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Toddler Emotion Expressions and Emotional Traits: Associations with Parent-Toddler Verbal Conversation

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Abstract

The present study examines how toddler emotions may influence their own or their parents' participation in parent-toddler verbal conversation. Limited, indirect evidence suggests that toddler positive emotions may encourage, whereas negative emotions may disrupt, parent-toddler verbal exchanges, but these hypotheses have not been tested directly. We investigated two aspects of toddler emotions— their emotion expressions and their emotional traits— and examined their relations with parent-toddler verbal conversation engagement. In a sample of families with 18-month-olds (N=120), we used live, unstructured home observations of toddler emotion expressions and spontaneous parent-toddler verbalizations, and collected parent ratings of toddler temperament. We found that less surgent toddlers who expressed more frequent negative emotion attempted fewer verbalizations. Among all toddlers, those expressing positive emotion received more frequent parent verbal responses, and, unexpectedly, more failed parent attempts to engage their toddler in conversation. Parent-initiated conversation was unrelated to toddler emotion expressions or emotional traits. We discuss how best to integrate the study of early emotional and language development from a transactional perspective.

Keywords

emotion expression; temperament; parent-child conversation; toddler; language

Social interactionist perspectives on language acquisition emphasize that young children acquire language not by passively receiving environmental inputs but by actively engaging in their social world (Bates et al., 1991; Hoff, 2006; Slomkowski et al., 1992). In particular, parents' engagement with their children in back-and-forth, contingent conversation supports early language development (Fernald & Weisleder, 2015; Hirsh-Pasek et al., 2015; Hoff, 2006; Zauche et al., 2016), even after accounting for exposure to adult speech (Rollins,

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2003; Zimmerman et al., 2009). It is thus critical to understand the factors that predict individual differences in parent-toddler conversation engagement. Ample research has focused on sociodemographic groups (Hoff, 2006; Hoff-Ginsberg, 1991; Sohr-Preston et al., 2013), but among these groups there is significant variability (Rowe, 2018; Zauche et al., 2016). Focusing on economically strained families, we considered toddler emotional traits and emotion expression as other factors that may contribute to parent-toddler conversation engagement. Emotions play a central role in parent-infant communication (Papousek et al., 1992; Tronick, 1989), and likely continue to influence those communications as children enter toddlerhood, a period of heightened negative emotion (Barry & Kochanska, 2010). We ask how toddler emotion expressions or emotional traits (temperament) relate to spontaneous parent-toddler verbal conversation at home.

Both toddlers and their parents play an important role in eliciting and maintaining verbal conversations. Across the second year of life, toddlers rapidly acquire expressive language and increase their attempts to communicate verbally, although attempts are often unintelligible at first (Snow, Pan, Imbens-Bailey, & Herman, 1996). Parents' responses to these communication attempts prompt further toddler vocalizations (Pan & Snow, 1999; Snow et al., 1996) and there is a steep increase in parent-child conversational turns as toddlers become more skillful and responsive conversational partners (Greenwood, Thiemann-Bourque, Walker, Buzhardt, & Gilkerson, 2011; Kochanska & Aksan, 2004; Pan & Snow, 1999; Snow et al., 1996). However, toddlers still rely heavily on their parents to facilitate verbal conversations (Pan & Snow, 1999; Snow et al., 1996).

Transactional and bioecological models of development (e.g., Bell, 1968; Sameroff, 1990; Wachs & Kohnstamm, 2001) emphasize the evocative effects of children's behavior and characteristics on parental behavior. For example, evidence suggests that toddlers who make fewer attempts to communicate give parents fewer opportunities to respond and to extend conversations (Bigelow & Power, 2016; Bohannon & Bonvillian, 1997; Bonifacio et al., 2007). Parent-child communication also involves emotion expression. Toddlerhood is characterized by increases in negativity; tantrums are common, and negative emotion expression frequency and intensity peaks in the second year (Barry & Kochanska, 2010; McCurdy et al., 2006; Raikes et al., 2007). However, the implications of individual differences in emotion expression or emotional traits for parent-toddler verbal conversation are not well understood. Toddler temperamental emotionality is linked to their language development, yet it is largely unknown why this link exists (Dixon & Smith, 2000; Kubicek & Emde, 2012; Noel, Peterson, & Jesso, 2008; Nozadi et al., 2013; Salley & Dixon, 2007). One possibility is that the emotions toddlers express during parent-child interactions, or the degree to which they are characteristically emotional, influences parent-child conversation engagement. We investigate whether toddler momentary emotion expressions and characteristic emotional traits, independently and conjointly, account for the frequency with which toddlers attempt to communicate verbally with their parents, as well as the frequency with which mothers and fathers initiate, sustain, or fail to initiate conversation with them.

Emotion Expressions, Emotional Traits, and Parent-Toddler Conversation

We conceptualize young children's emotion in two ways—their emotion expressions, i.e., discrete, observable, moment-to-moment expressions of emotions, and their temperament, i.e., individual differences in emotional reactivity or regulation. Temperamental characteristics are not directly observable but are often inferred from parental reports of children's behavioral patterns across situations and time (Rothbart & Bates, 2006; Strelau, 2001). Our approach allows examination of toddlers' momentary emotions within the context of toddlers' emotional dispositions.

Rothbart conceptualized two dimensions of temperament that involve emotionality, negative affectivity and surgency/extraversion, which relate to children's expression of negative and positive emotions, respectively. Negative affectivity refers to the frequency, intensity, and contexts of young children's negative emotions, and the ease with which they are soothed. Surgency/extraversion, which we refer to as surgency, refers to the patterns of young children's high intensity positive emotions and anticipatory joy, as well as non-emotional behaviors such as the degree to which they are social, stimulation-seeking, active and impulsive (Gartstein & Rothbart, 2003; Rothbart & Bates, 2006).

These emotional traits are thought to contribute probabilistically to young children's in-the-moment emotion expressions, although many other factors also influence those expressions (Crockenberg, 1986; Rothbart & Bates, 2006; Strelau, 2001). Children rated as low in negative affectivity nonetheless express negative emotions, those rated as high in negative affectivity nonetheless express positive emotion, and surgent children exhibit negative emotion. It is not surprising, then, that parents' temperament ratings often correlate weakly, or not at all, with single observations of children's emotion expressions (Carranza Carnicero et al., 2000; Tan et al., 2013). Yet both stable factors such as temperament and variable factors such as in-the-moment emotion expressions contribute to social interactions (Heerey, 2015). Few studies have examined whether *both* toddlers' emotional traits and their emotion expressions during parent-child interactions influence parenting, and none have examined the implications for parent-child conversation.

In studies of parenting influences on children's language or emotional development, most studies only include mothers. However, both mothers and fathers contribute to child language and emotional development (Cabrera et al., 2011; Tamis-LeMonda et al., 2004). In the following sections, we review what is known about links between emotions and parent-child verbal conversation. Our research includes fathers, but the literature review is largely based on studies of mothers only.

Emotions and parent-toddler conversation

Little is known about whether and how toddler emotion relates to parent-toddler conversation. However, there is growing evidence linking toddler emotional traits to their language development. Toddler negative affectivity is generally associated with poorer language outcomes (Dixon & Smith, 2000; Karrass & Braungart-Rieker, 2003; Kubicek & Emde, 2012; Noel et al., 2008; Nozadi et al., 2013; Salley & Dixon, 2007). On the other hand, both surgency and a more narrow aspect of surgency, positive emotionality, are

associated with better concurrent language skills and later receptive and expressive language skills (Garello et al., 2012; Karrass & Braungart-Rieker, 2003; Kubicek et al., 2001; Kubicek & Emde, 2012; Salley & Dixon, 2007; Slomkowski et al., 1992). Although it is largely unknown why these associations exist, a leading hypothesis is that emotional expressivity enhances or interferes with language development through its effect on children's social interactions (Kubicek et al., 2001; Moreno & Robinson, 2005). That is, young children's emotion expressions or emotional traits may influence parent-child conversation, either a) through effects on children's own communicative behavior or b) through effects on caregivers' verbal engagement with children.

Emotion and toddler verbal communication—A few have hypothesized that more surgent, emotionally positive toddlers attempt to communicate more often, creating more opportunities for parent-child conversation (Laake & Bridgett, 2014; Slomkowski et al., 1992; Wells, 1986). However, no known study directly tested this prediction. Toddlers' in-the-moment emotion expressions might also influence their verbal communication attempts. In the earliest stages of language acquisition, toddler emotion expressions rarely co-occur with speech. Toddlers have difficulty integrating verbal and emotional expressions, rarely speaking while expressing emotion, particularly negative emotions (Bloom & Beckwith, 1989). Thus, more surgent toddlers may make more attempts to communicate with parents, while toddler emotion expressions, particularly negative expressions, may interfere with their verbal communication.

Emotions and parental conversation engagement with toddlers—Another possibility is that toddler emotional states or traits influence the extent to which parents initiate or maintain conversation with their toddlers. A few studies hypothesize that toddler positive emotion expressions should elicit and encourage conversation, whereas toddler negative emotion expressions discourage or disrupt conversation (Kubicek & Emde, 2012; Slomkowski et al., 1992). For example, parents may more frequently initiate conversation with, or may respond more to, toddlers expressing positive emotions. On the other hand, parents may ignore toddlers who are expressing negative emotion, may disengage from the conversation, or may find it difficult to converse with their emotionally negative toddlers in conversation, trying but failing to engage them. These hypotheses have never been tested directly, despite ample evidence linking child emotional states or traits with global parenting qualities (for review, see Kiff, Lengua, & Zalewski, 2011). In general, this evidence indicates that higher levels of child positive emotion, in terms of temperament or actual expressions, is associated with more parental responsiveness (Braungart-Rieker et al., 2001; Kochanska, Friesenborg, Lange, & Martel, 2004), whereas negative emotion (temperament or expressions) is associated with less parental responsiveness (Kiff et al., 2011). However, responsive parenting in these studies may or may not involve verbal engagement; few studies examine how young children's emotional traits or expressions relate to parent verbal engagement with their toddlers, and existing evidence is mixed.

Two studies link young children's negative emotionality, as a trait, with parent verbal communication; mothers who perceived their children as more temperamentally negative provided their children with less language input and made fewer attempts to engage them in

conversation (Ontai & Virmani, 2010; Vernon-Feagans et al., 2012). The evidence is mixed, however, when observations of toddler emotion expressions and parent verbalizations are made during the same interaction. For example, one study reported that mothers talked more when their toddlers expressed more frequent positive emotions, but that toddler negative emotion expressions were unrelated to maternal talk (Smolak, 1987). Another study, which focused on emotion socialization rather than language input, reported that parents are less responsive to child negative emotion expressions, relative to positive expressions, in the toddler period (Kochanska & Aksan, 2004). Yet two additional studies found that parents were *more* likely to respond verbally to negative emotion expressions than to positive ones (Capatides & Bloom, 1993; Spinrad et al., 2004). However, none of these studies specifically addresses the role of toddler emotion in parent-child verbal conversations. It may be that negative emotions influence the nature of parent-child verbal communication; for example, negative emotions or emotionality may elicit more one-sided, controlling or directive language from parents rather than engagement in responsive, back-and-forth verbal conversations (Calkins & Johnson, 1998; Kiff et al., 2011; Kochanska & Kim, 2012). Although the specific content or quality of verbal engagement is not the subject of the present study, we examine the associations between toddler emotional states or traits and the extent to which parents initiate verbal interactions, respond contingently to toddler verbalization attempts, or speak to their toddler in a way that does not elicit a toddler response. Finally, both parent-toddler verbal engagement and toddler negative emotionality may be related because both are associated with socioeconomic status (Gouge et al., 2020; Hoff, 2006). In the present study, we account for this possibility by controlling for family socioeconomic status.

Emotional state-by-trait interactions

An important limitation of existing evidence is the absence of investigations of emotional traits *and* observed emotion expressions in one study. Yet the influence of children's actual emotion expressions on parenting may depend on parental perceptions of children's emotional disposition (Eisenberg & Fabes, 1994; Fabes et al., 1994; Fields-Olivieri et al., 2017). Two studies suggest that mothers are less responsive when children express more negative emotion, regardless of child temperament, whereas child temperamental negativity appears to decrease maternal responsiveness during calm, positive interactions (Ciciolla et al., 2015; van den Boom & Hoeksma, 1994). One study directly examined a state-by-trait interaction hypothesis, finding evidence for toddler state-by-trait interaction accounting for variability in parental expressed negative emotion, although not for parental responsiveness. Toddler negative emotion expressions predicted more parental negativity only for children who were rated as high in negative affectivity or high in surgency (Fields-Olivieri et al., 2017). Thus, limited evidence suggests that child negative affectivity may attenuate effects of child positive emotion expression, and exacerbate effects of negative expressions, on parenting. No study, however, addresses these moderating influences on parent-toddler conversation.

The Present Study

We investigated the extent to which (a) parental perceptions of toddler temperamental negativity and surgency, and (b) toddler spontaneous negative and positive emotion expressions observed during an unstructured home visit, accounted for variance in several aspects of parent-toddler conversations. We examined main and moderating effects on toddler verbal communication attempts, parent conversation initiations, parent responses to toddler verbal communication attempts, and parent failed attempts to engage their toddlers in conversation.

Study hypotheses are outlined in Table 1. In general, we expected toddler negative emotional states and traits to disrupt parent-toddler conversation engagement (e.g., be associated with fewer toddler communication attempts, fewer parent initiations and responses, and more failed parental attempts), whereas we expected toddler positive emotion expression and surgency to elicit or encourage parent-toddler conversation engagement. Regarding state-by-trait interactions, we expected that toddler negative affectivity would exacerbate inverse relations between toddler negative emotion expressions and parent conversation variables and would attenuate relations between toddler positive emotion expressions and parent conversation variables. We expected the opposite for surgency; that is, that associations between positive emotion expression and conversation engagement would be enhanced, and inverse associations between negative emotion expressions and conversation engagement would be attenuated.

Methods

Participants

A total of 120 families from rural and semi-rural economically strained households in the Northeastern United States participated in a longitudinal study of the early childhood development of emotion regulation. The study was approved by the university's Office of Research Compliance. Household annual income ranged from \$15,000-\$70,000 ($M = \$40,550$, $SD = \$14,222$) with an average of 1.83 children (Range=1–5, $SD = .85$). Parent education level ranged from some high school attendance to advanced graduate degrees; less than half (42.9% of mothers and 30.9% of fathers) completed a college degree or above. Most children were first- (43.3%) or second-born (40%). Mothers identified most children (93.3 %) as White; 6.7% identified their child as biracial. For the present study, we focus on toddler data collected within two weeks of the half-year birthday (mean age=18.44 months, $SD = .57$ months).

Procedures

Families were assessed semi-annually from target child age 18 months to 48 months; only the 18-month home observation is of interest in the present study. Home observations were scheduled when both parents were expected to be home, although the number of parents actually present varied. Families were asked to behave as they would normally, while a research assistant followed the toddler. Observations were live-coded, rather than video-taped, in order to be minimally intrusive to families. Research assistants observed the toddler

for six 10-minute intervals and noted all instances of toddler emotion expressions and their valence. These 10-minute intervals were also audio-recorded; two were selected for transcription. Parent-child conversation engagement was coded from transcripts. Mothers completed questionnaires assessing toddler temperament and toddler language abilities.

Measures

Parent-toddler conversation—An adapted version of the Connectedness Coding system (Brown et al., 1996; Ensor & Hughes, 2008) was used to assess the extent to which parents engaged or attempted to engage their toddlers in conversation and the extent to which toddlers attempted (intelligibly or unintelligibly) to communicate verbally with their parents. The system was adapted to add codes (e.g., gibberish) better suited to the limited verbal abilities of 18-month-olds.

A conversational turn was defined as the utterance of one speaker bounded by another speaker's utterance, or by significant (>10 seconds) silence. Each turn was assigned one of eight codes, from which four outcome variables were derived. Only conversation between the toddler and parents were coded. Coders were trained to achieve 90% accuracy with the third author, who was trained by Ensor (Ensor & Hughes, 2008). Twenty percent of the cases were double coded to assess interrater agreement.

Parent conversational turns: Three types of parental conversational turns were of interest. A turn was considered a *Conversational Response* if a parent's utterance followed and was semantically or referentially related to the child's previous utterance. A conversational turn was considered a *Conversation Initiation* if a parent initiated a new topic and successfully elicited a semantically or referentially related response from the child. A conversational turn was considered a *Failed Turn* if a parent's utterance was directed toward the child and failed to elicit a semantically or referentially related response. Overall, interrater agreement was excellent for frequency of conversational responses (mother ICC=.99, father ICC=.92) and initiations (mother initiation ICC=.89, father initiation ICC=.94). Interrater agreement for frequency of failed turns was fair for mothers (ICC=.56) and excellent for fathers (ICC=.77).

For the purposes of the present study, we summed mother and father codes to create total parent conversational response, conversation initiation, and failed turn scores. If only one parent was present for the visit, we included only one parent's codes in the parent composite and controlled for number of parents present (see Covariates below).

Parent-to-toddler verbal communication: Because parent speech towards their toddlers influences the extent to which toddlers attempt to communicate, we controlled for this in the model predicting toddler verbal communication attempts. The parent-to-toddler verbal communication composite was the sum of mother and father initiations, conversational responses, failed turns, and all other codes (floorholding, conflict, and attempts to understand, which were not this study's focus).

Toddler verbal communication attempts: On average, 40% of toddler utterances were unintelligible, thus receiving a Gibberish code (ICC=.80); this rate of unintelligible utterances is consistent with other studies of language development at this age (Snow et al.,

1996). Turns coded as Gibberish were significantly correlated with toddlers' initiations ($r=.357$, $p<.001$) and connected turns ($r=.456$, $p<.001$), suggesting that these turns were communicative, despite being unintelligible to coders. Given the high rate of unintelligible utterances and the wide variability in the rate of unintelligible utterances among toddlers (range: 2–100%), excluding unintelligible utterances may have provided inaccurate estimates of toddlers' communication attempts. For example, a toddler who made few attempts to communicate, and a toddler who made many unintelligible attempts to communicate, would receive the same score. Therefore, we focused on how often toddlers attempted to communicate, rather than on turn types requiring evaluation of semantic content. We created a verbal communication attempt composite that combined the frequency of *all* toddler codes (gibberish, initiations, failed turns, conversational responses, floorholding, and conflict) to reflect the frequency of toddler intelligible *and* unintelligible attempts to communicate verbally with their parents. There was a high degree of agreement between coders on the frequency of toddler verbal communication attempts ($ICC=.91$).

Toddler emotion expression—During the home observation, a research assistant recorded each time the toddler displayed a clear emotion expression, and identified each expression as positive, negative, or mixed valence. Observers were instructed to use vocal, facial, gestural, postural, and situational cues, or a combination of cues, to identify emotion expressions and determine their valence. Emotions expressed in multiple modalities (e.g., furrowed brow, slumped posture, clenched fist and whining in response to loss of desired object), were counted as a single expression. Mixed expressions were infrequent and not included in the present analyses. Notably, given that observers were asked to make live judgments to identify emotion expressions, they were not asked to identify specific emotions (e.g., sad, angry), or emotional intensity; rather, they were asked to identify emotional valence. Only emotion expressions observed during the two 10-minute intervals that were transcribed were analyzed. Interrater agreement was very good for both positive (Cohen's kappa = .84) and negative (Cohen's kappa = .81) emotion expressions.

Toddler emotional traits—Mothers completed the Toddler Behavior Assessment Questionnaire-Revised (TBAQ-R; Goldsmith, 1996; adapted by Rothbart, 1996) from which we used two emotional trait scores. The 105-item questionnaire asks caregivers to rate the frequency of specific child behaviors within the last month on a Likert scale ranging from 1 (Never) to 7 (Always). The Negative Affectivity scale summed the average of the anger, sadness, social fearfulness, and soothability (reversed) subscales. The Surgency scale summed the average of the high pleasure, positive anticipation, activity, impulsivity, and fear (reversed) subscales.

Covariates

Toddler productive vocabulary: Mothers reported on the number of words their toddlers understood or used on the MacArthur Communicative Development Inventory—Words and Gestures (Fenson et al., 2007). The total number of words used indexed productive vocabulary.

Family socioeconomic status: Demographic information was collected via maternal report during study enrollment. Each family's income-to-needs ratio [INR; Mean (SD)=2.323 (.867), Range=.74–4.35] was calculated by dividing total household income by the U.S. national poverty threshold adjusted for family size and composition. Mothers also reported on each parent's highest level of education. A few families had a single caregiver, so mean years of parent education completed was calculated. The socioeconomic status composite was the summed z-scores of family INR and mean years of parent education.

Parent-to-child ratio: During each 10-minute interval, the research assistant noted the number of children and adults present. Given that the presence of siblings and number of caregivers present influences language input and parent-child conversation (Hoff, 2006), we calculated a parent-to-child ratio variable by dividing mean number of parents present ($M=1.8417$, $SD=.367$) by mean number of children present ($M=1.758$, $SD=.857$, Range: 1–4.5) during transcribed intervals.

Data Analytic Plan

Data preparation—Data were inspected for errors, outliers, and distributions for all variables. Given skewed distributions of outcome variables, these values were square root transformed. Parent-child conversation data were missing for 22 participants (18.3%) due to technical difficulties with audio recording. Information on toddler language ability and toddler temperament was missing for small percentages of participants (5.8% and 1.7%, respectively). These data were found to be missing completely at random, Little's MCAR test $\chi^2 = 51.041$, $p=.730$. To maximize statistical power, we employed multiple imputation (SPSS Version 24; IBM Corps, 2016). As recommended, we performed 20 imputations, including all variables and interaction terms in the imputation models (Graham, 2012; Von Hippel, 2009).

Data analysis—Hierarchical regressions were conducted to assess the degree to which toddler positive and negative emotion expressions, toddler negative affectivity and surgency, and their interaction accounted for variance in four outcome variables: toddler communication attempts, parent initiations, parent conversational responses, and parent failed turns. Family socioeconomic status and parent-to-child ratio were covaried in all models. For the model predicting toddler verbal communication attempts, parent-to-toddler verbal communication and toddler productive vocabulary were covaried, given that toddlers' language ability, and parents' attempts to communicate with them, likely both contribute to toddlers' attempts to verbally communicate. In the three models predicting parent conversation variables, we covaried the frequency of toddler verbal communication attempts, rather than toddler language ability, as a more proximal predictor of parent conversation. Nonsignificant interactions were trimmed from the models. Significant interactions were probed by analyzing simple slopes at one standard deviation above and below the mean of the hypothesized moderator (Holmbeck, 2002).

Results

Descriptive Statistics

Descriptive statistics and intercorrelations are reported in Tables 2 and 3, respectively. Toddlers expressed positive emotion more frequently than negative emotion, $t(119)=5.354$, $p<.001$. Toddler negative emotion expression was inversely related to toddler verbal communication attempts, parent initiations, and parent conversational responses, and unrelated to parent failed turns and overall parent-to-toddler communication. Toddler positive emotion expression was related to parent failed turns and overall parent-to-toddler communication, and was unrelated to other parent-toddler conversation variables. Toddler negative affectivity was significantly and inversely related to toddler communication attempts and parent initiations, and marginally inversely related to parent-to-toddler communication and parent conversational responses. Toddler surgency was unrelated to any parent-toddler conversation variables at the bivariate level.

Male toddlers ($N=64$) had significantly lower productive vocabulary ($M=61.200$, $SD=61.776$) than female toddlers ($M=92.75$, $SD=80.153$), $t(109)=-2.339$, $p=.021$. Toddler gender was unrelated to any other study variables (e.g., emotion expressions, temperament, verbal communication attempts, parent communication variables). Toddler gender was not included as a covariate in the regression models, given that the more proximal variable, productive vocabulary, was included. During eighty-nine (75%) of home observations, both parents were present. Paired sample t-tests indicated that mothers made significantly more initiations ($M=6.710$, $SD=8.991$) than fathers ($M=2.91$, $SD=4.215$), $t(88)=3.605$, $p=.001$. Mothers also made significantly more connected turns ($M=13.989$, $SD=16.813$) than fathers ($M=5.685$, $SD=8.734$), $t(88)=4.257$, $p<.001$. Finally, mother made significantly more failed turns ($M=22.070$, $SD=18.686$) than fathers ($M=10.520$, $SD=10.698$), $t(88)=5.261$, $p<.001$.

Toddler Verbal Communication Attempts

Variance in toddler verbal communication attempts (see Table 4) was accounted for by main effects of parent-to-toddler communication ($\beta = .562$, $p<.001$) and toddler productive vocabulary ($\beta = .279$, $p<.001$), and by the interaction between toddler negative emotion expression and toddler surgency, ($\beta = .154$, $p=.024$). The only significant interaction, plotted in Figure 1, indicated that among less surgent toddlers, the frequency of negative emotion expression was inversely related to their verbal communication attempts (slope= $-.308$, $p = .004$) whereas there was no relation for more surgent toddlers (slope= $.026$, $p = .782$). The final model, $F(9, 110)=29.597$, $p<.001$, accounted for 71% of variance in the frequency of toddler attempts to communicate verbally with parents.

Parent-Toddler Conversation

For parental conversation engagement (initiations, conversational responses, and failed turns), there were no significant state-by-trait interactions; all were dropped from the final models, which are presented in Table 5.

Parent initiations—Variance in parent initiations was accounted for by positive main effects of family SES ($\beta = .153$, $p = .014$) and toddler verbal communication attempts (β

= .766, $p < .001$). No effects for toddler emotion expressions or temperament were significant. The final model, $F(7, 112) = 36.926$, $p < .001$, accounted for 70% of variance in parent initiations.

Parent conversational responses—Variance in parent conversational responses was accounted for by toddler verbal communication attempts ($\beta = .920$, $p < .001$), and by toddler positive emotion expression ($\beta = .104$, $p = .021$). Parents engaged in more conversational responses with toddlers who expressed more frequent positive emotion. The final model, $F(7, 112) = 121.297$, $p < .001$, accounted for 88% of variance in parent conversational responses.

Parent failed turns—Variance in parent failed turns was accounted for by the parent-to-child ratio during the observation ($\beta = .364$, $p = .002$), and by toddler positive emotion expression ($\beta = .261$, $p = .050$). Parents made more failed turns with toddlers who expressed more frequent positive emotions. The final model, $F(7, 112) = 5.209$, $p < .001$, accounted for 25% of variance in parent failed turns.

Summary

In sum, the interaction between toddler negative emotion expression and toddler surgency accounted for variability in toddler communication attempts, such that toddler negative emotion expressions were inversely related to toddler verbal communication attempts, for less surgent toddlers only. Once controlling for toddler verbal communication attempts, neither toddler negative emotion expressions nor toddler temperament related to parent communication with their toddlers. However, more frequent toddler positive emotion expression was associated with more frequent parent conversational responses and parent failed turns.

Discussion

The findings from the present study highlight the importance of considering young children's emotional traits and expressions in the study of parent-toddler conversation. A limited number of findings previously reported have linked toddler emotional traits to their language development, leading to the hypothesis that toddler emotional traits and expressions influence the conversations that contribute to their language acquisition (e.g., Kubicek & Emde, 2012). However, surprisingly few studies have examined toddler emotions – both trait patterns and in-the-moment expressions – in conjunction with parent-child conversation. We addressed this gap, finding that toddler emotions related both to their own contributions to conversation and to their parents' verbal engagement.

Toddler Communication Attempts

Studies have linked child surgency with better- and child expressed negative emotion with poorer- expressive language skills (Kubicek & Emde, 2012; Slomkowski et al., 1992), leading to theories that more surgent toddlers create more opportunities to communicate (Laake & Bridgett, 2014; Slomkowski et al., 1992; Wells, 1986), whereas negative emotion expressions interfere with toddler verbal communication (Bloom & Beckwith, 1989).

Therefore, we predicted a main effect of surgency, and an inverse main effect of observed negative expression, on toddler communication attempts. Instead, surgency and negative emotion expressions interacted to account for variability in toddler communication attempts. As expected, toddlers who more frequently expressed negative emotion made fewer attempts to communicate verbally; however, this was only the case if they were also less surgent. In contrast, more surgent toddlers made more frequent attempts to communicate, regardless of how frequently they expressed negative emotion, indicating a possible buffering effect of surgency against interference of negative emotion expressions with verbal communication.

It is possible that less surgent toddlers were more likely to express certain negative emotions, such as fear or sadness. These emotions are associated with withdrawn or disengaged behavior (Barrett & Campos, 1987). In contrast, high surgency is associated with high approach motivation including angry reactions to blocked goals (Polak-Toste & Gunnar, 2006; Rothbart, Derryberry, & Posner, 1994). Perhaps more surgent toddlers expressed different negative emotions than less surgent toddlers, and those specific emotions were associated increased likelihood that toddlers attempted to communicate. These hypotheses could not be directly assessed in the present study given that coders did not identify specific emotions; however, it is an important future direction for research. Notably, we found that maternal ratings of toddler surgency and productive vocabulary were positively correlated, consistent with other studies (Laake & Bridgett, 2014; Slomkowski et al., 1992). It is also worth noting that one study found that toddler language ability influences the extent to which negative emotion expression interfered with toddler speech (Bloom & Beckwith, 1989). Given that more surgent toddlers were also more verbally advanced, they may have been better able to verbalize while also expressing negative emotion. However, controlling for language ability in our models likely accounted for this possibility.

An alternative, but not mutually exclusive, interpretation is that negative emotion expression may momentarily interfere with verbal attempts among all toddlers, but more surgent toddlers make more attempts at other times. Given that real-time emotion expressions were not collected in the current study, this hypothesis could not be directly tested. Previous studies using temporal analyses indicated that toddler speech and emotion expression rarely co-occurred, but that the overall frequency of emotion expressions across the interaction was unrelated to the amount that toddlers spoke (Bloom et al., 1988; Bloom & Beckwith, 1989). Perhaps negative emotion expressions momentarily interfere with all toddlers' communication attempts; however, less surgent may not compensate for this interference during non-negative interactions.

Thus, the findings lend partial support for the hypothesis that more surgent toddlers create more opportunities for parent-child verbal communication, but that negative emotions interfere with toddler verbal communication. Importantly, analyzing both in-the-moment expressions and temperament, we discover a potential buffering effect of surgency against the expected interference of negative emotion on toddler efforts to communicate verbally. If so, this may explain, in part, why surgency is generally associated with better, whereas negative emotionality is associated with poorer, language outcomes over time (Kubicek & Emde, 2012; Slomkowski et al., 1992).

Importantly, surgency is a higher order temperament factor that includes sub-dimensions related to positive emotionality, but also to activity level and impulsivity. Although there is clear conceptual and empirical support to suggest that positive emotional expression should encourage verbal engagement, it is less clear that activity level and impulsivity should. It is possible that high levels of activity and impulsivity could in fact disrupt verbal engagement. The present findings do not address which specific sub-dimensions drive the moderating effect. Studies that link child language with more granular aspects of surgency consistently find that subdimensions related to positivity are associated with better expressive language; however the findings for activity level are mixed (Garello et al., 2012; Kubicek & Emde, 2012; Laake & Bridgett, 2014). Specifically, infant activity level and approach at 10 months are each associated with better expressive language at 14 months (Laake & Bridgett, 2014), whereas activity level in toddlers is associated concurrently with worse expressive language in one study (Garello et al., 2012), and is unrelated to language ability in another (Kubicek & Emde, 2012). An interesting extension of the present findings would be to examine the main and moderating effects of specific subdimensions of surgency on parent-toddler communication.

Parent Contributions to Parent-Toddler Conversation

As hypothesized, more frequent toddler positive emotion expression was associated with more parent conversational responses, but surprisingly, also with more failed parental efforts to communicate with toddlers. Neither negative emotion expression, temperament, nor their interaction accounted for parental conversation engagement. Parental initiations were only associated with family SES and with no aspect of toddler temperament or emotion expressions.

Positive emotion expressions—The finding that toddler positive emotion expression accounted for more frequent parental conversational responses is consistent with previous hypotheses that positive emotion elicits or encourages parent-child verbal communication (Kubicek et al., 2001; Laake & Bridgett, 2014; Slomkowski et al., 1992; Wells, 1986). These hypotheses, however, were based on observed correlations between children's temperament and their language abilities, and did not directly assess whether temperament, or in the moment emotion expressions, were associated with parent-child communication. Some empirical evidence links observed toddler positive emotion expression with more parental responsiveness (Braungart-Rieker et al., 2001; Kochanska et al., 2004); however, emotions were observed during laboratory assessments of temperament and not during the same interaction in which parenting was observed. Only one known study has directly observed an aspect of parent-child communication (parent-language input) with child positive emotion expression within the same interaction (Smolak, 1987). The current study extends upon this work by simultaneously observing parent-child verbal *communication* and child emotion expression within the same interaction. Notably, we accounted for toddler communication attempts in our models. Therefore, toddler positive emotion expression seems to have enhanced parental conversational responses, over and above toddler verbal contributions. However, an analysis of temporal and sequential relations is necessary to test the direction of these effects.

Surprisingly, frequent toddler positive emotion also accounted for more failed conversation attempts. Perhaps positive emotions encourage parents to persist in attempting to talk with toddlers even if their attempts are unsuccessful. It is also possible that toddler positive emotion made conversations more difficult; for example, parent-child play is associated both with greater child positive emotion expression (Miller et al., 2002) and with fewer parental conversational turns (Hoff-Ginsberg, 1991). During our unstructured home observations, children and parents engaged in a range of activities (e.g., play, mealtime, reading, dressing). Given documented effects of activity type on parent-child conversation (Christakis et al., 2009; Hoff-Ginsberg, 1991) and on child emotion expression (Miller et al., 2002; Sears et al., 2014), comparing relations between emotion and conversation across a variety of activities is an interesting next research step.

Negative emotion expressions and emotional traits—Despite some support at the bivariate level, after accounting for toddler verbal communication attempts, the prediction that more frequent toddler negative emotion would account for less successful parental initiations, less frequent parental responses, and more frequent failed turns was not supported. In-the-moment toddler negative emotion may instead interfere with toddler's attempts to communicate verbally, rather than with parental conversational engagement. That is, less surgent toddlers who more frequently expressed negative emotion may indeed have received fewer conversational responses from their parents, but this may be because they provided fewer conversational opportunities and may have been more difficult to engage.

The lack of association between toddler negative emotion expression and parent conversational responses was unexpected, although consistent with one other study (Smolak, 1987). Although numerous studies document inverse relations between toddler negative emotional states or traits and parental responsiveness (Kiff et al., 2011), none have specifically examined both in relation to early parent-child verbal conversation. It is possible that negative emotions relate not to the frequency, but to the quality, of conversation engagement, as we will discuss further below.

Finally, there was no evidence that state-by-trait interactions account for variability in parent conversation engagement. Although state-by-trait effects have been found for parent negativity (Fields-Olivieri et al., 2017), perhaps these effects are unique to parent emotional responses to their children. Moreover, Crockenberg and Leerkes (2003) suggest that state-by-trait interactions may be most apparent in the context of other psychosocial risks.

Socioeconomic status and parent-toddler conversation—Numerous studies find that higher SES is associated with parents eliciting and engaging in more conversational turns with their young children (e.g., Hoff, 2006; Hoff-Ginsberg, 1991; Sohr-Preston et al., 2013); however, there is notable variability in parent-child conversation engagement even within similar socioeconomic groups (Rowe, 2018; Zauche et al., 2016). In our economically strained sample, family SES (family income and parent education) related to only one aspect of parent-child verbal conversation: parents' tendency to initiate verbal communication with their toddlers. Moreover, although other studies have demonstrated links between socioeconomic risk and negative affectivity (e.g., Gouge et al., 2020), toddler

negative affectivity was unrelated to SES in the present study. The sample was intentionally drawn from a restricted income range to avoid the confounds associated with extremes of the socioeconomic spectrum. Perhaps with a full range of SES, there may be stronger effects of SES on parent-toddler engagement. Nonetheless, the present findings indicate the importance of considering other factors, including the proximal emotional processes embedded within the context of family SES, that contribute to parent-toddler conversation.

Summary and Implications

The present study addressed calls for research that considers 1) the evocative effects of child characteristics or behaviors on parenting (e.g., Sameroff, 1990), 2) the intersection of early emotional and language development (Bloom et al., 2001; Cole et al., 2010), and 3) factors other than SES that account for variability in parent-child verbal communication (Rowe, 2018; Sperry et al., 2018). The results highlight the importance of considering children's own role in parent-child conversation. Parent-child conversation is a transactional process that is critical for fostering early language development (Rowe, 2018). The findings suggest that toddler positive temperamental traits (surgency) and negative emotional states influence their participation in this transactional process. Moreover, toddler positive emotion expressions appeared to encourage parents to sustain conversations with their toddlers, and potentially to persist in engaging toddlers in conversation, even if their efforts frequently failed. Although we acknowledge its limitations, discussed below, the present study is an important step in understanding the role of toddler emotions in parent-toddler verbal conversation.

Limitations and Future Directions

A key limitation of the present study is its inability to address temporal or sequential relations between toddler emotion expression and parent-toddler verbal conversation. We examined associations among frequencies of emotion expressions and conversational turns across 20 minutes of a home observation. We cannot know whether toddler emotions occurred during conversations, whether they elicited or disrupted conversations, or whether they were elicited by these conversations. Future studies that measure emotion and speech continuously and examine sequential patterns will address the direction of effects between toddler emotion and parent-toddler verbal exchanges. Despite this limitation, we contend that examining associations across a longer time scale has value. It is possible that toddler emotions have not only immediate effects on parent-toddler conversation, but also continue to influence conversation over the course of an interaction. For example, parent engagement in conversation with a toddler who is currently calm but who had been crying for the past ten minutes may be different from engagement with a toddler who over the past ten minutes has been continuously calm.

As noted, the present findings do not address the quality or content of parent-toddler conversations. It is possible that toddler positive and negative emotion expressions, or their temperamental characteristics, influence the topics of parent-toddler conversation, or the sensitivity with which parents engage their toddler in conversation, if not the frequency. Parent socialization goals and practices differ during negative compared to positive or calm interactions (Howe et al., 2010) and depend on their perceptions of their children's

temperament (Eisenberg & Fabes, 1994), which may shape the course and topic of conversation. Therefore, assessing the quality or sensitivity of parent responses and topics of discussion surround toddlers' emotional experiences is an important extension of this work. Despite the lack of information about the content or quality of these conversations, engagement in parent-child conversation does have unique effects on child language development, over and speech exposure (Zimmerman et al., 2009) or parental sensitivity (Hirsh-Pasek et al., 2015). It is therefore still important to understand factors that influence the frequency at which parents and their toddlers engage in conversation.

Given that toddler emotions were coded during live observations, we identified only the valence, and not the specific type (e.g., anger, sadness, or fear) or intensity of emotion expressions. However, specific emotions have distinct functions and action tendencies (Barrett & Campos, 1987) and may have different implications for parent-toddler verbal conversation. For example, sadness or fear are associated with withdrawal, which may lead to disengagement from conversation, whereas anger is associated with approach. Moreover, different discrete emotions or emotional intensities may elicit different parental responses or socialization strategies (Havighurst et al., 2013; O'Neal & Magai, 2005). In addition, parents' own emotions or emotional self-regulation may influence their responses to toddler emotions, or may interact with child emotional states or traits to predict parenting quality (Bridgett et al., 2015; Dix et al., 2014; Paulussen-Hoogbeem et al., 2008). Thus, an interesting future direction is to consider parents' own emotional reactions to toddler emotions, and how these reactions influence verbal conversation engagement.

Finally, examining these relations across a wider range of income or SES or more varied cultural backgrounds are important next steps for this line of inquiry. Some evidence suggests that child negativity is more strongly related to parenting quality in lower SES households (Paulussen-Hoogbeem et al., 2015). Moreover, the role that language plays in socialization may differ across social classes. Whereas American parents of higher SES often encourage discussion in the context of conflict or discipline, their counterparts in lower SES circumstances tend to use more directives and prohibitions, and discourage discussions (Hart & Risley, 1992; Hoff-Ginsberg, 1991; Lareau, 2002). There is wide variability in the extent to which parents engage with their children in verbal conversation, both across and within social classes (Hoff, 2006; Rowe, 2018). It is also likely the role that emotions play in parent-toddler conversation varies as well, and this possibility warrants more extensive research.

Conclusion

Our findings addressed a gap in the literature: the question of whether toddler emotion expressions or emotional traits relate to parent-toddler verbal conversation engagement. We found that toddler negative emotion expressions may disrupt parent-toddler conversation through their interference with toddler verbal communication; however, toddler surgency may buffer against this interference. Toddler positive emotion expressions appeared to encourage parents to engage in conversation with their toddlers, even if parents' attempts to engage them are sometimes unsuccessful. We hope these findings stimulate more research on this subject, including examining the content and quality of these conversations, and

measuring emotions and verbal behaviors continuously in order to examine temporal relations and bidirectional influences among these modes of communication.

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Highlights

- Less surgent toddlers expressing more frequent negative emotion made fewer attempts to verbally communicate
- More frequent toddler positive emotion expression associated with more frequent parental conversation responses and more frequent parental failed conversational turns
- Parent conversation initiations unrelated to toddler emotional expressions or traits

Figure 1.
Interaction between toddler negative emotion expression and toddler surgency accounting for variability in toddler verbal communication attempts
* $p < .05$

Table 1

Summary of Study Hypotheses

Emotional States and Traits	Main Effects	Moderated Effects (State-by-Trait Interactions)
Negative Emotion Expression	<ul style="list-style-type: none">• Less frequent toddler communication 4 attempts• Fewer parent initiations, parent connected responses• More parent failed attempts to engage toddler	<ul style="list-style-type: none">• Negative affectivity exacerbates these relations• Surgency attenuates these relations
Positive Emotion Expression	<ul style="list-style-type: none">• More frequent parent initiations, parent connected responses	<ul style="list-style-type: none">• Negative affectivity attenuates these relations• Surgency enhances these relations
Negative Affectivity	<ul style="list-style-type: none">• Less frequent parent initiations, parent connected responses• More parent failed attempts to engage toddler	
Surgency	<ul style="list-style-type: none">• More frequent toddler communication attempts• More frequent parent initiations, parent connected responses	

Table 2

Descriptive Statistics

	<u>Mean</u>	<u>SD</u>	<u>Range</u>
Family Socioeconomic Status Composite	0.000	1.644	−4.260 – 3.590
Parent:Child Ratio	1.289	0.593	.222 – 2.000
Toddler Productive Vocabulary	75.008	71.793	0 – 323
Toddler Negative Emotion Expression	3.550	2.245	0 – 10
Toddler Positive Emotion Expression	5.617	2.775	0 – 16
Toddler Negative Affectivity	3.448	0.552	2.043 – 4.750
Toddler Surgency	4.571	0.570	2.946 – 5.696
Toddler Verbal Communication Attempts	34.337	27.800	0 – 183
Parent to Toddler Verbal Communication	72.755	43.415	11 – 253
Parent Initiations	9.633	9.561	0 – 73
Parent Conversational Responses	20.265	19.537	0 – 113
Parent Failed Turns	32.602	23.024	7 – 107

Table 3

Intercorrelations

Variables	1	2	3	4	5	6	7	8	9	10	11	12
<i>Covariates</i>												
1. Family SES Composite	1											
2. Parent:Child Ratio	.280**	1										
3. Toddler Productive Vocab	.235*	.111	1									
<i>Toddler Emotion (Expressions, Traits)</i>												
4. Negative Emotion Expression	-.103	-.094	-.159 ⁺	1								
5. Positive Emotion Expression	.145	.115	-.003	-.412**	1							
6. Negative Affectivity	-.049	-.153 ⁺	-.169 ⁺	.061	-.033	1						
7. Surgency	-.086	-.009	.279**	-.069	.018	-.224*	1					
<i>Parent-Toddler Communication</i>												
8. Toddler Comm. Attempts	.236*	.254*	.626**	-.235*	.135	-.202*	.157	1				
9. Parent to Toddler Comm.	.232*	.379**	.457**	-.145	.221*	-.198 ⁺	.122	.774***	1			
10. Parent Initiations	.259**	.248*	.592**	-.221*	.134	-.256*	.078	.819***	.783***	1		
11. Parent Conversation Responses	.234*	.233*	.659**	-.207*	.151	-.193 ⁺	.154	.966***	.800***	.802***	1	
12. Parent Failed Turns	.110	.361***	.002	-.002	.204*	-.077	.020	.161	.698***	.263***	.191 ⁺	1

⁺ p<.10

* p<.05

** p<.01

*** p<.001

Table 4

Hierarchical Regression Analysis Predicting Toddler Verbal Communication Attempts

Variable	B	SE B	β
Intercept	2.968	.385	
<i>Covariates</i>			
Family SES	.082	.089	.069
Parent:Child Ratio	-.128	.252	-.031
Parent to Toddler Verbal Communication	.028	.004	.562 ***
Toddler Productive Vocabulary	.008	.002	.279 ***
<i>Main Effects</i>			
Toddler Negative Emotion Expression	-.141	.066	-.173 *
Toddler Positive Emotion Expression	.021	.057	.005
Toddler Negative Affectivity	.045	.283	.022
Toddler Surgency	.131	.208	.052
<i>Interaction Effects</i>			
Negative Emotion X Surgency	.292	.129	.154 *
<i>Model Statistics</i>			
R ²		.708	
Adj. R ²		.684	
F		29.597 ***	

*
p<.05**
p<.01***
p<.001

Table 5

Hierarchical Regression Analyses predicting Parent Conversation Variables

Variable	Parent Initiations			Parent Conversational Responses			Parent Failed Turns		
	B	SE B	β	B	SE B	β	B	SE B	β
Intercept	1.566	.232		2.016	.207		3.942	.473	
<i>Covariates</i>									
Family SES	.115	.051	.153 *	.075	.049	.067	-.009	.116	-.010
Parent:Child Ratio	.099	.146	.049	-.104	.135	-.033	.990	.321	.364 ***
Toddler Verbal Communication Attempts	.033	.003	.766 ***	.064	.003	.920 ***	.007	.007	.123
<i>Main Effects</i>									
Toddler Negative Emotion Expression	.004	.040	.011	.027	.038	.024	.121	.093	.137
Toddler Positive Emotion Expression	.032	.031	.076	.079	.034	.104 *	.166	.084	.261 *
Toddler Negative Affectivity	-.135	.154	-.048	.023	.166	.008	-.220	.371	-.045
Toddler Surgency	-.033	.157	-.011	.105	.145	.037	-.141	.354	-.025
<i>Model Statistics</i>									
R ²		.698			.883			.246	
Adj. R ²		.679			.876			.198	
F		36.926 ***			121.297 ***			5.209 ***	

* p<.05

**

p<.01

p<.001