Adverse childhood events and adolescent mental health: The moderating role of parent-child relationships

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The authors declare that they have no competing interests.

Informed consent

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Abstract

The aim of this study was to examine the moderating role of the mother-child and father-child relationship on the association between Adverse Childhood Events (ACEs) and mental health problems from childhood through to early and late adolescence. ACEs can detrimentally affect mental health later in life, but protective factors – including parent-child relationship quality - can alleviate some of these effects. We used data from a large, nationally representative, longitudinal study to conduct pre-registered analyses examining the relationship between ACEs experienced before 9 years of age on mental health problems in childhood (age 9), early adolescence (age 13), and late adolescence (17/18 years) among children in Ireland (*n*=8568), controlling for child gender and household social class. We also explored the role of parent-child relationship quality in moderating these associations. ACEs predicted poorer mental health in late childhood, early adolescence, and late adolescence. Mental health problems decreased over adolescence, but contrary to our hypothesis, the rate of that change was not impacted by ACEs. Mother-child but not father-child relationship quality moderated the association between ACEs and mental health. The results indicate that the association between ACEs and mental health persists through later childhood and adolescence. Interventions to support and strengthen mother-child relationships may be especially useful for the mental health of children who have experienced ACEs.

Keywords

Adolescence; Adverse Childhood Events; Closeness; Conflict; Father-Child Relationship; Mother-Child Relationship

It is well established that adverse childhood events (ACEs) have significant, negative, and lasting effects on development, including increased mortality and morbidity (Hughes et al., 2021) and altered patterns of social, emotional, and cognitive development (Evans et al., 2013; McLaughlin et al., 2019; Sisitsky et al., 2023). Examples of childhood adversities include loss of, or separation from, parents or mental disorder in the immediate family. Such experiences are relatively common, with estimates of children having experienced at least one adversity ranging from 38% to 62% (Kessler et al., 2010; Merrick et al., 2018), and similar prevalence rates in high-, middle-, and low-income countries (Kessler et al., 2010). Furthermore, the more adversities that a child experiences, the more likely this is to overwhelm the adaptive capacities of the child (Merrick et al., 2018).

Experiences of ACEs do not tend to be isolated; rather, children tend to experience a co-occurrence of adverse experiences (Evans et al., 2013; McLaughlin et al., 2019; Merrick et al., 2018). The co-occurrence of adversities can have a cumulative effect on outcomes, with those experiencing multiple adversities having more dysfunction than those who experience fewer. One well established outcome of ACE is poor mental health, with the odds of developing a mental disorder increasing dramatically as the number of ACEs increases (Benjet et al., 2010; Dhondt et al., 2022; McLaughlin et al., 2019). This is not specific to one mental disorder, but rather the impact of ACEs appears to be transdiagnostic, impacting a range of common disorders, such as depression and anxiety (Albott et al., 2018). Despite these linkages, there is no one accepted measure of ACE - and while studies tend to use the Adverse Childhood Experiences (ACEs) scale from the seminal study (Felitti et al., 1998), there is little theoretical basis to the selection of the specific adversities included (Hawes & Allen, 2023) and many studies use a mixture of different adversities. Our study examined significant ACEs experienced before nine years using an existing measure employed as part a longitudinal study of child development. Specifically, we included the following variables given the robust

associations found between these findings and later mental health problems (McKay et al., 2022) - death of a parent, parental divorce/separation, drug taking or alcoholism in the immediate family, mental illness in the immediate family, and parental incarceration.

Examining the impact of ACEs longitudinally in childhood develops our understanding of the trajectories of ACEs on mental health outcomes from childhood through to adulthood which can inform age-appropriate intervention and treatment (Wang et al., 2022). Adversities can have differential effects at different points in development (Dhondt et al., 2022; Flouri et al., 2019). Despite middle childhood and adolescence being sensitive period for the emergence and exacerbation of mental health difficulties (Pfeifer & Allen, 2021), this period has received relatively less attention than other periods of the lifespan (Lam et al., 2024). ACEs have been associated with internalising and externalising behaviour problems in middle childhood (Hunt et al., 2017; McKelvey et al., 2018). Similarly, research has shown that ACEs are associated with both internalising and externalising problems and poor psychological functioning in adolescence (Bevilacqua et al., 2021; Henry et al., 2021; Wang et al., 2022). There may also be associations between ACEs and the rate of increase in mental health problems over time (Dai et al., 2024; Li et al., 2022), although the research on this is limited. The current study will add to this body of research by examining the association between ACEs and mental health problems across three key developmental stages: middle childhood, early adolescence, and late adolescence and by exploring the association between ACEs and changes in mental health problems across these three periods. By examining the trajectory of mental health over time, from middle childhood through adolescence, we can explore when the influence of ACEs is most pronounced and when parental relationships have the greatest moderating influence. This longitudinal approach allows for a more detailed understanding of the developmental pathways involved which can provide insights for targeted interventions.

While the association between ACEs and negative mental health are robust, there are children who develop no detrimental outcomes even after experiencing significant adversities (Hawes & Allen, 2023). Comparative to the research on the effects of ACEs on risk for child mental health, the factors that may protect against this risk are less clear and findings suggest significant diversity and complexity in these protective pathways (Hawes & Allen, 2023). A host of protective factors at the family, school, community and society levels appear to modify vulnerability to the effects of adversity (Hadfield & Ungar, 2018). In particular, connections to competent and caring others have been identified as important protective factors (McLaughlin et al., 2019; Nowalis et al., 2022). Parent-child relationships are key proximal processes that have positive effects on child development, by increasing competency or buffering dysfunction (Bronfenbrenner & Morris, 2006; Tudge et al., 2016). The power and direction of these processes vary considerably as a function of personal and contextual characteristics (Bronfenbrenner & Morris, 2006). Merçon-Vargas et al. (2020) argue that some proximal processes that occur frequently and become more complex over time could be detrimental to development, such as parent-child conflict. We use this process–person–context model (Bronfenbrenner & Morris, 2006) to examine the moderating role of parent-child relationship closeness and conflict, across both parental and child gender, on the relationship between ACEs and adolescent mental health.

A growing body of research advocates for the separate examination of positive (e.g., support, closeness) and negative (e.g., conflict, criticism) aspects of close relationships, arguing that these dimensions exert independent influences on health outcomes and can even interact in complex ways (Ross et al., 2011). Warm, supportive parenting behaviour and positive family functioning moderate the negative impact of ACEs on adolescent health and emotional wellbeing (Balistreri & Alvira-Hammond, 2016; Qu et al., 2022; Wang et al., 2021). Ge et al. (2009) found that closeness with mothers, but not with fathers, moderated the effects of

negative life events on subsequent depressive symptoms in adolescents. Dhondt et al. (2019) and Healy et al. (2022), using the same data set as the current study, found that parent-child relationship conflict mediated the relationship between ACEs and later psychopathology in early adolescence whereas parent-child closeness was not significantly associated with childhood adversity, but was protective against persistent psychopathology. While these studies have shown the mediating effect of parent-child relationship quality on the adversity-psychopathology association (e.g., Dhondt et al., 2019; Healy et al., 2022), and some cross-sectional research has shown the moderating role of parenting in this context (e.g., Anderson et al., 2022), we are aware of none that examine the moderating role of these closeness and conflict variable longitudinally across later childhood and adolescence. Lam et al.'s (2024) recent review highlights the broad gap in the literature on the moderators of the association between ACEs and mental health problems, which emphasises the gap in our understanding. By exploring how both closeness and conflict in the parent-child relationship strengthens or weakens this association over time, we can identify which qualities of this relationship - both positive and negative – are most influential on this relationship.

Research demonstrates differences in parenting and parental involvement between mothers and fathers (Endendijk et al., 2017; Mastrotheodoros et al., 2019). While there is a growing body of research on the role of fathers on mental health and resilience, it is somewhat limited due to the lack of differentiation between the effects of father-child relationships versus mother-child relationships, and the relative neglect of fathers compared to mothers (Cabrera et al., 2018). Flouri (2010) suggests that the quality of both mother-child and father–child interactions are associated with emotional and behavioural outcomes in early and later childhood, but the effect of mother–child interaction is stronger than the effect of father–child interaction. While both mother-child and father-child conflict and closeness are associated with mental health problems in early adolescence, research suggests that the effect is stronger for

mothers than for fathers (e.g., O'Brien et al., 2023). Longitudinal studies exclusively examining fathering variables indicate that father sensitivity and engagement can influence children's developmental outcomes, including psychopathology (Barker et al., 2017). More specifically, closeness in the father-adolescent relationship moderated the relationship between paternal depressive symptoms and adolescent depressive symptoms (Reeb & Conger, 2009) and paternal warmth was predictive of adolescent mental health service use (Reeb & Conger, 2011). Furthermore, parental relationships are also vulnerable to erosion by the same adversities that might lead to maladaptation (Jones et al., 2018; Khraisha et al., 2023), and such erosion may be more marked for the father-child relationship, such as through the impact of incarceration on the relationship (Geller et al., 2012). These findings suggest that fathers and father-child relationship quality have a unique influence on later child outcomes. However, more research is needed to parse out these effects, and particularly so in the context of adversity, where research on the father-child relationship is particularly lacking. By exploring the role of father-child and mother-child relationships separately we can explore specifically which relationship is a stronger buffer against the effects of ACEs and this would offer a more complete understanding of the family system's influence.

Research on resilience has also established the importance of distinguishing between father's and mother's parenting when modelling the moderator effect of parenting on children's positive adaptation in the face of specific (e.g., Brennan et al., 2003) and cumulative (e.g., Ge et al., 2009) contextual risk (Flouri, 2010). It is also important to examine these specific variables given the differential trajectory of mother-child and father-child closeness and conflict during the period from childhood to adolescence (Mastrotheodoros et al., 2019; Xie et al., 2021). This study addresses gaps in the literature by:

1. Examining the dynamic impact of ACEs on adolescent mental health: We will investigate not only the initial level of mental health problems but also their slopes (change over time) across

three timepoints from early to late adolescence. This allows us to understand if ACEs predict baseline severity and/or the trajectory of problems.

2. Differentiating parental influences: We will examine the distinct influences of both mother-child and father-child closeness and conflict on adolescent mental health.

3. Investigating the moderating role longitudinally: We will specifically examine the moderating role of both mother-child and father-child closeness and conflict on the relationship between ACEs and the trajectory of adolescent mental health problems.

By examining this moderating role longitudinally, we will explore how specific qualities of the parent-child relationships may alter the impact of childhood adversities on later mental health, to inform targeted intervention strategies. We hypothesise that:

- Hypothesis 1: Adolescents who have experienced more ACEs at age 9 will have a higher initial level of psychological problems at baseline (age 9) and later stages of development (age 13 and age 17/18) than those who have experienced less ACEs.
- Hypothesis 2 (Slope/Trajectory): Adolescents who have experienced more ACEs will exhibit a steeper increase in psychological problems across adolescence.
- Hypothesis 3 (Moderation of Trajectory by Closeness & Conflict): Parent-child relationships (specifically, distinct mother-child and father-child closeness and conflict) will moderate the association between ACEs and the trajectory of mental health problems. We expect this association to be weaker when the quality of parent-child closeness is higher and/or when conflict is lower.
- Hypothesis 4 (Parental Differentiation in Moderation): This moderating effect will be stronger for mother-child closeness and conflict than for father-child closeness and conflict.

Method

In this study, we use data from Growing Up in Ireland (GUI), a nationally representative dataset of children and their parents living in Ireland. GUI is a rich data source, incorporating parent and child questionnaires and information on academic performance at 9 years (n = 8568) (in 2007/2008), 13 years (n = 7525) (in 2011/2012), and 17/18 years (n = 6039) (in 2015/2016). The Growing Up in Ireland study received ethical approval from a dedicated Research Ethics Committee set up by the Irish Department of Children, Equality, Disability, Integration and Youth. The data is available through the Irish Social Science Data Archive and the Central Statistics Office in Ireland. The analysis of the data was pre-registered on osf - https://archive.org/details/osf-registrations-fds26-v1. The sample design used a two-stage selection process, in which the school was the primary sampling unit with the children within school were the secondary units. A random sample of 910 schools were involved in the study. In schools which had 40 or fewer nine-year-old children, all children were included into the sample; in schools with more than 40 children, a random sample of 40 children was taken for inclusion in the sample. After the initial sample selection at 9 years of age, no additions were made to the sample. The participants in each of the waves of the household-based component of the fieldwork were the children, their primary caregiver (defined as the person who provides most care to the child - in most cases, the child's mother), and, if resident in the household, the spouse / partner of the child's primary caregiver (often the child's biological or social father). For an overwhelming majority, it was the same primary caregiver at each wave – for about 1% of families, the mother completed the wave 1 data, while the father completed the wave 2. Respondents primarily came from two-parented households (82% at wave 1).

To reflect the two-stage sample design used in the study, study weights were constructed in two steps. The initial survey weight at wave 1 was designed to take account of non-response at the school and family level and adjust the responses to be representative of the

population of 9-year-olds as a whole. This weight took account of child or family characteristics and school characteristics. Population figures were taken from the Census of Population for child and family characteristics and from Department of Education school listings for school characteristics. In subsequent waves, new weights were derived which were the product of the initial weight and a weight to adjust for differential attrition across groups. See Murray et al. (2011) and Murphy et al. (2019) for further information on sampling and method.

Measures

We controlled for child gender and household social class in our analyses. Gender differences have been identified in the impact on ACEs on mental health problems (Zhu et al., 2025) and social class is also an established risk factor for the experience of ACEs (Walsh et al., 2019). Household social class was measured using the European Socio-economic Classification (Rose & Harrison, 2009) using the highest of either mother's or father's social class. For the purposes of this project, we coded it into three categories: Professional/Managerial, Other non-manual/Skilled manual, and Semi-skilled/unskilled manual.

Mental Health Problems

We used the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) to examine internalising and externalising behaviour. The questionnaire examines four areas of difficulties: emotionality, peer problems, hyperactivity/inattention, and conduct problems. We used the total score of the SDQ (excluding the prosocial scale), which was composed of 20 items (5 items per scale). It was completed by the primary caregiver at 9 years, 13 years, and 17/18 years. Higher scores indicate more mental health problems. The primary caregiver (predominantly mothers) was questioned on the basis of the Study Child's behaviour over the

last six months. Examples of items include 'Restless, overactive, cannot stay still for long' and 'Often unhappy, down-hearted or tearful'. Responses are provided on a three-point scale labelled as 'not true', 'somewhat true', and 'certainly true', with higher scores indicating more mental health problems. Previous studies found the Cronbach's α of this scale was .78 at wave 1, .80 at wave 2 (O'Brien et al., 2023), and .70 at wave 3 (Murphy et al., 2019).

Adverse Childhood Events (ACEs)

Primary caregivers were asked if the child had experienced specific adverse life experiences. McLaughlin et al. (2019) argue that to qualify as an adversity, experiences should be chronic or be a single event that is so severe that it would require significant emotional, cognitive, or neurobiological adaptation by an average child. In this study, we included five items from the items asked in the GUI study that reflected significant adversities that meet the McLaughlin et al. (2019) definition and are similar to those ACEs typically examined in other studies that were available in the GUI dataset. These were: 1) death of a parent, 2) parental divorce/separation, 3) drug taking or alcoholism in the immediate family, 4) mental illness in the immediate family, and 5) parental incarceration. These were summed to result in a cumulative ACE score, with possible scores ranging from 0 (no ACEs) to 5 (all ACEs). ACEs were calculated from the data collected at age 9. There was no information about when these adversities were experienced between age 0 and 9 years.

Parent-Child Relationship Quality

The primary and secondary caregivers separately completed the Child-Parent Relationship Scale (CPR-S) (Pianta, 1992) about their own relationship with the study child. This data was collected at wave 1 (age 9). The CPR-S measures closeness and conflict in the parent-child relationship. The conflict and closeness scales of the CPRS represent two distinct domains of parent-child relationships, as evidenced by a relatively low correlation between the

scales (r = 0.16) (Driscoll & Pianta, 2011). The eight-item conflict subscale measures the degree to which a parent feels that their relationship with a child is characterised by negativity. An example of a conflict item is 'My child and I always seem to be struggling with each other'. The seven-item closeness scale assesses the extent to which a parent feels that the relationship is characterized by warmth, affection, and open communication. An example of a closeness item is 'My child openly shares their feelings and experiences with me'. Responses were provided on a five-point Likert scale: 1-Definitely does not apply; 2-Not really; 3-Neutral, not sure; 4-Applies somewhat; 5-Definitely applies. A previous study found the Cronbach's alpha for maternal closeness and conflict were .58 and .85 and the Cronbach's alphas for paternal closeness and conflict were .62 and .82 (O'Brien et al., 2023).

Analysis

To test if number of ACEs is related to mental health problems, and if this relationship changes over time, we used a linear mixed-effects regression model. This model contained a random effect for intercept and for slope; this is a common approach to working with such data (see Singer and Willett (2003) for more details). The outcome was mental health problems as measured by the SDQ. The predictors were child gender (with male as a reference), social class (with "semi-unskilled manual" as a reference and dummy variables for "other non-manual/skilled manual" and "professional/managerial"), number of ACEs, wave, and the interaction between wave and number of ACEs.

To test if ACES and parent-child relationship quality was associated with mental health problems and if parent-child relationship quality moderated the relationship between ACEs and mental health problems, we conducted four linear mixed-effects regression models. These models contained a random effect for intercept. Each model had mental health problems as the outcome but differed based on which parent-child relationship was being investigated: (1) mother-child closeness, (2) mother-child conflict, (3) father-child closeness, and (4) father-

child conflict. All models contained the additional predictors of child gender, social class, number of ACEs, and an interaction between number of ACEs and parent-child relationship. Mother-child closeness, mother-child conflict, father-child closeness, and father-child conflict were each standardized by centering them around the grand mean of the sample, while all other continuous variables were kept in their original scale.

For any significant interactions, we used a simple slopes analysis to determine the underlying nature of the moderation effect. In past research with this dataset, multiple imputation methods were used to address missing data; however, as results were consistently similar regardless of method, we did not employ any missing data imputation (O'Brien et al., 2023). We used chi-square and t test analyses to determine if there were differences between the families that remained in the study and those who dropped out. We carried out all the above analyses, in addition to the generation of descriptive statistics, using R version 4.2.2. The mixed models were fitted using the lme function from the lme4 package with a maximum likelihood method in each case. R^2 Equivalents were generated for each model based on the fixed effects and, separately, on a combination of fixed and random using the r.squaredGLMM function from MuMIn package. The full script can be found in the supplemental files.

Results

Of the 8,568 children who took part in wave 1 of the study, 4,404 (51.4%) were female. There were 7,525 children and families who took part in wave 2 (12.2% attrition rate) and 6,157 who completed wave 3 (18.0% attrition rate from wave 2 to wave 3). There were some differences in those families who completed all three waves those who dropped out. Those who did not drop out were more likely to be from highest SES group and they are more likely to report 0 ACEs for their child and reported lower SDQ scores. There were few notable differences on parent-child relationship quality.

Descriptive statistics are presented in Tables 1 and 2. Zero order Pearson correlations between all independent variables can be found in Table 3. The majority of participants (85%)

experienced no ACEs, 13% experienced one ACE, 2% experienced two ACEs, and less than 1% experienced three or more ACEs. As indicated in Table 4, there were low prevalence levels for experiencing ACES. The most frequently reported ACE was parental divorce/separation, experienced by 10% of the sample. The least frequently reported was parental incarceration that was experienced by 0.5% of the sample.

[Insert Tables 1, 2, and 3 here]

Adverse Childhood Experiences and Mental Health Problems

Adverse childhood experiences predicted mental health problems with b = 1.68, SE = 0.13, $t(8,099) = 12.97$, $p < .001$ (Table 5). Each additional ACE predicted an increase in mental health problems of 1.68, as assessed on the SDQ scale. While there was a decrease in mental health problems across the three waves (b = -0.4, SE = 0.03, $t(13,016) = 12.42$, $p < .001$), there was no interaction between wave and ACEs (b = -0.12, SE = 0.08, $t(13,015) = 1.53$, $p = .13$); that is, having experienced more ACEs was not associated with a steeper change in mental health problems over time. The R^2 equivalent of the model based on fixed effects alone was 0.03 and based on fixed and random effects was 0.58.

[Table 5 here]

Parent-Child Relationship and Mental Health Problems

Having greater mother-child closeness (b = -0.23, SE = 0.01, $t(8,028) = 17.58$, $p < .001$) or father-child closeness (b = -0.13, SE = 0.01, $t(7,023) = 10.79$, $p < .001$) was associated with fewer child mental health problems (Table 6). Conversely, greater mother-child conflict (b = 0.27, SE = 0.01, $t(8,024) = 54.27$, $p < .001$) or father-child conflict (b = 0.19, SE = 0.01, $t(7,029) = 31.52$, $p < .001$) were associated with more child mental health problems (Table 6). The R^2 equivalent details for all four models can be found in Table 7.

[Tables 6 and 7 here]

Moderation Analysis

There was a significant interaction between ACEs and maternal closeness in predicting mental health problems (b = -0.07, SE = 0.03, t(8,028) = 2.56, p = .01, Table 6). A simple slopes analysis revealed that while ACEs are associated with more child mental health problems for children regardless of mother-child closeness, the association is weaker for those with a higher mother-child closeness. That is, when children have experienced more closeness with their mother, the relationship between adversity and mental health problems is weaker. The coefficient indicates that for every unit increase in a participants' closeness with their mother, the strength of the association between ACEs and mental health problems is reduced by a magnitude of 0.07.

There was also significant interaction between ACEs and maternal conflict in predicting mental health problems, (b = 0.02, SE = 0.01, t(8,024) = 2.48, p = .01, Table 6). A simple slopes analysis revealed that while ACEs are associated with more child mental health problems regardless of mother-child conflict, the association is stronger for those with a higher mother-child conflict. That is, when children have experienced more conflict with their mother, the relationship between adversity and mental health problems is stronger. The coefficient indicates that for every unit increase in a participants' conflict with their mother, the strength of the association between ACEs and mental health problems is increased by a magnitude of 0.02. No significant interactions were found in the models with father closeness or father conflict as the predictor; that is, father-child closeness and conflict had a similar relationship with child mental health regardless of the number of ACEs a child had.

Conclusion

This study contributes to the literature on childhood adversity and resilience by showing the moderating role of mother-child relationship quality on the association between ACEs and mental health problems from middle childhood through adolescence using a large, nationally representative dataset. Our results suggest that, for adolescents, being closer to their mother is

associated with experiencing less harmful effects of ACEs on mental health, while having more conflict with their mother is associated with the ACEs having a more damaging effect on mental health. This effect was not found for father-child closeness and conflict. These findings add to the growing body of research on the differential effects of father-child and mother-child relationship quality.

In line with the broader literature, our measure of ACEs predicted poorer mental health in middle childhood (age 9), early adolescence (age 13), and late adolescence (age 17/18 years) (Benjet et al., 2010; Dhondt et al., 2022). The associations remained after controlling for child gender and household social class. However, contrary to our hypotheses, while mental health problems decreased over adolescence, the rate of change in mental health problems across adolescence was not impacted by ACEs. Exploring the impact of ACEs on the rate of change in mental health problems is relatively new, but this finding contradicts previous research that has shown an association ACEs and a steeper increase in depressive symptoms (Li et al., 2022). This may be explained by the different ACEs explored in these studies, particularly the chronicity of ACEs explored in the Li et al. (2022) study. Our study tentatively suggests that the current ACEs are not associated with changes in mental health across this time period. Although the associations between adversities and mental health problems lasted from childhood through adolescence, experiencing these adversities did not predispose children to a worse mental health trajectory across adolescence. Although the aim of the study was not to examine longitudinal changes in mental health problems, it is interesting to note the decrease in this variable across adolescence.

Findings were also consistent with theory and research on the association of parental relationship quality with child mental health problems (e.g., Balistreri & Alvira-Hammond, 2016; Groh et al., 2017). Our findings support the distinct impact of positive and negative relationship dynamics for both fathers and mothers. Higher levels of mother-child closeness

and father-child closeness were associated with better mental health while higher levels of mother-child and father-child conflict was associated with poorer mental health.

Mother-child relationship quality, but not father-child relationship quality, moderated the association between childhood adversity and later mental health. The association between mother-child both closeness and conflict and mental health problems was stronger for children who experienced more ACEs. The findings build on those from previous studies on the mediational role of parent-child conflict (e.g., Dhondt et al., 2019; Healy et al., 2022) and support previous cross-sectional research (Alegra et al., 2022) with these findings from a longitudinal study. We found that mother-child – but not father-child conflict – moderated the relationship between adversity and poor mental health. While these results tentatively suggest that mother-child relationship quality may be especially important for children who have experienced more ACEs, it should be borne in mind that ACEs can also disrupt relationships and disentangling the relationship between ACEs and relationship quality is challenging (Scully et al., 2020). The differing moderating effects of the mother-child and father-child relationships on adolescent mental health reflect gendered parenting roles within the family system (Brand & Klimes-Dougan, 2010). The significant moderating effect of the mother-child relationship but not the father-child relationship may reflect the traditional role of mothers as primary emotional caregivers and fathers taking a more instrumental or behavioural control role (Van Lissa et al., 2019). However, it should also be noted that the first wave of data collection took place in 2007 and there have been significant social and policy shifts in Ireland, including increased parental leave, improved childcare supports, and the Covid-19 pandemic that have likely shaped the fathers' role in child rearing since data collection.

The experiences of ACEs were very low in this sample – only 15% of the sample experienced one or more of the five ACEs studied. These rates are considerably lower than that of other studies, where rates range from 28% to 62% (Kessler et al., 2010; Merrick et al., 2018).

Although parental divorce/separation was the most prevalent of the ACEs experienced – at just over 10% - rates of divorce in Ireland are much lower than other countries (Fahey, 2014). There was also a very low level of incarceration evident. Although rates of parental incarceration are low in Ireland they are still linked with poor outcomes for children (Bradshaw et al., 2020). Our lower rates of ACEs may limit the generalisability of the findings to other contexts where prevalence rates are much higher. Nonetheless, although research indicates that similar ACE prevalence across Low-, Middle-, and High-income countries (Kessler et al., 2010), these findings highlight the importance of conducting research across a range of countries, particularly given that they are taken from a nationally representative sample, rather than a privileged, convenience sample. There is no one accepted measure of ACEs and while many studies use the ACE scale from the seminal study (Felitti et al., 1998) – this study did not include a formal definition of adversity or have a theoretical basis to the selection of the specific adversities included (Hawes & Allen, 2023) – the literature is not consistent in the use of this scale, and other measures are frequently used. In the current study, we were limited in the questions asked in the survey and we included only those items that have been deemed a significant risk, akin to other ACE scales. There is also the possibility of under-reporting by the caregivers.

The study's strengths lie in the use of a large dataset of nationally representative, longitudinal data collected from mothers, fathers, and children. However, there are some limitations. *First*, the data allowed for examination of associations and could not determine any causal effects between ACEs and mental health problems. *Second*, there were limitations of the ACE measure and so it is different to that used in some other studies. Data was not available on the timing of the ACEs. This means that we could not identify whether there are specific times in childhood that are more sensitive to the effect of ACEs. Also, three of the ACEs included the loss of, or separation from, a parent, which overlaps with our moderator of interest

which could have raised collinearity issues in our analysis. However, our data indicate correlations between ACEs and the moderators ranged from 0.02 to 0.12 – well below multicollinearity thresholds. The measure of ACEs did not include the experience of growing up in poverty, or child abuse and neglect, which are significant negative life experiences that have considerable adverse consequences (Scully et al., 2020). This limited our ability to examine adverse experiences across specific dimensions of threat and deprivation, as suggested by McLaughlin et al. (2019), or across distinct types of exposure as suggested by Sisitsky et al. (2023). Hawes and Allen (2023) argue for the collective adoption of a definition that addresses both developmental and ecological aspects of adversity (Hawes & Allen, 2023). *Third*, the role of parent-child relationship quality on mental health outcomes and its moderating effects should be considered in light of the poor levels of internal consistency for parent-child in this dataset (mother-child closeness α=.58, father-child closeness α=.62; O'Brien et al., 2023). This may have added noise to the data which may have influenced some of the lack of statistical associations found. *Finally*, the variables in this analysis are parent-reported and this shared reporter bias may have affected the results. In particular, child-reported data would have be more beneficial in measuring internalising difficulties; however, in this study we only have the responses of the primary caregivers on this variable. We recommend future research attempts to replicate such findings through stronger measures of parent-child relationships (such as coded observations) as well as data collection on the full breadth of ACEs, including child abuse and neglect. Future research could also look at the effect of the timing and clustering of the ACEs in childhood on later mental health problems.

Nonetheless, this study provides valuable support for the relationship between childhood adversities on later psychopathology across the sensitive period of development from middle childhood to adolescence, where changes in the nature of the parental relationship are evident (Mastrotheodoros et al., 2019; Xie et al., 2021). These findings emphasise the

importance of examining mother and father relationship quality individually, given the role both have on mental health but the role of the mother-child relationship as a moderator for the association between ACEs experienced in childhood and later mental health problems. The study provides further evidence on the relationship between the ACEs on the mental health of adolescents growing up in Ireland, and moreover highlights the importance of relational variables, in this case the protective role of the mother-child relationship in moderating this relationship.

Implications

These findings have implications for research as they add to the body of literature on the impact of parent-child relationship quality in middle childhood on later outcomes in adolescence (Xie et al., 2021; Yan et al., 2019) and the differential impact of parent gender on adolescent outcomes, where mother-child closeness and conflict had a moderating impact on mental health outcomes, but father-child closeness and conflict did not have this effect. Our results may have implications for family practitioners and intervention programmes and tentatively suggest that targeted interventions that aim to support and strengthen the mother-child relationship may be especially useful for the mental health of children who have experienced ACEs.

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Table 1

Descriptives for Categorical Variables

Variable	Frequency	Percent
Child Gender		
Female	4,404	51.4
Male	4,164	48.6
Social Class[a]		
Professional managerial	4,489	55.4
Other non-manual/Skilled manual	2,882	35.5
Semi-unskilled manual	739	9.1

Note. Frequencies and percentages are based on wave 1 (age 9).

[a] 452 missing cases for Social Class.

Table 2

Descriptives for Continuous Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Mental Health Problems				
Wave 1 (age 9)	7.4	5.0	0	37
Wave 2 (age 13)	6.5	5.0	0	35

Wave 3 (age 17/18)	6.5	4.9	0	33
ACE	0.2	0.5	0	5
Parental Closeness				
Maternal	44.8	3.8	10	50
Paternal	43.9	4.2	12	50
Parental Conflict				
Maternal	21.7	8.5	12	59
Paternal	21.8	7.8	12	59

Table 4.

Prevalence of ACEs Experienced (n = 8568)

ACE	N	*%*
Death of a parent	129	1.5
Parental divorce or separation	894	10.43
Drug taking/alcoholism in immediate family	212	2.47
Mental illness	246	2.87
Incarceration of a parent	50	0.58

Table 5

Multilevel Model Investigating the Association Between Adverse Childhood Experiences and Mental Health Problems; Changes Across Ages 9, 13, and 17/18

Variable	Estimate	*SE*

Female	-0.27*	0.09
Professional	-1.19**	0.17
Skilled	-0.36*	0.18
Adverse Childhood Experiences	1.68**	0.13
Wave	-0.40**	0.03
Wave x Adverse Childhood Experiences	-0.12	0.08

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

Table 7

Fit Indices for all Four Models Testing the Contribution of Parental Closeness and ACEs to Mental Health Problems

Model	R^2 Equivalent
Maternal	
Closeness	
R^2 fixed	.07
R^2 fixed and random	.58
Conflict	
R^2 fixed	.25
R^2 fixed and random	.58
Paternal	
Closeness	
R^2 fixed	.04
R^2 fixed and random	.57
Conflict	
R^2 fixed	.12
R^2 fixed and random	.57

Note. R^2 Equivalents were generated for each model based on the fixed effects and, separately, on a combination of fixed and random using the r.squared GLMM function from MuMIn package

Table 3.

Pearson Correlations Between all Continuous Variables

	Mental Health Problems Wave 1	Mental Health Problems Wave 2	Mental Health Problems Wave 3	Adverse Childhood Experiences	Maternal Closeness	Paternal Closeness	Maternal Conflict	Paternal Conflict
Mental Health Problems Wave 1	1							
Mental Health Problems Wave 2	0.63	1						
Mental Health Problems Wave 3	0.5	0.61	1					
ACEs	0.18	0.16	0.15	1				
Maternal Closeness	-0.24	-0.16	-0.11	-0.02*	1			
Paternal Closeness	-0.16	-0.09	-0.07	-0.06	0.26	1		

Maternal Conflict	0.57	0.45	0.38	0.12	-0.26	-0.19	1	
Paternal Conflict	0.37	0.31	0.25	0.08	-0.16	-0.24	0.48	1

Note. All correlations are significant at $p < .001$ unless otherwise marked.

* $p < .05$. ACEs = Adverse childhood experiences

Table 6

Four Longitudinal Multilevel Models Predicting Child Mental Health Problems Based on Relationship Quality With Parents

Variable	Maternal Closeness		Maternal Conflict		Paternal Closeness		Paternal Conflict	
	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Relationship quality with parent[a]	-0.23**	0.01	0.27**	0.01	-0.13**	0.01	0.19**	0.01
Female	-0.04	0.09	-0.32**	0.08	-0.32*	0.1	-0.23*	0.09
Professional	-1.22**	0.17	-1.05**	0.14	-1.12**	0.19	-1.05**	0.18
Skilled	-0.4*	0.17	-0.25	0.15	-0.23	0.2	-0.17	0.18
Adverse Childhood Experiences	1.51**	0.12	0.97**	0.1	1.55**	0.16	1.18**	0.16
Wave	-0.41**	0.03	-0.4**	0.03	-0.39**	0.03	-0.39**	0.03

Adverse Childhood Experiences x[Relationship quality with parent]	-0.07*	0.03	0.02*	0.01	-0.01	0.03	0.03	0.02

Note. Maternal Closeness, Maternal Conflict, Paternal Closeness, or Paternal Conflict was centred around the grand mean of the sample while all other continuous variables were kept in their original scale. * $p < .05$, ** $p < .001$.

[a] 'Relationship quality with parent' is Maternal Closeness, Maternal Conflict, Paternal Closeness, or Paternal Conflict, depending on model.