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Childhood Maternal Warmth, Social Safety Schemas, and Adolescent Mental and Physical Health

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IMPORTANCE Although early maternal warmth strongly predicts adolescent health, questions remain about the biopsychosocial mechanisms underlying this association.

OBJECTIVE To understand how maternal warmth at 3 years of age shapes adolescent social safety schemas at 14 years of age and physical and mental health at 17 years of age.

DESIGN, SETTING, AND PARTICIPANTS The Millennium Cohort Study tracks approximately 19 200 children born from late 2000 to early 2002 in the UK. Participants were assessed from ages 3 to 17 years.

EXPOSURE Low maternal warmth (eg, lack of praise, negative tone of voice when speaking to the child) and maternal harshness (eg, using physical restraint, grabbing the child) were independently coded during a home visit (age 3 years).

MAIN OUTCOMES AND MEASURES Social safety (age 14 years) was measured by children's responses to 3 items (eg, "I have family and friends who help me feel safe, secure and happy"). Physical health was self-reported on a scale ranging from 1 (excellent) to 5 (poor) (age 17 years). Psychological distress (age 17 years) was assessed using the 6-item Kessler Psychological Distress Scale. Psychiatric problems (age 17 years) was a latent variable composed of self-disclosed clinical diagnosis of depression/anxiety, self-harm, and suicidal behaviors.

RESULTS The present sample included 8540 youths (52% female; 3.0% Black or Black British, 2.8% Indian, 6.7% Pakistani and Bangladeshi, 2.8% Mixed, 83% White, and 1.6% other). Data were analyzed from March 2024 to September 2024 using structural equation modeling. In models controlling for sex, ethnicity, income, neighborhood disadvantage, maternal mental health, and early cognitive ability, the paths from childhood maternal warmth (but not harshness) to social safety schemas at 14 years of age (b = 0.03; P < .001) and physical health at 17 years of age (b = 0.05; P = .02) were significant, suggesting that early maternal warmth enhances subsequent perceived social safety and physical health. Additionally, the paths from negative social safety schemas at 14 years of age to poorer physical health (b = 0.50; P < .001), psychological distress (b = 5.37; P < .001), and psychiatric problems (b = 0.21; P < .001) at 17 years of age were significant, suggesting that greater perceived social safety prospectively predicts better health. Social safety at 14 years of age mediated 20% to 100% of the effect of early maternal warmth on physical health, psychological distress, and psychiatric problems at 17 years of age (b = 0.01-0.15; P < .001 for all).

CONCLUSIONS AND RELEVANCE These results show that early-life maternal warmth affected adolescent health by influencing perceptions of social safety. Improving parent-child relationships and enhancing youths' perceptions of social safety may thus improve adolescent health.

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Supplemental content

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Understanding how parental warmth impacts the lifelong health of children is critical for determining how to improve population health. In this context, it is well-known that the quality of early-life parenting predicts mental and physical health outcomes in children, including depression and anxiety.[1-12] Although the strength of these associations varies, the consistent takeaway is that greater parental warmth is related to a reduced risk and severity of anxiety and depression across the lifespan.[2,13,14] Conversely, past research has shown that harsh parenting portends an increased risk and severity of depression and anxiety.[4,7,8] Furthermore, prior studies have suggested that harsh parenting can negatively affect physical health[15-17] across the lifespan. Although these findings collectively show that maternal warmth is beneficial for offspring health and that maternal harshness is harmful, precisely how experiences of parental warmth lead to changes in health across development remains unclear.

Social Safety Theory[18] provides a possible biopsychosocial explanation, positing that humans evolved to develop and maintain close social bonds to provide critical resources (eg, food, water, safety), reduce the risk of social conflict and physical injury, and increase the likelihood of reproductive success.[18-20] Just as the presence of social safety (eg, social integration, belonging) has multiple survival and health benefits, social threat (eg, social isolation, exclusion) can harm human health by activating components of the immune system involved in inflammation, which increases the risk of a variety of somatic and mental health problems, including anxiety disorders, depression, and suicidality.[12,13]

One way that experiences of social safety and threat may impact child health is by shaping the extent to which children believe their world is socially safe vs dangerous. These social safety schemas can impact social attitudes, behaviors, and expectations,[19] in turn affecting health and well-being. Although constructs such as received and perceived support and social connectedness are related to social safety schemas, they are distinct. For example, a person may have friends or family members who provide tangible (eg, monetary) assistance, but who fundamentally disagree with the individual's lifestyle, values, or decisions, leading to an experience of marginalization, devaluation, rejection, or exclusion.[19] From the perspective of Social Safety Theory, exposure to more parental warmth in early childhood may foster a sense that the social world is more caring, supportive, and dependable, in turn reducing the need for biological defense processes such as inflammation. Prior research on this topic has shown that early-life maternal warmth increases perceived social support by influencing individuals' general sense of belonging.[21] To our knowledge, no studies have longitudinally investigated whether perceptions of social safety prospectively mediate the impact of maternal warmth on adolescent health, which could be useful for developing interventions aimed at fostering well-being in adolescents who have faced poorer maternal care.

To address this gap, data from a large, population-based cohort were used to longitudinally examine whether social safety schemas in adolescence mediate the association between the quality of early-life maternal warmth and adverse health outcomes in late adolescence—namely, subjective physical health problems, psychological distress, and psychiatric problems (ie, depression, anxiety, and suicidal and self-harm behavior). Specifically, we hypothesized that social safety schemas in middle adolescence (age 14 years) would mediate the association between observer-reported early-life maternal warmth (age 3 years) and adverse health outcomes in late adolescence (age 17 years), with greater maternal warmth fostering more positive social safety perceptions that, in turn, predict better mental and physical health. In addition, we hypothesized that social safety schemas in middle adolescence (age 14 years) would mediate the association between observer-reported maternal harshness (age 3 years) and adverse health outcomes in late adolescence (age 17 years), with greater maternal harshness predicting more negative social safety perceptions that, in turn, portend worse mental and physical health. If supported, this work would contribute to the understanding of the mechanisms through which parenting influences mental and physical health outcomes in adolescents, which is critical given the increasing rates of adolescent anxiety and depression around the globe.[22,23]

Key Points

Question Does maternal warmth in early childhood shape youths' perceptions of social safety in middle adolescence in a manner that influences mental and physical health in late adolescence?

Findings Greater maternal warmth at 3 years of age was associated with greater perceived social safety at 14 years of age. Additionally, social safety at 14 years significantly mediated associations between maternal warmth at 3 years and physical health, psychological distress, and psychiatric problems (ie, depression/anxiety, self-harm, suicidal behaviors) at 17 years.

Meaning Social safety schemas may be a critical, potentially modifiable factor linking early-life maternal warmth with mental and physical health in adolescence.

Methods

Participants and Analytic Sample

The Millennium Cohort Study is a birth cohort survey in the UK tracking approximately 19 200 children born across the 4 UK countries from 2000 through 2002[24] using a representative sampling design (using sampling weights) (see the study by Plewis et al[25] for additional details). Data collection took place through interviews with the mothers (and a negligible number of fathers; not included in the present analysis) and using test batteries and questionnaires in the child's home. Ethical approvals were obtained in each survey sweep through the National Health Service's research ethics committee system with multicenter ethics committees. Informed consent was given by parents before any interviews were conducted. Children provided their assent at 11 years of age and consent at 14 and 17 years of age. We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

The survey wave of children aged 3 years included 15 575 cohort members who were singletons or firstborn twins or triplets, the survey wave of those aged 14 years included 11 726 families, and the survey wave of those aged 17 years included 10 625 families. For the present analysis, all participants were singletons (or firstborn twins or triplets) and had valid data for both maternal warmth at age 3 years (the main exposure variable) and the 6-item Kessler Psychological Distress Scale for psychological distress at age 17 years. The final sample consisted of 8540 children.

Measures and Procedures

Low Maternal Warmth (Age 3 Years)

As part of the cognitive assessment for children at 3 years of age, the interviewer assessed each child's interactions with their mother using the Home Observation Measurement of the Environment-Short Form (HOME) scale from Caldwell and Bradley.[26] The subscale used here was negative maternal responsivity (or low level of maternal warmth), which coded for 5 different behaviors during naturalistic play. This subscale ranged from 0 to 5, where 5 indicates that 0 of 5 positive interactions were observed (eg, voice when speaking of or to the child conveyed positive feeling; mother conversed with the child at least twice, discounting any scolding or negative comments; mother caressed, kissed, or cuddled the child at least once). A value of 0 indicates that all 5 of the positive interactions took place (Cronbach α = .67).

Harsh Parenting (Age 3 Years)

In addition to capturing maternal warmth in the HOME visits, 3 additional behaviors were also coded for maternal harshness. The range of this measure was from 0 to 3, where the maximum score indicates that all 3 of the harsh parenting interactions were observed (mother scolded or made derogatory comments to child; mother used physical restraint, grabbed, or pinched child during the visit; and mother slapped or spanked the child during the visit) (Cronbach α = .47).

Social Safety Schemas (Age 14 Years)

Cohort members responded to 3 items that captured their perceptions of social safety and belonging on a scale ranging from 1 to 3 (1 indicates agree; 2, neither agree nor disagree; and 3, disagree), with higher values in each case corresponding to more negative perceptions of social safety (with the last item reverse-coded): "I have family and friends who help me feel safe, secure, and happy," "There is someone I trust whom I would turn to for advice if I were having problems," and "There is no one I feel close to." In the structural equation models, the negative social safety measure was a latent variable composed of these 3 items.

Physical Health Problems (Age 17 Years)

Cohort members were asked to describe their overall physical health, choosing between 1 (excellent), 2 (very good), 3 (good), 4 (fair), and 5 (poor).

Psychological Distress (Age 17 Years)

Cohort members completed the 6-item Kessler Psychological Distress Scale,[27] which measures nonspecific psychological distress across emotions including hopelessness, nervousness, and sadness (eg, "During the last 30 days, about how often did you feel hopeless?"). Each item response was on a 5-point Likert scale ranging from 0 (none of the time) to 4 (all of the time). The total score ranged from 0 to 24, with higher scores indicating more psychological distress (Cronbach α = .86).

Psychiatric Problems (Age 17 Years)

Cohort members also responded to binary items (yes or no) that collectively defined the latent variable of psychiatric problems. Participants reported whether they had received a clinical diagnosis of depression or anxiety, ever hurt themselves on purpose to end their life, or displayed any behaviors such as cutting, stabbing, burning, bruising, or pinching themselves or pulling out their hair. These 3 items loaded onto the latent variable with standardized factor loadings of at least 0.58, 0.69, and 0.55, respectively.

Covariates

Neighborhood Disadvantage (Survey Stratum)

Neighborhood disadvantage was based on UK electoral wards and tracking deprivation through the Child Poverty Index. Each UK country has an "advantaged" and a "disadvantaged" stratum, whereby area disadvantage corresponds to wards in the upper quartile (poorest 25%) of the Child Poverty Index. In England, there was a third stratum (ethnic minority) that identified areas with at least 30% Black (Black Caribbean, Black African, and Black Other) or Asian (Indian, Pakistani, and Bangladeshi) populations, as defined in the 1991 census.

Income (Age 3 Years)

The family's total household income was a derived variable provided in Organisation for Economic Co-operation and Development–equivalized quintiles (an interval variable ranging from 1 to 5).

Maternal Depression/Anxiety (Age 3 Years)

The mother's prior clinical diagnosis of depression or anxiety (up to the time of the interview at the age 3 year survey wave) was a binary variable (yes or no; coded as 1 or 0).

Biological Sex (Age 9 Months)

The child's biological sex at birth (male or female) was provided by the primary caregiver in the first survey wave at age 9 months.

Ethnicity (Age 9 Months)

The child's ethnicity was provided by the primary caregiver according to the categories of the UK census (**Table 1**) and was reported in the first survey wave at age 9 months. For the present analysis, this variable was dichotomized into White and non-White categories. Ethnicity was included in the analysis because race and ethnicity have been shown to be associated with both mental health and social support in adolescence.[28-30]

Cognitive Ability (Age 3 Years)

Cognitive ability was indexed by verbal ability in early childhood, which was captured with a subscale of the British

Table 1. Participant Demographic Characteristics and Sample Bias Analysis

Characteristic	No. (%)		*P* value[a]
	Analytic sample (n = 8540)	Rest of sample (n = 7035)	
Biological sex			
Male	4129 (48)	3818 (54)	<.001
Female	4411 (52)	3217 (46)	
Neighborhood disadvantage			
England (advantaged)	2522 (30)	1684 (24)	<.001
England (disadvantaged)	2080 (24)	1795 (26)	
England (ethnic minority)	1050 (12)	909 (13)	
Wales (advantaged)	405 (4.7)	287 (4.1)	
Wales (disadvantaged)	823 (9.6)	744 (11)	
Scotland (advantaged)	489 (5.7)	443 (6.3)	
Scotland (disadvantaged)	408 (4.8)	472 (6.7)	
Northern Ireland (advantaged)	320 (3.7)	265 (3.8)	
Northern Ireland (disadvantaged)	443 (5.2)	436 (6.2)	
Ethnicity	n = 8503	n = 6973	
White	7064 (83)	5820 (83)	.04
Mixed	239 (2.8)	209 (3.0)	
Indian	239 (2.8)	162 (2.3)	
Pakistani and Bangladeshi	573 (6.7)	442 (6.3)	
Black or Black British	256 (3.0)	253 (3.6)	
Other ethnic group	132 (1.6)	87 (1.2)	
Income	n = 8487	n = 6901	
1 (Lowest)	1577 (19)	1757 (25)	<.001
2	1696 (20)	1688 (24)	
3	1731 (20)	1300 (19)	
4	1705 (20)	1202 (17)	
5 (Highest)	1778 (21)	954 (14)	
Maternal depression/anxiety	n = 8131	n = 6654	
0 (Never diagnosed)	5921 (73)	4572 (69)	<.001
1 (Diagnosed)	2210 (27)	2082 (31)	
Cognitive (verbal) ability, mean (SD)[b]	50 (12) [n = 8062]	49 (11) [n = 6253]	<.001
Low maternal warmth		n = 5831	
0	7370 (86)	4791 (82)	<.001
1	750 (8.8)	636 (11)	
2	250 (2.9)	195 (3.3)	
3	103 (1.2)	106 (1.8)	
4	46 (0.5)	64 (1.1)	
5	21 (0.2)	39 (0.7)	
Harsh parenting		n = 5959	
0	7772 (91)	5214 (87)	<.001
1	593 (6.9)	549 (9.2)	
2	150 (1.8)	169 (2.8)	
3	25 (0.3)	27 (0.5)	
Family/friends safety	n = 7794	n = 2517	
1	6705 (86)	2107 (84)	.008
2	1059 (14)	394 (16)	
3	30 (0.4)	16 (0.6)	
Interpersonal trust	n = 7787	n = 2514	
1	6134 (79)	1936 (77)	.17
2	1452 (19)	509 (20)	
3	201 (2.6)	69 (2.7)	
Someone I feel close to	n = 7766	n = 2499	
1	6950 (89)	2200 (88)	.09
2	647 (8.3)	231 (9.2)	
3	169 (2.2)	68 (2.7)	

(continued)

Table 1. Participant Demographic Characteristics and Sample Bias Analysis (continued)

Characteristic	No. (%)		P value[a]
	Analytic sample (n = 8540)	Rest of sample (n = 7035)	
Psychological distress, mean (SD)[c]	7.3 (4.9)	6.6 (4.6) [n = 654]	<.001
Clinical diagnosis (depression/anxiety)	n = 7959	n = 624	
0 (No)	7112 (89)	576 (92)	.02
1 (Yes)	847 (11)	48 (7.7)	
Suicide attempt	n = 7832	n = 613	
0 (No)	7243 (92)	588 (96)	.002
1 (Yes)	589 (7.5)	25 (4.1)	
Self-harm	n = 7833	n = 616	
0 (No)	6048 (77)	507 (82)	.004
1 (Yes)	1785 (23)	109 (18)	
Physical health problems	n = 7850	n = 695	
1 (None)	2302 (29)	209 (30)	.32
2	3127 (40)	255 (37)	
3	1874 (24)	182 (26)	
4	461 (5.9)	38 (5.5)	
5	86 (1.1)	11 (1.6)	

[a] Pearson χ^2 test; Welch 2-sample *t* test.

[b] Based on British Ability Scales II age- and ability-adjusted *t* scores; range, 20-80, with higher scores indicating higher verbal ability.

[c] Based on the 6-item Kessler Psychological Distress Scale; range, 0-24, with higher scores indicating more psychological distress.

Ability Scales II—specifically, the Naming Vocabulary, which is designed to measure expressive language skills by assessing children's spoken vocabulary (range, 20-80; higher scores indicate higher verbal ability).[31]

Statistical Analysis

Missingness, Sample Bias, and Correlations

Descriptive analyses were performed to identify possible differences between participants included vs excluded from the analytic sample and to ensure that missingness was both low and random (ie, values were missing at random), a step that also informed the imputation process later. Pairwise correlations were calculated to provide a better sense of the link between the numerical variables in the study and to ensure there was minimal risk of collinearity in the models. Full details of missingness and all other results are in the supplemental online material.[32]

Survey-Weighted Imputed Structural Equation Models

Six structural equation models were used to test the hypothesis that social safety schemas in middle adolescence mediate the association between early childhood maternal warmth and late adolescence health outcomes. Two models were fitted for each of the 3 health outcomes: a minimally adjusted model that controlled for biological sex and neighborhood disadvantage only and a fully adjusted model that also controlled for ethnicity, equivalized household income, maternal depression/anxiety, and the cohort member's cognitive ability. This 2-tier analysis (with survey weights) was conducted to ensure that the additional confounders (all of them taken from the first 2 waves of the survey, that is, at or before age 3 years) did not introduce biases, such as omitted variable bias or multicollinearity bias. Both relative and absolute model fit indices were used to ensure that model fit was acceptable—namely, the robust Comparative Fit Index and the Tucker-Lewis Index (which measured how well the structural equation model fit the observed data compared with a null model, adjusting for sample size and penalizing for model complexity), as well as the standardized root mean square residual and the root mean square error of approximation (which measured how well the hypothesized model reproduces the observed data without reference to a null model). Missing data were imputed using multiple imputation by chained equations[33] and the imputed datasets were combined following Rubin rules.[34] All calculations were performed using R[32] with the mice package[35] and the structural equation package lavaan[35] (R Foundation). Hypothesis testing was 2-sided, with $\alpha = .05$ indicating statistical significance.

Results

Participants

Characteristics of the final analytic sample (N = 8540) are provided in Table 1, and a simplified model of the main analysis is depicted in the **Figure**. In addition, a summary of the results for the 3 fully adjusted models is shown in **Table 2**. In each case, the model fit was excellent based on all relevant indices. Complete details for each model can be found in the supplemental online material.[32]

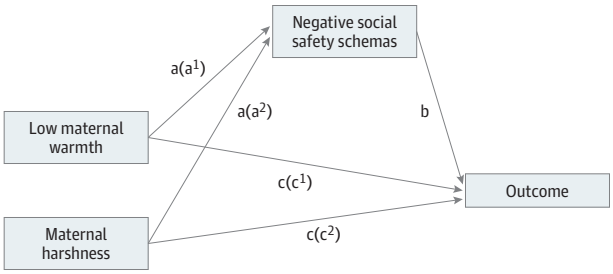
Social Safety Schemas

As hypothesized, results revealed that youth who experienced more maternal warmth at 3 years of age had significantly more positive social safety schemas at 14 years of age ($b = 0.03$; $P < .001$). In contrast, the path from maternal harshness at 3 years of age to social safety schemas at 14 years of age was nonsignificant ($b = 0.01$; $P = .42$).

Physical Health

The path from maternal warmth at 3 years of age to physical health at 17 years of age was significant ($b = 0.05$; $P = .02$). Furthermore, youth exhibiting more negative social safety schemas at 14 years of age had worse physical health at 17 years of

Figure. Crude Structural Regression Model



Simplified schematic of the crude structural regression model. Paths from the independent variables (exposures) to the mediator are labeled "a" (a^1 and a^2). The path from the mediator to the outcome is labeled "b." Direct paths from the exposures to the outcome are labeled "c"(c^1 and c^2).

age (b = 0.50; P < .001), and the indirect path from maternal warmth (age 3 years) to physical health (age 17 years) through negative social safety schemas (age 14 years) was significant (b = 0.01; P = .001). In this case, the model explained 6% of the variance in physical health problems, and social safety schemas mediated approximately 20% of the total prospective association between childhood maternal warmth and physical health problems.

Psychological Distress

Although more negative social safety schemas at 14 years of age were significantly associated with higher psychological distress at 17 years of age (b = 5.37; P < .001), the direct path from maternal warmth to psychological distress was nonsignificant (b = −0.06; P = .57). However, the indirect path from maternal warmth (age 3 years) to psychological distress (age 17 years) through negative social safety schemas (age 14 years) was significant (b = 0.15; P < .001). Therefore, as hypothesized, a lack of maternal warmth at 3 years of age was significantly indirectly associated with psychological distress at 17 years of age through negative social safety schemas at 14 years of age. In this case, the model explained 14% of the variance in psychological distress, and the total prospective association between early maternal warmth and psychological distress was fully mediated by social safety schemas.

Psychiatric Problems

Youth with more negative social safety schemas at 14 years of age had more psychiatric problems at 17 years (b = 0.21; P < .001); however, the direct path from maternal warmth at 3 years of age to psychiatric problems at 17 years of age was nonsignificant (b = 0.00; P = .58). In turn, the indirect path from maternal warmth (age 3 years) to psychiatric problems (age 17 years) through negative social safety schemas (age 14 years) was significant (b = 0.01; P < .001). Therefore, as hypothesized, a lack of maternal warmth at age 3 was indirectly associated with psychiatric problems at 17 years of age through negative social safety schemas at 14 years. In this case, the model explained 17% of the variance in psychiatric problems, and social safety schemas mediated approximately 60% of the total prospective association between early maternal warmth and psychiatric problems.

Discussion

The present findings show that youths' perceptions of social safety mediate the association between childhood maternal warmth and adolescent health outcomes in a population-based study. Observer-assessed maternal warmth at 3 years of age was associated with more positive social safety schemas at 14 years of age, suggesting that youth who experienced more maternal warmth in early life were more likely to develop more positive social safety schemas in adolescence compared with those who experienced less maternal warmth. These findings also demonstrate that social safety schemas in middle adolescence were associated with self-reported physical health, psychological distress, and psychiatric problems in late adolescence (age 17 years), with youth exhibiting more positive social safety schemas reporting better physical and mental health years later. In contrast, all direct and indirect paths from maternal harshness to both social safety schemas at age 14 years and subsequent health were nonsignificant. These data thus highlight the critical role that youths' perceptions of social safety play in the association between early-life maternal care and subsequent health and well-being.

Because both warmth and harshness were measured in the same model, the results suggest that maternal warmth may positively influence adolescent mental health more strongly than the negative influence of maternal harshness. These results further support the important shift from exclusively focusing on reducing poor care to also increasing positive care as articulated in Social Safety Theory. Prior research on this topic[15] has found that having 1 warm and responsive parent can help buffer the negative impact of harsh parenting on health, although the mediating mechanisms have remained unclear. The present results extend this work and suggest that that public health interventions aimed at increasing maternal warmth may be particularly effective in positively impacting adolescent health.

In addition, the present findings show that maternal warmth at 3 years of age influenced how adolescents think about the availability of social safety at 14 years of age, which positively affected both mental and physical health at 17 years of age. These results are consistent with prior research showing that maternal warmth is related to feelings of safeness and received social support,[21] but extend this work by elucidating the social-cognitive mechanisms underlying these associations. The results thus support Social Safety Theory[12,13] and point to an important takeaway that even if actual rearing environments cannot be changed, public health campaigns that help individuals increase perceptions of social safety may still benefit youth mental health.

Clinical Implications

The need for effective interventions to combat anxiety, depression, self-harm, and suicide have never been greater. The present results may be useful in this context because they speak to the idea that if health care professionals are able to augment a youth's social safety schema by increasing their perceptions of available social safety and inclusion, they may be

Table 2. Coefficients for Direct and Indirect Paths in the Fully Adjusted Structural Regression Model Among 8540 Participants (Imputed, Survey-Weighted)

Variable	Unstandardized estimate (SE)			
	Physical health problems	Psychological distress	Psychiatric problems	Negative social safety (age 14 y)
Low maternal warmth	0.05 (0.02)[a]	−0.06 (0.10)	0.00 (0.00)	0.03 (0.01)[b]
Harsh parenting	−0.01 (0.03)	−0.05 (0.16)	0.00 (0.01)	0.01 (0.01)
Negative social safety	0.50 (0.07)[b]	5.37 (0.43)[b]	0.21 (0.02)[b]	
Male	−0.10 (0.02)[b]	−2.10 (0.11)[b]	−0.07 (0.01)[b]	
England (disadvantaged)	−0.01 (0.03)	−0.06 (0.17)	0.01 (0.01)	
England (ethnic minority)	−0.06 (0.07)	−0.15 (0.29)	−0.00 (0.01)	
North Ireland (advantaged)	−0.51 (0.07)[b]	−0.28 (0.27)	−0.03 (0.01)[c]	
North Ireland (disadvantaged)	−0.21 (0.07)[c]	−0.48 (0.28)	−0.01 (0.02)	
Scotland (advantaged)	−0.07 (0.06)	0.22 (0.24)	0.02 (0.02)	
Scotland (disadvantaged)	0.03 (0.05)	0.26 (0.23)	−0.00 (0.01)	
Wales (advantaged)	−0.06 (0.04)	0.07 (0.24)	0.01 (0.01)	
Wales (disadvantaged)	−0.08 (0.05)	−0.01 (0.23)	0.00 (0.01)	
Black or Black British[d]	−0.04 (0.09)	−0.70 (0.37)	−0.04 (0.02)[a]	
Indian[d]	0.14 (0.08)	−0.51 (0.41)	−0.04 (0.02)[a]	
Pakistani and Bangladeshi[d]	0.07 (0.06)	−1.07 (0.38)[c]	−0.08 (0.02)[b]	
Mixed[d]	0.18 (0.08)[a]	0.23 (0.36)	−0.01 (0.02)	
Other ethnic group[d]	−0.06 (0.09)	−0.00 (0.50)	−0.04 (0.02)[a]	
Income	−0.07 (0.01)[b]	−0.15 (0.06)[c]	−0.01 (0.00)[b]	
Maternal depression/anxiety	0.14 (0.03)[b]	1.01 (0.13)[b]	0.05 (0.01)[b]	
Cognitive ability	−0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	
Indirect paths				
Low maternal warmth → negative social safety → outcome	0.01 (0.00)[b]	0.15 (0.00)[b]	0.01 (0.00)[b]	
Harsh parenting → negative social safety → outcome	0.00 (0.01)	0.00 (0.00)	0.00 (0.01)	
Factor loadings (for negative social safety)				
Safety of family and friends	0.67	0.68	0.67	
Interpersonal trust	0.58[b]	0.56[b]	0.57[b]	
Someone I feel close to	0.47[b]	0.47[b]	0.47[b]	
Fit indices				
Scaled χ^2	196.52 (57)[b]	204.28 (57)[b]	337.10 (101)[b]	
CFI	0.95	0.95	0.96	
TLI	0.93	0.93	0.95	
RMSEA	0.02	0.02	0.02	
SRMR	0.01	0.01	0.01	

Abbreviations: CFI, Comparative Fit Index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker-Lewis Index.

[a] $P < .05$.

[b] $P < .001$.

[c] $P < 01$.

[d] The child's ethnicity was provided by the primary caregiver according to the categories of the UK census.

able to improve both their mental and physical health even when they have experienced low maternal warmth. On an individual level, results of the present study indicate that modifying social cognitions involving social safety (eg, engaging the community, building social networks) may be especially effective for reducing mental and physical health risks in adolescence.

On a collective level, schools and organizations where youth spend much of their time may benefit from adopting public health interventions that foster a stronger sense of social connection, inclusion, and belonging. Findings of this study suggest that public health campaigns aiming to reduce mental health difficulties in youth may not only benefit from promoting warm, positive parenting, but also by helping adolescents develop a stronger sense of social safety. Although the present data do not speak to how social safety can be boosted (eg, behaviors and experiences that influence social safety above and beyond maternal care), they nevertheless address the idea that if it is possible to augment an adolescent's social safety schema—for example, by using cognitive behavior therapy or enhancing social engagement—then it may be possible to improve mental health even after the experience of poor early maternal care. Broadly speaking, these results provide the support needed to motivate future research on what experiences and behaviors (eg, community engagement, peer support, social integration, social network building) may augment social safety schemas and how they influence health and well-being over time.

This study has several strengths. First, a large, longitudinal dataset with a diverse population was used, which en-

abled the characterization of temporal associations between maternal care and health. Second, maternal care was assessed by trained, third-party observer reports (instead of self-reports), thus ensuring the quality of the main independent variable (eg, by reducing biases in parent or child reports of care). Third, multiple mental and physical health outcomes were assessed, which enabled examination of the association between maternal care and social safety schemas on a variety of mental and physical health outcomes.

Limitations

Several limitations of this study should also be noted. First, given the data available, paternal care was not measured. Prior research has found that warmth from a second parent can buffer the negative care received from the other.[9] Overall, paternal warmth has been relatively overlooked,[8] despite research suggesting that it also is associated with child outcomes.[2] Second, because the measurement of social safety schemas was restricted by the data available, future research should consider measuring cognitive representations of safety across the social self, world, and future.[14] Third, additional studies are needed to examine the generalizability of these findings to other nations, cultures, and contexts in which parenting practices differ.[36]

Conclusions

These results highlight the critically important role that childhood maternal warmth plays in shaping mental and physical health into late adolescence. In addition, the data extend prior research by showing that perceptions of social safety are a critical mediator linking experiences of early maternal warmth and adolescent well-being. The results thus have important implications for guiding public health efforts by providing evidence in favor of investing in programs that not only improve parent-child relationships, but also adolescents' perception of social safety.

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