Maternal Anxiety and Toddler Inhibited Temperament Predict Maternal Socialization of Worry

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Abstract

Parent emotion socialization refers to the process by which parents impart their values and beliefs about emotion expressivity to their children. Parent emotion socialization requires attention as a construct that develops in its own right. The socialization of child worry, in particular, has implications for children's typical socioemotional development, as well as their maladaptive development towards anxiety outcomes. Existing theories on emotion socialization, anxiety, and parent-child relationships guided our investigation of both maternal anxiety and toddler inhibited temperament as predictors of change in mothers' unsupportive (i.e., distress, punitive, and minimizing) responses to toddler worry across 1 year of toddlerhood. Participants included 139 mother-toddler dyads. Mothers reported on their own anxiety and their emotion socialization responses to toddler worry. We assessed toddler inhibited temperament through a mother-report survey of shyness and observational coding of dysregulated fear. Maternal anxiety but not child inhibited temperament predicted distress reactions and punitive responses, whereas maternal anxiety and toddler dysregulated fear both uniquely predicted minimizing responses. These results support continued investigation of worry socialization as a developmental outcome of both parent and child characteristics.

Keywords

anxiety; inhibited temperament; parents/parenting; emotion socialization; worry

Parents engage in *emotion socialization* by conveying their beliefs, values, and practices concerning emotional expressivity to their children through a variety of means, including parents' emotion expressivity and modeling, discussions about past emotional events, and direct responses to children's emotion displays (Eisenberg, Cumberland, & Spinrad, 1998; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Zeman, Cassano, & Adrian, 2013). Emotion socialization functions as a key mechanism in children's social development, predicting children's socioemotional and psychological outcomes (Denham, Bassett, &

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Wyatt, 2007; Morris et al., 2007). Existing theoretical models (Eisenberg et al., 1998; Morris et al., 2007) provide a framework for considering parent- and child-level predictors of parent emotion socialization. However, there exist several limitations of the present literature.

First, little is known about unsupportive responses to children's worry, specifically, despite worry being common for typically developing children (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998) and central to child anxiety (Weems, Silverman, & Greca, 2000). Furthermore, more research is needed on antecedents of emotion socialization. Emotion socialization begins when children are very young (e.g., Spinrad et al., 2007), requiring examination of predictors of socialization of worry in early childhood. Relatedly, although contemporary emotion socialization models theorize that both parent and child characteristics influence parent emotion socialization, these factors are rarely studied together, which is necessary to identify their unique contributions. The current longitudinal study addressed these issues by examining the predictive relations between anxiety-relevant constructs (maternal anxiety, toddler inhibited temperament) and mothers' later socialization responses to their toddlers' worry.

Unsupportive Emotion Socialization and Worry

As one form of emotion socialization, mothers may provide direct, unsupportive responses to their children's emotions via *distress*, *punitive*, or *minimizing* reactions (Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002). A *distress* response involves the mother becoming upset about her child's emotion. A mother may *punitively* respond by scolding her child, threatening privilege removal, or otherwise reacting harshly to the emotion. Finally, a *minimizing* reaction may correspond to labeling the emotion an overreaction or ignoring the emotion.

Parents' responses to their children's *worry* may be especially important for both typical and anxiety development. Most children worry at least occasionally (Muris et al., 1998), with 30% of children experiencing excessive worry despite falling below clinical thresholds for anxiety diagnoses (Bell-Dolan, Last, & Strauss, 1990). Toddlers may express a variety of worries, such as those corresponding to medical procedures, being left alone at night, or meeting a new babysitter. Children who report more frequent, varied, and intense worries tend to be more anxious (Muris et al., 1998; Weems et al., 2000). Such anxiety symptoms often emerge in toddlerhood and predict children's later anxiety outcomes (Mian, Wainwright, Briggs-Gowan, & Carter, 2011). Focus on worry socialization stems from research suggesting that parents' distress, punitive, and minimizing reactions are associated with children's concurrent and later internalizing symptomatology (Eisenberg et al., 1999; Hudson, Comer, & Kendall, 2008; Hurrell, Hudson, & Schniering, 2015; Luebbe, Kiel, & Buss, 2011; O'Neal & Magai, 2005). Therefore, it is critical to understand predictors of mothers' responses to toddlers' worry.

Potential Predictors of Emotion Socialization Responses to Worry

There remains need for attention to parent- and child-level characteristics pertinent to the *development* of parents' worry-specific emotion socialization. To this end, the current study

focused on elucidating the unique contributions of maternal anxiety and child inhibited temperament to mothers' engagement in unsupportive responses to toddler worry displays.

Maternal anxiety.

Although a wide range of maternal characteristics influence parenting, we focus on maternal anxiety because child worry may be personally relevant to mothers who are themselves anxious. Maternal anxiety relates to a range of parenting behaviors and greater negativity in parent-child relationships (Harvey, Stoessel, & Herbert, 2011; Whaley, Pinto, & Sigman, 1999). Evidence is accruing that maternal anxiety is relevant to emotion socialization. For example, Breaux et al. (2016) found that mothers with heightened, compared to fewer, anxiety symptoms were more likely to respond to toddlers' emotions with unsupportive reactions.

We sought greater specificity by focusing on the relation between maternal anxiety and three particular indices of maternal unsupportive responses to children's worry: distress, punitive, and minimization responses. The current literature offers the most support for maternal anxiety as a predictor of distress and minimization responses. Given that anxiety is maintained by internal, cognitive processes (Hofmann, 2007; Owens, Derakshan, & Richards, 2015) and that distress responses are internal reactions, anxiety may be salient to mothers' distress reactions towards their toddlers' worry. That is, mothers who report more anxiety may experience more internal anxious distress when their children come to them with worries, which may promote their own distressed responses over time. This is indirectly supported by research on anxious individuals' tendencies to shift their attention inward and overestimate negative consequences during interpersonal situations they find distressing (Hofmann, 2007).

We derive theoretical support for the relation between maternal anxiety and minimizing reactions from models highlighting that individuals with anxiety utilize strategies to avoid the distress associated with emotional experiences (Mennin, Heimberg, Turk, & Fresco, 2005). Patterns of avoidance in anxious individuals may extend to emotion socialization, with parents neglecting or devaluing their children's negative emotion displays (Arellano, Gramszlo, & Woodruff-Borden, 2018). In one study, parental anxiety contextualized an association between children's negative affect and parents' discouragement of emotion expression (Arellano et al., 2018). Discouragement may be one manner by which parents may minimize worry.

The literature does not, as of yet, support a relation between maternal anxiety and punitive responses to child worry. The relation between anxiety and punitive responses has only occurred in the context of a composite of unsupportive reactions (e.g., Breaux et al., 2016). Thus, existing literature supports a hypothesis that maternal anxiety relates to distress and minimizing responses, but perhaps not to punitive responses.

Child inhibited temperament.

Inhibited temperament is conceptualized as indicating the degree to which a child shows wariness, withdrawal, and fear in response to unfamiliar objects, individuals, or contexts (Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984). Inhibited temperament is

moderately stable over time and predicts children's anxiety both concurrently and longitudinally (Chronis-Tuscano et al., 2009; Fox, Henderson, Marshall, Nichols, & Ghera, 2005). A number of constructs relate closely to or fall under the domain inhibited temperament; we focus on two. First, we examine *shyness*, which characterizes inhibited temperament displayed in social situations. Shyness is particularly predictive of social anxiety when assessed through parent report (Chronis-Tuscano et al., 2009). Second, we focus on *dysregulated fear*, which corresponds to heightened distress and withdrawal in *low-threat* contexts, thereby capturing the mismatch between lack of situational threat and excessive inhibition (Buss, 2011; Buss et al., 2013). Dysregulated fear identifies children who are fearful of novel and possibly uncertain, but largely unthreatening, situations, in contrast to other children who may enjoy such situations (Buss et al., 2013). Toddler dysregulated fear predicts greater anxiety symptoms over time, above and beyond more traditionally measured inhibition (Buss, 2011; Buss et al., 2013). Thus, both shyness and dysregulated fear are specific aspects of inhibited temperament.

Having a toddler who exhibits higher, rather than lower, shyness or dysregulated fear may prime mothers' unsupportive reactions to worry. Few studies address shyness and dysregulated fear, specifically, in relation to emotion socialization, so our hypotheses were informed by research examining the broader construct of inhibited temperament. Because they express more concerns about uncertainty, inhibited children provide more opportunities for worry socialization and may elicit more unsupportive maternal reactions. Inhibited temperament may predict more distress responses to worry. Indeed, Hastings et al. (2018) found that mothers' anxious and concerned responses to toddler withdrawal were stable over one year, but only for mothers of children with initially high anxious affect, characteristic of inhibited temperament. Other findings suggest that inhibited, compared to uninhibited, children have mothers who experience more child-focused worry (Bryan & Dix, 2009). Further, theory surrounding the anxious-coercive cycle characterizing families of anxiety-prone children posits that these children place high demands on their parents for reassurance and help, which may become taxing over time (Dadds & Roth, 2001). Frustrations with consistent and unremitting fears and worries may then engender punitive and minimizing responses to worry. Thus, toddler inhibited temperament, measured through shyness and dysregulated fear, may predict distress, punitive, and minimizing responses, independent of maternal characteristics.

The Current Study

Given the relevance of worry to both typical and anxiety development, it is critical to understand how parents' worry socialization develops. There remains a need for (a) consideration of worry-specific socialization, (b) investigation of these links in early childhood, and (c) attention to the unique variance of parent and child-level factors. To this end, we tested the main-effect predictive relations between maternal anxiety and toddler inhibited temperament, and change in specific unsupportive socialization responses to worry over one year of toddlerhood. We focused on toddlerhood given the aforementioned early emergence of parent emotion socialization practices (Spinrad et al., 2007). We controlled for concurrent anger socialization to strengthen specificity to worry socialization. Despite value in understanding the interplay between maternal anxiety and toddler inhibited temperament

in relation to parenting outcomes, we chose to focus on main effects given our use of multiple facets of unsupportive emotion socialization in the service of uncovering greater specificity of relations. We did not make unique hypotheses for maternal perceptions of shyness versus laboratory-observed dysregulated fear, as they both characterize inhibited temperament. First, given the shared internal nature of both anxiety and distress (Hofmann, 2007; Owens et al., 2015) and findings that mothers of inhibited children experience concern and child-focused worry (Bryan & Dix, 2009; Hastings et al., 2018), we hypothesized that mothers' distress responses would be uniquely predicted by both maternal anxiety and toddler inhibited temperament. Second, we hypothesized that toddler inhibited temperament, alone, would predict mothers' punitive reactions. No theory or empirical studies specifically identifies punitive socialization as a consequence of maternal anxiety, but parents engaged in an anxious-coercive cycle with anxiety-prone children may be prone to punitive socialization of worry (Dadds & Roth, 2001). Finally, we hypothesized that maternal minimizing responses would be predicted by both maternal anxiety, due to anxiety's influence on avoidance motivation (Mennin et al., 2005), and inhibited temperament, due to theory surrounding the anxious-coercive family cycle (Dadds & Roth). Despite being similarly predicted by both maternal anxiety and toddler inhibited temperament, we acknowledge that distress and minimization responses may still arise from different motivations (i.e., vigilance/overemphasis on toddler worry, versus interpreting toddler worry as unimportant).

Method

Participants

Participants included 139 mothers and toddlers (55 female) enrolled in a larger longitudinal study of temperament, parenting, and children's outcomes at a Midwestern university. Participants were recruited from an earlier study assessment at child age 1 year or newly recruited via mailings to families who posted birth announcements in local newspapers, flyers in local venues, and in-person at a Women's, Infants, and Children's office for the Time 1 (T1) assessment when toddlers were 24–30 months old ($M = 26.80$, $SD = 2.02$). Mothers were 21.28 to 45.11 years old ($M = 32.58$, $SD = 5.23$) and reported education from 9 to 21 years ($M = 15.37$, $SD = 2.65$), with 18.5% reporting a high school education or less. Median annual household gross income was $51–60K, with 30% of the sample reporting $30K or less. Mothers reported their own and their children's racial identity, respectively, to be Black/African American (0.7%, 1.4%), Asian/Asian American or Pacific Islander (3.6%, 1.4%), White/European American (89.2%, 81.3%), Native American (0.7%, 0.0%), or multiracial/other (1.4%, 10.8%). Mothers reported their own and their child's ethnicity as 2.2% and 2.9% Hispanic/Latinx, respectively. Ninety-eight families (70.5%) participated in Time 2 (T2), when toddlers were 36–42 months old ($M = 39.21$, $SD = 2.34$).

Procedure

Procedures received approval from Miami University's Institutional Review Board. At T1, interested mothers were mailed a consent form and questionnaires (including those assessing emotion socialization and maternal perceptions of toddler shyness) to complete and bring with them to the subsequent T1 laboratory visit, where the mother-toddler dyad engaged in

tasks including the Clown and Puppet Show episodes (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996), used in existing studies to measure dysregulated fear (Buss, 2011). After T1 observational procedures, mothers completed measures of maternal anxiety. At T2, mothers were re-contacted for a follow-up assessment. The only data from the T2 assessment used in the current study was the T2 emotion socialization survey.

Measures

Maternal perceived anxiety.—Common features of anxiety include worry, social-evaluative concerns, and physiological hyperarousal (Barlow, 2002), so mothers reported on these three aspects of their own anxiety. The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a 20-item measure assessing characteristic levels of social difficulties prompted by anxiety (e.g., "I have difficulty making eye-contact with others") on a 0 (*not at all*) to 5 (*extremely*) scale. The SIAS has been shown to have high internal consistency, test-retest reliability, and convergent and discriminant validity (Mattick & Clarke, 1998). After reversing negatively-worded items, all items ($\alpha = .94$) were summed for the final score.

The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item measure assessing the extent of trait-level worry (e.g., "My worries overwhelm me"). The PSWQ has adequate internal and test-retest reliability, and established convergent and discriminant validity (Meyer et al., 1990). Items are measured on a 1 (*not at all typical*) to 5 (*very typical*) scale. All items were summed after necessary reversing ($\alpha = .94$), with higher scores reflecting higher levels of worry.

The Depression, Anxiety, Stress Scales (DASS; Lovibond & Lovibond, 1995) asked mothers to indicate the extent to which items, scored from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*), applied to them over the past week. The current study used the 7-item Anxiety scale, which focuses on bodily sensations of physiological arousal (e.g., "I was aware of the action of my heart in the absence of physical exertion [e.g., sense of heart rate increase, heart missing a beat]"). This scale has previously been shown to have high internal consistency and convergent validity with other measures of anxiety (Lovibond & Lovibond, 1995). Anxiety items were summed ($\alpha = .84$) and multiplied by 2 to derive the final perceived physiological anxiety score.

The three anxiety measures were moderately intercorrelated ($rs = .35$ to $.52$, all $ps < .001$). Because anxiety measures were conceptually related and to help streamline results, we standardized each measure and averaged them to create a maternal anxiety composite for primary analyses. Given the modest nature of correlations, exploratory analyses using the discrete anxiety measures (which did differ) are reported in the Supporting Information.

Toddler inhibited temperament.—We assessed both observed dysregulated fear and mother-perceived shyness. For the observational measure of dysregulated fear, we followed previous studies (Buss, 2011) in coding toddler distress and shyness/withdrawal in low-threat episodes. In the Clown episode, the mother and toddler interacted with a friendly female experimenter dressed as a clown who invited the toddler to play three 1-minute-long games, before cleaning up. In the Puppet Show episode, the experimenter presented two

animal puppets, who invited the child to play games and receive a prize. Mothers were instructed to behave naturally through both episodes. Distress represented toddlers' displays of facial/vocal expressions indicating negative affect. Shyness/withdrawal represented movements away from the stimulus, refusals to approach when prompted, or hiding the face or body. Distress and shyness/withdrawal were each given scores ranging from 1 (*none*) to 5 (*extreme, prolonged displays*), per episode. Coders were required to meet minimum reliability (ICC > .80) with the master coder prior to coding independently. The master coder double-scored 20–25% of cases throughout coding to prevent coder drift. Final reliabilities were adequate across scores and episodes (ICCs = .82 – 1.00). Distress and shyness/withdrawal were correlated within Puppet Show ($r = .40$, $p < .001$) and within Clown ($r = .30$, $p = .001$), and shyness/withdrawal in Clown was related to both distress ($r = .42$, $p < .001$) and shyness/withdrawal ($r = .38$, $p < .001$) in Puppet Show. Although Clown distress was not related to Puppet Show distress ($r = .10$, $p = .271$) or shyness/withdrawal ($r = .05$, $p = .561$), principal components analysis yielded a single component explaining 46.95% of the variance in these scores. Because these composites were significantly related when averaging scores within episode, ($r = .38$, $p < .001$), and to stay consistent with previous operationalizations of dysregulated fear (Buss, 2011), we averaged the four scores together to yield the final variable of dysregulated fear. Taking the mean of scores, rather than using the principal component, allowed both shared and unique variance among the four scores to be retained in the composite.

Mothers reported their perceptions of toddlers' shyness via the Shyness scale of the Early Child Behavior Questionnaire – Short Form (ECBQ; Putnam, Gartstein, & Rothbart, 2006). The ECBQ short-form is a 107-item measure that instructs caregivers to rate the recent frequency of various toddler behaviors on a 1 (*never*) to 7 (*always*) scale. The Shyness scale (5 items; e.g., "When approaching unfamiliar children playing, how often did your child seem uncomfortable?") has shown adequate internal consistency, cross-rater agreement, and convergent and discriminant validity (Putnam et al., 2006). Items were averaged to yield the final measure of maternal perceptions of toddler shyness ($\alpha = .78$).

Emotion socialization.—Mothers completed the 82-item Coping with Toddlers' Negative Emotions Scale (CTNES; Fabes, Eisenberg, & Bernzweig, 1990; Spinrad, Eisenberg, Kupfer, Gaertner, & Michalik, 2004) at both T1 and T2 to rate their perception of their responses to their toddlers' worry displays. The CTNES presents 12 hypothetical scenarios to facilitate a mother imagining her child experiencing a negative emotion. For each scenario, mothers indicate on a 7-point scale (1 = *very unlikely* to 7 = *very likely*) the likelihood of particular responses. We focused on four vignettes involving maternal reactions to child *worry* (i.e., the child being afraid/worried about a doctor visit, a new babysitter, being alone at bedtime, or getting stuck on playground equipment). Scores were averaged across the four vignettes for *Distress Reactions* (e.g., "I would feel upset and uncomfortable because of my child's reactions"), *Punitive Reactions* (e.g., "I would tell my child to behave or we'll have to go home right away") and *Minimizing Reactions* (e.g., "I would tell my child that he/she is overreacting"). Past studies have shown that the CTNES demonstrates acceptable to excellent test-retest and internal reliability, as well as construct validity (Spinrad et al., 2004). Presently, internal consistencies for the worry-focused distress,

punitive, and minimizing responses were fair to good for T1 (α = .82, .69, .76, respectively) and for T2 (α = .85, .62, .69, respectively). To interpret our independent variables as predicting change in socialization of worry, we used the CTNES worry response subscales at both time points. We also used T2 subscales to derive a measure of socialization of anger, to be used as a covariate. We identified five vignettes involving the child feeling angry (i.e., because they could not have a snack, fit a puzzle piece, or play outside, with a toy, or with the mother). Mothers reported on their distress (α = .50), punitive (α = .65), and minimizing reactions (α = .75) to these situations for anger socialization scales.

Results

Preliminary Analyses

Missing data.—Twenty-two participants (15.8%) did not have T1 emotion socialization; this measure was added after data collection began. It was mailed to existing participants, but some families did not send it back, despite reminders. Missing values occurred for the ECBQ (n =12, 8.6%) because mothers did not complete the questionnaire packet, and dysregulated fear (n = 12, 8.6%), primarily because families moved and only completed mailed questionnaires. Missing values occurred for the DASS (n = 13, 9.4%) and PSWQ and SIAS (n = 6, 4.3%), but averaging existing measures resulted in fewer mothers missing the maternal anxiety composite (n = 4; 2.9%). Fifty-six participants (40.3%) did not complete the CTNES at T2; 41 were lost due to attrition, and 15 only completed other aspects of T2. Overall, 24.29% of values were missing.

Whether comparing participants with any missing versus complete data, or comparing participants lost to attrition versus retained, missingness related to lower maternal education and higher anxiety. Mothers with any missing values, versus complete data, reported higher toddler shyness (see Supporting Information document for analyses). Missingness was not related to income, number of children, or toddler sex. Little's missing completely at random (MCAR) test suggested that the pattern of missingness deviated from an MCAR pattern (χ^2[339] = 392.82, p = .023). Given that maternal education could be included in the imputation algorithm and primary analyses, and that it is unlikely that datasets are ever completely not missing at random (Enders, 2010), multiple imputation remained the most appropriate strategy for handling missing values (Graham, 2009). The algorithm included all primary variables, planned covariates (T1 worry socialization, T2 anger socialization) and maternal education to create 40 imputed datasets. We report pooled estimates of regression coefficients and their tests, which weight the contribution of each imputation's statistic to the final result based on its standard error. Pooled estimates are not provided for model information (R^2 and F-tests), so the average and range are provided. Thus, except for descriptive statistics, all subsequent analyses use the full sample of 139 participants.

Descriptive statistics and bivariate associations.—Descriptive statistics for primary variables (prior to imputation) and bivariate correlations (computed both prior to and after imputation) are displayed in Table 1. Dependent variables demonstrated reasonable adherence to a normal distribution (skew < |2.00|, kurtosis < |4.00|). Dysregulated fear was higher in male (M = 1.91, SD = 0.63) than female (M = 1.63, SD = 0.40) toddlers (t[124.98]

= 3.02, p = .003, Cohen's d = 1.08). Sex differences did not emerge for T2 worry socialization.

Stability was moderate for punitive and minimizing reactions to worry, and lower for distress reactions. T2 responses to anger and worry were correlated, suggesting the importance of controlling for reactions to anger in subsequent analyses. Maternal perceptions of toddler shyness and observed dysregulated fear demonstrated a small correlation. Maternal anxiety appeared to be more highly related to T2 responses to worry than to T2 responses to anger (with the exception of distress), suggesting some specificity of relations to worry.

Primary Models

We used hierarchical multiple regression in SPSS 25 to test hypotheses with the imputed data (n = 139). Each of three models predicted a specific T2 worry socialization outcome. In Step 1, we entered covariates (relevant T1 worry [to predict change] and T2 anger [to control variance in broader emotion socialization] socialization variables, and maternal education). Step 2 included the maternal anxiety composite. Step 3 included the two child inhibited temperament variables. A priori power analyses for hierarchical regression suggested that, for a medium effect size, power of .80, and Type I error rate of .05, 73 and 79 participants would be required at Steps 2 and 3, respectively. Thus, the sample size was adequate to detect hypothesized effects. Across all coefficients in all models, collinearity diagnostics suggested adequate tolerance (all values > .60) and low variance inflation factor (all values < 2.00).

The first model predicted T2 distress reactions to child worry (Table 2). In Step 1 (model fit significant across all 40 imputations, p < .001), concurrent distress reactions to child anger emerged as significant. In Step 2 (model change significant in 35 of 40 imputations, p < .05), maternal anxiety predicted T2 distress reactions. In Step 3 (model change significant in 11 of 40 imputations, p < .05), neither child inhibited temperament variable reached significance. Maternal anxiety remained significant.

The second model predicted T2 punitive worry responses (Table 3). In Step 1 (significant across all 40 imputations, p < .001), both T1 punitive responses to worry and T2 punitive responses to anger related to T2 punitive responses to worry. In Step 2 (significant in 39 of 40 imputations, p < .05), maternal anxiety showed a significant positive relation. In Step 3 (significant in only 3 of the 40 imputations, p < .05), neither child inhibited temperament variable significantly predicted punitive responses to child worry. Maternal anxiety remained significant.

Finally, the third model predicted T2 minimizing worry responses (Table 4). In Step 1 (significant across all 40 imputations, p < .001), minimizing responses to anger related to minimizing responses to worry. In Step 2 (significant across all 40 imputations, p < .01), maternal anxiety predicted minimizing responses. In Step 3 (significant in 36 of 40 imputed datasets, p < .05), dysregulated fear predicted minimizing responses. Maternal anxiety remained significant.

Post-hoc exploratory analyses tested for evidence of interactions between maternal anxiety and toddler inhibited temperament, as well as the moderating role of toddler biological sex. No interactions emerged, more information about which is available from the authors.

Discussion

The current study investigated relations of both maternal anxiety and toddler inhibited temperament to change in mothers' distress, punitive, and minimizing responses to children's worry across 1 year of toddlerhood. Relations emerged above and beyond maternal socialization responses to anger, so findings seem unique to worry, rather than indicative of broader socialization across emotions. Results for maternal anxiety and toddler inhibited temperament supported some, but not all, hypotheses.

Mothers' perceptions of their own anxiety uniquely predicted their endorsement of distress (hypothesized), minimization (hypothesized), and punitive responses (not hypothesized). Anxiety involves internal, cognitive experiences, so it follows that anxiety would relate to the internal experience of distress. When dealing with children's worry expressions, mothers perceiving heightened levels of their own anxiety may experience more negative internal reactions (Hofmann, 2007; Owens et al., 2015) and, thus, respond negatively to their children (Breaux et al., 2016; Harvey et al., 2011). Anxiety relates to parents' doubts about child competency (Budinger, Drazdowski, & Ginsburg, 2013), which could also exacerbate anxious parents' distress (Rapee & Heimberg, 1997).

We expected maternal anxiety to predict minimizing responses based on anxious individuals' proneness to avoid emotional experiences (Mennin et al., 2005), and perhaps, by extension, their children's emotions. Anxious mothers may downplay their children's worries in an attempt to avoid situations that heighten feelings of inefficacy. It is also possible that minimizing serves a regulatory function for mothers with heightened anxiety. One way to decrease arousal is to minimize the cue (here, children's worry) that prompted it. Research on parental experiential avoidance suggests that anxious parents may avoid their children's negative affect and/or promote children's avoidance of negative affect (Cheron et al., 2009). Future research may investigate whether experiential avoidance mediates the relation between maternal anxiety and minimization of toddler worry.

Although not hypothesized, the association between maternal worry and punitive responses to child worry is consistent with past research examining unsupportive emotion socialization more broadly (Breaux et al., 2016). Finding this specific relation may help refine theory surrounding specific responses. The consistent relation between mothers' perceived anxiety and each of the socialization responses to child worry suggests that maternal anxiety is a general risk factor for unsupportive worry socialization. That mothers' perceived anxiety related to all three types of unsupportive worry socialization above and beyond toddlers' dysregulated fear and mother-perceived shyness is consistent with previous findings suggesting that maternal anxiety functions as a contributor to parenting unique from child temperament (Murray et al., 2012). Thus, directly targeting maternal anxiety in parent-focused interventions may have broad benefits for decreasing negative socialization of children's worry.

Toddler dysregulated fear predicted maternal minimization of worry above and beyond maternal anxiety but did not predict mothers' reported distress or punitive responses. Thus, child-elicited effects on worry socialization may be specific to minimization responses. It is possible that toddlers higher in dysregulated fear do not elicit increased distress, and they are also not met with punitive reactions. Mothers may be motivated to minimize worry in a non-distressed and non-punitive manner. Continued investigation into transactional interactions between toddlers high in dysregulated fear and mothers practicing minimization of worry could shed light on whether this leads to positive or negative outcomes. Although no sex difference existed in minimization responses, male toddlers were higher in dysregulated fear. As transactional parent-child dynamics solidify across early childhood, this could explain the often-found pattern of the dampening of boys' displays of withdrawal-based emotions. Neither dysregulated fear nor mother-perceived shyness predicted punitive responses, suggesting some specificity in the types of socialization that may be occurring in the anxious-coercive cycle (Dadds & Roth, 2001). Inhibited temperament's lack of association with punitive responses speaks to the potential drawbacks of exclusively aggregating punitive and minimization responses to worry.

Maternal perceptions of toddler shyness did not predict any of the worry socialization responses. When included in the same model, shared variance between shyness and dysregulated fear dropped out, leaving only what was unique to each measure. Dysregulated fear is observed in low-threat situations (Buss, 2011), which have previously yielded toddler behaviors more highly (albeit imperfectly) related to maternal report of inhibited temperament than toddler behaviors observed in higher-threat situations (Kiel & Hummel, 2017). Variance in maternal report of shyness unique from dysregulated fear may reflect mothers' perceptions of toddler inhibition in other, qualitatively different contexts (e.g., with a new babysitter). It is also possible that variance specific to maternal perceptions of shyness is relevant for parenting behaviors not studied presently or in the context of maternal characteristics outside the scope of the current study (e.g., goals for or beliefs about shyness; Hastings, Nuselovici, Rubin, & Cheah, 2010).

Surprisingly, neither dysregulated fear nor mother-perceived shyness predicted mothers' endorsement of distress responses. As some parents report fear and shyness to be confusing, upsetting, and worrisome (Hastings & Rubin, 1999), toddler dysregulated fear may interact with maternal beliefs about worry. The lack of relation between dysregulated fear and maternal punitive responses can be contextualized by mixed findings in the literature. Inhibited temperament relates to parents' warmth, involvement, and physical affection, but it also relates to harsh parenting (e.g., Rubin, Hastings, Stewart, Henderson, & Chen, 1997; see also Fox et al., 2005; Hastings et al., 2010). We did not investigate interactions in the current study to minimize predictors in models, and exploratory analyses suggested they did not exist. Further investigation into specific contexts in which toddler inhibited temperament relates to distress or punitive responses may be warranted.

Future research may address several limitations of the current study. We focused on mothers to the exclusion of fathers. Despite increasing equalization of maternal/paternal parenting roles, mothers still spend more time with their toddlers, are more involved in daily caregiving tasks, and tend to be sought when toddlers are distressed, relative to fathers

(Sasaki, Hazen, & Swann Jr, 2010; Umemura, Jacobvitz, Messina, & Hazen, 2013), providing more opportunities to socialize their children's worry. However, fathers are also key socializers of emotion, and examining the extent to which parents influence each other's socialization could elucidate dynamic family processes that evolve over time. Additional time points and larger samples would be required to more comprehensively model transactional, longitudinal effects among family members. A larger sample would also support tests of interactions between maternal anxiety and toddler inhibited temperament across multiple outcomes. We were not able to delineate the complex interplay between maternal and toddler variables. We derived all variables from maternal report except for dysregulated fear, so it is possible that some associations may be biased by shared method variance. In this way, it is important to acknowledge that the maternal anxiety and emotion socialization measures may both be interpreted as mothers' perceptions of their anxiety and responses to toddler emotions. In vivo measure of emotion socialization would be needed to clarify if these reports match actual behaviors. Finally, the theoretical models of emotion socialization on which we based the current study (Eisenberg et al., 1998; Morris et al., 2007) acknowledge the role of culture and other contextual influences on parents' socialization responses. The current study was unable to examine racial or ethnic differences due to the size and composition of the sample, but it remains essential to understand whether maternal anxiety and toddler inhibited temperament relate to worry socialization in multiple populations.

In sum, maternal distress, punitive, and minimizing responses to worry were predicted by maternal anxiety, and toddler dysregulated fear specifically predicted minimizing responses. Both maternal and child characteristics are important to consider in models of worry socialization. We encourage continued investigation of discrete unsupportive responses either instead of or in addition to their aggregated form. Further, the results of the current study suggest continued examination of socialization of worry, specifically, in early childhood.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

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Table 1

Descriptive Statistics and Correlations

Variable	Mean (SD)	Range	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 maternal anxiety	0.02 (0.85)	−1.19 – 3.95	–	.26**	.09	−.06	.33**	.11	.53***	.24	.14	.51***	.49***	.46***
2. T1 maternal perceptions of toddler shyness	3.74 (1.18)	1.40 – 6.60	.25**	–	.22*	.13	.14	.11	.02	−.00	.02	.03	.10	.02
3. T1 toddler dysregulated fear	1.80 (0.56)	1.00 – 4.00	.09	.21*	–	−.12	.06	.02	−.03	−.02	.05	.04	.02	.18†
4. T1 maternal distress reactions to worry	4.92 (0.84)	2.75 – 7.00	−.05	.11	−.13	–	−.20†	−.14	.04	−.25*	.08	.15	−.22*	−.08
5. T1 maternal punitive reactions to worry	1.83 (0.88)	1.00 – 4.75	.33***	.14	.08	−.20*	–	.29**	.39***	.51***	.37***	.18	.54***	.27*
6. T1 maternal minimizing reactions to worry	3.49 (1.47)	1.00 – 7.00	.12	.10	.04	−.14	.30**	–	.04	.28*	.49***	.07	.28*	.46***
7. T2 maternal distress reactions to anger	2.28 (1.18)	1.00 – 5.33	.51***	.02	.03	.06	.42***	.05	–	.41**	.29*	.59***	.44***	.36**
8. T2 maternal punitive reactions to anger	2.27 (1.15)	1.00 – 5.50	.24*	−.01	.06	−.24*	.53***	.29*	.42***	–	.52***	.28*	.63***	.46***
9. T2 maternal minimizing reactions to anger	2.89 (1.32)	1.00 – 7.00	.14	.02	.18	.11	.39***	.50***	.30**	.51***	–	.28*	.48***	.68***
10. T2 maternal distress reactions to worry	3.00 (1.58)	1.00 – 6.75	.45***	.01	.10	.21†	.17	.10	.57***	.27*	.29**	–	.35**	.36**
11. T2 maternal punitive reactions to worry	1.76 (0.90)	1.00 – 5.50	.46***	.07	.08	−.20†	.58***	.29*	.43***	.64***	.48***	.31**	–	.46***
12. T2 maternal minimizing reactions to worry	3.06 (1.26)	1.00 – 6.25	.39***	−.06	.27*	−.06	.29*	.50***	.32**	.44***	.70***	.32**	.42***	–

Note. Descriptive statistics were computed prior to imputation. Maternal anxiety is an average of three z-scores. Descriptive statistics of individual anxiety scales are located in the Supporting Information. Correlations computed prior to imputation are located below the diagonal; correlations computed after imputation (all *n* = 139) are located above the diagonal.

† *p* < .10,

* *p* < .05,

** *p* < .01,

*** *p* < .001

Table 2

Hierarchical Regression Analysis Predicting Time 2 Maternal Distress Reactions to Toddler Worry

Variable	b (SE)	95% CI (b)	t	p	sr^2
Step 1					
Distress reactions to worry	0.28 (0.18)	−0.08, 0.64	1.54	.126	.019
T2 distress reactions to anger	**0.77 (0.12)**	**0.52, 1.01**	**6.20**	**<.001**	**.334**
Maternal education	−0.07 (0.07)	−0.20, 0.06	−1.10	.274	.012
Step 2					
Distress reactions to worry	0.33 (0.17)	−0.02, 0.67	1.87	.063	.025
T2 distress reactions to anger	**0.58 (0.14)**	**0.30, 0.86**	**4.10**	**<.001**	**.136**
Maternal education	−0.06 (0.07)	−0.19, 0.07	−0.88	.383	.008
Maternal anxiety	**0.57 (0.28)**	**0.01, 1.13**	**2.03**	**.046**	**.054**
Step 3					
Distress reactions to worry	**0.38 (0.18)**	**0.02, 0.73**	**2.06**	**.041**	**.032**
T2 distress reactions to anger	**0.57 (0.15)**	**0.28, 0.85**	**3.91**	**<.001**	**.124**
Maternal education	−0.06 (0.06)	−0.19, 0.06	−0.97	.335	.009
Maternal anxiety	**0.62 (0.29)**	**0.05, 1.19**	**2.16**	**.033**	**.057**
Observed toddler dysregulated fear	0.22 (0.28)	−0.33, 0.77	0.80	.424	.005
Maternal perceptions of toddler shyness	−0.14 (0.15)	−0.43, 0.15	−0.97	.335	.008

Note. Predictors are at Time 1 unless otherwise noted. Statistically significant coefficients are bolded. Coefficients represent pooled estimates across 40 imputed datasets ($n = 139$). Model information statistics (R^2, F change, p) represent the average value across imputations (with range within parentheses) as follows. Step 1: $R^2 = .39$ (.23 to .51); $F[3, 135] = 29.27$ (13.70 to 46.94), all $ps < .001$. Step 2: $R^2 = .06$ (.01 to .17); $F[1, 134] = 15.34$ (1.55 to 39.12); $p = .022$ (<.001 to .216). Step 3: $R^2 = .02$ (.00 to .07); $F[2, 132] = 2.24$ (0.11 to 8.67); $p = .292$ (<.001 to .893).

Table 3

Hierarchical Regression Analysis Predicting Time 2 Maternal Punitive Responses to Toddler Worry

Variable	b (SE)	95% CI (b)	t	p	sr^2
Step 1					
Punitive responses to worry	**0.32 (0.11)**	**0.11, 0.53**	**3.02**	**.003**	**.065**
T2 punitive responses to anger	**0.37 (0.10)**	**0.17, 0.57**	**3.76**	**<.001**	**.153**
Maternal education	−0.01 (0.03)	−0.07, 0.06	−0.19	.853	.000
Step 2					
Punitive responses to worry	**0.23 (0.10)**	**0.04, 0.42**	**2.39**	**.018**	**.030**
T2 punitive responses to anger	**0.35 (0.09)**	**0.18, 0.52**	**4.14**	**<.001**	**.135**
Maternal education	−0.00 (0.03)	−0.06, 0.06	−0.05	.959	.000
Maternal anxiety	**0.35 (0.13)**	**0.09, 0.62**	**2.68**	**.009**	**.081**
Step 3					
Punitive responses to worry	**0.23 (0.10)**	**0.04, 0.42**	**2.34**	**.020**	**.030**
T2 punitive responses to anger	**0.35 (0.09)**	**0.18, 0.53**	**3.98**	**<.001**	**.130**
Maternal education	−0.00 (0.03)	−0.06, 0.06	−0.04	.964	.000
Maternal anxiety	**0.36 (0.13)**	**0.10, 0.61**	**2.73**	**.008**	**.077**
Observed toddler dysregulated fear	−0.02 (0.14)	−0.29, 0.25	−0.15	.879	.000
Maternal perceptions of toddler shyness	−0.00 (0.08)	−0.16, 0.16	−0.01	.994	.000

Note. Predictors are at Time 1 unless otherwise noted. Statistically significant coefficients are bolded. Coefficients represent pooled estimates across 40 imputed datasets ($n = 139$). Model information statistics (R^2, F change, p) represent the average value across imputations (with range within parentheses) as follows. Step 1: $R^2 = .47$ (.29 to .63); $F[3, 135] = 41.10$ (18.40 to 77.37), all $ps < .001$. Step 2: $R^2 = .09$ (.02 to .24); $F[1, 134] = 27.39$ (3.76 to 71.72), $p = .002$ (<.001 to .055). Step 3: $R^2 = .01$ (.00 to .05); $F[2, 132] = 1.01$ (0.01 to 5.71]), $p = .558$ (.004 to .995).

Table 4

Hierarchical Regression Analysis Predicting Time 2 Maternal Minimizing of Toddler Worry

Variable	b (SE)	95% CI (b)	t	p	sr²
Step 1					
Minimizing responses to worry	0.15 (0.09)	−0.03, 0.33	1.61	.290	.020
T2 minimizing responses to anger	**0.58 (0.11)**	**0.36, 0.80**	**5.24**	**<.001**	**.251**
Maternal education	0.00 (0.04)	−0.09, 0.09	0.06	.952	.000
Step 2					
Minimizing responses to worry	0.13 (0.08)	−0.02, 0.28	1.72	.088	.016
T2 minimizing responses to anger	**0.55 (0.08)**	**0.39, 0.72**	**6.60**	**<.001**	**.219**
Maternal education	0.02 (0.04)	−0.07, 0.10	0.37	.714	.001
Maternal anxiety	**0.58 (0.16)**	**0.27, 0.89**	**3.74**	**<.001**	**.126**
Step 3					
Minimizing responses to worry	**0.15 (0.07)**	**−0.00, 0.29**	**1.97**	**.051**	**.019**
T2 minimizing responses to anger	**0.53 (0.08)**	**0.37, 0.69**	**6.63**	**<.001**	**.200**
Maternal education	0.01 (0.04)	−0.07, 0.09	0.21	.834	.000
Maternal anxiety	**0.62 (0.15)**	**0.31, 0.92**	**4.02**	**<.001**	**.132**
Observed toddler dysregulated fear	**0.35 (0.17)**	**0.02, 0.67**	**2.09**	**.038**	**.019**
Maternal perceptions of toddler shyness	−0.16 (0.09)	−0.33, 0.01	−1.85	.066	.017

Note. Predictors are at Time 1 unless otherwise noted. Statistically significant coefficients are bolded. Coefficients represent pooled estimates across 40 imputed datasets ($n = 139$). Model information statistics (R^2, F change, and p) represent the average value across imputations (with range within parentheses) as follows. Step 1: $R^2 = .49$ (.38 to .63); $F[3, 135] = 43.84$ (27.00 to 75.98), all $ps < .001$. Step 2: $R^2 = .13$ (.03 to .24); $F[1, 134] = 46.94$ (7.45 to 98.01), $p = .000$ (<.001 to .007). Step 3: $R^2 = .03$ (.00 to .07); $F[2, 132] = 6.57$ (0.27 to 13.74), $p = .036$ (<.001 to .765).