A Biopsychosocial Approach to Asthma in Adolescents Encountering Child Protective Services

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Objective To further test the validity of the Biobehavioral Family Model (BBFM), a biopsychosocial approach to explaining the effects of family processes on illness, by testing the model with adolescents with asthma involved in child protective services (CPS), a sample for whom the model’s constructs are highly relevant. Methods Data are from the National Survey of Child and Adolescent Well-Being, CPS sample (n = 5,501). Adolescents with asthma (n = 101, ages 11–15 years) self-reported their negative emotional climate (NFEC; caregiver psychological aggression and caregiver relationship quality), caregiver–adolescent relational security, and depressive symptoms. Caregivers rated adolescent health quality. Models were tested using path analyses and bootstrapping. Results Path analyses and bootstrapping results demonstrate support for the BBFM in explaining health quality for this sample. Conclusions Applying the BBFM to families involved with CPS demonstrates pathways by which family processes affect health quality of adolescents with asthma, underscoring the need for biopsychosocial assessments and services.

Key words asthma; child abuse and neglect; depression; family functioning.

Introduction

Chronic illness during adolescence can be a difficult experience for both the adolescent and their family. Adolescents and families struggling with disease are often faced with realizations of changing health or adaptations required for illness management (Cohen, 1999). To best understand and treat these adolescents and their families, applying a biopsychosocial framework that explains both the etiology and impact of disease, symptom severity, and associated factors can be helpful. The Biobehavioral Family Model (BBFM; Wood & Miller, 2002), a model that examines biopsychosocial influences on health among family members with chronic illness, has been successfully applied to children and adolescents with asthma. The model posits that family functioning and emotion regulation are processes that recursively influence one another and, if maladaptive and dysregulated, negatively affect asthma severity in young family members (Wood et al., 2008). The influence of detrimental family patterns on health is particularly salient for adolescents involved with child protective services (CPS), as they are likely to have experienced many of the relevant factors related to the BBFM. Involvement with CPS indicates that a report of abuse and/or neglect has been made. Adolescents involved with CPS due to allegations of maltreatment are at increased risk of negative health outcomes whether reports of abuse or neglect are substantiated or not (Lanier, Jonson-Reid, Stahlschmidt, Drake, & Constantino, 2010). Although adolescents involved with CPS are likely to have experienced factors related to the BBFM, and demonstrate an even greater risk for negative health outcomes (Jee et al., 2006), the BBFM has not yet been applied to this specific population. Therefore, the current study further tests the predictive value of the BBFM with a sample of adolescents encountering CPS.

A Biopsychosocial Approach: The BBFM

Originally, the BBFM was an attempt to address the limitations of Minuchin’s psychosomatic family model, which
describes family relational processes and their association with child illness (Minuchin et al., 1975). Wood et al. (1989) sought to define the limitations of the psychosomatic family model, to reformulate it to include child biobehavioral reactivity (Wood, 1993), and to add parent–child attachment security as a mediating or moderating factor (Wood, Klebba, & Miller, 2000). The BBFM models the interdependence of family relationships, emotional processes, and physiological changes, describing the contribution of family emotional climate (Figure 1), parental relationship quality (Figure 2), parent–child relational security, and biobehavioral reactivity to disease severity in stress-related illnesses (Wood et al., 2008). This model has primarily been used to investigate pathways relevant to pediatric asthma as a stress-related illness. The authors of the BBFM theorized pathways of the effects of family through psychobiologic mediators on asthma activity. Despite the fact that family variables that affect asthma outcomes may be particularly pertinent for adolescents involved with CPS (Lanier et al., 2010), the BBFM has not yet been applied to families involved with CPS.

Family Emotional Climate
Family emotional climate is used in the BBFM to describe the intensity and positivity or negativity of emotional processes within the family (Wood et al., 2008). Negative family emotional climate (NFEC), characterized by hostility and criticism, directly contributes to depression for children and adolescents (age 7–17 years) with asthma; NFEC does not contribute to asthma disease severity, which is congruent with the BBFM’s proposition that a NFEC acts on illness through the emotionality of the child or adolescent (Wood et al., 2007).

\[ \chi^2 (1) = .029, p = .865, \text{RMSEA} = .000, \text{NFI} = 1.000, \text{CFI} = 1.000 \]

\[ \chi^2 (1) = .404, p = .525, \text{RMSEA} = .000, \text{NFI} = .995, \text{CFI} = 1.000 \]

**Figure 1.** Model 1, NFEC, relational security, adolescent depression and overall quality of health \( (n = 90) \). Significant paths are indicated in bold. \( ^*p < .05, ^{**}p < .001 \).

\[ \chi^2 (1) = .029, p = .865, \text{RMSEA} = .000, \text{NFI} = 1.000, \text{CFI} = 1.000 \]

**Figure 2.** Model 2, Caregiver relationship quality, relational security, adolescent depression and overall quality of health \( (n = 90) \). Significant paths are indicated in bold. \( ^*p < .05, ^{**}p < .01, ^{***}p < .001 \).
Family emotional climate is an especially relevant construct for adolescents involved with CPS due to allegations of neglect, psychological aggression and conflict, or physical or sexual abuse. In the National Survey of Child and Adolescent Well-Being (NSCAW) study of children and adolescents for whom a CPS decision regarding the substantiation of maltreatment was documented, 30% were determined to have experienced abuse or neglect (NSCAW, n.y.c.).

Caregivers’ Relationship Quality
Parental relationship quality refers to interactions between parents that may include either support and understanding, or hostility and conflict (Wood et al., 2008). Parental discord is part of a NFEC and negatively affects children and adolescents’ emotional functioning (Davies et al., 2002); this relationship is mediated by emotional security (Davies & Cummings, 1998). This is an especially relevant variable for families with CPS involvement. For example, data from the NSCAW CPS sample show that 45% of female caregivers report having experienced intimate partner violence in their lifetime; 29% have experienced violence in the last 12 months (Hazen, Connelly, Kelleher, Landsverk, & Barth, 2004).

Caregiver–Child Relational Security
The construct of relational security is related to attachment theory (Bowlby, 1969) and was added to the BBFM (Wood et al., 2000) to integrate theory representative of family systems (Wood, 2002). The authors of the BBFM propose that parent–child attachment/relational security is a substantial part of emotion regulation skill development (Hofer, 1994; Wood et al., 2008). The construct serves as a mediator between NFEC or caregiver relationship quality and biobehavioral reactivity in the BBFM.

Relational security and parent–child attachment is an important component in understanding families with child maltreatment. Parents who neglect and abuse their children have higher scores on the Child Domain of the Parenting Stress Index (Abidin, 1995), which is associated with parent–child attachment (Hadadian & Merbler, 1996); these parents view their children as demanding, noncompliant, and difficult (DiLauro, 2004). In addition, physically abused and neglected children and early adolescents (age 6–12 years) self-report significantly greater levels of insecure attachment styles (Finzi, Ram, Har-Even, Shnит, & Weizman, 2001).

Biobehavioral Reactivity
This portion of the BBFM connects psychological and emotional processes with physiological processes; biobehavioral reactivity is the way in which a family member responds to emotional stimuli (Wood et al., 2008) and is often measured as anxiety or depression (e.g., Wood et al., 2007, 2008).

Biobehavioral reactivity is a highly relevant construct in examining families with CPS involvement. Data from the NSCAW CPS sample show that these children and adolescents report greater levels of mental health concerns than non-CPS comparisons; 15% specifically report symptoms of depression (NSCAW Research Group, n.y.a.). In addition, maltreatment in childhood is associated with the development of depression and suicidality in adolescence; these adolescents are three times more likely to become depressed than those without a history of neglect, physical, and sexual abuse (Brown, Cohen, Johnson, & Smailes, 1999).

Quality of Health as the Dependent Variable
The BBFM predicts health outcomes as exogenous variables; as outlined above, the endogenous variables in the model are applicable to families with CPS involvement given their likely exposure to maladaptive or dysregulatory versions of these constructs. Recent data from the NSCAW demonstrate that 28% of children and adolescents involved in an investigation of possible maltreatment are reported as having a chronic health condition, and most (42%) experience two or more medical issues; rates are stable across time and age groups. Asthma, reported for 13% of these children and adolescents, was the most common medical condition; this is similar to national estimates suggesting that 12% of children are diagnosed with asthma (NSCAW Research Group, n.y.b).

Hypotheses Regarding BBFM and CPS
Our purpose is to further test the BBFM with a sample of adolescents with asthma encountering CPS, as the model should be especially relevant for these families. We specifically replicated previous tests of the BBFM’s ability to predict health quality in adolescents with asthma using similar variables (e.g., Wood et al. 2008). In Model 1, we hypothesized: (a) a direct pathway between a NFEC and adolescent depression; (b) an indirect pathway between a NFEC and depression, mediated by caregiver–adolescent relational security; and (c) a direct pathway between adolescent depression and overall quality of health. We hypothesized that (d) there would not be a significant direct effect of NFEC on overall quality of health, as we suggest that the effects of family processes on adolescent health function through the indirect pathways described in Hypotheses 1–3. We hypothesized the following in Model 2: (a) a direct pathway between
caregiver relationship quality/conflict and adolescent depression; (b) an indirect pathway between caregiver conflict and depression, mediated by caregiver–adolescent relational security; and (c) a direct pathway between adolescent depression and overall quality of health. We hypothesized that (d) there would not be a significant direct effect of caregiver relationship quality on overall quality of health for reasons similar to Model 1.

**Methods**

Data for this study were from the NSCAW, a national longitudinal study of children and adolescents involved with CPS. The population included children and adolescents in the United States who were subjects of abuse or neglect investigations within a 15-month period between October, 1999 and December, 2000. A two-stage stratified sampling design was used. First, the United States was divided into nine sampling strata. Within each stratum, primary sampling units were formed representing distinct geographic areas across the USA and of differing sizes. A random selection scheme was used so that the same number of youths was selected from each unit, regardless of the size of the unit. All caregiver and adolescent interviews were conducted by NSCAW field researchers in the family’s home (NSCAW Research Group, 2002). The NSCAW included a representative sample of over 6,000 children and adolescents, aged 0–14 years at initial time of interviewing and consisted of two separate groups: children and early adolescents who were subjects of child welfare investigations of abuse or neglect (“CPS sample,” n = 5,501) and children and adolescents who had been in out-of-home placement for approximately 12 months at the time of sampling (n = 727) (NSCAW Research Group, 2002). As we were interested in testing the BBFM with adolescents with asthma encountering CPS and their relational and emotional risk factors for worsening health more broadly, rather than effects specific to adolescents in foster care, the CPS sample was the focus of this study. Informed consent was obtained by NSCAW researchers and has been described elsewhere (NSCAW Research Group, 2002). Approval for this study and use of these data was obtained from Florida State University’s Institutional Review Board.

**Participants**

This study is a cross-sectional study of Wave 1 of the NSCAW CPS sample (NSCAW Research Group, 2002). Of the entire CPS sample, 101 adolescents’ (age 11–15 years) current caregivers reported a diagnosis of asthma (n = 101). This sample of adolescents with asthma was used to test both models. In addition, the Rochester Assessment Package for Schools–Self-Report Instrument for Middle School Students (RAPS-SM; Connell, 1998, as cited in National Data Archive of Child Abuse and Neglect [NDACAN], 2006), a measure used in both models, was only administered to adolescents aged 11 years and older. Adolescents in the CPS sample resided with a variety of adult caregivers; caregivers of the adolescents in our sample were mostly biological mothers (57%), along with other family members (28%) including sisters, aunts, grandmothers, and biological fathers. In addition to kin caregivers, 15% of caregivers in our sample were other nonrelative providers.

**Demographic Characteristics**

Both models included adolescents aged 11-15 years. The average age of the adolescent in Model 1 was 12.81 (SD = 1.28) and 54.4% were female. For Model 2, the average age of the adolescent was 12.78 (SD = 1.28) and 53.8% were female. Both models were similar in racial composition: 42% were Caucasian, 34% African American, 14% American Indian, 6% (Model 1) to 7% (Model 2) Asian/Hawaiian/Pacific Islander, and 3% identified themselves as “other.”

**Measures**

**Family Emotional Climate**

For Model 1, we sought an adolescent-report measure of perceived negativity and criticism, reflective of a NFEC (Wood et al., 2007). Adolescents in the CPS sample completed the child portion of the Parent–Child Conflict Tactics Scales (Straus, 1998). We used scores on the Psychological Aggression subscale which measures communications intended to cause the child psychological pain or fear (Straus & Hamby, 1997), including, for example, the adolescent’s experience of being yelled or screamed at, threatened to be hit, or called names (Straus et al., 1998). The reliability for this subscale in the NSCAW data is .70 (NDACAN, 2006).

**Caregiver Relationship Quality**

We avoided use of the term “parents” in investigating this construct to prevent excluding adolescents who live with other adult caregivers (e.g., grandparents, aunts and uncles, etc.) and focused on broader caregiver relationship quality. Caregiver relationship quality is part of the family emotional climate and refers to interactions between adults that may include hostility and conflict (Wood et al., 2008). Adolescents in the CPS sample completed the Violence Exposure Scale (Fox & Leavitt, 1995), Home Set (NDACAN, 2006). Items assessed the number of times
the adolescent witnessed yelling, an adult throwing things at another adult, shoving or slapping, or the use of weapons. For Model 2, we used the scale score for total number of exposures to mild and severe violence. The reported internal consistency for the NSCAW data is .96 for the total scale score, with subscales ranging from .86 to .92 (NDACAN, 2006).

Relational Security
In testing the applicability of the BBFM to the CPS sample, we focused on adolescent–caregiver relational security to prevent excluding adult caregivers other than biological parents. Caregiver–adolescent relational security was examined as a mediator in both Models 1 and 2. We used the RAPS-SM (Connell, 1998, as cited in NDACAN 2006) to assess adolescents’ feelings about their relationship with their current primary caregivers. Previous research using the BBFM (e.g., Wood et al., 2008) has used the Relatedness Questionnaire (Lynch & Cicchetti, 1991), a brief attachment assessment derived from the RAPS-SM. Items on the RAPS-SM measured current caregiver emotional security, caregiver interest in and time spent with the adolescent, and caregiver’s trust and fair treatment of the adolescent per adolescent report. The reported internal consistency of the mean relatedness score for the NSCAW data is .88 (NDACAN, 2006).

Biobehavioral Reactivity
The Children’s Depression Inventory (CDI; Kovacs, 1992) was used to assess adolescents’ self-report of depression. The CDI contains 27 items measured on a 3-point Likert scale; higher scores indicate more symptoms of depression. Previous studies testing the BBFM using the CDI have reported α coefficients exceeding .85 (Wood et al., 2007, 2008). The reported internal consistency for the NSCAW data is .81 for youths aged 7–12 years and .87 for 13–15 years (NDACAN, 2006). The CDI was used for both Models 1 and 2.

Physical Health
To assess the impact of family environment and adolescent symptoms of depression on the quality of health for these early adolescents with a diagnosis of asthma, we used a continuous measure of adolescent health quality in which current caregivers rated the adolescent’s health on a 5-point scale from “poor” to “excellent” as the exogenous variable. This measure was used for both Models 1 and 2.

Statistical Analysis
Both models of the BBFM were tested with path analyses, and standardized path analysis coefficients were estimated in AMOS using direct maximum likelihood estimation. We used bootstrapping methodology, a nonparametric resampling procedure (Preacher & Hayes, 2008) to confirm the results of the path analyses. As demonstrated in previous research (e.g., MacDonnell, Naar-King, Murphy, Parsons, & Harper, 2010), bootstrapping is appropriate for use with smaller sample sizes because it increases the power of statistical results (Shrout & Bolger, 2002) and involves repeatedly sampling from the actual data to generate an empirical approximation of the sampling distribution and confidence intervals for the indirect effect (Preacher & Hayes, 2008). Using this method, a confidence interval for the size of the indirect path is generated; a statistically significant mediation effect is indicated if the values between the upper and lower confidence limit do not include zero. We examined the bias-corrected and accelerated intervals as a recommended improvement on traditional CI and bootstrapping methods (Efron, 1987). We present these confidence intervals as well as point estimates for the indirect effects of each model’s independent variable on the dependent variable through each mediator, for both the data and the bootstrapping resamples (Table I).

Lastly, the same sample (n = 101) was used to test Models 1 and 2. Model 1 tests the hypotheses related to NFEC, and Model 2 tests those regarding caregiver relationship quality. We used listwise deletion to address

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*Point estimate of the indirect effect of the independent variable on the dependent variable through the mediator listed.

*Bias is the difference between the estimates obtained from the original sample and the bootstrap resamples.

*Bias-corrected and accelerated CIs.

Table I. Mediation Effects for Models 1 and 2 (Bootstrapping Results)
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Results

Model 1: NFEC

Model 1 demonstrated good fit [$\chi^2 (1) = .404, p = .525$, RMSEA = .000, NFI = .995, TLI = 1.050, CFI = 1.000]. Standardized path coefficients were significant in the hypothesized directions (Figure 1). However, the coefficient for a direct pathway between a NFEC and adolescent depressive symptoms was near zero. The findings demonstrated an indirect pathway between NFEC and adolescent depression, mediated by caregiver-adolescent relational security. This indirect pathway involved two inverse associations, indicating that higher adolescent-report scores of psychological aggression were associated with lower relational security with caregiver scores, and that lower relational security scores were associated with higher depression. There was also a significant direct pathway between adolescent depression and overall quality of health. As predicted, the direct path between NFEC and overall quality of health was not statistically significant, which is consistent with the BBFM and suggests that the effects of family on adolescent health function through the emotional processes of the adolescent (Wood et al., 2008).

Bootstrapping Analyses

Adolescent depressive symptoms did not mediate the effects of a NFEC on overall quality of health, although the relationship approached significance with a 95% bias-corrected and accelerated CI (0.02, 0.07) (Table I). Conversely, relational security with caregivers mediated the relationship between caregiver relationship quality and adolescent depressive symptoms, with a 95% bias-corrected and accelerated CI (0.49, 1.56). The difference between the total and direct effect of a NFEC on depressive symptoms is different from zero.

Model 2: Caregiver Relationship Quality

The second hypothesized model also demonstrated good model fit [$\chi^2 (1) = .298, p = .650$, RMSEA = .000, NFI = 1.000, TLI = 1.062, CFI = 1.000]. Standardized path coefficients were significant in the hypothesized directions (Figure 2). Results demonstrated a direct pathway between caregiver relationship quality, or adolescent report of witnessing household violence, and adolescent depressive symptoms. The findings also demonstrated an indirect pathway between caregiver relationship quality and adolescent depression, through caregiver–adolescent relational security. The indirect path involved two inverse associations, indicating that higher adolescent-report scores of violence exposure were associated with lower scores of relational security with caregivers, and lower relational security scores were associated with higher depression. There was also a significant direct pathway between adolescent depression and overall quality of health. As predicted, there was not a significant relationship between caregiver relational security and overall quality of health, again demonstrating that the effects of family on adolescent health function through the emotional experiences of an adolescent.

Discussion

Overall, both models demonstrated multiple significant effects. These results are especially telling, as the outcome of health quality was reported by current caregivers and all other variables were measured by adolescent self-report. Testing the BBFM with adolescents with asthma involved in CPS demonstrated that hostility, criticism, yelling, and the infliction of psychological harm within the family, as well as exposure to adult violence in the home, negatively affects these adolescents’ mental health, relationships with their caregivers, and their physical health quality. Our test of the applicability of the BBFM with a sample of families encountering CPS demonstrates that the theoretical model is valuable in predicting the effects of these families’ processes on the health of adolescents with asthma.

Results underscore the necessity of comprehensive assessments for adolescents referred to CPS, as well as multidimensional, collaborative, biopsychosocial approaches to providing services for these families. These models highlight several areas in which services could be targeted and improvements could be made to improve the overall health of adolescents with asthma involved in CPS. The results of this study suggest a need for interventions at
the individual adolescent, couple relationship, and family level, and highlight the importance of informed professionals and caregivers; these adults often play large roles in access to services for adolescents (Horwitz, Owens, & Simms, 2000).

Families are referred to CPS for allegations of maltreatment and adolescents in these families are likely to have experienced negative family processes and are at least as likely as the general US population to have a chronic health condition (NSCAW Research Group, n.y.b). Recent research suggests that present cost estimates underestimate the effects of maltreatment on healthcare burden (Lanier et al., 2010). The ability to distinguish families with risk factors (e.g., conflict, hostility, and negative parent–child relationships) associated with adolescent mental and physical health issues may help to identify families struggling to manage asthma symptoms and prevent worse health outcomes for adolescents (Bender & Klinnert, 1998). Additionally, a family’s response to symptoms of asthma mediates the relationship between their children’s understanding of asthma symptoms and morbidity (McQuaid et al., 2007), a finding relevant to this CPS population which may receive fragmented care (Horwitz et al., 2000), or not consistently receive healthcare services (Schneiderman, McDaniel, Xie, Cabassa, & Suh, 2010).

An even bigger concern is that, despite higher rates of behavior problems, difficulties with social skills, and the greater likelihood of psychological issues, only 18% of these youths involved with CPS received outpatient mental health services (NSCAW Research Group, n.y.a). Given the findings of this study and past research suggesting that the emotional health of an adolescent is associated with physical health outcomes (Bender & Klinnert, 1998), a lack of mental health services for these youth and their families may be particularly deleterious.

Regarding interventions, there has been an encouraging increase in the literature describing family-focus interventions for families coping with a child’s asthma symptoms (e.g., Naar-King, Ellis, Kolmodin, Cunningham, & Secord, 2009; Walders, Drotar, & Kercsmar, 2000). A recent example by Bruzzese and colleagues (2008) describes a school-based, group treatment asthma intervention for middle school students and their caregivers, titled Asthma: It’s a Family Affair! Results demonstrated that caregivers reported better problem-solving with their adolescent children; in addition, adolescents were more responsible for carrying their prescriptions, used an increased number of symptom prevention steps, and woke up fewer nights from asthma (Bruzzese, Unikel, Gallagher, Evans, & Colland, 2008). This group psychoeducation program produced these wide-ranging improvements by educating families on symptom prevention, asthma management, and parenting skills for supporting adolescent autonomy. Although not a program specifically designed to intervene in pathways of the BBFM, improvements in constructs and behaviors representative of family emotional climate were significantly related to improvements in adolescent health.

In addition, recent research provides tentative support for multisystemic therapy, an empirically supported family-based treatment modality typically geared toward adolescent behavior problems, as a potentially effective intervention for families with a child with asthma (Naar-King et al., 2009). In a review of research of families coping with chronic childhood illnesses, Cohen (1999) suggests that medical family therapy models, emphasizing the total family system, are particularly effective in reducing the negative impact of a childhood illness by nurturing family resilience. This is consistent with pathways modeled by the BBFM in which family processes affect health quality of adolescents with asthma.

**Limitations**

The CPS sample included families investigated for allegations of child maltreatment. However, the sample included adolescents whose current caregivers may include biological family, nonbiological family, and other adult caregivers. It is important to interpret our findings with the understanding that they may be impacted by the heterogeneity of the sample and possible differences among adolescents residing with different types of caregivers. In addition, we are unable to detect heterogeneity in regard to asthma morbidity in this sample, as this was not measured in the NSCAW. There may have been possible sub-sample variation in asthma severity which could impact disease management, health outcomes, and associations found between family and adolescent variables and quality of health. Additionally, our measure of caregiver relationship quality assessed violence observed and experienced in the home. Although more relevant for a CPS sample of adolescents who may not currently reside with biological parents and for whom traditional measures of interparental conflict may not apply, it does not solely measure adult-to-adult or caregiver romantic relationship violence and may include other instances of aggression.

Further limitations include that we used caregiver reports of adolescents’ diagnoses of asthma and their overall quality of health, not data obtained from or confirmed by medical providers. The recognition of medical problems by these caregivers may be inconsistent with health provider
assessments. In addition, we used a continuous measure of adolescent quality of health in which caregivers rated their child’s health on a five-point scale. Unfortunately, this is the only measure in the NSCAW data set that assesses adolescent physical health quality, and it is not specific to asthma symptoms, control, or morbidity. In addition, with the exception of the inclusion of the RAPS-SM, a measure of emotional security, we did not include additional measures addressing the resiliency of these families. The only measure administered by NSCAW researchers that may be reflective of more positive processes was a measure of caregiver felt social support (NDACAN, 2006); this is not reflective of the theoretical orientation of the BBFM, so it was not included. However, not including measures representative of the full spectrum of family dynamics may have affected our results. Future research should highlight the strengths and resiliencies of these families and examine whether they serve as protective factors for adolescents with asthma encountering the CPS.

Future Research

There are several potential directions for future research. Future research testing the BBFM with families encountering CPS may benefit from gathering data directly from medical professionals, as well as using a measure of health quality directly reflective of asthma symptoms and management. Also, using more precise measures of caregiver relationship quality may enhance our understanding of unique processes occurring in these families, their relation to their encountering CPS, and overall effects on adolescent health. In addition, the BBFM has been evaluated most often with a pediatric asthma population; future research testing its application to other chronic health conditions, adolescent health in general, and other vulnerable populations would be beneficial. Lastly, the cross-sectional design mirrors previous research on the BBFM; future research would benefit from examining these pathways longitudinally.

Results of this study lend support for the use of the BBFM in explaining the complex processes of stress-related illness in adolescence and extend the use of this model to adolescents and families encountering CPS. Additionally, these findings were produced almost entirely using adolescent self-report, an important distinction given the frequent use of parent report of symptoms. Considering the perceptions of an adolescent with a stress-related illness is crucial to understanding their experience of family processes, their depression, and biobehavioral reactivity, and to understand factors contributing to their overall quality of health.

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Conflicts of interest: None declared.

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Child emotional security and interparental conflict. 


