's longer term mental health and personal adjustment.

Attachment theory as developed by John Bowlby (1969, 1973, 1980) and Mary Ainsworth and colleagues (Ainsworth, Blehar, Waters, & Wall, 1978) postulates that children and adolescents who experience parenting which adequately meets their emotional or physical needs will develop internal representations of self and others as safe and available. The following mechanisms and processes are theorised as leading to the associations between childhood/adolescent attachment and poor mental health outcomes. Firstly developing attachment bonds help individuals in predicting and understanding their environment, engaging in relationships and establishing a psychological sense of security (Bretherton, 1985; Sroufe & Waters, 1977). Consequently Bowlby hypothesised that early parent–child relationships are prototypes of later relationships; in the course of development, individuals develop internal representations of themselves and others which forecast and organise subsequent interpersonal behaviours (George & West, 2001). Bowlby called these mental representations “working models”; they represent cognitive/affective constructs which develop in the course of behavioural interactions between the infant/child and his/her parents and act as “prototypes” for future relationships. Therefore they have been conceptualised as stable constructs which

* Corresponding author. Tel.: +64 3 372 0406; fax: +64 3 372 0407.
E-mail address: dm.fergusson@otago.ac.nz (D.M. Fergusson).

influence long term expectations, strategies, and behaviours. While attachment behaviours are largely situational, the attachment bond exists consistently over time, which in turn explains why adult behaviours can be viewed as a product of early parent–child attachment experiences. Following this idea, beyond infancy attachment relations come to be governed by internal working models that young individuals construct from the experienced interaction patterns with their principal attachment figures.

According to Bowlby, early successful attachment becomes organised into complex social behaviours. Securely early attached adolescents will be able to engage in social relationships, to make friends and to eventually attain physical intimacy.

The instruments that have been used most frequently to assess bonding and attachment in adolescents are the Parental Bonding Instrument (PBI) developed by Parker et al. (1979) and the Inventory of Parent and Peer Attachment (IPPA) developed by Armsden and Greenberg (1987b).

The Parental Bonding Instrument (PBI) is a 25 item questionnaire which provides a retrospective measure of parental attitudes and behaviours during childhood, self-reported by adolescents. These reports are represented by two factors described as Care and Over-protection. The care factor measures the extent of affection and warmth in the parent–child relationship. The over-protection factor describes the extent of controlling, over-protective behaviours by the parent.

The Parental Attachment section of the IPPA is a 28 item self report of the quality of current parent/child relationships designed to be completed by adolescents. The measure includes three subscales of communication, trust and alienation.

Both the PBI and IPPA have predictive validity for a wide range of outcomes. For example, research investigating the association between the Parental Bonding Instrument (PBI) and mental health in clinical samples reports associations between parental care/over-protection and: anxiety disorders (Faravelli et al., 1991; Silove, Parker, Hadzi-Pavlovic, Manicavasagar, & Blaszczyński, 1991; Wiborg & Dahl, 1997); drug dependency (Torresani, Favaretto, & Zimmermann, 2000); eating disorders (Sordelli, Fossati, Devoti, La Viola, & Maffei, 1996); behavioural problems and delinquency (Mak, 1994; Rey & Plapp, 1990); schizophrenia (Parker, Johnston, & Hayward, 1988; Winther Helgeland & Torgersen, 1997); anti-social personality (McCord, 1978; Reti et al., 2002); depression (Joyce, 1984; Lizardi & Klein, 2005; Parker et al., 1979); borderline personality disorders (Zweig-Frank & Paris, 1991); and substance abuse and suicidal ideation (Martin & Waite, 1994). While most of the previous studies have measured the effect of parental bonding on mental health in clinical populations, some studies have used the PBI in community-based samples. For example, Neale et al. (1994), Sakado et al. (2000) and Enns et al. (2002) confirmed the association between the two bonding dimensions and adult psychopathology.

Similarly, research using the Inventory of Parent and Peer Attachment (IPPA) has found associations between poor quality parental attachment and risks of clinical depression (Milne & Lancaster, 2001; Wilkinson & Walford, 2001), suicidal ideation and anxiety (Armsden et al., 1990) and low self-esteem (Papini & Roggman, 1992). For example, Vivona (2000), in a community based US sample of 173 undergraduate students, showed that ambivalent and avoidant attached adolescents reported higher rates of depression and anxiety than the securely attached group; furthermore negative attachment styles were associated with poorer adjustment and lower intimacy development for women. IPPA dimensions have also been found to be associated with a number of personality variables in late adolescence and adulthood (Armsden, 1986; Armsden & Greenberg, 1987a; Rice, FitzGerald, Whaley, & Gibbs, 1995).

While there is a growing body of research suggesting that various dimensions of bonding and attachment are predictive of later mental health and other outcomes, there has been a lack of research which has examined the combined effects of different measures. To the extent that the subscales of the PBI and IPPA represent overlapping and correlated dimensions of the quality of parent/child relationships, it could be hypothesised that: a) the various subscales of the PBI and IPPA are indicators of a more general factor representing the overall quality of parent/child relationships; b) this general factor mediates the associations between the sub-tests of the PBI and IPPA and the various outcomes reviewed above.

In this paper we use data gathered over the course of a 30 year longitudinal study:

1. To examine the relationships between measures of bonding/attachment assessed at 15–16 years using both the PBI and the IPPA and measures of depression, anxiety, suicidal behaviours, property/violent offending and illicit drug abuse/dependence assessed up to the age of 30. The aims of this component of the research are to confirm the findings reported in the studies reviewed above.
2. To develop a general structural equation model of the linkages between measures of attachment and bonding gathered in adolescence and later adjustment. The aims of this component of the research are to examine the extent to which associations between measures of attachment and bonding reflect a more general dimension of quality of parent child relationships which mediates the associations between the specific childhood measures and later outcomes.
3. To extend the general structural equation model to adjust associations between parent/child bonding and attachment in childhood and later outcomes for important sources of confounding including: childhood socio-economic background; family functioning; child abuse and individual factors. There is extensive evidence to suggest that all of these factors are related to future mental health and thus may confound any association between parent child bonding/attachment and later outcomes.

Method

Participants

The data were gathered as part of the Christchurch Health and Development Study, a longitudinal study of a birth cohort of 1265 children born in the Christchurch (New Zealand) urban region during a 4-month period in mid-1977. This cohort has

been studied at birth, 4 months, 1 year, at annual intervals to age 16 years, and at ages 18, 21, 25 and 30 years. A detailed description of the study and an overview of study findings can be found in Fergusson, Horwood, Shannon, and Lawton (1989) and Fergusson and Horwood (2001). All phases of the study have been subject to ethical approval from the Canterbury (New Zealand) Regional Ethics Committee, and participants have given informed consent to participate in all aspects of the study. The present analysis is based on the sample of 924 participants (males $N = 449$ and females $N = 475$) who were assessed on measures of bonding/attachment at age 15–16 years and on later adjustment outcomes to age 30. This sample represented 75% of the surviving cohort at age 30.

Measures of parental bonding/attachment

Parental bonding (16 years)

At age 16 sample members were questioned about their relationship with their parents using the Parental Bonding Instrument (PBI) (Parker et al., 1979). This 25-item scale assesses two broad domains of parenting: parental care and parental over-protection. The Parental Care dimension measures variations in parent affection, emotional warmth, empathy and closeness. The Over-control dimension assesses variations in parental control, overprotection, intrusion, excessive contact, infantilization. Scale reliabilities were: maternal care ($\alpha = 0.89$), paternal care ($\alpha = 0.91$), maternal over-protection ($\alpha = 0.85$) and paternal over-protection ($\alpha = 0.87$). For the purposes of the present analysis, measures of maternal and paternal care and measures of maternal and paternal over-protection were averaged respectively to create two overall scores of parental care and over-protection.

Parental attachment (15 years)

At age 15, participants were interviewed about the quality of their relationship with their parents using the parental attachment scale of the Inventory of Parent and Peer Attachment (IPPA) (Armsden & Greenberg, 1987b). This 28-item measure comprises three subscales measuring: parental communication, trust and alienation. The trust dimension measures variations in respect for the parent and perceptions of parental reliability. The communication dimension assesses the nature and quality of parent/child interaction. The alienation dimension assesses the closeness of the parent/child relationship.

All items were rated on a three-point scale (doesn't apply, applies somewhat, definitely applies). A total parental attachment score was computed by first reverse scoring the alienation items and then summing the total item set. The reliability of the resulting scale was $\alpha = 0.87$. Previous research has shown the IPPA has good test–retest reliability and convergent validity with similar scales (Armsden & Greenberg, 1987b; Nada Raja, McGee, & Stanton, 1992; Paterson, Pryor, & Field, 1995).

Adult psychosocial adjustment

At age 25 and 30 years, participants were interviewed about their psychosocial adjustment over the period since the previous assessment. This interview combined a range of standardised assessment tools and custom written survey items to assess the following outcomes over the periods 21–25 years and 25–30 years respectively.

Depression

Items from the Composite International Diagnostic Interview (CIDI) (World Health Organization, 1993) were used to assess DSM-IV symptom criteria for major depression over each interview period. Using these data participants were classified on a 3-level ordinal measure reflecting the severity of depressive symptomatology over each interview period. This classification was: participant reported no depressive symptoms; participant reported depressive symptoms but did not meet diagnostic criteria for a major depressive episode; participant met criteria for major depression in the interview period.

Anxiety disorder

CIDI items were used to assess diagnostic criteria for a range of DSM-IV anxiety disorders including: generalised anxiety disorder, social phobia, specific phobia, panic disorders, and agoraphobia. A measure of the severity of anxiety disorder for each interview period was constructed based on a count of the number of anxiety disorders for which the participant met diagnostic criteria during the interview period.

Suicidal behaviours

Participants were questioned using custom written survey items about the extent and nature of any suicidal thoughts or suicide attempts. This information was used to classify participants on a 3-level measure reflecting the severity of suicidal behaviours for each interview period: no suicidal thoughts; suicidal ideation only; suicide attempt.

Criminal offending

Sample members were questioned about their criminal offending since the previous assessment using the Self Report Delinquency Inventory (Elliott & Huizinga, 1989) supplemented by custom written survey items. A measure of the severity of offending behaviour over each interview period was constructed based on a count of the number of property or violent offences reported by the participant in that interval. Property offences included: burglary, theft, vandalism, fire setting and related activities. Violent offences included: physical/sexual assault, threats of violence, fighting and related activities.

Illicit drug abuse/dependence

Sample members were questioned about their use of cannabis and other illicit drugs. As part of this questioning CIDI items were used to assess DSM-IV diagnostic criteria for illicit drug abuse and dependence. These data were used to classify participants on a 3-point scale reflecting the severity of illicit drug abuse/dependence over each interview period. This classification was: no drug use disorder; illicit drug abuse only; illicit drug dependence.

Covariates

The covariates used in the analysis were selected on the grounds that: a) they were statistically associated with one or more measures of parent/child attachment and bonding b) they were known to be predictors of future psychosocial outcomes from previous research. Covariate factors were divided into 4 domains: *Childhood socio-economic background* (including measures of parental education, family socio-economic status and family living standards); *Family functioning* (including measures of changes of parents from birth to age 16 and a composite score reflecting parental adjustment problems); *Child abuse* (including sexual and physical abuse) and *Child individual characteristics* (including measures of the child cognitive ability, childhood anxiety/withdrawal and childhood conduct problems) (see the online [Appendix A](#) for a more detailed description of these measures).

Statistical methods

Bivariate associations. Associations between the observed measures of bonding/attachment and later psychosocial adjustment outcomes (Table 1) were tested for statistical significance using Mantel–Haenszel chi square test for linear trend. In each case the strength of the observed association was summarised by the Pearson correlation between the observed measure and the outcome. In all cases there was evidence of significant linear associations between the measures of bonding/attachment and later outcomes. For purposes of data display the measures of attachment and bonding in Table 1 were divided into quintiles. For all other analyses the continuously scored measures were used.

Structural equation modelling (SEM). A structural equation model in which the associations between measures of bonding/attachment measured in adolescence and later outcomes were mediated by a latent factor representing the overall quality of parent child relationships in adolescence was developed (See Fig. 1). The model was fitted to the variance–covariance matrix of the observed data using LISREL 8 (Jöreskog & Sörbom, 1996) and asymptotic distribution free methods of estimation. Model goodness of fit was assessed using the following indices: the model chi square goodness of fit statistic; the Comparative Fit Index (CFI); Root Mean Squared Error of Approximation (RMSEA); and the standardised root mean squared residual correlation (SRMR). In well-fitting models the CFI should be close to 1, the RMSEA less than 0.05 and the SRMR close to zero (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

Adjustment for confounding. The associations between latent parent/child relationship quality and confounding factors were estimated by extending the SEM in Fig. 1 to include the covariate factors as a set of confounding factors correlated with parent/child relationship quality that were also predictive of later adjustment outcomes. The strength of the associations

Table 1

Associations between measures of parental bonding/attachment (15–16 years) and later psychosocial adjustment (21–30 years) $N = 924$.

a) Parental care (PBI)							
Outcome	Parental care quintile					<i>r</i>	<i>p</i>
	1 (Low)	2	3	4	5 (High)		
% Major depression 21–30 y	36.5	33.3	28.7	28.6	27.7	–0.09	<0.05
% Any anxiety disorder 21–30 y	37.1	26.8	27.5	26.4	18.6	–0.15	<0.001
% Suicidal ideation/attempt 21–30 y	22.8	23.5	12.0	10.4	10.9	–0.16	<0.001
% Any property/violent crime 21–30 y	29.3	15.9	13.2	11.5	11.4	–0.16	<0.001
% Illicit drug abuse/dependence 21–30 y	25.8	23.0	12.6	14.8	15.9	–0.12	<0.005
b) Parental over-protection (PBI)							
Outcome	Parental over-protection quintile					<i>r</i>	<i>p</i>
	1 (Low)	2	3	4	5 (High)		
% Major depression 21–30 y	21.4	28.9	33.1	32.0	37.9	0.13	<0.005
% Any anxiety disorder 21–30 y	17.0	20.7	31.5	28.4	36.2	0.17	<0.001
% Suicidal ideation/attempt 21–30 y	7.6	16.4	14.4	19.1	19.8	0.13	<0.005
% Any property/violent crime 21–30 y	8.8	15.9	14.4	15.0	24.9	0.12	<0.001
% Illicit drug abuse/dependence 21–30 y	15.7	13.5	21.0	17.5	24.3	0.10	<0.05
c) Parental attachment (IPPA)							
Outcome	Parental attachment quintile					<i>r</i>	<i>p</i>
	1 (Low)	2	3	4	5 (High)		
% Major depression 21–30 y	38.4	36.6	31.1	27.2	26.3	–0.11	<0.005
% Any anxiety disorder 21–30 y	35.3	28.5	29.6	22.2	21.5	–0.11	<0.001
% Suicidal ideation/attempt 21–30 y	22.6	15.7	14.3	13.3	13.4	–0.11	<0.05
% Any property/violent crime 21–30 y	27.9	14.5	12.8	12.8	9.7	–0.15	<0.001
% Illicit drug abuse/dependence 21–30 y	30.5	16.9	16.3	17.2	10.8	–0.14	<0.001

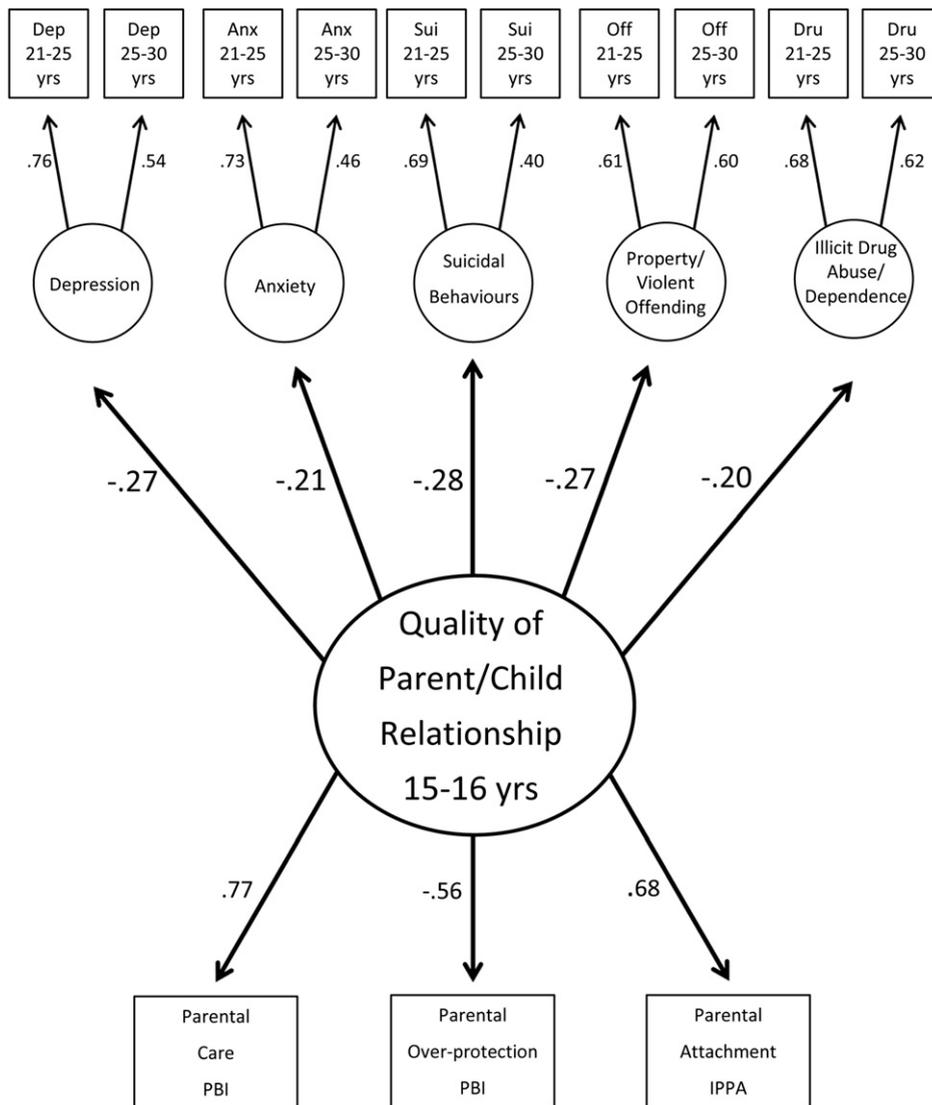


Fig. 1. Fitted structural equation model of the associations between latent quality of parent/child relationships in adolescence and adult psychosocial outcomes.

between latent parent/child relationship quality and later psychosocial outcomes after adjustment for confounding was estimated from the standardised regression parameters from the fitted model for the regression of each outcome on latent relationship quality.

Results

Associations between measures of bonding/attachment and later adjustment

Table 1 shows the cohort assessed on three measures of bonding/attachment: parental care (Table 1a), parental over-protection (Table 1b) and parental attachment (Table 1c). For the purposes of data display, each measure is divided into 5 groups (quintiles). These groups ranged from those with the lowest level of parental care, attachment and over-protection whose scores placed them in the bottom 20% of the distribution (Group 1) to those with the highest levels of perceived quality of parental bonding/attachment who fell into the 81th to 100th percentiles (Group 5). Each of these measures is related to a series of psychosocial adjustment outcomes in adulthood including measures of: major depression; anxiety disorder; suicidal ideation/attempt; property/violent offending; and illicit drug abuse/dependence. To simplify data presentation in each case the outcome data for the two assessment periods (21–25, 25–30 years) have been combined to

reflect the occurrence of adjustment difficulties at any time in the interval (21–30 years). For each analysis the Table reports the Mantel–Haenszel chi square test for linear trend and its associated p value. The strength of each association is summarised by the Pearson correlation. Table 1 shows:

1. Higher levels of parental care were associated with declining rates of depression ($p < 0.05$), anxiety disorder ($p < 0.001$), suicidal ideation/attempt ($p < 0.001$), property/violent offending ($p < 0.001$) and illicit drug abuse/dependence ($p < 0.005$).
2. Greater parental over-protection was associated with higher rates of depression ($p < 0.005$), anxiety disorder ($p < 0.001$), suicidal ideation/attempt ($p < 0.005$), property/violent crime ($p < 0.001$) and illicit drug abuse/dependence ($p < 0.05$).
3. Increasing (more positive) parental attachment was associated with declining rates of depression ($p < 0.005$), anxiety disorder ($p < 0.001$), suicidal ideation/attempt ($p < 0.05$), property/violent offending ($p < 0.001$) and illicit drug abuse/dependence ($p < 0.001$).

Structural equation modelling

Further analyses showed that the measures of parental care, over-protection and attachment were substantially correlated (with Pearson product moment correlations ranging from $r = -0.39$ – 0.67). These findings in conjunction with the results in Table 1 suggested that the measures of bonding/attachment in adolescence may be linked to measures of later adjustment by the model in Fig. 1. This model assumes:

1. The measures of Care, Over-protection and Attachment were all indicators of a more general latent dimension reflecting the reported quality of parent/child relationships in adolescence.
2. The psychosocial outcomes in adulthood were treated as latent factors identified by assessments at age 25 and 30 respectively. These latent factors represent the individuals' overall propensity to each outcome over the period from 21 to 30.
3. The latent dimension of positive parent/child relationships in adolescence was related to each of the latent psychosocial adjustment outcomes in adulthood.
4. Finally, the disturbances of the latent measures of psychosocial outcomes were permitted to be correlated. These correlations are not shown in Fig. 1 in order to simplify the model presentation.

This model was fitted to the variance–covariance matrix of the observed indicators of psychosocial adjustment and parent/child relationship quality using LISREL 8 (Jöreskog & Sörbom, 1996) and asymptotic distribution free methods of estimation. This initial model failed to provide an adequate fit to the data. However, examination of the model modification indices suggested that the fit of the model could be improved by permitting correlations between errors of some of the indicators. Specifically, between: i) errors on the measures of parental care and over-protection, ii) errors on the internalising outcomes (depression, anxiety and suicidal behaviours) assessed at the same age, and iii) errors on the externalising outcomes (violent/property offending and illicit drug abuse/dependence) assessed at the same age. This suggested the presence of some specificity in the within time associations in the above patterns of correlations.

A revised model that incorporated the above pattern of error correlations provided an adequate fit to the observed data (Model goodness of fit indices: $\chi^2(41) = 58.06$, $p = 0.04$; CFI = 0.99; RMSEA = 0.02; RMSR = 0.03). Fig. 1 shows the standardised parameter estimates for the key parameters from the revised model. The figure shows:

1. The observed indicator measures of parental bonding/attachment had factor loadings on the latent measure of parent/child relationship quality that ranged from -0.56 to 0.77 . In all cases these were statistically significant ($p < 0.001$).
2. The psychosocial outcomes assessed at ages 25 and 30 had factor loadings that ranged from 0.40 to 0.76 on the corresponding latent constructs. In all cases these were statistically significant ($p < 0.001$).
3. The correlations between (latent) parent/child relationship quality and the latent outcomes ranged from -0.20 to -0.28 and were in all cases statistically significant ($p < 0.001$). In all cases these estimates imply that increasing parent/child relationship quality was associated with declining rates of later psychosocial problems.

Adjustment for covariates

One explanation of the associations between the latent parent/child relationship quality factor and later psychosocial adjustment outcomes in Fig. 1 is that these associations could be explained by confounding social, family and individual factors that were correlated with parent/child relationship quality during adolescence and with psychosocial outcomes in adulthood. To explore this issue, the model in Fig. 1 was extended to include a series of covariate factors that were permitted to be correlated with latent quality of parent/child relationships and to influence the psychosocial outcomes. These covariates spanned different domains reflecting: family socio-demographic background, family functioning, and exposure to child abuse

and child individual characteristics (see online Appendix A). The estimated correlations between latent parent/child relationship quality and the covariate domains were as follows: i) associations with the family socio-demographic background domain (parental education, SES, family living standards) ranged from $r = 0.15$ to $r = -0.26$; ii) the correlations with the family functioning domain (number of parental changes, parental adjustment problems) were $r = -0.27$ and $r = -0.22$ respectively; iii) the correlations with a childhood history of physical and sexual abuse were respectively $r = -0.36$ and $r = -0.25$; and finally the associations with the child characteristics domain (IQ, childhood anxiety/withdrawal, childhood conduct problems) ranged from $r = -0.15$ to $r = -0.36$. In all cases the correlations were statistically significant ($p < 0.01$).

These findings imply that the covariates described above have the potential to confound the associations between the quality of parent/child relationships in adolescence and later psychosocial adjustment outcomes. The key findings from the model including covariates are summarised in Table 2. This table reports the standardised model parameters for the adjusted associations between the latent dimension representing the quality of parent/child relationships and each of the dependent psychosocial outcomes. For comparative purposes the first column of Table 2 reports the corresponding parameters from the unadjusted model. Finally, the significant ($p < 0.05$) covariates for each adjusted association are reported in the right hand column.

The table shows that statistical control for the effects of the covariate factors reduced the associations between the latent relationship quality factor and the outcomes from the range -0.20 to -0.28 to a range from -0.16 to -0.17 , suggesting that a substantial component of the associations was explained by confounding factors. Nonetheless even after control for covariates significant ($p < 0.05$) associations remained between the parent/child relationship quality factor and all outcomes. Key covariates included: maternal and paternal education; parental change; parental adjustment problems; gender; childhood anxiety/withdrawal; childhood conduct problems and childhood sexual abuse.

Supplementary analyses

To examine whether the associations between the parent/child relationship quality and later psychosocial adjustment outcomes held equally for males and females, the model in Fig. 1 was extended to a multi-group analysis. Results showed that there were statistically significant gender differences in the means of the latent outcomes such that females showed higher levels of depression and anxiety and males exhibited higher rates of crime and illicit drug abuse/dependence. However, there were no statistically significant gender differences in either a) the associations between the quality of parent/child relationships in adolescence and each of the psychosocial adjustment outcomes in adulthood or b) the factor loadings for any of the latent factors. These findings suggest that in general the model in Fig. 1 applied equally for males and females.

Discussion

This paper has used data gathered over the course of a 30 year longitudinal study to examine the relationships between measures of parental bonding and attachment gathered in adolescence and later psychosocial outcomes including: major depression; anxiety disorders; suicidal ideation/attempt; property/violent crime and illicit drug abuse/dependence. The analyses addressed three issues relating to these associations.

Association: The first stage of the analysis examined the association between each outcome and three measures of adolescent parent/child relations (parental care; over-protection and quality of parental attachment). This analysis showed the presence of consistent linear associations between the extent of positive parent/child relationships and each outcome. On the basis of this evidence it is clear that adolescent reports of parental relationships were prognostic of future adjustment.

Structural Equation Modelling: Further analysis suggested that the specific measures of parental care, over-protection and attachment were all substantially correlated. To represent these correlations and the associations of these measures with the outcome variables, a structural equation model was fitted to the data. This model assumed that the measures of parental care, over-protection and attachment were all indicators of a more general dimension representing the quality of parent/child relationships during adolescence. In turn, this general latent dimension was assumed to be related to latent factors representing the individual's propensity to: depression; anxiety; suicidal behaviours; crime; and illicit drug abuse/dependence.

Table 2

Estimated associations between quality of adolescent parent/child relationships and adult outcomes before and after adjustment for covariates.

Outcome	Unadjusted model ^a	Adjusted model ^b	Significant covariates ^c
Depression	-0.27**	-0.17*	1 ($\beta = 0.21$); 2 ($\beta = 0.20$)
Anxiety	-0.21**	-0.16*	1 ($\beta = 0.18$); 2 ($\beta = 0.20$); 3 ($\beta = 0.10$)
Suicidal behaviour	-0.28**	-0.16*	2 ($\beta = 0.15$); 4 ($\beta = 0.12$); 5 ($\beta = 0.20$)
Property/violent offending	-0.27**	-0.17*	1 ($\beta = -0.18$); 5 ($\beta = 0.16$); 6 ($\beta = 0.14$)
Illicit drug abuse/dependence	-0.20**	-0.17*	1 ($\beta = -0.22$); 4 ($\beta = 0.11$); 5 ($\beta = 0.13$); 7 ($\beta = 0.10$); 8 ($\beta = 0.15$)

* $p < 0.05$; ** $p < 0.001$.

^a Goodness of fit indices for unadjusted model: $\chi^2(41) = 58.06$, $p = 0.04$; CFI = 0.99; RMSEA = 0.02; SRMR = 0.03.

^b Goodness of fit indices for covariate adjusted model: $\chi^2(118) = 167.9$, $p = 0.001$; CFI = 0.99; RMSEA = 0.02; SRMR = 0.02.

^c Significant covariates: 1 = Gender; 2 = Childhood sexual abuse (<16 yrs); 3 = Childhood anxiety/withdrawal 7–9 yrs; 4 = Maternal education; 5 = Childhood conduct problems 7–9 yrs; 6 = Number of parental changes; 7 = Paternal education; 8 = Parental adjustment problems.

This model proved to have adequate fit to the data (subject to a number of correlated error terms) and suggested the presence of general relationships in which the extent of positive parent/child relationships during adolescence was predictive of later outcomes with the standardised model parameters (outcome correlations) ranging from -0.20 to -0.28 .

The significance of this analysis is that it provides a methodology for synthesising a large amount of previous research into a more general model of the ways in which parent/child relationships in adolescence are related to later psychosocial outcomes. The model findings are also consistent with a large body of previous research which has suggested the presence of linkages between measures of parent/child relationships in childhood and later outcomes including: mental health (Fonagy, Steele, Steele, Moran, & Higgitt, 1991; Schiffman et al., 2002; Ying et al., 2007); crime (Allen et al., 1998; Fonagy, Target, Steele, & Steele, 1997; Lyons-Ruth, 1996); and substance use (Brook, Whiteman, & Finch, 1993; Maunder & Hunter, 2001). What the present analysis suggests is that these specific findings may all be special cases of a more general model involving the overall quality of parent/child relationships in adolescence and a variety of later developmental outcomes.

Control for Covariate Factors: A potential threat to the validity of the model described above is that the apparent associations between measures of the quality of parent/child relationships in adolescence and later outcomes may reflect the presence of covariate factors that are associated with parent/child relationship quality and with later outcomes. A particular strength of the present study was the availability of a large number of prospectively collected measures of childhood family and related factors that spanned: i) family socio-demographic background; ii) family functioning; iii) exposure to child abuse; and iv) child characteristics. Control for these factors reduced the associations between the quality of parent/child relationships and the outcome variables. After adjustment the standardised regression coefficients ranged from -0.16 to -0.17 .

In general, these findings suggest the presence of modest but pervasive relationships between the quality of parent/child relationships in adolescence and later psychosocial functioning in young adulthood. The findings also suggest that a substantial amount of the association is explained by social and contextual factors that were correlated with adolescent reports of parent/child relationships. After adjustment for these factors the quality of adolescent parent/child relationships was only modestly correlated with later psychosocial adjustment and explained only between 2 and 3% of the variance in the outcomes studied.

These findings are consistent with an existing body of research suggesting that the quality of an adolescent's attachment to their parents has pervasive effects across the life span (Ainsworth, 1985; Bornstein, 1995; Bowlby, 1979; Bronstein, Fitzgerald, Briones, Pieniadz, & D'Ari, 1993; Steinberg, 1990). Numerous studies have already reported a significant association between parent/child attachment (assessed with PBI and IPPA) and later dysfunctional outcomes (Cubis, Lewin, & Dawes, 1989; Enns et al., 2002; Joyce, 1984; Milne & Lancaster, 2001; Parker et al., 1979; Reti et al., 2002; Silove et al., 1991; Wiborg & Dahl, 1997; Wilkinson & Walford, 2001). However, previous research is characterised by a number of limitations including: i) the use of cross-sectional designs (Joyce, 1984; Parker et al., 1979; Silove et al., 1991; Wiborg & Dahl, 1997; Wilkinson & Walford, 2001), ii) reliance on clinical samples (Faravelli et al., 1991; Joyce, 1984; Parker et al., 1988; Schiffman et al., 2002; Silove et al., 1991), and iii) limited control of confounding factors (Neale et al., 1994; Sakado et al., 2000).

The current study addresses previous research limitations and has several strengths including: a) the use of a community based sample of males and females; b) the availability of a wide range of confounding factors, c) the development of an integrative measure assessing the quality of parent/child relationships in adolescence.

As with all research the present study has a number of limitations. First, the findings are limited to a particular cohort of young people studied in a specific social context during a particular historical period. The extent to which the findings generalise to other cohorts and other settings is not known. However, the general consistency of the study findings with previous research provides substantial reassurance about this concern. A second threat to study validity comes from the possibility of omitted covariate factors which might explain the associations between the quality of parent/child relationships and later psychosocial outcomes. For example this association might reflect the presence of common genetic factors that influence both parenting behaviours and offspring outcomes. This suggests the need for further analyses using genetically informative designs (twin studies; adoption studies) to examine this topic.

Finally the results in this study are based on self-report of parent/child relationships in adolescence. It is possible that these reports may be subject to a number of biases which may limit their validity as measures of parent/child relationship quality. For these reasons it would be useful if future analyses of this topic included observational and multi-informant data to address possible reporting bias.

Within these limitations the present study suggests the presence of modest but pervasive relationships between the quality of parent/child relationships in adolescence and later psychosocial adjustment. The findings also suggest that the associations between specific measures of attachment and bonding are indicators of a more general dimension of quality of parent/child relationships which mediates the associations between subscale measures and the outcomes studied in this paper.

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Conflict of interest

All authors declare they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.adolescence.2012.12.002>.

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