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Melissa L. Engel April 8, 2017

Somatic Complaints in the Preschool to School-Age Period: Associations with Maternal and Child Psychopathology

by

Melissa L. Engel

Patricia Brennan, Ph.D.
Adviser

Department of Psychology

Patricia Brennan, Ph.D.

Adviser

Arri Eisen, Ph.D.

Committee Member

Andrew Kazama, Ph.D.

Committee Member

Anne Winiarski, M.A.

Committee Member

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Abstract

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Childhood somatic complaints have been associated with concurrent and future internalizing symptoms and disorders, as well as with maternal psychopathology. Prior research has examined these relationships in older children and adolescents, but the persistence across early development, behavioral correlates, and gender differences of somatic complaints in younger children have not been examined longitudinally. The current study explores these associations in children considered high-risk due to the majority of their mothers having a history of psychopathology. A sample of 185 mother-child dyads participated in a lab visit at preschool-age and an online follow-up survey at school-age. Mothers completed measures of psychopathology, and mothers and alternate caregivers completed ratings of children's somatic complaints, anxiety, and depression at both time points. A high rate of child somatic complaints was noted in this sample. Regression analyses indicated that somatic complaints at preschool predicted somatic complaints, anxiety, and depression at school-age, and gender did not moderate these relationships. Overall, maternal psychopathology predicted somatic complaints, but findings were inconsistent across reporters, time points, and types of maternal psychopathology. Evidence of maternal perceptual distortion of children's somatic complaints was mixed. Clinical implications and future directions are discussed.

Keywords: Child somatic complaints, anxiety, longitudinal, maternal psychopathology

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Somatic Complaints in the Preschool to School-Age Period: Associations with Maternal and Child Psychopathology

Somatic complaints, also known as functional symptoms or medically unexplained symptoms, describe physical complaints with no identifiable organic cause (Beck, 2008; Campo, 2012). These persistent physical symptoms most often include headaches, abdominal pain, musculoskeletal pain, vomiting, chest pain, fatigue, and dizziness, among others (Beck, 2008). Childhood is an integral time to study somatic complaints, as somatic symptoms at this stage of development have been associated with a plethora of concurrent and future maladaptive outcomes, such as school absences, emotional and behavioral problems, and internalizing disorders of adulthood (Eminson, 2007). In addition to functional impairment, somatic complaints often lead to overuse of the medical system, including unnecessary and expensive medical consultation and treatment (Campo & Fritsch, 1994). Inconsistent definitions and measures of somatic complaints across both clinical and community samples make generalizations about such complaints difficult (Campo & Fritsch, 1994; Wolff et al., 2010). It is generally accepted that somatic complaints affect 10-30% of children and adolescents in the United States and account for 2-4% of all pediatrician visits (Beck, 2008; Campo & Fritsch, 1994). Accumulating evidence suggests that reports of childhood headaches and abdominal pain have increased in recent years (Albers, von Kries, Heinen, & Straube, 2015; Petersen, Bergström, & Brulin, 2003; Santalahti, Aromaa, Sourander, Helenius, & Piha, 2005). Their prevalence, coupled with the physical, psychosocial, and economic costs of these symptoms to the child, family, and entire healthcare sector, make early-life somatic complaints a potentially serious public health concern.

Prevalence of Somatic Complaints

It is well-established that the presence of any one somatic complaint predicts the presence of others, and that somatic complaints increase with age. For example, among a community sample of more than 10,000 Nordic children, at least one somatic complaint was reported in 13% of 2-6 year olds, 17% of 7-12 year olds, and 23% of 13-17 year olds (Campo, 2012; Berntsson & Kohler, 2001). Other studies have found greater rates in both early and late childhood, with 20% of 3-5 year old Spanish children and 56% of children and adolescents in grades 2-12 experiencing at least one somatic complaint (Campo, 2012; Doménech-Llaberia et al., 2004; Garber, Walker, & Zeman, 1991). Symptom presentation changes as a function of a child's developmental status. Abdominal pain is the most common complaint in early childhood; by school-age, headaches become most prevalent, followed by abdominal pain (Beck, 2008; Campo, 2012). Since the majority of studies on somatic complaints do not begin until school-age, adolescence, or adulthood, literature regarding the preschool period is quite limited. The existing research suggests that 8-9% of preschool-age children experience recurrent stomachaches and 2-3% experience recurrent headaches (Doménech-Llaberia et al., 2004; Zuckerman, Stevenson, & Bailey, 1987). Somatic complaints are known to be significantly more prevalent in girls; by adolescence, girls report more than twice as many somatic symptoms as boys (Beck, 2008). However, there are conflicting findings regarding the temporal emergence of these gender differences- while many studies report no gender differences before puberty, some identify a greater prevalence in girls across childhood (Campo, 2012). Therefore, more research is needed to tease apart these gender effects.

Psychological Comorbidity

Childhood somatic complaints are consistently associated with several psychosocial factors in both clinical and community samples. Children who suffer from frequent stomach

aches and headaches tend to have difficult temperaments and be described as anxious, self-conscious, or perfectionistic. These features may emerge early in life, as preschoolers with frequent somatic complaints are significantly more likely to exhibit associated emotional and behavioral problems (Barr, 1983; Zuckerman, Stevenson, & Bailey, 1987; Wolff et al., 2010). For instance, children between the ages of 3 and 6 with somatic complaints are more likely to experience anxiety, hyperactivity, conduct issues, and oppositionality (Beck, 2008). Gender-specific patterns of associations between somatic complaints and psychopathology have been documented in school-age children and adolescents. Overall, children with somatic complaints are significantly more likely to experience symptoms of anxiety and depression (Campo, 2012). However, this association is stronger in girls. In boys, somatic complaints have been associated with disruptive behavior, including conduct disorder, oppositional defiant disorder, and attention-deficit/hyperactivity disorder (Egger, Costello, Erkanli, & Angold, 1999).

Developmental Trajectory

Perhaps the most compelling reason to begin studying somatic complaints in early childhood is their associated maladaptive developmental trajectory. These symptoms tend to persist throughout childhood. For example, studies have reported stomach aches and headaches persisting from age 4 to age 10, physical complaints at age 3 predicting greater physical complaints at age 12, and striking continuity of recurrent abdominal pain from age 2 to age 6 (Borge, Nordhagen, Moe, Botten, & Bakketeig, 1994; Pihlakoski et al., 2006; Ramchandani, Hotopf, Sandhu, & Stein, 2005). Interestingly, prospective studies have concluded that children with recurrent somatic complaints are not at a greatly heightened risk of experiencing physical complaints as adults; rather, these children are at a significantly increased risk of developing other psychiatric disorders, most notably anxiety (Hotopf, Carr, Mayou, Wadsworth, & Wessely,

1998; Shelby et al., 2013). Somatic complaints have been associated with anxiety and depressive symptoms in a number of cross-sectional and longitudinal studies, though most of the longitudinal research has not begun until at least school-age. At the same time, childhood anxiety and depression are both associated with somatic complaints later in life. This reciprocal comorbidity has led some to question whether somatic complaints, anxiety, and depression are distinct symptoms and disorders or the manifestation of shared vulnerabilities (Campo, 2012). Each phenotype is moderately heritable, more common in girls, and often begins in adolescence (Rice, Harold, & Thapar, 2002: Thapar & McGuffin, 1995; Vassend et al., 2012; Eminson, 2007). Additionally, they share common biological and cognitive etiologies, including elevated HPA-axis activation, heightened stress sensitivity, and negative affect, and effective treatments for any single phenotype tend to improve outcomes for all three (Ask, Waaktaar, Seglem, & Torgersen, 2016; Kroenke, 2007; Mayou, 2007). A recent twin study supported a latent internalizing factor, affected by both genetic and environmental influences, that underlies anxiety, depression, and somatic complaints. This latent internalizing factor was composed of 44% additive genetic factors, 25% shared environmental factors, and 31% non-shared environmental factors. In the final model, it accounted for 35% of phenotypic variance in somatic complaints, 41% in anxiety, and 56% in depression (Ask et al., 2016). The comorbidity of somatic complaints, anxiety, and depression has yet to be explored longitudinally from early childhood, yet this research suggests common etiologies may be present early in life.

Biopsychosocial Framework

A number of models have been proposed to explain the development of childhood somatic complaints, and the most comprehensive theories utilize the biopsychosocial framework (Engel, 1977). This integrative approach does not classify problems as exclusively physical or

mental but instead considers the complex biological, psychological, and social contributing factors (Garralda, 2010). When examining somatic complaints, risk factors can lie within the child (i.e. exposure to trauma, difficult temperament, maladaptive coping style, heightened stress reactivity or physiological sensitivity), within the family (i.e. low SES, parental reinforcement of symptoms, familial somatic complaints), or within the broader ecological context (i.e. school stress, poor interactions within health care system; Eminson, 2007; Campo & Fritsch, 1994; Beck, 2008). Background factors, such as sex, pubertal status, or chronic pain in parents may interact with emotional factors and result in the development of somatic complaints, especially in the presence of stressful life events (Stanford, Chambers, Biesanz, & Chen, 2008). Evidence has linked somatic complaints with various forms of adversity, including maternal distress. It is generally accepted that parents, especially mothers, of young children play a critical role in shaping their children's development, and mothers may "transfer" their own anxiety and somatic complaints to children through a variety of mechanisms, such as genetic predispositions, stressful environments, and social modeling (Wolff et al., 2010). Interestingly, most of the data on child somatic complaints rely on maternal report; thus, it is ultimately mothers' perceptions of their children's symptoms that are being considered. This may be particularly problematic in mothers with a history of anxiety or depression, who may present distorted views of their children (Eminson, 2007; Garralada, 1996).

Maternal Psychopathology and Childhood Somatic Complaints

In general, maternal psychopathology significantly predicts mothers' reports of psychopathology and maladjustment in children; distressed mothers tend to respond to child assessments with a global negative response set (Friedlander, Weiss, & Traylor, 1986; Kinsman & Wildman, 2001). A meta-analytic review of maternal depression and child psychopathology

confirmed the association between maternal depression and adverse child outcomes, including higher levels of various internalizing and externalizing disorders. Younger children may be most vulnerable to the ill-effects of maternal depression, as they are often most dependent on and influenced by their mothers. Regardless of age, maternal depression is more strongly associated with internalizing problems in girls than in boys (Goodman et al., 2011). Given the large association, and possible common etiology, between internalizing disorders and somatic complaints, one can reason that young girls are at greatest risk for developing symptoms of anxiety and depression, as well as somatic complaints.

The current findings regarding the associations between maternal psychopathology and child somatic complaints are unclear. In a study assessing the validity of the Child Behavior Checklist (CBCL), mothers with depression rated their children higher on the general internalizing and externalizing scales, as well as every CBCL subscale. However, the association between maternal depression and CBCL subscales was significant for every scale except somatic complaints, for which maternal depression accounted for only 4% of the variance (Friedlander et al., 1986). In another study, maternal somatic complaints, parenting stress, and symptoms of anxiety throughout pregnancy and after childbirth independently predicted child somatic complaints at 18 months. Maternal depression predicted somatic complaints, but this proved nonsignificant after adjusting for child temperament, parenting stress, and demographic factors (Wolff et al., 2010). A study of children and adolescents with functional abdominal pain found significantly greater rates of mood disorders in their mothers. A total of 46.4% of these mothers reported a lifetime history of major depressive disorder and 39.3% reported generalized anxiety disorder, compared to the general adult population rates of 16.6% and 5.7%, respectively

(Campo et al., 2007). A consensus regarding the specific association of different maternal mental illnesses with child somatic complaints has yet to be established.

Studies of early childhood typically rely on maternal report, but this may be problematic due to the potential for maternal distortion. It is widely assumed that depressed mothers present distorted views of their children; their own negative cognitions may lead them to misperceive typical child behavior as atypical or in need of treatment (Richters, 1992; Friedlander et al., 1986). With regards to somatic complaints, there is some evidence to support this belief. For example, higher levels of maternal distress are associated with greater mother-child discordance of reports of somatic and emotional symptoms in children with recurrent abdominal pain (Garber, Van Slyke, & Walker, 1998). However, in a critical review of the literature, Richters (1992) challenges this prevailing assumption. Depressed mothers do report more behavioral and emotional problems in their children, but this alone is not enough evidence to justify perceptual distortion. In fact, the converse may be true- it is possible that depressed mothers are more sensitive to their children's symptoms and thus report accurate rates of heightened problems (Richters, 1992). Due to their limited verbal and cognitive capacities, it is difficult to study somatic complaints in young children using child-reports. Therefore, it is critical to rely not only on maternal reports, but to include data from alternate caregivers, such as fathers, grandparents, or teachers, as well. Doing so may help untangle to what extent a child's behavior is directly affected by maternal psychopathology, as opposed to a function of maternal distorted perceptions due to her own psychopathology.

Current Study

Previous longitudinal research on somatic complaints has focused primarily on school-age children, adolescents, and adults. The persistency, correlates, and gender differences of

somatic complaints from preschool to school-age have not been thoroughly examined. Furthermore, little is known about somatic complaints specifically in children of mothers affected by psychopathology. While these children are known to be at risk for internalizing behaviors, the study of childhood somatic complaints has largely focused on community or clinical child samples referred for specific physical complaints. Maternal anxiety has been linked to child somatic complaints, but maternal depression and general psychopathology have not yet been established as independent risk factors for these symptoms. Although the bulk of literature in young children relies on maternal report, there are conflicting findings regarding potential distortion among mothers with depression.

The present study aims to fill these gaps by examining a high-risk community cohort of 185 children with the following hypotheses:

1. Somatic complaints at preschool will predict somatic complaints at school-age.
2. Somatic complaints at preschool will predict an increase in anxiety and depression from preschool to school-age.
3. Gender will moderate the relationship between somatic complaints and anxiety, such that somatic complaints at preschool will be a stronger predictor of school-age anxiety in girls.
4. Maternal psychopathology will predict somatic complaints at preschool and the continuity of somatic complaints from preschool to school-age. Overall psychopathology, as well as anxiety and depression independently, will predict childhood somatic complaints. Of these, maternal anxiety will be the greatest predictor.
5. Maternal depression will be associated with a distortion of childhood somatic complaints, but this will not fully account for the association between maternal depression and

childhood somatic complaints. When considering alternate caregiver reports, there will still be an increased rate of somatic complaints in children of mothers with depression; however, the effect will be weaker than when solely relying on maternal reports. Utilizing a sample that is weighted towards mothers with high psychopathology may enable us to examine relationships in a more reliable manner. A more comprehensive understanding of maternal mental health and child physical and mental outcomes may provide opportunities for early identification of somatic complaints and interventions to prevent their development into later psychopathology.

Method

Participants

Participants were drawn from an existing sample of 219 mother-child dyads, 178 of whom were recruited from the Emory Women's Mental Health Program (WMHP) within the Department of Psychiatry at the Emory University School of Medicine. The WMHP serves as a referral program that provides services and care for women suffering from mental illness. The women recruited from WMHP were first evaluated during pregnancy and then seen during multiple visits across pregnancy and postpartum. The remaining 41 women in the sample were recruited from the community at the time of the preschool study visit. These 41 women did not take psychotropic medications during pregnancy, as verified by obstetrical records.

Participants recruited from the WMHP and controls did not differ on any demographics relevant to the current study (mother age, child age, mother/child ethnicity, mother's marital status, education level, number of hours worked per week, number of adults in the household) with the exception of number of children in the home ($p = 0.046$) with controls having more children in the household than participants recruited from WMHP.

This study was approved by the Institutional Review Board of Emory University. Mothers and alternate caregivers provided consent for their participation in the study. Children's mothers also provided consent for their participation in the preschool study, whereas the children provided assent. In the preschool study, mothers were financially compensated for their involvement in the study, and children received a toy for participation. In the school-age follow-up, mothers and alternate caregivers were both financially compensated for their involvement in the study.

Demographics

During the preschool phase of the study, children's ages ranged from 2.5 to 5.5 years (M=3.7, SD=0.89) and mother's ages ranged from 21 to 49 years (M=36.9, SD=5.0). Child sex was evenly split (N=110 females). The women in the sample were predominantly Caucasian (82.6%), although other ethnicities were represented as well (9.6% African American, 3.2% Hispanic, 2.3% Asian, 1.4% Biracial). The children in the sample also represented a variety of ethnic groups. Mothers were well educated (2.3% GED, 12.8% completed part of college, 6.8% graduated 2-year college, 32.9% graduated 4-year college, 4.1% completed part of graduate/professional school, 40.2% completed graduate/professional school), and most were married (81.7%). A total of 83.9% of mothers in the sample were diagnosed with one or more DSM-IV Axis I diagnoses across their lifetimes. Furthermore, 59.4% of the mothers were undergoing mental health treatment (e.g., individual therapy, psychiatric services) at the time of the preschool visit.

The mother-child dyads that were followed up at school-age (N=185) represent approximately 85% of the participants who were initially recruited for the preschool phase of the study. The inclusion criteria for the final sample included having completed Child Behavior

Checklist data from the child's mother or an alternate caregiver at school-age. The mothers lost to follow-up differed significantly from retained participants in terms of mother's education (lost, *M*=5.88, *SD*=1.64; retained *M*=6.56, *SD*=1.45). The children included in the final sample did not differ significantly from the 34 children not included on measures of somatic complaints, anxiety/depression, maternal age, maternal BDI, or race/ethnicity during the preschool phase.

During the school-age phase of the study, children's ages ranged from 5 to 11 years, mother's ages ranged from 24 to 53 years, and child sex was evenly split. Mother's employment status and education levels reflected a high socioeconomic status of the sample overall. Specific demographic characteristics of the final sample can be found in Table 1.

Procedure

During the preschool phase of the study, participants visited the BUILD laboratory in the psychology department at Emory University where children completed several measures of behavioral, cognitive, and language functioning. Mothers completed interviews and questionnaires about their mental health history and current symptoms of depression, as well as reports of their children's behavior. Children's behaviors were rated by an alternate caregiver (e.g., grandmother, father, babysitter, etc.) to supplement our mother-report measures.

In the follow-up school-age study, data were collected via a secure online database called REDCap. Permission to re-contact, along with contact information, was obtained during the preschool phase of the study. Mothers received a direct hyperlink to the online measures. Participants were instructed to click on the link, read consent information thoroughly, and complete the online questionnaires if they agreed to study details. Participants were not required to complete every questionnaire in one sitting, and were re-contacted if measures were left incomplete for longer than two weeks. Similar to the preschool phase of the study, behavioral

questionnaires were also completed by an alternate caregiver using the same REDCap procedures outlined above.

Measures

Somatic Complaints. To assess somatic complaints in preschool children, each child's mother and an alternate caregiver were asked to complete the 100-item Preschool-Age Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) which evaluates children's behavior across several domains of functioning. Raters were asked to indicate whether the items listed described the child's behavior over the past two months, and whether the item was "not true" (0), "somewhat or sometimes true" (1), or "very true or often true" (2). A primary subscale of interest in the present study was the somatic complaints syndrome scale. Examples of items that load onto this subscale include "headaches (without medical cause)," "stomachaches or cramps (without medical cause)," and "vomiting, throwing up (without medical cause)."

Somatic complaints in the school-age follow-up were measured using the School-Age CBCL completed by the child's mother and an alternate caregiver. The School-Age CBCL (Achenbach, 2001) is very similar to the Preschool-Age form in that there is overlap on the items measuring somatic complaints, except that there are 113 items, and the rater is asked to rate the child's behavior over the course of the last six months.

To assess continuity of somatic complaints according to mother and alternate caregiver reports, a Persistent Somatic Complaints variable was created for each reporter. These variables identified the children whose somatic complaints were rated as above the median at both preschool (1 or more complaints) and school-age (2 or more complaints).

Anxiety/Depression. The CBCL was also used to assess anxiety and depression in preschool and school-age children. In this case, the primary subscale of interest was the anxious/depressed

syndrome scale. Examples of items that load onto this subscale include "nervous, highstrung, or tense," "too fearful or anxious," and "self-conscious or easily embarrassed."

Maternal Psychopathology. Maternal mental illness was initially assessed using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), a semi-structured interview that assesses lifetime history of mental illness (First, Spitzer, Gibbon, & Williams, 1995). Overall psychopathology, as well as anxiety and depression independently, were examined. Overall psychopathology was operationalized as total number of lifetime diagnoses. Mothers who met criteria for a lifetime diagnosis of dysthymia or major depressive disorder were classified as having a depressive disorder, and mothers who met criteria for a lifetime anxiety disorder, including panic disorder, agoraphobia, social anxiety disorder, OCD, PTSD, GAD, anxiety due to another medical condition, substance-induced anxiety disorder, or anxiety disorder NOS were classified as having an anxiety disorder. The SCID-I reliability was calculated by having 15% of interviews double-coded by a licensed clinical psychologist. Reliabilities for anxiety and depression were high ($K \geq .87$).

Maternal depression was also assessed both initially and at follow-up using the Beck Depression Inventory (BDI). This questionnaire consists of 21 items, and each symptom is followed by four levels of severity. Example items include "sadness," "loss of pleasure," and "irritability." Good reliability and validity have been demonstrated for this scale (Beck, Steer, & Carbin, 1988).

Statistical Approach

Due to skew and kurtosis, somatic complaints and anxiety/depression at school age were winsorized for analyses, with upper limits of 5 somatic symptoms and 11 anxious/depressed symptoms. Data analyses were primarily carried out using regression techniques. Linear

regressions were used to analyze continuous outcomes and logistic regressions were used to analyze categorical outcomes. Covariates were controlled for as needed. Mean centered interaction terms were used to test for moderating effects.

Results

Descriptive Analyses

Prevalence of maternal psychopathology in this sample was high; 47.6% of mothers met lifetime criteria for an anxiety disorder and 43.8% for a depressive disorder. Over 82% met criteria for at least one DSM-IV diagnosis. Prevalence of child somatic complaints far exceeded levels previously reported in community samples, especially at preschool-age. Across reports, over 60% of preschool and nearly 50% of school-age children experienced at least one somatic complaint. Descriptive statistics for raw child somatic complaints at both preschool and school age, as reported by both mothers and alternate caregivers, are presented in Table 2. Correlations between somatic complaints and anxiety at preschool and school-age, as reported by both mothers and alternate caregivers, are presented in Table 3. Correlations were significant and positive for both reporters at both time points. The only nonsignificant correlations were between maternal and alternate caregiver reports, and they were thus separated for analyses.

Determining Covariates

Demographics including gender, maternal age, maternal education, and child age were tested as potential covariates. Child's age significantly co-varied with both maternal anxiety and alternate caregiver reports of somatic complaints and was controlled in all analyses examining these outcomes. Notably, rates of somatic complaints at school-age did not differ by gender. No other covariates were noted.

Hypothesis Testing

Our first hypothesis was that somatic complaints at preschool would predict somatic complaints at school-age. This hypothesis was supported. Results from linear regressions showed that somatic complaints at preschool significantly predicted somatic complaints at school-age in both maternal ($F(1, 183)=22.823$, $R^2=.111$, $p<.001$) and alternate caregiver ($F(1, 108)=17.115$, $R^2=.126$, $p<.001$) reports.

Our second hypothesis was that somatic complaints at preschool would predict an increase in anxiety and depression from preschool to school-age. This hypothesis was also supported. Results from linear regressions showed that, controlling for preschool anxiety and depression, somatic complaints at preschool significantly predicted anxiety and depression at school-age in both maternal ($F(1, 181)=10.242$, $R^2=.041$, $p=.002$) and alternate caregiver ($F(1, 108)=7.221$, $R^2=.059$, $p=.008$) reports.

Our third hypothesis was that gender would moderate the longitudinal relationship between somatic complaints and anxiety, such that this relationship would be stronger for girls than for boys. Gender and somatic complaints variables were centered around the mean, and interaction variables were created by multiplying these mean-centered terms. Next, linear regression models were used to assess the independent contribution of this interaction term (above and beyond main effects) to child anxiety and depression outcomes. The interaction term was not significant in either maternal ($F(1, 170)=.233$, $R^2=.001$, $p=.630$) or alternate caregiver ($F(1, 106)=.029$, $R^2=.000$, $p=.864$) reports. Therefore, contrary to our hypothesis, results indicate no moderating effect of gender.

Our fourth hypothesis was that maternal psychopathology, as measured by lifetime history of anxiety, lifetime history of depression, and total number of lifetime DSM-IV primary diagnoses, would predict child somatic complaints at preschool and school-age, as well as the

continuity of somatic complaints across time points. We hypothesized that maternal anxiety disorder would be the strongest predictor. Table 4 summarizes our findings.

Maternal psychopathology analyses examining alternate caregiver reports of child somatic complaints yielded no significant results. However, maternal psychopathology analyses examining maternal reports of child somatic complaints provided partial support for our fourth hypothesis. Specifically, results from linear regressions showed that at preschool, number of lifetime maternal diagnoses significantly predicted child somatic complaints, whereas maternal depression and anxiety did not. At school-age, number of lifetime maternal diagnoses and maternal anxiety significantly predicted child somatic complaints, whereas maternal depression did not. Results from binary logistic regressions showed that maternal depression, but not maternal anxiety or number of lifetime diagnoses, significantly predicted child persistent somatic complaints. As each measure of maternal psychopathology predicted child somatic complaints in one or more regression analysis, we could not conclude from our results that anxiety was the strongest predictor (see Table 4).

Our final hypothesis was that maternal depression would be associated with distortion in reports of childhood somatic complaints but not fully account for the association between current maternal depressive symptoms and child somatic complaints. In order to assess distortion, we created a variable that represented the difference between maternal and alternate caregiver reports of child somatic complaints at school-age. Interestingly, approximately half the sample scored above and below zero on this difference score (M=-.029, SD=1.255), suggesting that there was not an overall pattern of increased reports of somatic complaints by the mothers in our sample. In addition, correlation analyses revealed no significant association between current maternal depressive symptoms as reported on the BDI and our distortion index (r=.110, p=.199).

Linear regressions showed that maternal depression predicted somatic complaints at school-age in both maternal ($F(1, 183)=15.526$, $R^2=.078$, $p<.001$) and alternate caregiver ($F(1, 136)=8.947$, $R^2=.062$, $p=.003$) reports.

Discussion

This study contributes to the literature on childhood somatic complaints by longitudinally examining a high-risk community cohort of mother-child dyads as the children developed from preschool to school-age. A novel research design addresses several critical gaps in the literature by assessing children in preschool, investigating the influence of various expressions of maternal psychopathology on early childhood behavior, utilizing alternate caregiver reports to examine maternal distortion, and investigating somatic complaints broadly, rather than individually (e.g., headaches, stomach aches) as is typically seen in pediatric clinical studies. Several notable findings emerged from this study, and results indicated significant relationships between child somatic complaints and both maternal and child psychopathology.

Consistent with associations between somatic complaints and internalizing disorders later in childhood, our results suggest that early childhood somatic complaints may be an early expression of underlying anxiety and depression. Furthermore, our study results align with the latent internalizing factor proposed by Ask et al. (2016) in which common genetic and environmental influences underlie anxiety, depression, and somatic complaints.

Results from this study support the continuity of preschool somatic complaints to school-age, as well as their ability to predict later anxiety and depression. Previous research has identified child somatic complaints as a predictor of internalizing disorders of adolescence and adulthood, but current findings suggest that these cognitive and behavioral patterns may emerge much earlier. This brings potential for early identification of children who demonstrate

beginning manifestations of internalizing disorders. Targeting preschoolers presenting somatic complaints may prevent these youths from continuing on associated maladaptive developmental trajectories and experiencing anxiety and depression.

Interestingly, gender differences were not found in either the prevalence of somatic complaints or in their ability to predict later anxiety and depression. Prior research lacks consensus on the temporal emergence of gender differences in somatic complaints, and our results suggest that these do not occur until after elementary school. The existing literature suggests such differences might emerge during adolescence, but we cannot conclude this from the current study (Campo, 2012). Contrary to our hypothesis, boys were just as likely as girls to develop symptoms of anxiety and depression at school-age if they manifested somatic complaints at preschool. It is well established that girls are at greater risk for anxiety disorders (Campo, 2012), but our results suggest that further work is needed to better understand this gender difference. Since young boys have traditionally been thought to be low-risk, they may have been neglected in research and clinical work. Future theory and practice should target somatic complaints and related internalizing symptoms in this population. Additionally, gender differences in externalizing behaviors, which have previously been reported to be more prevalent among boys with somatic complaints, should be explored across the preschool and school-age periods.

Inconsistent findings emerged concerning maternal “depression-distortion” in reports of child somatic complaints. While various dimensions of maternal psychopathology significantly predicted child somatic complaints among maternal reports, alternate caregiver reports did not reveal significant findings. However, there was general agreement in findings across maternal and alternate caregiver reports of prevalence of somatic complaints, associations with later

anxiety, and the continuity of these symptoms. Furthermore, maternal depressive symptoms were positively correlated with both maternal and alternate caregiver reports of somatic complaints, suggesting that maternal distortion does not fully account for the associations between maternal psychopathology and child somatic complaints. This aligns with Richters's (1992) challenge of the traditional view that mothers with depression present distorted views of their children. In contrast, maternal psychopathology may truly associate with an increased risk of child somatic complaints.

Rates of somatic complaints in the children in this clinical-community sample far exceeded the bulk of previous reports of community samples, further suggesting that maternal psychopathology heightens children's risk of developing somatic complaints. Among maternal reports, several notable findings emerged regarding maternal psychopathology and child somatic complaints. Most novel, perhaps, was the finding that the number of maternal lifetime diagnoses significantly predicted child somatic complaints at both preschool and school-age. While previous literature has identified maternal internalizing disorders as a predictor of somatic complaints, our findings suggest a relationship between a general psychopathology factor in mothers and childhood somatic outcomes. Mental illnesses have traditionally been categorized along single dimensions of internalizing, externalizing, or thought disorders, but a General Psychopathology factor has received increasing attention. Caspi et al. (2014) found this general dimension to explain psychiatric disorders better than any single dimension, and Waldman, Poore, van Hulle, Rathouz, & Lahey (2016) recently confirmed this general dimension factor to be moderately heritable and associated with familial psychopathology. Future research should work to further untangle this factor and its relationship with child somatic complaints.

Maternal histories of anxiety and depression were differentially related to child somatic complaints. Maternal anxiety significantly predicted child somatic complaints at school-age but not at preschool. Child anxiety is known to increase with age, so it is interesting that maternal anxiety was not a significant predictor of somatic complaints until later in development. Perhaps children become more sensitive to maternal anxiety as they undergo cognitive and emotional development, and begin to display somatic complaints at that time. It is notable and perplexing that maternal depression significantly predicted persistent somatic complaints, but not complaints at preschool or school-age independently. Considering the small number of children in the sample with persistent somatic complaints (N=46), these findings should be taken with caution. However, the emergence of maternal depression as a significant predictor of persistent complaints suggests it may be the expression of maternal psychopathology that should be of greatest concern. Persistent somatic complaints put youth at greatest risk for following the maladaptive developmental trajectory on which somatic complaints lead to concurrent and future anxiety and depression. Overall, these results extend the previous literature linking maternal psychopathology with child internalizing symptoms to preschool and school-age, while also suggesting that understudied dimensions, such as depression and general psychopathology, may make important contributions.

Potential Limitations and Future Directions

Several limitations underlie the current findings. This sample of mother-child dyads was predominately Caucasian, came from high socioeconomic status backgrounds, and were able to gain ready access to mental health services. Cultural factors may contribute to children's expressions of and reporters' awareness of somatic complaints. Therefore, future research should examine associations between child somatic complaints and maternal and child

psychopathology within a more heterogeneous population (Simon, Gater, Kisely, & Piccinelli, 1996). Although complementary alternate caregiver reports strengthened our findings, this data is not without methodological problems. For example, we had a smaller sample size of alternate caregivers, they were not necessarily consistent over time, and they had variable relationships (i.e. father, grandparent, teacher) with the children they reported on. Children are generally most emotionally expressive around the adult they feel closest to, which is often their mother. Furthermore, mothers may be more knowledgeable of and sensitive to their children's complaints (Richters, 1992). Thus, it is expected that a child may complain more to a mother than to a teacher or grandparent.

We examined distortion in our study by comparing maternal and secondary caregiver reports on a behavior checklist. Maternal distortion due to psychopathology should ideally be examined with more objective or standardized measures. For example, Richters et al. (1992) suggests depressed and control mothers rate multiple videotaped samples of their children and that these ratings then be compared to those of trained observers.

While it may be difficult to achieve in very young children, examining child reports of somatic complaints may be also be worthwhile. Doing so would allow us to assess how physical complaints are impacting children's daily quality of life and avoid relying on others' perceptions. Santalahti et al. (2005) noted differences between child and parent reports of somatic complaints, but this has yet to be explored in young children. However, child reports can also be flawed, as self-report measures often bring bias.

The larger study was not designed to assess associations between child somatic complaints and related psychopathology, and we thus lack potentially valuable information, such as the physical health histories of these children. No known studies that longitudinally examine

the relationship between somatic complaints and medical diagnoses begin in early childhood. Thus, it would be interesting to examine whether children presenting somatic complaints at preschool eventually develop diagnosable medical conditions, internalizing disorders, or neither. Furthermore, the small number of children presenting with any specific individual somatic complaint (e.g., headaches) in preschool prevented us from examining whether particular physical symptoms were associated with certain forms of maternal or child psychopathology. Comparing specific symptoms may allow us to determine which children are at highest risk for developing psychopathology.

The significant results of the current study, as demonstrated by both maternal and alternate caregiver reports, warrant further research on somatic complaints in young children of mothers with a history of psychopathology. Future research should take a multidisciplinary approach, including the self-report methods presently employed and also considering health histories, along with cultural, temperamental, and physiological factors suggested to play a role in the development of somatic complaints (Beck, 2008). Perhaps most critical, this study demonstrates the importance of tracking somatic complaints early in the child's life. Optimal future work should follow samples from preschool to adulthood, collecting data at several time points to gain a more nuanced understanding of the development of somatic complaints and also determine optimal periods of intervention. In accordance with the ultimate goal of prevention, perhaps maternal mental health assessments could be integrated into pediatric primary care. Psychoeducational programs, as well as mindfulness-based interventions, may reduce the physical and psychological components of somatic complaints in both mothers and children. Mindfulness-based therapy has been found to effectively treat chronic pain, anxiety, and depression, and a recent meta-analysis found this therapy to be potentially effective in treating

somatization disorders (Lakhan & Schofield, 2013). The low cost, ease of use, and lack of side effects makes mindfulness-based treatments an area worthy of exploring in children with somatic complaints.

Conclusions

This study longitudinally explored the relationship between maternal psychopathology and childhood somatic complaints from preschool to school-age. Somatic complaints at preschool predicted both somatic complaints and increased anxiety and depression at school-age, and there is evidence of maternal psychopathology predicting somatic complaints as well. Few significant differences were found between maternal and alternate caregiver reports, and no gender differences were found. These findings support the importance of early detection of somatic complaints and the need for evidence-based interventions to prevent affected children from developing internalizing disorders that are costly to individuals and society.

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Table 1.

Demographic Characteristics

Child Sex	
Male (N)	95
Female (N)	90
Child Age in Years: mean (SD)	7.16 (1.20)
Child Ethnicity	
Caucasian %	81.1%
African American %	9.7%
Hispanic %	2.7%
Asian %	1.6%
Other %	3.8%
Missing %	1.1%
Mother's Age in Years: mean (SD)	40.9 (4.9)
Mother's Education	
High School or Equivalent	7.1%
Two-Year Degree	6.0%
Bachelor's Degree	40.4%
Master's Degree	29.5%
Professional Degree	6.6%
Doctoral Degree	10.4%
Mother's Employment Status	
Unemployed/Not Working	28.7%
Employed Part-Time	24.9%
Employed Full-Time	45.3%
Retired	1.1%

Table 2.

Somatic Complaints Raw Scores

	N	Min	Max	Mean	SD	Frequency of 1+ Somatic Complaint
Preschool						
Maternal	185	0	9	1.69	1.78	67.0%
Alternate Caregiver	159	0	7	1.33	1.53	60.4%
School-Age						
Maternal	185	0	12	.70	1.80	49.2%
Alternate Caregiver	138	0	16	1.19	2.06	46.4%

Table 3.

Correlations between Somatic Complaints and Anxiety/Depression

Variable	1	2	3	4	5	6	7	8
1. Maternal Somatic PS	-	.344**	.276**	.128	.358**	.385**	.047	.138
2. Maternal Anx/Dep PS		-	.102	.386**	.342**	.499**	.201*	.278**
3. Alt. Caregiver Somatic PS			-	.379**	.151	.178*	.273**	.215*
4. Alt. Caregiver Anx/Dep PS				-	.119	.244**	.257**	.218*
5. Maternal Somatic SA				.	-	.570**	.514**	.236**
6. Maternal Anx/Dep SA						-	.326**	.494**
7. Alt. Caregiver Somatic SA							-	.455**
8. Alt. Caregiver Anx/Dep SA								-

**p<0.05 **p<0.01*

Note: Variables represent maternal and alternate caregiver reports of somatic complaints and anxiety/depression at preschool (PS) and school-age (SA).

Table 4.

Summary of Maternal Psychopathology and Child Somatic Complaints

	df	*F Change*	*R^2 Change*	*p*
Number of Maternal Lifetime Diagnoses				
Mom PS	**215**	**6.725**	**.030**	**.010**
AC PS	107	.450	.004	.504
Mom SA	**181**	**7.632**	**.040**	**.006**
AC SA	106	3.064	.026	.083
Maternal Anxiety				
Mom PS	215	1.317	.006	.252
AC PS	107	1.462	.013	.229
Mom SA	**181**	**9.008**	**.047**	**.003**
AC SA	106	2.980	.025	.087
Maternal Depression				
Mom PS	215	.485	.002	.487
AC PS	107	1.717	.016	.193
Mom SA	181	1.625	.009	.204
AC SA	106	.489	.004	.486
Persistent	*df*	*Wald*	*Exp (B)*	*p*
# Diagnoses Mom	1	2.272	1.145	.132
# Diagnoses AC	1	.295	1.094	.587
Anxiety Mom	1	.410	1.244	.522
Anxiety AC	1	.434	1.432	.510
Depression Mom	**1**	**5.076**	**2.184**	**.024**
Depression AC	1	.192	1.268	.661

Note: bolded values indicate significance p <.05