



Original article

The Inter-relationship of Adolescent Unhappiness and Parental Mental Distress



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 A B S T R A C T

Purpose: Substantial evidence supports the hypothesis that parental well-being impacts upon child well-being and that this relationship is bidirectional. Here we explore how, in a large, nationally representative sample, both parents' mental distress relates over time to each other's mental distress and to their adolescent child's unhappiness, and vice versa.

Methods: Analyses were conducted using data from waves one to five (2009/10–2014/15) of Understanding Society, the UK Household Longitudinal Study. Understanding Society collects data on adults' mental distress (General Health Questionnaire), and on youths' (age: 10–15 years) unhappiness in relation to their school work, appearance, family, friends, school, and life as a whole. We use repeated-measures structural equation models to investigate the reciprocal relationships between both parents' distress and their child's unhappiness, using both longitudinal cross-lagged and nonrecursive contemporaneous specifications. The analytic sample is 1,883 triads (adolescent child, mother, and father) with data at two or more consecutive time points. Analyses are stratified by adolescent gender.

Results: Our results show that parental mental distress predicts unhappiness of girls but not that of boys. Reciprocal associations of maternal and paternal mental distress are evident in families with an adolescent daughter. Unhappiness of adolescents does not predict their parents' mental distress. Results are similar whether examined contemporaneously or over time.

Conclusions: Our findings support the suggestion that the family should be considered as a dynamic system, for instance when planning clinical interventions. This is particularly pertinent in families with an adolescent daughter present.

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IMPLICATIONS AND CONTRIBUTION

Adolescent unhappiness does not influence parents' mental distress. Girls' but not boys' unhappiness is affected by parents' mental distress. There are reciprocal effects of parents' mental distress in families with a daughter, but in families with a son the relationship goes from mother to father, and not vice versa.

Adolescence, defined by the World Health Organization as lasting from age 10–19 years, is a pivotal development stage which is second only in the life course to the fetal period and

infancy in the rate of growth and change throughout the body [1]. It is a time of dramatic brain development, during which individuals mature physically, psychologically, and socially from childhood to adulthood and when the rate of onset of most mental health disorders peaks [2]. As such, it has been proposed that adolescence be considered as a critical or sensitive period in the life course for later health and well-being [1].

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Maintaining well-being among adolescents is a key to ensuring healthy physical and social development and a successful transition to adulthood. Following Bowen's Family Systems Theory [3], in which the family is considered to be a complex, integrated system, family members each have an important role in one another's mental health and well-being. This may be particularly true for family systems which include an adolescent experiencing the changes associated with this developmental stage, which can be disruptive to other family members. The mental health of an adolescent or their parents should not be considered in isolation, but rather in the context of the family as a whole. In this context, we aim to investigate whether there are reciprocal influences of parents' mental distress on early and mid-adolescent children's unhappiness and vice versa.

In recent years, there has been growth in research in this area, particularly in the psychology literature. Examples from this literature consider both the effect of the parent on the adolescent and the reciprocal effect of the adolescent on the parent [4–11] and the effect of both parents on the adolescent [4,6,12–18]. Although some studies analyze longitudinal data [4,6,8–11,13,16], to our knowledge, only two studies use longitudinal data to look at reciprocal effects of adolescents and both parents on one another [4,6].

In their 1995 study, Ge et al. [6] used three waves of annually collected panel data on 368 adolescent-mother-father triads in cross-lagged models, with the aim of investigating the mutual influences on psychological distress. They found that the psychological distress of adolescents and their parents was reciprocally associated over time and that there were gender differences in the associations observed: the strongest effects were between adolescents and their opposite gender parent.

The study by Powdthavee and Vignoles [4] addresses the question of whether parental mental distress influences adolescent life satisfaction, and vice versa, using data from 10 waves of annually collected panel data on 1,175 adolescents and their parents in multilevel multivariate response models. They found that parental distress measured at the previous year predicted adolescent life satisfaction, with boys unaffected by maternal distress levels. In addition, father's, but not mother's, mental distress was predicted by adolescent life satisfaction from the previous year.

Neither of the two existing longitudinal studies which investigated the reciprocal effects that adolescents and both parents have on one another modeled all these effects simultaneously in the same model. In previous work, we have shown that reciprocal effects were present for young children of both sexes [19]. However, parent-adolescent relationships might be quite different and gender differences might be more important at this stage than at younger ages. The existing literature on adolescents supports this hypothesis, with more consistent effects found where the family includes an adolescent girl [4,15,20].

We aim to contribute to the existing literature with analyses of data on adolescent children and their parents in the first five waves (2009/10–2014/15) of Understanding Society, the UK Household Longitudinal Study (UKHLS). The study takes advantage of the repeated measures collected in UKHLS to investigate mental distress of parents and unhappiness of children during the dynamic phase of early and midadolescence. We use repeated-measures structural equation models to simultaneously estimate the following effects: (1) maternal mental distress on adolescent unhappiness; (2) paternal mental distress

on adolescent unhappiness; (3) adolescent unhappiness on maternal mental distress; (4) adolescent unhappiness on paternal mental distress; (5) maternal mental distress on paternal mental distress; and (6) paternal mental distress on maternal mental distress. We investigate these relationships longitudinally and contemporaneously and explore whether the effects differ according to the gender of the adolescent.

Methods

Data and sample

The data used for this work were drawn from waves one to five of UKHLS, a household panel study which sampled around 50,000 households, resulting in a sample at wave one of approximately 41,000 individuals living in 26,000 households across the United Kingdom who have been surveyed annually since 2009/10 [21]. UKHLS and secondary analyses of UKHLS data have been approved by the University of Essex Ethics Committee.

The analytic sample was restricted to adolescent-mother-father triads living in the same household which include a member of the UKHLS youth panel (participants aged 10–15 years) and their natural, adoptive, or step mother and father ($N = 4,659$), all of whom were members of the UKHLS general population sample. Where a household included more than one member of the youth panel, one member was selected at random.

After these restrictions to the data, we had 7,273 years of outcome data from 4,659 unique triads. Of this, 3,295 years of outcome data from 1,883 unique triads had lagged data on adolescent unhappiness and maternal and paternal mental distress so could be included in our models. Triads included in our analytic sample included adolescents reporting higher unhappiness (mean difference [MD]: .37, 95% confidence interval [CI]: .17–.57), similar maternal 12-item General Health Questionnaire (GHQ-12) (MD: -.01, 95% CI: -.25, .23) and lower paternal GHQ-12 (MD: -.28, 95% CI: -.51, -.05) than excluded triads. All members of the included triads were older (adolescent MD: .71, 95% CI: .64, .78; mother MD: 1.28, 95% CI: 1.04, 1.52; and father MD .98, 95% CI: .69, 1.27), households had higher incomes ($p < .001$), and there were more likely to be other children in the household ($p < .001$).

Of the triads in our final analytic sample, 50% were present for two waves, 29% for three waves, 17% for four waves, and 4% for all five waves, with the main reason for moving in or out of our sample being the child's age since children are only eligible to be in the youth sample from age 10–15 years.

Variables

Maternal and paternal mental distress: at each of waves one to five, adult UKHLS participants (age 16+) answer the GHQ-12 [22] during a computer-assisted personal interview. This is a screening scale designed to identify minor psychiatric disorders in the general population. Each item is scored on a four-point Likert scale, and all responses are summed to give a total score on a scale from 0 to 36, with higher scores indicating greater mental distress.

Adolescent unhappiness: at each of waves one to five, members of the UKHLS youth panel (age 10–15 years) are asked to respond to a paper and pencil self-completion questionnaire in which they are asked about their happiness or unhappiness with various aspects of their lives: their school work, appearance,

Table 1

Description of analytic sample of 1,883 mother-father-adolescent triads, and mean adolescent unhappiness and maternal and paternal GHQ scores

| | Range/category | Mean (SD)/N [%] ^a | Adolescent unhappiness | | Maternal GHQ-12 | | Paternal GHQ-12 | |
|-----------------------------------------|----------------------|------------------------------|------------------------|--------------------|-----------------|--------------------|-----------------|-------------------|
| | | | Mean (SD) | <i>p</i> value | Mean (SD) | <i>p</i> value | Mean (SD) | <i>p</i> value |
| All | | 3,295 [100.0] | 6.8 (4.8) | — | 11.6 (5.7) | — | 10.7 (5.0) | — |
| Adolescent gender | Girl | 1,678 [50.9] | 7.0 (5.0) | .006 ^b | 11.7 (5.7) | .313 ^b | 10.7 (4.9) | .904 ^b |
| | Boy | 1,617 [49.0] | 6.5 (4.6) | | 11.5 (5.7) | | 10.7 (5.1) | |
| Adolescent age | 10 | 9 [.3] | 5.4 (2.7) | <.001 ^c | 13.4 (7.5) | .262 ^c | 15.3 (6.8) | .375 ^c |
| | 11 | 664 [20.2] | 5.4 (4.6) | | 11.5 (5.6) | | 10.7 (5.1) | |
| | 12 | 714 [21.7] | 6.2 (4.7) | | 11.3 (5.5) | | 10.7 (4.8) | |
| | 13 | 645 [19.6] | 7.0 (4.7) | | 11.7 (5.8) | | 11.0 (5.5) | |
| | 14 | 633 [19.2] | 7.5 (4.9) | | 11.7 (5.9) | | 10.6 (4.8) | |
| | 15 | 630 [19.1] | 7.9 (4.8) | | 11.8 (5.8) | | 10.6 (4.7) | |
| Maternal age | <35 | 306 [9.3] | 6.5 (4.5) | .051 ^c | 12.3 (6.2) | .018 ^c | 11.0 (5.8) | .689 ^c |
| | 35–44 | 1,682 [51.1] | 6.7 (4.8) | | 11.7 (6.0) | | 10.6 (4.8) | |
| | ≥45 | 1,307 [39.7] | 6.9 (4.9) | | 11.3 (5.3) | | 10.8 (5.0) | |
| Paternal age | <35 | 177 [5.4] | 6.4 (4.3) | .020 ^c | 12.1 (6.0) | .014 ^c | 10.4 (5.5) | .933 ^c |
| | 35–44 | 1,341 [40.7] | 6.6 (4.9) | | 11.8 (6.1) | | 10.7 (5.0) | |
| | ≥45 | 1,777 [53.9] | 6.9 (4.8) | | 11.4 (5.4) | | 10.8 (5.0) | |
| Parental marital status | Cohabiting | 405 [12.3] | 7.3 (4.9) | .070 ^b | 12.7 (6.2) | .005 ^b | 11.3 (5.3) | .065 ^b |
| | Married | 2,890 [87.7] | 6.7 (4.8) | | 11.4 (5.6) | | 10.6 (4.9) | |
| Equalised household monthly income (£s) | 1 (lowest quintile) | 765.4 (255.0) | 7.3 (5.1) | <.001 ^c | 12.1 (6.1) | <.001 ^c | 11.4 (5.4) | .013 ^c |
| | 2 | 1,119.3 (75.4) | 6.9 (4.6) | | 12.1 (6.0) | | 10.6 (5.0) | |
| | 3 | 1,377.9 (79.7) | 6.9 (4.7) | | 11.7 (6.1) | | 10.8 (4.8) | |
| | 4 | 1,728.4 (124.2) | 7.0 (5.1) | | 11.6 (5.6) | | 10.4 (4.8) | |
| | 5 (highest quintile) | 2,766.4 (1102.9) | 6.0 (4.6) | | 10.7 (4.8) | | 10.5 (5.0) | |
| Number of other children in the home | 0 | 1,310 [39.8] | 7.2 (4.9) | .050 ^c | 11.8 (5.7) | .385 ^c | 10.6 (4.8) | .309 ^c |
| | 1 | 1,281 [38.9] | 6.3 (4.7) | | 11.3 (5.6) | | 10.9 (5.0) | |
| | 2+ | 704 [21.4] | 6.8 (4.7) | | 11.6 (5.9) | | 10.8 (5.3) | |

GHQ-12 = 12-item General Health Questionnaire; SD = standard deviation.

^a Averaged over all person-years (N = 3,295).^b Difference between mean scores from Student *t*-tests.^c Chi-square test for trend, which tests for a linear relationship between the dependent and independent variables across categories of the independent variable.

family, friends, school, and life as a whole. Responses are scored on a seven-point Likert scale. The six items all load onto the same factor ($\alpha = .73$), therefore, it is appropriate to sum them to give a summary scale, with a range of values from 0 to 36. This score is used in a growing social science literature (e.g., [23–25]) and measures the cognitive component of children's subjective well-being [26] and higher scores indicate greater unhappiness.

Covariates: adolescent gender is considered as a potential moderator of the relationships between parental mental distress and adolescent unhappiness. Other covariates considered for inclusion in models are adolescent, maternal and paternal age (all treated as continuous), marital status of the parents (binary married or cohabiting), logged equalized household income (continuous) and the number of additional children aged 0–15 years living in the household (categorized as 0, 1, or 2+).

Table 1 shows the analytic sample in terms of the key variables of interest. Half the observations were of triads including an adolescent girl, and the adolescents were roughly evenly distributed by age in years. Nearly 90% of observations were of triads in which the parents were married.

Analysis strategy

Pearson's correlation coefficients were calculated for adolescent unhappiness and maternal and paternal mental distress at the five waves, stratified by adolescent gender. Mean scores for adolescents, mothers, and fathers in the analytic sample were calculated according to gender of adolescent, age of adolescent, mother and father, parental marital status, equalized

household income quintile and the number of additional children living in the household.

In our investigation of the reciprocal relationships between maternal mental distress, paternal mental distress and adolescent unhappiness we follow Brezina [27] who compared the results from cross-lagged longitudinal and nonrecursive contemporaneous models to investigate the reciprocal relationship between parent and child aggression. Brezina suggests that both strategies have distinct assumptions and limitations and that the comparison of results is useful: if we see a consistent pattern of findings this can increase our confidence in the findings of a particular model [27]. We extend Brezina's dyadic models to include maternal, paternal, and adolescent child effects using longitudinal (cross-lagged effects, Figure 1A) and contemporaneous (nonrecursive effects, Figure 1B) repeated-measures structural equation models with 1-year lags. The contemporaneous models include 1-year lagged measures of all three outcome variables, so are equivalent to conditional change models.

With both modeling strategies we initially ran unadjusted models, including maternal GHQ-12, paternal GHQ-12, and adolescent unhappiness measured at *t*-1 and *t*, with paths as illustrated in Figure 1. In the contemporaneous model, we included paths from maternal GHQ-12, paternal GHQ-12, and adolescent unhappiness at *t*-1 to the same measure at *t* to take account of stability effects. Based on the existing literature we hypothesized interactions by adolescent gender [4,15,20] and adolescent pubertal status [28]. Since UKHLS does not include measures of pubertal status, we used adolescent age as a proxy. To test for interactions with adolescent age at outcome (10–12

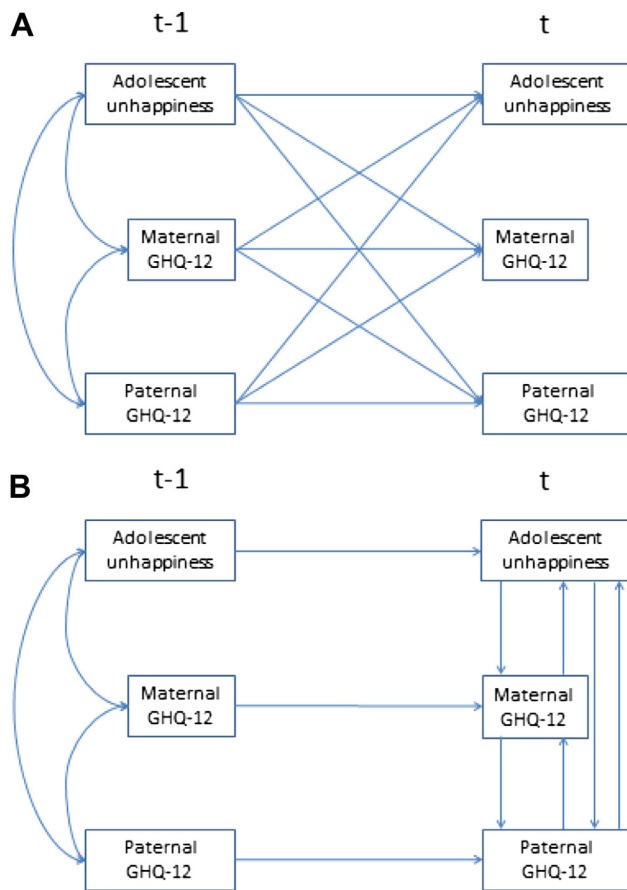


Figure 1. (A) Longitudinal, cross-lagged effects model; (B) Cross-sectional, nonrecursive contemporaneous effects model. GHQ = General Health Questionnaire.

and 13–15 years) and gender, these two variables were separately used as grouping variables and Lagrange multiplier tests and Wald tests were performed to test whether parameters allowed to vary across groups could be constrained to be equal. These tests, along with likelihood ratio tests, supported stratification of analyses by adolescent gender and the incorporation of a number of interactions between adolescent age and covariates. There were no age interactions in the main associations of interest. Paths were added from the age of both parents, marital status of parents, the logged equalized household income, and number of other children in the household measured at time t to each of the outcomes measured at time t. In all models, paths from maternal age, paternal age, and number of other children in the household to each of the outcome variables were nonsignificant at the 90% level so were removed using stepwise backward elimination, checking at each stage that model fit was not poorer.

Two sensitivity analyses were run. First, on an analytic sample restricted to triads in which the mother and father were the natural parents of the sample adolescent (N triads = 1,807; n observations = 3,177), we tested the effect of whether the sample adolescent was the eldest child of their mother and father. We reran the final models with additional paths from being the maternal eldest to maternal GHQ-12 and adolescent unhappiness and from being the paternal eldest to paternal

GHQ-12 and adolescent unhappiness. Second, we tested whether the associations observed in our main models were seen in models using adolescent children's Strengths and Difficulties Questionnaire (SDQ) scores rather than unhappiness scores. SDQ has a correlation of .54 ($p < .001$) with unhappiness. Since SDQ is administered at every other wave of UKHLS, in this analysis, two-year lags for maternal and paternal GHQ-12 and adolescent SDQ were used, therefore, the sample size was reduced somewhat (N triads = 885; n observations = 982).

All analyses were undertaken in Stata 13, and models were built using the sem command.

Results

Table 1 gives mean unhappiness and GHQ-12 scores and their standard deviations for adolescents and their parents, by the covariates of interest. Mean adolescent unhappiness and parental GHQ-12 scores did not differ significantly according to the gender of the adolescent but were poorer for adolescents and their mothers in families with older adolescents (age 13–15 years at outcome compared with age 11–12 years). There appeared to be differences according to maternal and paternal age, with trends toward greater unhappiness for adolescents in families with older parents, higher GHQ-12 scores for fathers when fathers were older and lower GHQ-12 scores for mothers when either parent was older. Unhappiness and GHQ-12 scores for all triad members were lower in families with married rather than cohabiting parents and with higher household incomes.

Table 2 gives Pearson's correlation coefficients between adolescent unhappiness and maternal and paternal GHQ-12 at waves 1–5, stratified by adolescent gender. Within-individual measures correlated over time, with, in general, a weakening of the correlation when measurements were more years apart, particularly in adolescents. Correlations between family members were relatively weaker, and the correlation between adolescent unhappiness and their parents' GHQ-12 was weaker than that between the GHQ-12 of the two parents. Unhappiness of female adolescents and mental distress of their fathers showed very few statistically significant correlations.

Table 3 gives the mean unhappiness scores for each of the measures of unhappiness and for the overall unhappiness scale. Student t -tests showed that boys were less happy with school work, and girls were less happy with their appearance and their lives in general, while on the other measures and for the total score, there were no statistically significant differences.

Table 4 shows the results of the structural equation modeling. We found that there was continuity in unhappiness and GHQ-12 over time within individuals and that inter-relationships between unhappiness and GHQ-12 of triad members differed according to the gender of the sample adolescent. In triads in which the sample adolescent was a girl, we observed positive associations of both maternal and paternal GHQ-12 on the other parent's GHQ-12 and the adolescent's unhappiness. This was not the case in our models including triads with a boy: in these models, we saw a positive association of maternal GHQ-12 on paternal GHQ-12 but no other interindividual effects. Consistent across all our models, irrespective of adolescent gender, was the lack of association of unhappiness of the sample adolescent on the GHQ-12 of their parents. Our results were very similar, in terms of statistical significance, whether we looked at the relationships longitudinally, as in our cross-lagged effects model, or contemporaneously, as in our nonrecursive effects model.

Table 2
Pearson's correlations between adolescent unhappiness, maternal, and paternal GHQ-12 scores

| | Adolescent unhappiness | | | | | Maternal GHQ-12 | | | | | Paternal GHQ-12 | | | | |
|-----------------------------------------|------------------------|--------|--------|--------|-------|-----------------|--------|--------|--------|-------|-----------------|--------|--------|--------|------|
| | W1 | W2 | W3 | W4 | W5 | W1 | W2 | W3 | W4 | W5 | W1 | W2 | W3 | W4 | W5 |
| Families with a female adolescent | | | | | | | | | | | | | | | |
| Adolescent unhappiness (correlation, N) | W1 | 1.00 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | 959 | | | | | | | | | | | | | | |
| | W2 | .59*** | 1.00 | — | — | — | — | — | — | — | — | — | — | — | — |
| | 498 | 1,085 | | | | | | | | | | | | | |
| | W3 | .41*** | .55*** | 1.00 | — | — | — | — | — | — | — | — | — | — | — |
| 347 | 648 | 1,027 | | | | | | | | | | | | | |
| W4 | .41*** | .48*** | .60*** | 1.00 | — | — | — | — | — | — | — | — | — | — | |
| 206 | 458 | 613 | 956 | | | | | | | | | | | | |
| W5 | .29* | .45*** | .50*** | .60*** | 1.00 | — | — | — | — | — | — | — | — | — | |
| 121 | 312 | 460 | 610 | 875 | | | | | | | | | | | |
| Maternal GHQ-12 (correlation, N) | W1 | .14*** | .19*** | .06 | .13 | .14 | 1.00 | — | — | — | — | — | — | — | — |
| | 867 | 470 | 326 | 192 | 114 | 878 | | | | | | | | | |
| | W2 | .07 | .11** | .18*** | .11* | .15* | .49*** | 1.00 | — | — | — | — | — | — | — |
| | 477 | 1,014 | 631 | 447 | 302 | 457 | 1,037 | | | | | | | | |
| | W3 | .02 | .09* | .10* | .06 | .07 | .43*** | .59*** | 1.00 | — | — | — | — | — | — |
| 316 | 605 | 938 | 578 | 431 | 301 | 601 | 954 | | | | | | | | |
| W4 | .01 | .05 | .10* | .10** | .06 | .45*** | .55*** | .47*** | 1.00 | — | — | — | — | — | |
| 194 | 431 | 569 | 868 | 568 | 184 | 422 | 554 | 888 | | | | | | | |
| W5 | -.08 | .05 | .08 | .07 | .05 | .40*** | .52*** | .53*** | .56*** | 1.00 | — | — | — | — | |
| 112 | 296 | 439 | 575 | 803 | 106 | 290 | 425 | 565 | 824 | | | | | | |
| Paternal GHQ-12 (correlation, N) | W1 | .08* | .08 | .04 | .06 | .04 | .26*** | .15** | .12* | .20* | .09 | 1.00 | — | — | — |
| | 759 | 421 | 298 | 176 | 107 | 731 | 409 | 273 | 170 | 98 | 771 | | | | |
| | W2 | .03 | .07 | .04 | -.01 | .03 | .14** | .22*** | .11** | .05 | .06 | .46*** | 1.00 | — | — |
| | 431 | 896 | 571 | 403 | 274 | 412 | 883 | 538 | 374 | 261 | 402 | 918 | | | |
| | W3 | .00 | -.03 | .02 | .06 | .05 | .11 | .11* | .21*** | .12* | .15** | .41*** | .41*** | 1.00 | — |
| 285 | 554 | 813 | 513 | 384 | 273 | 543 | 785 | 491 | 375 | 263 | 533 | 828 | | | |
| W4 | .00 | -.01 | .08 | .05 | .11* | .12 | .10 | .12** | .17*** | .10* | .29** | .43*** | .48*** | 1.00 | |
| 168 | 385 | 506 | 737 | 494 | 158 | 375 | 490 | 712 | 479 | 155 | 368 | 482 | 755 | | |
| W5 | .00 | -.01 | .03 | -.03 | .00 | -.10 | .03 | .11* | .09* | .15** | .29** | .29*** | .34*** | .44*** | 1.00 |
| 97 | 257 | 378 | 489 | 677 | 92 | 251 | 366 | 477 | 661 | 90 | 243 | 352 | 467 | 695 | |
| Families with a male adolescent | | | | | | | | | | | | | | | |
| Adolescent unhappiness (correlation, N) | W1 | 1.00 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | 946 | | | | | | | | | | | | | | |
| | W2 | .54*** | 1.00 | — | — | — | — | — | — | — | — | — | — | — | — |
| | 449 | 1,079 | | | | | | | | | | | | | |
| | W3 | .49*** | .57*** | 1.00 | — | — | — | — | — | — | — | — | — | — | — |
| 291 | 624 | 1,002 | | | | | | | | | | | | | |
| W4 | .41*** | .49*** | .58*** | 1.00 | — | — | — | — | — | — | — | — | — | — | |
| 181 | 461 | 617 | 936 | | | | | | | | | | | | |
| W5 | .27** | .42*** | .45*** | .58*** | 1.00 | — | — | — | — | — | — | — | — | — | |
| 108 | 296 | 440 | 577 | 859 | | | | | | | | | | | |
| Maternal GHQ-12 (correlation, N) | W1 | .13** | .13** | .11 | .11 | .08 | 1.00 | — | — | — | — | — | — | — | — |
| | 834 | 411 | 261 | 169 | 102 | 842 | | | | | | | | | |
| | W2 | .14* | .13*** | .10* | .11* | .09 | .57*** | 1.00 | — | — | — | — | — | — | — |
| | 430 | 998 | 596 | 447 | 293 | 406 | 1,027 | | | | | | | | |
| | W3 | .04 | .07 | .10** | .08 | .11* | .41*** | .63*** | 1.00 | — | — | — | — | — | — |
| 263 | 577 | 893 | 569 | 407 | 247 | 569 | 915 | | | | | | | | |
| W4 | .08 | .10* | .03 | .12** | .10* | .55*** | .54*** | .60*** | 1.00 | — | — | — | — | — | |
| 169 | 438 | 582 | 850 | 537 | 163 | 432 | 560 | 867 | | | | | | | |
| W5 | .10 | .02 | .08 | .12** | .11** | .48*** | .55*** | .55*** | .55*** | 1.00 | — | — | — | — | |
| 100 | 293 | 421 | 543 | 779 | 96 | 294 | 410 | 537 | 806 | | | | | | |

Table 2
Continued

| Paternal GHQ-12 (correlation, N) | Adolescent unhappiness | | | | | Maternal GHQ-12 | | | | | Paternal GHQ-12 | | | | |
|-------------------------------------|------------------------|-------|-------|-------|------|-----------------|--------|--------|-------|--------|-----------------|--------|--------|------|------|
| | W1 | W2 | W3 | W4 | W5 | W1 | W2 | W3 | W4 | W5 | W1 | W2 | W3 | W4 | W5 |
| | W1 | .12** | .09 | .15* | .11 | .05 | .26*** | .19** | .19** | .20* | .20 | 1.00 | — | — | — |
| W2 | .14** | 398 | .12** | .10* | .10 | .18** | .26*** | .18*** | .16* | .26*** | .39*** | 1.00 | — | — | — |
| W3 | .07 | 890 | .08 | .10** | .11* | .09 | .18*** | .21*** | .10* | .17* | .33*** | .56*** | 1.00 | — | — |
| W4 | -.04 | 532 | .07 | .04 | .02 | .16 | .11* | .07 | .11** | .03 | .32** | .46*** | .45*** | 1.00 | — |
| W5 | .06 | 401 | .12* | .08 | .09* | .33** | .19* | .13* | .09 | .15** | .41** | .44*** | .52*** | .748 | 1.00 |
| | 92 | 268 | 378 | 483 | 681 | 88 | 265 | 360 | 466 | 664 | .86 | 258 | 359 | 462 | 703 |

p* < .05; *p* < .01; and ****p* < .001.
GHQ-12 = 12-item General Health Questionnaire.

Table 3

Mean unhappiness scores for female and male adolescents, by dimensions of unhappiness, and differences between groups

| Dimension of unhappiness | Female adolescent; mean (SD) | Male adolescent; mean (SD) | T-tests for differences |
|--------------------------|------------------------------|----------------------------|-------------------------|
| School work | 2.3 (1.1) | 2.6 (1.3) | <.001 |
| Appearance | 2.8 (1.5) | 2.6 (1.3) | <.001 |
| Family | 1.5 (.9) | 1.6 (1.0) | .353 |
| Friends | 1.6 (1.0) | 1.6 (.9) | .601 |
| School | 2.2 (1.4) | 2.3 (1.4) | .097 |
| Life in general | 2.1 (1.1) | 2.0 (1.1) | .013 |
| Total | 6.6 (4.9) | 6.4 (4.6) | .315 |

Higher scores indicate greater unhappiness.
SD = standard deviation.

Where there were statistically significant interindividual effects, the effect sizes were slightly larger in the contemporaneous effects models.

Additional paths to adjust for whether adolescents were their parents' eldest child did not alter the main effects, and the paths themselves were not statistically significant (results not shown) with the exception of the path to maternal GHQ-12 in models where the sample adolescent was male, where being the eldest reduced maternal GHQ-12 similarly in longitudinal and contemporaneous models ($\beta = -.40$, 95% CI = $-.74$ to $-.06$).

Analyses using adolescent SDQ and two-year-lagged measures showed continuity in SDQ and GHQ-12 but, for the most part, no effects of parental GHQ-12 on adolescent children's SDQ or vice versa (results not shown). The exception here was the path from maternal GHQ-12 to adolescent SDQ in triads with an adolescent son: adjusted models did not converge but in unadjusted models higher maternal GHQ-12 was linked to higher SDQ (longitudinal model: $\beta = .11$, 95% CI = $.04$ – $.17$; contemporaneous model: $\beta = .18$, 95% CI = $.06$ – $.29$).

Discussion

Inter-relationships between mental distress of parents and unhappiness of adolescent children were dependent upon the gender of the adolescent in the household: unhappiness of adolescent girls was affected by parents' mental distress, but this was not the case for adolescent boys. Similarly, reciprocal effects of maternal and paternal mental distress were evident in families with an adolescent daughter, but when the adolescent was a son the relationship only went from mother to father, and not vice versa. However, there were some similarities across families: first, whether the adolescent was a girl or a boy, their unhappiness did not affect parents' mental distress, and second, unhappiness of adolescents and mental distress of parents showed continuity over time. Our results did not substantively differ when we investigated relationships contemporaneously or longitudinally: although in the contemporaneous model effect sizes appeared slightly larger, CIs were largely overlapping. To our knowledge, this is the first study to simultaneously estimate the inter-relationships between unhappiness of adolescent children and mental distress of mothers and fathers, for which we have used longitudinal data from a population representative sample.

Our findings suggest that, in households with an adolescent daughter, there is greater social sensitivity among family members. Our finding of a gender difference in the inter-relationships between mental distress of parents and unhappiness of

Table 4
Results from cross-lagged and contemporaneous effects nonrecursive structural equation models

| Outcome (t) | Exposure | | Cross-lagged model; coefficient (95% CI) ^a | | Contemporaneous effects model; coefficient (95% CI) ^a |
|-----------------------------------------|------------------------|-----|-------------------------------------------------------|-----|------------------------------------------------------------------|
| Families with female adolescents | | | | | |
| Adolescent unhappiness | Adolescent unhappiness | t-1 | .51*** (.44–.58) | t-1 | .51*** (.43–.58) |
| | Maternal GHQ-12 | t-1 | .03* (.00–.06) | t | .06† (.00–.12) |
| | Paternal GHQ-12 | t-1 | .04* (.00–.07) | t | .07† (.00–.15) |
| Maternal GHQ-12 | Adolescent unhappiness | t-1 | .03 (–.01 to .07) | t | .06 (–.02 to .13) |
| | Maternal GHQ-12 | t-1 | .49*** (.46–.53) | t-1 | .49*** (.45–.52) |
| | Paternal GHQ-12 | t-1 | .06** (.02–.10) | t | .13** (.03–.22) |
| Paternal GHQ-12 | Adolescent unhappiness | t-1 | –.01 (–.06 to .03) | t | –.02 (–.10 to .05) |
| | Maternal GHQ-12 | t-1 | .04* (.00–.08) | t | .08* (.01–.16) |
| | Paternal GHQ-12 | t-1 | .46*** (.42–.50) | t-1 | .45*** (.41–.49) |
| Families with male adolescents | | | | | |
| Adolescent unhappiness | Adolescent unhappiness | t-1 | .62*** (.54–.69) | t-1 | .62*** (.54–.69) |
| | Maternal GHQ-12 | t-1 | .02 (–.01 to .05) | t | .03 (–.01 to .08) |
| | Paternal GHQ-12 | t-1 | .01 (–.02 to .04) | t | .02 (–.05 to .08) |
| Maternal GHQ-12 | Adolescent unhappiness | t-1 | .01 (–.03 to .05) | t | .02 (–.06 to .09) |
| | Maternal GHQ-12 | t-1 | .58*** (.55–.61) | t-1 | .58*** (.55–.61) |
| | Paternal GHQ-12 | t-1 | .02 (–.02 to .06) | t | .04 (–.04 to .12) |
| Paternal GHQ-12 | Adolescent unhappiness | t-1 | .01 (–.03 to .05) | t | .01 (–.06 to .08) |
| | Maternal GHQ-12 | t-1 | .04* (.00–.07) | t | .07* (.01–.12) |
| | Paternal GHQ-12 | t-1 | .50*** (.47–.54) | t-1 | .50*** (.47–.54) |

* $p < .05$; ** $p < .01$; and *** $p < .001$; † $p < .10$.

CI = confidence interval; GHQ-12 = 12-item General Health Questionnaire.

^a Adjusted for the age of adolescent, marital status of parents, and logged equivalized household income.

adolescent children is reflected in much of the existing literature. Powdthavee and Vignoles [4] found an effect of maternal psychological distress on the life satisfaction of girls but not boys, while Ranoyen et al. [15] found stronger and more consistent associations between parents' and daughter's mental health than between parents' and son's mental health, Landman-Peeters et al. [20] concluded that intergenerational transmission of emotional disorder was strongest when one or both of the affected parent and child are of female gender and Van der Valk et al [11]. found reciprocal relationships between parental marital distress and adolescent emotional adjustment where the adolescent was a girl, but no relationships where they were a boy. Conversely, Ge et al. [6] found reciprocal effects between adolescent and parent psychological distress were stronger with the opposite sex parent for both boys and girls. Van der Valk et al. [11] discussed the gender difference they observed in the context of adolescent girl's greater social sensitivity and suggested that this could lead to greater interpersonal involvement, resulting in other relationships within the family being more affected by girl's well-being than by boy's, an explanation which may be of relevance to our findings.

Our finding of similar effects in our cross-lagged (longitudinal) and nonrecursive (contemporaneous) models can serve to increase our confidence in our findings [27], and our observation of slightly larger effects in the contemporaneous model compared with the longitudinal model reflects similar observations in the literature [13,27]. Although our observed effect sizes for the inter-relationships between parental mental distress and adolescent unhappiness are small, these are of similar size to those in previous studies (e.g., [4,13]). Adachi and Willoughby [29] justify the importance of even very small effects in longitudinal autoregressive models: since past levels of the outcome are adjusted for to take account of "stability effects," the size of the effect of the predictor on the outcome is greatly reduced. Furthermore, small effects are not necessarily trivial, particularly when they reflect an ongoing process related to the well-being of individuals and families [30].

Despite its novel contribution to the literature, our work has the following limitations. First, the analyses performed here were restricted to families with an adolescent child and a mother and father present in the household. This excludes two important and interesting groups from our analyses, namely single parent families and families in which parents are of the same gender. In their investigation of the relationship between parental psychiatric problems and children's behavioral and emotional problems, Schleider et al. [31] highlighted the importance of family structure, but unfortunately our analytic method did not allow for us to include a wider range of family forms.

Second, we only investigated the relationships between unhappiness and mental distress of one randomly selected adolescent and their parents. Although we recognize the important influences on adolescents' unhappiness of the wider social context, including siblings and peers (e.g., [32]), our models did not allow for data from other children present to be included and data on peers were not available. Our exploration of the influences of the presence of other children is therefore restricted to the number of other children in the household and whether the sample adolescent was their parents' eldest child. Neither influenced the associations between adolescent unhappiness and parental mental distress. Future work should explore associations between unhappiness of siblings and the effect of sibling gender.

Third, unlike some excellent examples from the existing literature, we have not explored the pathways through which adolescents' unhappiness and parents' mental distress might influence each other. Existing hypothesized pathways which have met with some support include parenting practices [12,14], parent-child relationship quality [4,17], and parental marital relationship quality [9,11,14]. Leinonen et al. [14] found that the effects of parental mental health on child adjustment were completely mediated by marital interaction and parenting style, whereas Woodhouse et al. [17] found that perceptions of mothers as a secure base, in terms of attachment, mediated the relationship between maternal and adolescent depressive symptoms. When Blodgett Salafia et al. [9] investigated similar

research questions they found some mediation by marital conflict in the bidirectional relationship between maternal emotional distress and adolescent internalizing and, particularly externalizing, behaviors. Unfortunately similar analyses were not possible here, since marital quality and quality of relationships children have with their parents are measured only at alternative waves in UKHLS.

Fourth, due to a lack of relevant data, we have not been able to take account of whether participants have received treatment for unhappiness or mental distress. Any bias this has introduced has likely led to an underestimation of associations between parental mental distress and adolescent unhappiness.

The unhappiness scale has been measured previously in the Millennium Cohort Study and the British Household Panel Survey and is robust alongside other measures of well-being [24–26]. Clair used the same measures, taken from British Household Panel Survey, to indicate child life satisfaction in an investigation of the effect of parental life satisfaction on adolescent life satisfaction [13]. Sensitivity analyses using SDQ, which provides an alternative measure of young people's well-being, showed, for the most part, no effects of parents' GHQ-12 on their adolescent children's SDQ or vice versa. We suggest that this is due to the use of two-year lags which reduced the analytic sample size. This also reinforces our hypothesis that adolescence is a dynamic time during which the inter-relationships between the mental health and well-being of family members should be investigated over short follow-up periods to detect effects.

Our findings contribute importantly to the existing literature on the influence parents and their adolescent children have upon each other's well-being. Our results are in line with most of the existing literature: mental distress of parents has an influence on unhappiness of adolescent daughters but not sons, and mental distress of one parent can influence that of the other, particularly when there is an adolescent daughter in the family. While sociological and psychological literature has broached the concept of reciprocity in parent-child relationships, [33] this has not always translated in the design and implementation of interventions. Yet reciprocity has implications for the etiology, maintenance, assessment, and treatment of psychological and behavioral problems [34]. Our results suggest that family dynamics should be considered when assessing and treating adolescents and their families.

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