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# The Differential Influences of Parenting and Child Narrative Coherence on the Development of Emotion Recognition

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The ability to recognize and label emotions serves as a building block by which children make sense of the world and learn how to interact with social partners. However, the timing and salience of influences on emotion recognition development are not fully understood. Path analyses evaluated the contributions of parenting and child narrative coherence to the development of emotion recognition across ages 4 through 8 in a diverse (50% female; 46% Hispanic, 18.4% Black, 11.2% White, .4% Asian, 24.0% multiracial) longitudinally followed sample of 250 caregiver–child dyads. Parenting behaviors during interactions (i.e., support, instructional quality, intrusiveness, and hostility) and children’s narrative coherence during the MacArthur Story Stem Battery were observed at ages 4 and 6. Emotion recognition increased from age 4 to 8. Parents’ supportive presence at age 4 and instructional quality at age 6 predicted increased emotion recognition at 8, beyond initial levels of emotion recognition and child cognitive ability. There were no significant effects of negative parenting (i.e., intrusiveness or hostility) at 4 or 6 on emotion recognition. Child narrative coherence at ages 4 and 6 predicted increased emotion recognition at 8. Emotion recognition at age 4 predicted increased parent instructional quality and decreased intrusiveness at 6. These findings clarify whether and when familial and child factors influence emotion recognition development. Influences on emotion recognition development emerged as differentially salient across time periods, such that there is a need to develop and implement targeted interventions to promote positive parenting skills and children’s narrative coherence at specific ages.

*Keywords:* emotion recognition, parenting, narrative coherence

Encompassing the abilities to perceive and label emotions, emotion recognition supports positive adaptation across multiple domains, including peer relationships, behavior, and academics (Izard et al., 2001; Trentacosta & Fine, 2010). Although children’s emotion recognition capability is known to increase over time (Denham, 1998; Saarni, 1990), individual differences in the development of emotion recognition reflect the operation of diverse influences across childhood. Efforts to support the adaptive growth of this crucial skill hinge on understanding not just the range of influences on emotion recognition development, but also when and how prominently these factors exert their effects. Therefore, the present study sought to evaluate the magnitude and timing of parenting factors and child narrative coherence as predictors of the development of children’s emotion recognition across ages 4 through 8.

## Emotion Recognition, Emotion Knowledge, and Emotion Understanding

The broader construct of emotion understanding captures a range of skills, including emotion recognition, that enable the perception and comprehension of one’s own felt emotions, as well as those displayed by social partners (Saarni, 1990). A recent model developed by Castro, Cheng, Halberstadt, and Grünh (2015) decomposes emotion understanding into two higher order factors: emotion recognition and emotion knowledge. Whereas emotion recognition refers to the ability to identify a presented emotion, emotion knowledge refers to the ability to use situational cues to understand the causes and consequences of emotions. Encompassing both emotion recognition and knowledge, emotion understanding is a central component of emotion competence, which also includes skills pertaining to the expression and regulation of emotion (Denham, 1998). Emotion recognition is a particularly important task for children to master because identifying emotional cues from interaction partners guides situationally appropriate reactions in social contexts and contributes to positive interpersonal relationships (e.g., Leppänen & Hietanen, 2001). Further, emotion recognition skills form an essential foundation for more complex facets of emotion understanding, such as prediction of appropriate emotional responses in specific situations (Joseph & Newman, 2010). Thus, the current effort to identify specific predictors of the development of emotion recognition advances a step forward toward explicating and unpacking the complex influences on the

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development of emotion understanding and, by extension, emotion competence.

### The Development of Emotion Recognition

Although studies have established that emotion recognition increases with age among children, adolescents, and young adults, the precise age at which ceiling effects in emotion recognition emerge remains uncertain (Durand, Gallay, Seigneuric, Robichon, & Baudouin, 2007). Some evidence suggests children master this skill by age 7 (Tremblay, Kirouac, & Dore, 1987), but other data indicate that some emotions (e.g., happiness) may be recognized at adult levels by age five, whereas recognition of other emotions (e.g., surprise) may continue developing into pre- and early adolescence (Lawrence, Campbell, & Skuse 2015; Mancini, Agnoli, Baldaro, Ricci Bitti, & Surcinelli, 2013; Rodger, Vizioli, Ouyang, & Caldara, 2015) or adulthood (Gao & Maurer, 2010; Thomas, De Bellis, Graham, & LaBar, 2007). Given the dearth of longitudinal data documenting the growth of emotion recognition, it remains difficult to concretely establish the parameters of its development (Herba & Phillips, 2004).

The current study focused on the development of emotion recognition from ages 4 to 8, in light of prior evidence suggesting significant variability in emotion recognition skills during this period (Gao & Maurer, 2010; Tremblay et al., 1987). Moreover, we sought to evaluate the prospective contributions of familial and child factors to the development of emotion recognition to identify potential sources of differentiation (and avenues for modification) in this process. This age range represents a period when the current effort to elucidate predictors of the development of emotion recognition may be especially valuable in light of the increasing variability in parenting practices and children's increasing autonomy during the transition from preschool to formal schooling. The current investigation addressed the complementary needs to document this developmental trajectory and to identify influences on it by examining longitudinal data on emotion recognition from ages 4 to 8 in a large and diverse community sample, while evaluating directional hypotheses regarding the magnitude and timing of theoretically specified familial and child predictors of its development. Specifically, we investigated parents' supportive presence, quality of instruction, intrusiveness, and hostility during observed interactions with their child and children's narrative coherence as family- and child-level predictors of emotion recognition development.

### Familial Influences on Emotion Recognition

Prior research examining familial influences on emotion competence has focused on a subset of specific parenting behaviors that explicitly target children's recognition, knowledge, expression, and regulation of emotion, as opposed to the general parenting behaviors examined in this study. Emotion socialization studies have shown that direct coaching, parental reactions to children's emotion displays, and the emotional climate of the family influence children's overall emotion competence (Morris, Silk, Steinberg, Myers, & Robinson, 2007; Thompson & Meyer, 2007), including emotion understanding (Denham & Kochanoff, 2002). Direct emotion coaching involves explicit efforts by parents to teach children about emotions (e.g., labeling emotions, teaching

about display rules; Gottman, Katz, & Hooven, 1997; Morris et al., 2007). Direct coaching has been repeatedly linked with children's enhanced emotion knowledge (Garner, 1999; Garner, Jones, Gaddy, & Rennie, 1997) and overall emotion understanding (Cunningham, Kliewer, & Garner, 2009; Denham & Kochanoff, 2002; Havighurst, Wilson, Harley, Prior, & Kehoe, 2010). Parents' reactions to children's emotion displays vary in the degree to which they are supportive, dismissive, or outwardly hostile (Morris et al., 2007). Positive and accepting parental responses to children's emotion displays have been associated with children's increased emotion understanding (Denham & Kochanoff, 2002; Havighurst et al., 2010), whereas parents' negative reactions have been associated with children's increased negative emotionality (Eisenberg, Fabes, & Murphy, 1996), but have not been explicitly linked to emotion understanding with regard to either emotion recognition or knowledge. Finally, children's opportunities to learn response contingencies for positive and negative emotion experiences and expressions are also influenced by whether and how frequently positive and negative emotions are expressed in the home environment (Darling & Steinberg, 1993; Morris et al., 2007). Research suggests that increased expressions of both positive and negative emotion in the family are positively associated with children's recognition of parents' emotions (Dunsmore, Her, Halberstadt, & Perez-Rivera, 2009) and display rule knowledge (Jones, Abbey, & Cumberland, 1998) across early and middle childhood. In contrast, households with limited emotional expressiveness, such as may occur in contexts of parental depression (Raikes & Thompson, 2006) or neglect (Sullivan, Bennett, Carpenter, & Lewis, 2008), hinder children's developing emotion understanding.

As noted above, although studies that specifically document associations between parents' emotion socialization practices and children's emotion recognition are rare (see Castro, Halberstadt, Lozada, & Craig, 2015; Dunsmore et al., 2009, for exceptions), prior research does support a consistent link between parents' emotion socialization behaviors and children's broad emotion understanding. However, relative to the abundant literature documenting specific effects of parents' emotion socialization practices on children's emotion understanding development, fewer studies have evaluated the influence of general parenting guidance and support on children's emotion understanding broadly, let alone on children's emotion recognition skills specifically.

A supportive parent-child relationship in which the child can explore and make sense of the world may provide a safe context for children to experience both positive and negative emotions without becoming overwhelmed and promote children's emergent capacities to recognize and label those emotions in themselves and others (Sroufe, 1995). Positive parenting practices, such as warmth and support observed during varied problem solving tasks in the laboratory, have been associated with increased emotion recognition skills (Bennett, Bendersky, & Lewis, 2005), as well as with broader emotion understanding (Cole, Dennis, Smith-Simon, & Cohen, 2009; Steele, Steele, Croft, & Fonagy, 1999) during the preschool and school-age years. Although studies have shown that parents' quality of instruction regarding specific emotion management strategies during arousing challenges can support children's emotion understanding (Denham & Kochanoff, 2002; Havighurst et al., 2010), the current study is one of the first to evaluate whether high quality instructional support that may include, but is

not limited to, emotion-specific support, predicts children's emotion recognition within and across time. Instructional support beyond emotion contexts may reduce the probability of children becoming overwhelmed by emotion when completing problem-solving tasks, and may permit the child to experience and experiment with negative emotion without incurring negative consequences. Parents' quality of instruction may also provide direct scaffolding for children's developing cognitive abilities, which may facilitate emotion processing. The few studies that most closely examine this question have produced equivocal findings. For example, a study of preschoolers found that maternal questioning during an observed interaction predicted better emotion understanding among girls, but not among boys (Bailey, Denham, & Curby, 2013), whereas another study did not find a significant relation between parental instruction and preschoolers' emotion understanding (Guajardo, Snyder, & Petersen, 2009).

Relative to the small literature on parenting support and instruction, even fewer studies have examined relations between negative parenting behaviors, such as intrusiveness and hostility, and children's emotion recognition. Although negative parenting may represent an opportunity for children to observe varied emotional expressions from their parent, frequent, overly intense, and/or inconsistent expressions of negative emotions may threaten the child's emergent capacities to recognize and process these emotions. Extant research on negative parenting and emotion recognition has yielded mixed results. Some studies have found that physically abused children evidence higher levels of anger recognition than their nonabused peers (Pollak, Cicchetti, Hornung, & Reed, 2000; Pollak & Sinha, 2002), but other research has not supported relations between emotion recognition and harsh parenting (Berzenski & Yates, 2013), nor between emotion understanding and parental criticism (Guajardo et al., 2009).

Although little is known about the degree to which parents' emotion socialization behaviors correlate with general parenting practices, it stands to reason that there may be considerable covariance (Chan, Bowes, & Wyver, 2009). Regardless of this potential overlap, which is not a topic the present study is poised to address, the current effort to evaluate whether and when positive and negative general parenting behaviors (i.e., those which are not explicitly tied to encouraging and clarifying emotion experiences) influence children's emergent emotion recognition has important implications for efforts to protect and promote children's wellbeing. For example, general parenting behaviors may be more accessible targets for both assessment and intervention than emotion socialization behaviors, which occur during a smaller proportion of parent-child interactions. Although interventions that specifically target parents' emotion socialization practices have yielded promising results (Havighurst et al., 2013; Kehoe, Havighurst, & Harley, 2014), these interventions are in their infancy, and remain limited in both availability and in data on their long-term effectiveness (Havighurst et al., 2010). In contrast, there are scores of general parenting interventions that are designed to address dozens of categories of parenting behaviors and child outcomes (Kaminski, Valle, Filene, & Boyle, 2008). Thus, the current effort to clarify relations between general parenting behaviors and emotion recognition could reveal that extant interventions to bolster general parenting practices would also promote emotion recognition development. This evidence would prove useful either when specific interventions targeting emotion socialization are not available, or

when there is a need for efficient, broadly targeted impacts on child development, given the established long-term associations between general parenting behaviors and multidomain adjustment (e.g., Pettit, Bates, & Dodge, 1997). Finally, given the mixed evidence of relations between emotion socialization behaviors and children's emotion recognition noted earlier, it may be that general parenting could account for some missing pieces in the puzzle of when and how familial factors influence the development of emotion recognition. Therefore, the current study evaluated general parenting behaviors, namely supportive presence, quality of instruction, intrusiveness, and hostility, as predictors of the development of children's emotion recognition skills.

### Child Influences on Emotion Recognition

Beyond familial influences, a number of child factors may influence the development of emotion recognition. For example, children's verbal ability is integral to developing emotion recognition (Bennett et al., 2005; Cutting & Dunn, 1999; Izard et al., 2001), likely because of its contribution to children's labeling and understanding of emotion vocabulary. Further, global cognitive ability (i.e., IQ) is a well-established positive correlate of emotion recognition (Field & Walden, 1982; Izard, Schultz, Fine, Youngstrom, & Ackerman, 2000). As such, any investigation of emotion recognition should consider, and likely hold constant, the influence of child cognitive ability.

In the present study, we sought to evaluate children's narrative coherence as a predictive factor that may explain unique variance in emotion recognition beyond both parenting effects and child cognitive ability. In addition to the acquisition and application of knowledge that may be supported by general cognitive ability, a child's capacity to access and apply their skills in a flexible and contextually responsive manner may support the development of emotion recognition. Coherence of mind is a conceptual construct that captures the degree to which an individual is able to process information about the self, relationships, and emotion in a way that is balanced, accurate, and open to modification (Hesse, 2008; Sher-Censor, Grey, & Yates, 2013; Steele & Steele, 2005). Typically assessed via narrative techniques, such as free speech samples (Magaña et al., 1986; Sher-Censor & Yates, 2014) and semi-structured interviews (Hesse, 2008; Steele & Steele, 2005) in older individuals, storytelling paradigms are a valuable tool to assess young children's coherence (Emde, Wolf, & Oppenheim, 2003).

The capacity to produce a coherent narrative about an emotionally charged family experience requires that children possess both the comfort to engage and the ability to identify positive and negative emotions without becoming overwhelmed or disorganized (Robinson & Mantz-Simmons, 2003). Moreover, narrative coherence engenders other emergent capabilities, such as the organization and elaboration of autobiographical memory (Valentino et al., 2014), which have been associated with higher levels of emotion knowledge (Wang, 2008) and understanding (Bergen, Salmon, Dadds, & Allen, 2009), respectively. These findings suggest that, beyond basic verbal and cognitive capacities, children's narrative coherence may provide unique support for emotion recognition abilities to flexibly engage/identify and cogently discuss/label emotions (Dunsmore & Karn, 2004). Research demonstrating relations between narrative coherence and emotion regulation abilities among preschoolers (Sala, Pons, & Molina, 2014) and school-

age children (Macfie & Swan, 2009) supports the probable salience of narrative coherence as a positive influence on children's emotion competence. However, although associations between individual narrative qualities and emotion recognition have been documented among schizophrenic adults (Lysaker et al., 2012), they have not yet been investigated among typically developing children. The current study sought to address this gap by evaluating whether and when children's narrative coherence would be associated with the development of emotion recognition across childhood, after controlling for the predicted positive influence of children's general cognitive ability on emotion recognition skills.

### Study Overview

The current evaluation of a theoretically specified model of familial and child influences on the development of children's emotion recognition has important implications for future efforts to promote children's adaptation by targeting both family- and child-level processes that support emotion recognition and, by extension, children's broader emotion understanding, emotional competence, and multidomain adaptation (e.g., see Trentacosta & Fine, 2010 for review). Moreover, in addition to identifying concurrent associations, we employed a longitudinal research design to clarify the timing and directionality of these effects so that intervention efforts can be targeted where and when they will be most impactful. For example, although we hypothesized that parenting processes would predict emotion recognition, it may also be that children's emotion recognition and, by extension, their appropriate emotional expression, leads to more sensitive and responsive parenting. This assertion is consistent with contemporary transactional models of development (Cicchetti & Toth, 1997; Sameroff, 2009; Sameroff & Fiese, 2000), and warrants empirical evaluation to accurately inform developmental science and practice. Likewise, although we hypothesized that child narrative coherence would bolster the development of emotion recognition, we also recognize complementary evidence that better emotion recognition may advance child cognitive abilities and, by extension, narrative coherence (e.g., evidence that emotion knowledge influences working memory; Wang, 2008).

The current study capitalized on a longitudinal design featuring multimethod laboratory assessments with a large and diverse community sample of children and their caregivers at ages 4, 6, and 8. This design permitted the evaluation of directional hypotheses regarding the influence of general parenting behaviors and child narrative coherence on children's emotion recognition over and above the influence of prior emotion recognition capabilities and child cognitive ability assessed during the preschool period. In doing so, we sought to inform the design and implementation of intervention efforts when they are apt to be most impactful by evaluating the magnitude of specific influences at age 4 versus at age 6 on emotion recognition at age 8.

First, we hypothesized that group mean levels of emotion recognition would increase from age 4 to age 8. Second, we hypothesized that positive parenting factors (i.e., supportive presence and quality of instruction) and child narrative coherence would predict enhanced emotion recognition at age 8, controlling for prior cognitive ability and initial levels of emotion recognition at age 4. Unfortunately, the sparse and equivocal findings on negative parenting and emotional development in the extant literature, coupled

with the dearth of studies isolating effects on emotion recognition from effects on general emotion understanding, constrained our ability to offer specific hypotheses regarding the relations between parenting intrusiveness and hostility and children's emotion recognition development. Third, given prior cross-sectional evidence that parental emotion socialization factors are positively related to children's emotion understanding in *both* preschool and early childhood, as well as the limited body of literature examining general parenting or child narrative coherence effects at *either* age, we sought to explore whether these family- and child-level predictors would have significant effects on children's emotion recognition at ages 4 versus 6. Theoretical assertions that the differential timing of developmental influences can produce varied effects (Bornstein, 1989) and the valuable implications of identifying sensitive intervention points targeting these influences justified these exploratory comparisons. Finally, we explored putative transactional effects from children's emotion recognition skills to parenting behaviors and child narrative coherence.

### Method

#### Participants

A community sample of 250 children and their primary caregivers (91.4% biological mothers, 3.6% foster/adoptive mothers, and 5% grandmothers or other kin caregivers) were recruited at age 4 ( $M_{\text{age}} = 49.05$  months,  $SD = 2.91$ ; 50% female) and followed at ages 6 ( $N = 215$ ;  $M_{\text{age}} = 73.30$  months,  $SD = 2.51$ ; 49.3% female) and 8 ( $N = 213$ ;  $M_{\text{age}} = 97.51$  months,  $SD = 2.97$ ; 48.8% female). Across the sample, 227 (90.8%) families contributed at least two data points to these analyses. The sample of children was diverse with regard to race/ethnicity (46% identified as Hispanic, 18.4% Black, 11.2% White, .4% Asian, and 24.0% multiracial) and poverty status as determined by the family's income-to-needs ratio (across racial/ethnic groups, 35.7%–41.3% of families resided below the poverty line, and 63.9%–73.9% were eligible to receive some type of government aid; U.S. Census Bureau Housing & Household Economics Division, 2007).

#### Procedures

Flyers inviting participation in a "study of children's learning and development" were distributed to local child care centers. Participants were screened by phone to ensure the child was (a) between 3.9 and 4.6 months of age, (b) proficient in English, and (c) not diagnosed with a developmental disability. Families received \$25 per hour in exchange for their participation, and children received a small age-appropriate gift. Three- to 4-hr laboratory assessments were conducted at each time point. All procedures were approved by the University's Human Research Review Board.

#### Measures

**Emotion recognition.** The Kusché (1984) Emotion Inventory (KEI) assessed children's emotion recognition at ages 4 and 8. This measure has been widely used across ethnically diverse populations of preschoolers and school-age children, and has demonstrated validity in associations with social competence and ex-

executive functioning (Blair, Granger, & Peters Razza, 2005; Miller et al., 2005; Rhoades, Greenberg, & Domitrovich, 2009). The KEI consists of 40-item recognition and labeling subtests that were shortened to 30 items each in the present study, in accordance with prior work (e.g., Berzenski & Yates, 2013; Rhoades et al., 2009). Each subtest of the current measure assessed 15 basic and complex emotions using two items each (i.e., angry, ashamed, confused, disappointed, embarrassed, excited, frustrated, happy, love, proud, sad, scared, surprised, tired, and worried). To assess emotion recognition, children were shown four line drawings of children expressing various emotions and asked to select a target emotion (e.g., “Which boy/girl feels happy? Point to happy;”  $\alpha_{\text{age4}} = .74$ ,  $\alpha_{\text{age8}} = .76$ ). To assess emotion labeling, children were asked to select the expressed emotion in one line drawing from four options (e.g., “Does this boy/girl feel happy, sad, angry, or scared?;”  $\alpha_{\text{age4}} = .76$ ,  $\alpha_{\text{age8}} = .80$ ). Labeling choices were stated and then repeated in reverse order for each item. For both subtests, responses were scored 0 (*wrong*), 1 (*wrong emotion, correct valence*), or 2 (*correct*). The sum of the recognition and labeling scores were used in these analyses ( $r_{\text{label-recog\_age4}} = .68$ ,  $p < .001$ ;  $r_{\text{label-recog\_age8}} = .72$ ,  $p < .001$ ).

**Parenting behaviors.** Parenting was observed during four video-recorded teaching tasks at ages 4 and 6, which were adapted from Block and Block (1980) and included age-appropriate versions of sorting, building, discussion, and game tasks. The teaching tasks were designed to be just beyond the level of difficulty that the child could complete alone, and parents were instructed to help the child as much as they thought the child needed, while allowing the child to do as much work as s/he could independently. Coders who were blind to other information about the family evaluated parenting quality during each task using 7-point scales (Egeland, 1982; Egeland, Pianta, & O’Brien, 1993), which have demonstrated high reliability and validity in predicting child well-being in previous samples (Carlson, Jacobvitz, & Sroufe, 1995; Jacobvitz & Sroufe, 1987). All cases were scored by at least two independent coders and tasks were coded in a counterbalanced order across coders to minimize carry over effects.

Consensus scores were averaged across tasks to index parental supportive presence, quality of instruction, intrusiveness, and hostility. *Supportive presence* referred to the sensitivity and responsiveness of parenting, reflecting positive regard and appropriate encouragement ( $\text{ICC}_{\text{age4}} = .81$ ,  $\text{ICC}_{\text{age6}} = .74$ ). *Quality of instruction* referred to the extent to which the parent was able to provide appropriate instruction to assist the child in completing the tasks without being overly directive or underinvolved ( $\text{ICC}_{\text{age4}} = .82$ ,  $\text{ICC}_{\text{age6}} = .73$ ). *Intrusiveness* referred to the parent’s failure to respect the child’s needs and efforts to work autonomously, regarding the parent’s own agenda as more important than that of the child ( $\text{ICC}_{\text{age4}} = .75$ ,  $\text{ICC}_{\text{age6}} = .78$ ). *Hostility* referred to overt expressions of anger or rejection toward the child ( $\text{ICC}_{\text{age4}} = .80$ ,  $\text{ICC}_{\text{age6}} = .83$ ).

**Child cognitive ability.** Children’s cognitive ability was assessed at age 4 using subtests from the Wechsler Preschool and Primary Scale of Intelligence—III (WPPSI-III; Wechsler, 2002). Age appropriate subtests (i.e., receptive vocabulary for children under 48 months and expressive vocabulary for children 48 months or older) were used to compute a prorated verbal IQ score for each child, and performance IQ was computed using the block design subtest. Each child’s verbal and performance scale scores

were composited according to published scoring guidelines to assess full-scale IQ ( $M_{\text{FSIQ}} = 94.76$ ,  $SD = 13.55$ ).

**Child narrative coherence.** Children’s narrative coherence was assessed at ages 4 and 6 using the MacArthur Story Stem Battery (MSSB; Bretherton, Oppenheim, Buchsbaum, & Emde, 1990). This measure has demonstrated validity in predicting child adaptation across multiple domains (Grey & Yates, 2014; Laible, Carlo, Torquati, & Ontai, 2004; Oppenheim, Emde, & Warren, 1997). Children completed a set of story stems using a family of gray rabbits from the Calico Critters™ doll series. The examiner initiated each story using a variety of props, after which, the child was asked to “show me and tell me what happens next.” Following a warm-up birthday story, narrative stems were drawn from the MSSB to capture: (a) parental discipline (spilled juice—not administered at age 6); (b) child injury (hot gravy); (c) parental conflict (lost keys); (d) separation from parents (departure); (e) reunion with parents (reunion); and (f) parent comfort (park outing at age 4 and monster in bedroom at age 6). Coders were trained to reliability by Dr. Jenny Macfie who coauthored the Narrative Coding Manual (Robinson, Mantz-Simmons, & Macfie, 1992, 1996) and were blind to children’s scores on the other study variables.

Each story stem was rated on a 0–10 continuum that captured the organizational characteristics of the narrative with regard to its fluency, the extent to which the child engaged the problem in the story, and the child’s resolution of the problem. Following previous studies (Oppenheim, 2006; Sher-Censor et al., 2013), reported analyses employed dichotomized coherence scores to highlight the distinction between narratives that were incoherent (i.e., ratings of 0–4, in which the child described events in an illogical sequence, and/or failed to address or resolve the problem, e.g., “I don’t know what happens, I don’t know. . . . Susan was flying.”) from those that were coherent (i.e., ratings of 5–10, in which the child resolved the problem in an organized event progression, e.g., “Mom said ‘Go to time out.’ Then mom said ‘Okay Susan, you can come eat dinner now.’ Then Susan said ‘I’m sorry I spilled the juice,’ and they all ate dinner.”). This designation most appropriately addresses the ordinal properties of the scale in which there is a disproportionate conceptual difference between a score of 4 and a score of 5. This approach replicates the coding and analytic procedures of other research groups, and serves to deemphasize the artifact of apparent individual variability within the coherent and incoherent ranges. The mean number of coherent narratives was used for analyses across six stories at age 4 ( $\text{ICC} = .85$ ) and across five stories at age 6 ( $\text{ICC} = .87$ ).

## Data Preparation

All 250 child participants had complete data on IQ. Data were missing due to attrition at ages 6 and 8, as well as select task noncompletion due to technology or administration errors. Emotion recognition data were missing for five and 43 participants at ages 4 and 8, respectively. Parenting data was missing for 38 participants at age 6. Narrative coherence data were missing for 14 and 39 participants at ages 4 and 6, respectively. Little’s (1988) MCAR test indicated these data were not missing completely at random;  $\chi^2(104) = 142.81$ ,  $p = .004$ . Associated  $t$  tests confirmed that missing data on narrative coherence at age 4 differentiated scores on parents’ quality of instruction ( $p = .024$ ) and intrusive-

ness ( $p = .012$ ) at age 4, quality of instruction ( $p = .011$ ) and intrusiveness ( $p = .013$ ) at age 6, and emotion recognition at age 4 ( $p = .005$ ) and at age 8 ( $p = .008$ ). Parenting variables at age 6 also differentiated scores on children’s emotion recognition at age 8 ( $p = .009$ ). Therefore, the path model was estimated in MPlus v. 6.12 (Muthen & Muthen, 1998–2011) using Maximum Likelihood Estimation to most appropriately account for nonrandomness in missing data. Emotion recognition at age 8 ( $skew_{original} = -2.29$ ,  $kurtosis_{original} = 7.48$ ) was transformed using an arc sin transformation ( $skew_{final} = -.96$ ,  $kurtosis_{final} = 1.70$ ), and all other variables were sufficiently normal as to render parametric statistics appropriate (Afifi, Kotlerman, Ettner, & Cowan, 2007).

**Results**

**Preliminary Analyses**

Table 1 displays descriptive statistics and bivariate relations among study variables. Higher initial emotion recognition was related to higher levels of supportive parenting at age 4, as well as greater quality of instruction in parenting, lower levels of intrusive parenting, and higher levels of children’s narrative coherence at ages 4 and 6. Initial emotion recognition, supportive parenting, quality of instruction in parenting, and narrative coherence were positively related to emotion recognition at age 8, and intrusive parenting was negatively related to emotion recognition at age 8. Although these relations are provided for the purposes of description and replication, the many associations among these variables precluded accurate interpretations of bivariate relations with emotion recognition, or differences in relations across time. Therefore, we used a path analytic evaluation approach to test our hypotheses.

In determining appropriate covariates for the model, child cognitive ability and child sex were examined for their potential relations with emotion recognition at age 8. Age 8 emotion recognition was significantly associated with child cognitive ability,  $r = .39$ ,  $p < .001$ , but there was not a significant mean difference between boys ( $M = 109.88$ ) and girls ( $M = 109.95$ ;  $t(205) = -.06$ ,  $p = .956$ ). Therefore, only child cognitive ability was included as a covariate in the model.

At the group mean level, our first hypothesis was supported, as emotion recognition increased from age 4 to age 8,  $t(201) = -35.28$ ,  $p < .001$ . Further, paired  $t$  tests of subcomposites representing each discrete emotion assessed in the study confirmed that recognition of each emotion increased across ages 4 to 8 (see Table 2).

**Path Analyses**

A path model predicted emotion recognition at age 8, controlling for emotion recognition and child cognitive ability at age 4. Parenting (i.e., supportive presence, quality of instruction, intrusiveness, and hostility) and child narrative coherence were entered as predictors at ages 4 and 6. All concurrent correlations and within domain stability paths (e.g., supportive presence at age 4 to supportive presence at age 6) were estimated, as were transactional paths from emotion recognition at age 4 to parenting and narrative coherence variables at age 6.

The model fit very well ( $\chi^2[25] = 31.12$ ,  $p = .185$ ; RMSEA = .031; CFI = .989), given its nonsignificant chi square value,

**Table 1**  
*Descriptive Statistics and Bivariate Relations Between Study Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	Mean	SD	Range
1. Emotion recognition <sub>Age 4</sub>	—												77.20	13.87	28.70–113.00
2. Emotion recognition <sub>Age 8</sub>	.37***	—											109.91	8.68	60.00–120.00
3. Parent support <sub>Age 4</sub>	.22***	.25***	—										4.86	.80	2.00–6.75
4. Parent instruction <sub>Age 4</sub>	.28***	.27***	.79***	—									4.58	.91	1.25–6.75
5. Parent intrusiveness <sub>Age 4</sub>	-.21**	-.22**	-.57***	-.58***	—								2.78	.82	1.00–5.25
6. Parent hostility <sub>Age 4</sub>	-.04	-.13	-.44***	-.34***	.41***	—							1.54	.61	1.00–5.00
7. Parent support <sub>Age 6</sub>	.15*	.21**	.44***	.39***	-.33***	-.29***	—						4.82	.58	3.00–6.80
8. Parent instruction <sub>Age 6</sub>	.35***	.37***	.43***	.47***	-.37***	-.24**	.73***	—					4.77	.61	3.00–6.60
9. Parent intrusiveness <sub>Age 6</sub>	-.21**	-.22**	-.32***	-.31***	.39***	.20**	-.57***	-.58***	—				2.01	.60	1.00–4.20
10. Parent hostility <sub>Age 6</sub>	.02	-.15*	-.19**	-.11	.21**	.37***	-.59***	-.36***	.44***	—			1.46	.48	1.00–4.40
11. Narrative coherence <sub>Age 4</sub>	.33***	.28***	.07	.19**	-.12	-.04	.15*	.24**	-.09	-.04	—		.43	.27	.00–1.00
12. Narrative coherence <sub>Age 6</sub>	.15*	.30***	.01	.12	-.02	-.05	.16*	.11	-.15*	-.21**	.19**	—	.68	.27	.00–1.00
13. Cognitive ability <sub>Age 4</sub>	.47***	.39***	.16*	.16*	-.11	-.19***	.21**	.29***	-.15*	-.07	.25***	.15*	95.17	13.47	61.50–145.00

Note. Transformed Emotion Recognition Age 8 Mean = 1.19, SD = .16.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2  
Mean Differences in Discrete Emotion Recognition Across Time

Emotion	Mean Age 4	Mean Age 8	Paired <i>t</i> test statistic*
Angry	1.65	1.97	-10.30
Ashamed	.74	1.74	-26.44
Confused	.99	1.89	-26.06
Disappointed	.85	1.60	-20.04
Embarrassed	1.18	1.84	-20.19
Excited	1.22	1.91	-17.78
Frustrated	1.37	1.83	-14.34
Happy	1.48	1.85	-11.90
Love	1.56	1.96	-14.41
Proud	1.01	1.75	-19.94
Sad	1.67	1.91	-9.44
Scared	1.75	1.92	-6.53
Surprised	1.38	1.69	-9.18
Tired	1.48	1.86	-12.52
Worried	.98	1.85	-23.70

\* All test statistics were significant at  $p < .001$ .

RMSEA  $< .05$ , and CFI  $> .90$  (Hu & Bentler, 1999). There was significant stability of each parenting variable from ages 4 to 6 ( $\gamma_{\text{support}} = .35$ ,  $\gamma_{\text{instruction}} = .32$ ,  $\gamma_{\text{intrusiveness}} = .28$ ,  $\gamma_{\text{hostility}} = .30$ ,  $ps < .001$ ), as well as of child narrative coherence from ages 4 to 6 ( $\gamma = .18$ ,  $p = .011$ ). After controlling for all other influences, the remaining direct effect of emotion recognition at age 4 on emotion recognition at age 8 was not significant ( $\gamma = .11$ ,  $p = .133$ ). Concurrent correlations were significant, with exceptions at age 4 of emotion recognition with hostility, IQ with intrusive parenting,

and child narrative coherence with supportive presence and hostility, and at age 6 of child narrative coherence with quality of instruction.

Figure 1 depicts the full model and significant predictive influences on emotion recognition at age 8. Supportive parenting at age 4 ( $\gamma = .23$ ,  $p = .040$ ), but not at age 6 ( $\gamma = -.19$ ,  $p = .066$ ), contributed uniquely to better emotion recognition at age 8, suggesting a unique effect of early supportive presence on the development of emotion recognition. Higher quality of parental instruction at age 6 ( $\gamma = .27$ ,  $p = .004$ ), but not at age 4 ( $\gamma = -.10$ ,  $p = .344$ ), predicted better emotion recognition at age 8, suggesting that this factor may have special salience later in development. Neither parental intrusiveness at age 4 ( $\gamma = -.07$ ,  $p = .373$ ) or age 6 ( $\gamma = .03$ ,  $p = .666$ ), nor hostility at age 4 ( $\gamma = .09$ ,  $p = .219$ ) or age 6 ( $\gamma = -.09$ ,  $p = .251$ ), evidenced significant effects on emotion recognition at age 8. Higher levels of children's narrative coherence at ages 4 ( $\gamma = .14$ ,  $p = .044$ ) and 6 ( $\gamma = .22$ ,  $p = .001$ ) predicted better emotion recognition at age 8. Of note, all these effects controlled for child cognitive ability and prior levels of emotion recognition. Therefore, our hypotheses that positive parenting and child narrative coherence would predict increased emotion recognition development were supported, and evidence was provided to speak to our exploratory questions about the timing of these effects.

In terms of transactional effects, emotion recognition at age 4 predicted increased parent quality of instruction at age 6 ( $\gamma = .26$ ,  $p < .001$ ). Given this, the indirect effect of emotion recognition at age 4 on emotion recognition at age 8 through parent quality of instruction at age 6 was tested, and was significant ( $\gamma = .07$ ,  $p =$

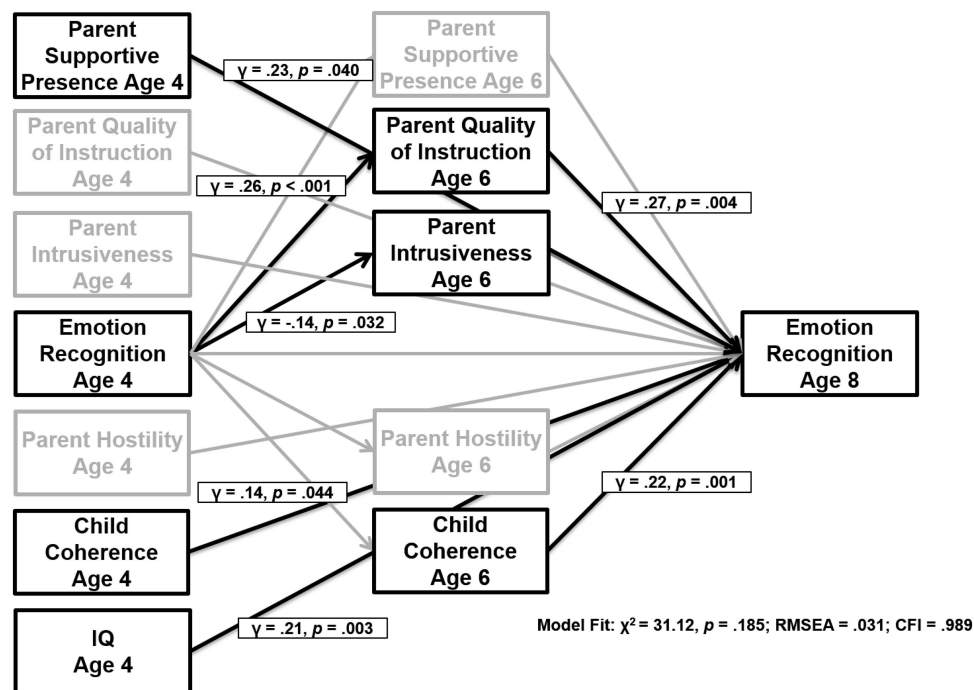


Figure 1. Path model predicting emotion recognition at age 8 from developmental influences at age 4 and age 6. Significant pathways to emotion recognition shown in bold; within time point intercorrelations and within domain stability paths modeled but not displayed, for clarity.



.018). In addition, emotion recognition at age 4 significantly predicted decreased parental intrusiveness at age 6 ( $\gamma = -.14, p = .032$ ), however, given the lack of a significant effect of intrusiveness on emotion recognition at age 8, no indirect pathway was tested.

A post hoc exploratory analysis tested for significant gender differences in the obtained pathways using a multigroup path analysis to compare the model across genders. The results of a chi-square difference test suggested that the more parsimonious model in which all paths were constrained to be equal between boys and girls did not fit significantly worse than the unconstrained model,  $\chi^2(53) = 63.17, p = .160$ . Thus, there were no significant differences in model parameters between boys and girls.

### Discussion

This study demonstrated a novel set of associations among children's emotion recognition, general parenting behaviors, and child narrative coherence. As expected, emotion recognition increased over time at the group mean level, in terms of both the overall composite and each discrete emotion score. Parents' supportive presence and children's narrative coherence at age 4 predicted increased emotion recognition at age 8. Parents' quality of instruction and children's narrative coherence at age 6 predicted increased emotion recognition at age 8. In addition, there was an indirect effect of emotion recognition at age 4 on emotion recognition at age 8 through parents' quality of instruction at age 6, and the full model did not differ significantly between boys and girls.

Extending prior cross-sectional studies (Bennett et al., 2005; Cole & Deater-Deckard, 2009), the current findings demonstrated that parents' supportive presence at age 4 contributed to increased emotion recognition, above and beyond its later influence at age 6. Importantly, supportive parenting in the context of children's encounters with challenging tasks entails not only parental positive regard and expressions of praise, but also the capacity to acknowledge and contain the child's negative affect and frustration. Therefore, in addition to providing examples of positive emotional displays, supportive presence by parents early in development may include negative emotional displays that scaffold the child's capacity to engage in their own positive and negative emotional displays. In this supportive context, children can learn to acknowledge and label emotions rather than become overwhelmed and disorganized by them. Exposure to parents' responsive and congruent emotional displays may be particularly important during the preschool years when children begin to become proficient in recognizing discrete emotions (Rodger et al., 2015). During this period, it may be that the presence of the parent's contextually appropriate emotional displays and support for the child's expression of the full range of emotions begin to set the stage for emotion recognition.

Parents' quality of instruction at age 6 predicted emotion recognition development, above and beyond any influence from age 4. Evidence that parents' quality of instruction can scaffold the development of emotion recognition is consistent with prior studies showing that specific emotion socialization instruction (e.g., direct coaching) is a key component in building children's emotion understanding (Denham & Kochanoff, 2002; Havighurst et al., 2010). However, the current finding extends prior work by show-

ing that instructional quality in problem-solving contexts that do not involve direct emotion socialization may generalize to influence children's emotional development. Given that specific emotion socialization behaviors were not measured in the present study, additional work is needed to ascertain whether or not general parent quality of instruction is more than just a proxy for the quality of parents' emotion socialization instruction. However, these findings provide important evidence that parents' quality of instruction as assessed outside direct emotion socialization contexts has significant implications for understanding children's emotion recognition development. Moreover, the specific timing of this effect at age 6 may signify that parents' direct guidance in processing emotional experiences and general instructional support may become especially important following the preschool years when children's emotion recognition skills become more nuanced, and emotion recognition challenges become more complex.

These longitudinal data support the directionality of these effects while elucidating particular times when they may be especially impactful. Although the timing of the obtained effects awaits replication, these suggestive results map onto extant developmental theories of organization wherein early emotional support and exposure set the stage for later complexity and scaffolded competence in socioaffective processing (Sroufe, 1995).

Importantly, despite evidence of a negative bivariate relation between intrusiveness and emotion recognition at age 8, neither intrusive nor hostile parenting influenced the development of emotion recognition in the path model. Although intrusive parenting is generally thought to have negative effects on child development (e.g., Soenens et al., 2007), several studies have shown that the effects of parental intrusion and related aspects of control may be qualified by varied contextual factors that were not examined in this model (e.g., ethnicity, acculturation, Ispa et al., 2004; peer influences, Mason, Cauce, Gonzales, & Hiraga, 1996).

Likewise, extant research on the effect of parents' negative emotional displays on children's emotional development is mixed. Although overall emotional expressivity is important for emotional development, it has been suggested that negative emotionality may evidence a curvilinear effect on children's emotion competence, such that some negative displays are advantageous (e.g., when they occur in a broader context of supportive parenting), but displays that are too numerous, too intense, or inappropriate given the context, can hinder children's emotional development (Halberstadt & Eaton, 2002). Related work on theory of mind suggests that parents' negative emotional expression can cease to be a positive influence if it occurs too frequently or inconsistently (Pavarini, de Hollanda Souza, & Hawk, 2013). These findings suggest that the absence of a significant contribution of parent hostility to child emotion recognition development in this study may follow from our assessment of inappropriate hostile emotional displays directed specifically at the child, rather than general negative emotional expression. In the case of parents' hostility, the negative nature of the parent-child interaction may counteract any potential benefit to the child of exposure to parents' negative emotional expressivity. Indeed, as noted previously, negative emotion may be expressed in supportive parenting, as when a parent appropriately reflects a child's frustration or disappointment.

Unlike general parenting behaviors, children's narrative coherence was the one factor that was significant both at age 4 and at

age 6, indicating that both time points exerted distinct influences on the development of emotion recognition from age 4 to age 8. Although the effect of narrative coherence from age 6 appeared larger than the effect from age 4, the coefficients did not differ significantly. Child narrative coherence may share a similar function as parent quality of instruction during this period of development because it supports children's capacity to process more nuanced emotional situations. Although it appears children's ability to make sense of their emotional experiences is key throughout development, coherently processing these experiences and being able to integrate the full range of positive and negative emotions may be particularly valuable later in childhood as children take on greater autonomy over their social exchanges in schools and neighborhoods.

Ultimately, these findings support the notion that developmental influences on emotion recognition are numerous, multifaceted, and may take on unique salience during sensitive periods in development. Importantly, by controlling for initial levels of emotion recognition, this study demonstrated that these factors contribute to the development of emotion recognition capabilities over time, rather than simply reinforcing existing evidence of concurrent relations. Moreover, this study documented the influence of familial and child factors on the development of emotion recognition above and beyond children's cognitive ability and highlighted potential transactional influences of child emotion recognition on parenting.

Emotion recognition at age 4 predicted greater quality of instruction in parenting and decreased parent intrusiveness at age 6. This may indicate that the burden of instruction for parents (and the pressure to be intrusive to get children to complete tasks and process experiences) is reduced when children demonstrate early skills in emotion recognition. Moreover, the significant indirect effect of early emotion recognition on later emotion recognition through parents' instructional quality supports the idea that the development of emotion recognition reflects a transactional process wherein children's development influences parenting, which then affects ongoing development. Importantly, this process suggests that there are likely to be significant benefits to early skill acquisition vis a vis support for continued emotion recognition development. These effects may also contribute to the timing of parental influences, as parental instructional quality may take on greater salience later in development because parents have had the time to adjust their instructional approach in response to child effects. Moreover, the effect of emotion recognition on later parental intrusiveness may explain the bivariate correlation between the two constructs, which failed to manifest in the path model as a parent effect. Thus, this path investigation illustrates the risks inherent in studies that interpret uncontextualized relations between variables by examining bivariate correlations in isolation.

## Limitations

Although promising findings emerged from this study, it is important to interpret them in the context of several limitations. First, this study defined and measured emotion recognition, specifically children's capacity to recognize and label emotion representations. While these are central elements of emotion understanding, situational emotion knowledge is also important to consider (Castro, Cheng, Halberstadt, & Grünh, 2015; Saarni,

1990). Although children's emotion recognition and labeling skills developed from ages 4 to 8 in this study, it is important for future work to clarify development of children's capacity to understand the appropriateness of emotions in particular situations, which may emerge across a different time frame and/or via different processes. For example, if situational emotion knowledge emerges later in development, parents' supportive presence may have a more pronounced influence on it at that time relative to the earlier influences observed during the preschool period in this study. Thus, the overarching function of parents' supportive presence to promote early emerging capabilities would be retained, but the timing of that support may emerge later than the preschool period in the case of later developing abilities.

Second, the absence of an emotion recognition assessment at age 6 limited our analytic options. A fully cross-lagged model investigating theoretically specified developmental influences and emotion recognition at all three time points would have provided more information about the timing and directionality of these effects. Nevertheless, the timing of measurements in the present study represents an important advance over existing cross-sectional work, and strengthened our capacity to render appropriate conclusions about the direction and timing of these developmental links.

Third, and perhaps the most pressing limitation of the present work, is the need to infer potential mechanisms driving these influences from the specific constructs measured here. For example, the present study measured general parenting behaviors as opposed to behaviors specifically targeting emotion socialization. To the extent that these general parenting behaviors were correlated with, or even acted as proxies for, parents' emotion socialization practices, we cannot conclude that general parenting uniquely contributes to the development of emotion recognition. Although the current findings add to the existing literature in that general parenting behaviors have rarely been examined with regard to their influence on emotion recognition development, a next important step will be to explicitly compare emotion socialization and general parenting behaviors in the same study. Existing research suggests that parenting behaviors do influence emotion socialization practices, but that they are not entirely overlapping constructs (Chan et al., 2009). The present study provides important evidence that parenting behaviors do not have to be limited to those occurring in an explicitly emotion socializing context in order to influence emotion recognition development. Thus, these findings support the idea that wide-ranging parenting interventions may be effective for promoting multiple facets of children's adjustment, including their emotional development. Similarly, with regard to children's narrative coherence, we speculate that children's abilities to engage and integrate both positive and negative affect in a flexible manner supported their emotion recognition both directly and indirectly, by promoting children's access to and integration of autobiographical memories and prior emotional experiences, which are known to support emotion understanding (Valentino et al., 2014). However, future studies would benefit from explicit evaluation of these underlying mechanisms to achieve a more complete understanding of the processes that account for children's emotion recognition development.

## Strengths and Implications

Despite these limitations, this study advanced our understanding of developmental influences on emotion recognition in several ways. By using observational data to document parenting behaviors and children's narrative coherence in the context of a longitudinal research design and a process-oriented theoretical framework, these findings support more specific conclusions than the bivariate associations and self-report data that dominate the largely cross-sectional literature to date. Although extant studies were crucial in establishing these preliminary relations, the present study instantiates a new effort to clarify the timing and directionality of specific familial and child influences on the development of children's emotion recognition. In so doing, these findings encourage and inform the development and implementation of general parenting interventions and narrative treatment approaches, such as play-based therapies (Larner, 1996), to support children's emotional development. Moreover, these findings suggest that parent-focused interventions centered on general support and responsiveness may be important early on, whereas more explicit instructional supports may become more salient in later development.

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