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What You Say and How You Say It: Socioeconomic Differences in Parent
Mental-State Talk

A Thesis submitted in partial satisfaction of the requirements for the degree of
Master of Arts

in

Psychological Sciences

by

James Z. Sullivan

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Professor Rose Scott, Chair
Professor Heather Bortfeld
Professor Jan Wallander

2020

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Abstract

What You Say and How You Say It: Socioeconomic Differences in Parent Mental-State Talk

by James Z. Sullivan for the partial satisfaction of the requirements for the degree of
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Dr. Rose Scott, Chair

Parental mental-state talk predicts several aspects of their child's mental-state understanding. Research has identified a number of age-related changes in how parents talk about mental states (Taumoepeau & Ruffman, 2006). However, little research has examined the impact of socioeconomic status (SES) on mental-state talk. Here, we examined the mental-state talk used by a socioeconomically diverse sample of parent-child dyads during a picture-book activity. The number of cognition labels used by parents was positively correlated with SES, and parents from lower-SES backgrounds used more indirect methods of conveying mental-state information. Analyses also revealed that child age influenced whose mental states parents referred to and the type of mental states they labeled the most. These findings suggest that the methods parents use to describe mental states is influenced by SES and child age, which has implications for children's socio-cognitive development.

Introduction

The interactions that children have with their parents impact their development in numerous ways. Previous research investigating the amount of talk parents use with their children has found that overall exposure to talk predicts their child's vocabulary development (Hoff, 2003; Fernald, Marchman, & Hurtado, 2008; Hurtado, Marchman, & Fernald, 2008; Hart & Risley, 1995). The amount of speech parents produced during a 20-minute play session when their child was 18 months old was positively correlated with their child's vocabulary size at 24 months (Fernald et al., 2008). This trend also extended to other languages. The Spanish-learning children of mothers who spoke more at 18 months had larger vocabularies at 2 years old when participating in the same task (Hurtado et al., 2008).

Additional research has investigated how different types of talk impact language and other forms of development. Some research has focused on parents use of mental-state language, a type of talk that refers to psychological states such as *think*, *know*, and *happy*. Parents' use of this kind of talk with their children is related to many aspects of children's social cognition (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Hughes & Dunn, 1998; Adrian, Clemente, Villanueva, & Rieffe 2005; Taumoepeau & Ruffman, 2006; Taumoepeau & Ruffman, 2016; Howard, Mayeux, & Naigles, 2008; Gola 2012; Devine & Hughes, 2018). For example, children who hear more mental-state talk pass elicited-response false-belief tasks at younger ages than children exposed to less mental-state talk (Devine & Hughes, 2018). For example, children of parents who use mental-state talk more frequently also display better emotional understanding at 1 to 2 years old (Taumoepeau & Ruffman, 2006), and more mental-state vocabulary at ages three to five years old (Hughes & Dunn, 1998; Taumoepeau & Ruffman, 2016).

Researchers have proposed several accounts of how mental-state talk influences the development of social cognition. Some researchers argue that children gradually construct mental-state concepts across early childhood, and mental-state talk supports this process (de Villiers & de Villiers, 2000; Taumoepeau & Ruffman, 2006; Ruffman et al., 2018). For instance, Taumoepeau and Ruffman (2006) argue that infants initially focus on attending to the actions and behaviors of others as infants believe people are predisposed to act certain ways toward objects. However, infants do not understand the underlying mental states behind these actions and the use of mental-state talk by their parents helps them begin to link behavior to the mind. When parents notice their child has some understanding of goals, they will talk more about desires, rather than thoughts and feelings, to promote this link. Thus, parents speaking about the desires of their infants while they engage in goal-directed behavior ("*Do you want that rattle?*") can introduce the child to mental states through speech (Taumoepeau & Ruffman, 2006). As children display a better understanding of goals, parents shift their focus from talking about desires and begin to speak more about emotions and cognition (Taumoepeau & Ruffman, 2008). The progression of children hearing more talk about thoughts and feelings could lay the foundation for children to construct later concepts such as emotional and false-belief understanding. For example, talking about *thoughts* could help children notice that people can hold different beliefs. Other theorists suggest that children must master embedded complement syntax (i.e. *I thought that you were here*), in order to represent beliefs (de Villiers & de Villiers, 2000). This research suggests that children must be

exposed to these types of sentences and understand notional sentences and/or predictions before they can make sense of beliefs.

Another class of theories suggests that representations of mental-state concepts are present very early on in infancy (Carruthers, 2013; Buttelmann et al., 2009; Scott & Baillargeon, 2017; Southgate et al., 2007; Kovács, Téglás, & Endress, 2010; Luo, 2011). If this is the case, then mental-state talk cannot be responsible for the creation of these concepts. Instead, Roby and Scott (2016) have argued that experiencing mental-state talk assists children in using the mental-state concepts that they already possess to interpret the thoughts and feelings of others around them. This theory suggests that frequent exposure to mental-state talk makes children more aware of and more likely to spontaneously attend to mental states, which gives children practice inferring mental states, retrieving mental-state relevant information, and using this relevant information to predict and interpret behavior. This also gives children practice responding appropriately to others' mental states. According to this view, mental-state talk therefore is not necessary to create mental-state concepts, but aids children in being able to quickly and accurately infer and use these concepts in the appropriate contexts based on their exposure over time.

These theories suggest that specific aspects of mental-state talk influence children's understanding of mental states. According to Taumoepeau and Ruffman (2006), the specific *type* of mental-state term helps children learn about specific mental states. When parents notice their child's focus on actions and behaviors, it draws parents to talk about desires to help the child understand goal-directed behavior. Then as their child gets older, parents shift and begin referring to thoughts and feelings as well. Taumoepeau and Ruffman (2008) also suggest that *who* the parents refer to when speaking about mental states is important. The authors specifically argue that parents should refer to their child's mental states at first, as it is easier for children to reason about their own thoughts and feelings. Then as children get older, parents should begin referring to their own and others' mental states more often. de Villiers and de Villiers (2000) also suggest that the type of term matters, but for a different reason. Their research concluded that it is mandatory to be exposed directly to cognition terms in order to learn the necessary syntactic structure to make sense of thoughts and beliefs. Roby and Scott (2016) argue that all talk is helpful, but that exposure to each type of mental-state term helps children respond to a different type of mental state. These theories highlight the importance of the type and referent of mental-state talk and suggest that differences in how parents talk about mental states will impact what their child will understand.

Consistent with these views, research has found a number of age-based patterns in how parents talk about mental states to their children. Age-related shifts in mental-state talk have been reported as parents use emotional terms (*happy, sad*) when their children are younger and shift to using more words that reference cognition (*know, remember*) as their children become older (Taumoepeau & Ruffman, 2008). As children get older, parents also change whose mental state they talk about. Parents begin by using more mental-state talk that focuses on the feelings and thoughts of their child when they are young and over time begin to draw their child's focus to the mental states of the parent (Paine, Hashmi, Roberts, Fyfield, & Hay, 2018).

Previous research has not made any predictions about the type of sentence mental-state talk is used in. However, there is reason to believe that sentence type matters as well in how parents use mental-state talk. In existing research, sentence type in regard to mental-state talk predicts certain outcomes in social cognition. Previous research investigating how parents talk about mental states with their 1.5- to 2.5-year-old children found that parents who asked more open-ended questions concerning emotions elicited more emotion talk from their child and the amount of open-ended questions concerning emotions also was positively correlated with their child's prosocial behavior (Brownell et al., 2013). Patterns of using mental-state talk in questions or statements also extends to understanding the thoughts feelings of others as children get older. Children of parents who used more mental-state verbs in questions, as opposed to statements were better able to pass false-belief tasks at ages 3 to 4 years old (Howard et al., 2008). These findings suggest that using mental-state terms in questions might be more likely to engage children than using them in statements, which provides them with more effective experience reasoning about the thoughts and feelings of others.

The work discussed thus far suggests that parent mental-state talk impacts children's social cognition, and this research has also identified a number of patterns in when and how parents talk about mental states. However, much of this work has focused on higher SES families. This is potentially problematic because prior research suggests lower SES children hear less talk overall (Hoff, 2003; Hoff-Ginsberg, 1998; Hart & Risley, 1995), which in turn could mean there might also be differences in amount of mental-state talk they hear. Lower SES children also lag behind on some aspects of social cognition (Cutting & Dunn; 1999; Devine & Hughes, 2008), which could perhaps be the result of different patterns of talk in the home. However, relatively little work has focused specifically on how parent mental-state talk is shaped by SES. To date, no study has explored age-related changes in referent (whose mental state is being talked about), sentence type (question or statement), and the types of terms most frequently used in lower SES populations and how these patterns may impact the development of lower-SES children.

The two studies that have explored overall amounts of mental-state talk based on SES have found mixed results. In one of these studies, Thompson, Foster, and Kapinos (2016) examined how parents talked to their 3- to 7-year-olds during an interaction. Specifically, parent/child dyads participated in a problem-solving activity where they constructed a marble run. Parent talk was transcribed and coded for the number of questions and statements and usage of mental-state terms. Results suggested that lower SES parents used fewer mental-state questions than higher SES parents (Thompson et al., 2016). This study suggests that like overall amount of talk, mental-state talk is also less frequent in low SES populations.

In the other study, Ebert et al. (2017) assessed whether parent mental-state talk impacted their 3- to 5-year-old child's false-belief understanding in a three-phase longitudinal study. Parent mental-state talk was measured using a questionnaire that had parents pick from four possible statements they might make during a hypothetical interaction with their child. These hypothetical scenarios contained topics such as discussing a present bought for dad or losing keys. Choices included either elaborated ("Dad has not seen the present we got him because we wrapped it earlier") or non-

elaborated non-mental state sentences (“Dad has not seen the present we got him”) as well as elaborated and non-elaborated mental-state sentences (“Dad does not know what present we got him / because we wrapped it earlier”). The tendency to choose mental-state options (elaborated or non-elaborated) did not differ based on parent SES (Ebert et al., 2017). This study suggests that regardless of SES, parents tend to make the same choices about how they will use sentences containing mental-state talk.

One possible reason for these conflicting results is the way researchers assessed mental-state talk. Live interactions might provide a more valid measurement of parents’ typical mental-state talk than using a questionnaire about hypothetical scenarios. Hypothetical questionnaires, such as the one used in Ebert et al. (2017), may limit parents into making decisions about talk they might not normally make. Thompson et al. (2016) on the other hand, found differences when capturing a play activity that may have allowed for a more organic, genuine measure of mental-state talk made by parents. This suggests the possibility of a relationship between mental-state talk and SES when measured through parent-child interactions. Further research is needed to verify this possibility.

An additional limitation of this research is that it has focused on the number of mental-state terms parents produced. Although this is a common approach in the field, there is reason to suspect that it might not fully capture the ways in which parents reference mental states. This might be especially true for populations that fall outside of the traditional demographic for this research.

Research on narrative storytelling suggests that the way parents convey mental states might differ across SES groups (Miller, Cho, & Bracey, 2005; Burger & Miller, 1999; McCabe, Bailey, & Melzi, 2008). Research investigating the structure of storytelling skills of parents and their 1.5- to 3-year-old children through natural conversation found that lower SES children use different methods to narrate their experiences. When asked to talk about an event that happened in the past, children from lower socioeconomic households were more elaborative, expressive, and narrated their experiences in a more self-dramatizing fashion compared to their middle-class peers (Miller, Cho, & Bracey, 2005). Lower SES children were more likely to talk about the surroundings at the time of the event, take the perspective of someone else when speaking, and told more dramatic stories of anger and aggression revolving around them being the protagonist. This study further concluded that children from lower SES households arrive at kindergarten as better narrative storytellers than their more privileged classmates.

This provides additional evidence that researchers may be underestimating how children experience talk about mental states, and how they are able to put their experiences to use. If children from lower SES backgrounds use alternative methods to discuss and talk about their emotions and the experiences of others, then perhaps their parents are describing them in a different fashion than traditionally measured (i.e. number of words). Consequently, by only counting the number of mental-state words, researchers may also be missing other instances in which parents can communicate mental states. If we are to study lower SES families and compare their experiences to others, research must broaden its approach in capturing how parents talk about mental states with their children.

Thus, the current study had three goals. First, this study examined whether SES influences the nature of parent mental-state talk. Secondly, this study sought to understand how SES impacts the nature of mental-state talk as children age (including how mental states are used in sentences and who is the referent). Lastly, this study investigated whether the standard coding approach used in research underestimates how parents, especially lower SES parents, can convey mental states to their children.

Methods

Participants

This study drew participants from two existing data sets of parent-child interactions (Roby, 2017). One data set consisted of ninety-seven 28-month-olds (27.0 – 31.7 months; $M = 28.8$) and the other consisted of fifty-four 36-month-olds (33.4 – 39.3 months; $M = 35.7$). Participants were recruited from birth records provided by the California Department of Public Health and a database of parents who expressed interest in participating in research studies. Twenty-four dyads from each data set were selected based on the completion of the parent-child activity and the following criteria: An overall equal number of girls and boys, and equal numbers of the majority race/ethnic groups from the dataset (non-Hispanic White and Latinx/Hispanic). SES was assessed via parental education (see Table 1). Dyads were selected to give a range of education levels, but lower education levels were oversampled due to the focus on lower SES families.

Using these criteria, twenty-four children from the 28-month-old data set were selected (27.0 – 30.6 months, $M = 28.3$) and twenty-four children from the 36-month-old data set (33.5 – 39.1 months, $M = 35.9$) were selected. Parents were asked to indicate their child's race and ethnicity. For race, 32 parents selected White, 10 selected more than one race/other, and 3 selected Black/African-American, and 2 parents declined to answer for their child. For ethnicity, 24 parents selected Latinx/Hispanic, 23 selected non-Latinx/Hispanic, and 1 parent declined to answer for their child. Thirty-nine completed the activity with their mother, while 9 completed the activity with their father.

Procedure

Children first participated in one or two false-belief tasks, which are not analyzed here. Children then went into a separate room and participated in one or two activities with their parent. This study focused on a picture book activity, which was in both data sets. The book was based on previous research on parent mental-state talk (Taumoepeau & Ruffman, 2008). The book contained 8" x 11" color photos of people engaging in a variety of activities (e.g., visiting the duck pond, getting a shot at the doctor). The book varied in length across datasets: for 28-month-old children the book had 23 pages, while for 36-month-olds the book had 10 pages.

Parent and child could sit on the floor, in chairs next to each other, or the child could sit on the parent's lap. Parents were instructed to go through the picture book and talk about the pictures like they normally would during a home activity. The parents of the 28-month-olds were told they could take as much time as they wanted, whereas the parents of the 36-month-olds were told they had a 10-minute limit. In the former group, 5 parents took more than 10 minutes to complete the activity. The interaction was video recorded.

Coding

The interactions were coded in a program called ELAN (Max Planck Institute for Psycholinguistics, 2018). Parents' utterances were transcribed verbatim. Sounds such as coughs, laughs, and sighs were not transcribed. Since the focus of this study was parent mental-state talk, children's utterances were also not transcribed.

Coding was done in two parts: each utterance was first coded for the presence of three categories of mental-state talk using the coding scheme from Ensor and Hughes (2008). These words captured *cognition*, *emotions*, and *desires*. Table 2 has a complete list of the mental-state words used in this study. For the cognition category, these were words that referred to thoughts, beliefs, memories, and knowledge. The most commonly used cognition terms reported were *think* and *know*. For the emotion category, all words that conveyed an emotional state were counted. The most frequently used in these interactions were *happy* and *like*. Desire terms were words that referred to wanting or if someone would like something and the most commonly used in this dataset was *want*.

For each utterance that contained one of these three categories of mental-state words, they were next coded for *utterance type* and *referent*. Utterance type referred to how the mental-state word was used in a sentence. This included *yes/no questions* ("Is that boy happy?"), which were questions that could be answered with a simple yes or no response. *Open-ended questions* were utterances that asked a who, what, when, where, why, how question ("How does that girl feel?"), which would evoke a response besides yes or no. If the utterance containing a mental state did not contain a question, it was counted as a *statement*. Statements were utterances that did not necessarily require a response ("I think that is a dog"). For each utterance containing a mental-state word, the *referent* of mental-state talk was coded for to further analyze how the parents talk about mental states. Referents included *parent*, *child*, *both*, and *other*. Utterances that referred to the *parent's* mental state were questions or statements that parents made about their *own* mental state ("That makes me happy!"). Utterances that referred to the *child's* mental state were sentences the parents made about the thoughts and feelings of their child ("Do you think that's a rabbit?"). If parents spoke about their child's and their own mental state at the same time, it was counted as *both* ("Do we like going to the beach?"). If the parent used a mental-state word while describing the thoughts or feelings of people in the book or others besides themselves or their child, it was counted as *other* ("Does he look angry?"). Therefore, every utterance containing mental-state talk would have three codes (type of mental state conveyed, utterance type, and referent).

Any utterance that did not contain one of these three categories of terms was then coded for additional ways parents could convey mental states. These categories were inspired by previous work by Burger and Miller (1999) and Miller, Cho, and Bracey (2005). These included *implied mental states*, *mental-state actions*, and *reported speech*. The Appendix provides descriptions and examples of these categories of indirect mental-state talk. Parents can indirectly reference mental states through talking about the *actions* one might take when feeling or thinking a certain way. By saying things such as ("She is hiding from the big dog") parents can convey the fear of the dog. Likewise, by saying ("Why did he hit him?"), parents can use words that are indicative of actions people do when feeling or angry or upset. In addition to actions, parents can use other words or phrases that indirectly imply mental states. If a parent talks about their feelings toward an object without using a direct mental-state label, they can *imply a mental state*. A list of

words was composed based on their ability to convey how parents might feel or think without directly using a mental-state label. By talking about their or others' feelings without directly labeling them ("*That onion is yucky!*"), parents can convey that they do not like onions or find them disgusting to their children without directly labeling those mental states. Parents can also say things like, "*This girl is saying 'This is great!'*". This is considered reported speech as the parent is speaking as someone other than themselves. This may illuminate to children that the thoughts and feelings of others are different as the parent reports them as belonging to others.

Results

The main analyses will focus on the highest level of education reported by either parent because this was our primary indicator of SES.¹ To avoid small cell sizes, education levels were collapsed into four groups: a high school education or less, an Associate's degree, a Bachelor's degree, and a Master's or professional degree such as PhD/MD.

To examine potential differences in the length of the interaction (i.e. the time from when the parents first start talking about the pictures until when they finished), we conducted an analysis of variance (ANOVA) with the total activity duration as the dependent variable and parental education (HS or less, AA, BA, MA/PhD), age group (28-month-olds, 36-month-olds), and child sex as between-subjects factors. Results revealed a significant effect of age group, $F(1, 32) = 4.50, p = .042$; parents of 28-month-olds took significantly longer during the activity ($M = 7.04, SE = .68$) than parents of 36-month-olds ($M = 4.97, SE = .69$). The average duration across both data sets was 6.17 minutes. No other effects were significant, all F s < 1.60 , all p s $> .214$. Nevertheless, the difference in duration likely resulted from the fact that the data sets used different books and the parents received different instructions. Therefore, all subsequent age effects could partially be due to these procedural differences and thus should be interpreted with caution.

To examine potential differences in the total quantity of parent talk, we conducted an ANOVA with the total number of parent utterances as the dependent variable and parental education (HS or less, AA, BA, MA/PhD), age group (28-month-olds, 36-month-olds), and child sex as between-subjects factors. Results revealed a significant effect of age group, $F(1, 32) = 4.60, p = .04$; parents of 28-month-olds produced significantly more utterances ($M = 154.02, SE = 16.55$) than parents of 36-month-olds ($M = 103.51, SE = 16.75$). This difference in utterances likely stems from the duration difference already noted and the difference in instructions. No other effects were significant, all F s < 2.27 , all p s $> .14$. In particular, no SES differences were found in the amount of utterances parents produced, $F(3, 32) = .30, p = .827$. If later analyses reveal

¹ All analyses were also ran using the education level of the parent who participated in the activity. However, we only found one marginal effect, the use of "both" as a referent of indirect mental-state talk, $F(3, 42), p = .06$. Parents in the Bachelor's ($M = .18, SE = .06$) group used more indirect references to "both" than parents in the high school or less ($M = 0, SE = .04$), Associate's degree ($M = -.02, SE = .06$), or Masters or professional degrees ($M = .03, SE = .08$) groups.

differences in mental-state talk based on SES, this is not due to the lower-SES parents being less engaged during the activity. Nevertheless, we included total utterances as a covariate in subsequent analyses to control for individual differences in parent verbosity. Because these preliminary analyses of mental-state talk did not reveal any effects of child sex, it was collapsed across in subsequent analyses.

Direct mental-state talk

To examine potential differences in direct mental-state labels, we conducted a multivariate analysis of variance (MANOVA) with cognition, desire, and emotion labels as dependent variables, parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors, and the total number of parent utterances as a covariate (see Table 3 for descriptive statistics on patterns of direct mental-state talk by child age). Results revealed a significant effect of age group on the total amount of direct mental-state labels, $F(3, 37) = 5.84, p = .002$. There was also a marginal effect of parental education, $F(9, 117) = 1.87, p = .063$. Examination of the individual types of mental-state labels revealed a significant effect of age group for cognition labels, $F(1, 39) = 5.39, p = .025$, and emotion labels, $F(1, 39) = 9.58, p = .004$, but not for desire labels, $F(1, 39) = 2.63, p = .113$. Parents of the 36-month-olds produced significantly more utterances containing cognition labels ($M = 8.84, SE = 1.16$) compared to parents of the 28-month-olds ($M = 4.94, SE = 1.16$). Parents of older children also used significantly less emotion talk during the activity ($M = 8.06, SE = 1.45$) compared to the parents of the 28-month-olds ($M = 14.56, SE = 1.45$). Similarly, there was a significant effect of parent education on cognition labels, $F(3, 39) = 4.03, p = .014$, but not emotional labels, $F(3, 39) = 1.43, p = .248$, or desire labels, $F(3, 39) = 0.42, p = .743$. Parents in the Bachelor's ($M = 8.12, SE = 1.54$) and Masters or professional degrees ($M = 11.08, SE = 1.88$) groups used more cognition talk than parents in the high school or less ($M = 3.77, SE = 1.64$) or Associate's degree ($M = 4.58, SE = 1.32$) groups.

To examine potential differences in the referent of direct mental-state labels, we conducted a MANOVA with parent, child, other, and both references as dependent variables, parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors, and the total number of parent utterances as a covariate. Results revealed a significant effect of age group on the referent of direct mental-state labels, $F(4, 36) = 5.48, p = .001$. Examination of the individual referents revealed a significant effect of age group on parents referring to their own mental states, $F(1, 39) = 6.24, p = .017$, their child's mental states, $F(1, 39) = 8.26, p = .007$, and the mental states of others, $F(1, 39) = 13.54, p = .001$, but not for the references to both the parent and child, $F(1, 39) = .01, p = .913$. Parents of the 36-month-olds made significantly more utterances that referred to their own mental states ($M = 4.18, SE = .68$) compared to parents of the 28-month-olds ($M = 1.73, SE = .69$). Parents of the 36-month-olds also referred more to the mental states of their child ($M = 9.03, SE = 1.07$) than the parents of the 28-month-olds ($M = 4.59, SE = 1.07$). However, the parents of the 36-month-olds used significantly less mental-state talk that referred to others ($M = 7.14, SE = 1.55$) than parents of the 28-month-olds ($M = 15.4, SE = 1.55$). No other effects were significant, all $F_s < 2.25$, all $p_s > .098$.

To examine potential differences in parents' tendency to use questions versus statements in mental-state talk, we first collapsed yes/no questions and open-ended

questions into a single questions variable. We then conducted a MANOVA with the collapsed questions variable and mental-state statements as dependent variables, parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors, and the total number of parent utterances as a covariate. Results did not reveal any significant effects of parent education or age group for the multivariate tests, however there was a marginal between-subjects effect of parent education on the total amount of questions used by parents, $F(3, 42) = 2.51, p = .07$. Parents in the Masters or professional degrees ($M = 15.39, SE = 2.13$) group tended to use more questions than parents in the Bachelor's ($M = 11.63, SE = 1.83$), Associate's degree ($M = 9.92, SE = 1.57$) and high school or less groups ($M = 7.84, SE = 1.91$). No other effects were significant, all F s < 2.14 , all p s $> .15$.

Prior studies suggest open-ended questions are particularly important for children's mental-state understanding (Brownell et al., 2013). We therefore further explored the marginal effect in the previous analysis by examining whether parent education is differentially related to the two question types. To do so, we conducted another MANOVA using yes/no questions and open-ended questions as dependent variables, parent education (HS or less, AA, BA, MA, PhD) as a between-subjects factor and the total number of parent utterances as a covariate (Age group was not included because it was not significant in the prior analysis). Results revealed a marginal effect of parent education, $F(6, 86) = 2.14, p = .057$. Examination of the individual question types showed a significant effect of parent education on the total amount of open-ended questions, $F(3, 43) = 3.43, p = .025$. Parents in the Masters or professional degrees ($M = 3.61, SE = .75$), Bachelor's ($M = 1.97, SE = .64$), and Associate's degree ($M = 2.05, SE = .55$) groups used more open-ended questions than parents in the high school or less ($M = 0.37, SE = .67$) group. Yes/no questions did not vary significantly by parent education, $F(3, 43) = 1.25, p = .303$.

Indirect mental-state talk

To examine potential differences in indirect mental state references, we conducted a MANOVA with indirect references to cognition, desire, and emotion as dependent variables, parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors, and the total number of parent utterances as a covariate (see Table 4 for descriptive statistics on use of indirect mental-state talk by child age). Results revealed a marginal effect of age on overall amount of indirect references, $F(3, 37) = 2.53, p = .072$. Examination of individual categories showed there was a significant effect of age group on the total amount of indirect references to emotion, $F(1, 39) = 5.57, p = .025$, but not for cognition, $F(1, 39) = 0.97, p = .332$, or desire, $F(1, 39) = 1.13, p = .295$. Parents of the older 36-month-old children made significantly fewer indirect references to emotion ($M = 7.2, SE = 1.38$) than the parents of 28-month-olds ($M = 11.87, SE = 1.38$). No other effects were significant, all F s < 1.08 , all p s $> .295$.

To examine potential differences in the referent of indirect mental-state talk, we conducted a MANOVA with parent, child, other, and both references as dependent variables, parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors, and the total number of parent utterances as a covariate. Results revealed a significant effect of age group on the referent

of indirect mental-state talk, $F(4, 36) = 4.06, p = .008$. Examination of the individual categories of referent revealed a significant effect of age group on parents referring indirectly to others' mental states, $F(1, 39) = 11.54, p = .002$, and reference to both parent and child's mental states, $F(1, 39) = 6.57, p = .014$, but not the mental state of the parent, $F(1, 39) = 1.16, p = .287$, or their child, $F(1, 39) = .65, p = .437$. Parents of the 36-month-olds made significantly fewer indirect references to others' mental states ($M = 4.57, SE = 1.24$) compared to parents of the 28-month-olds ($M = 10.7, SE = 1.25$). Parents of the 36-month-olds also made more indirect references to the mental states of both themselves and their child ($M = .12, SE = .04$) than the parents of the 28-month-olds ($M = -.02, SE = .04$).² The effect of parent education was significant on the use of both as a referent, $F(3, 39) = 3.35, p = .028$, but not for indirect references to the mental states of the parent, $F(3, 39) = 1.02, p = .395$, child $F(3, 39) = 1.71, p = .181$, or others, $F(3, 39) = 0.41, p = .744$. Parents in the Bachelor's group ($M = .19, SE = .05$), used more references to both parent and child compared to parents in the Masters or professional degree ($M = .02, SE = .06$), Associate's degree ($M = .01, SE = .04$) and the high school or less ($M = 0, SE = .05$) groups. Moreover, the interaction between parent education and age group on the use of both parent and child as a referent of indirect mental-state talk was significant, $F(3, 39) = 4.28, p = .01$. This interaction was due to the age difference being more pronounced in the Bachelor's group compared to the other three parent education groups. However, due to the low frequency of both as a referent of mental-state talk, the significant effects for this variable should be interpreted with caution and bear replication.

To examine potential differences in the type of sentence parents used indirect mental-state talk in, we conducted a MANOVA with indirect mental-state questions and mental-state statements as dependent variables, parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors, and the total number of parent utterances as a covariate. There was an overall marginal effect of age group on indirect mental-state talk sentence type, $F(2, 38) = 3.14, p = .055$. Examination of each category showed a significant effect of age group on the total amount of statements used, $F(1, 39) = 6.44, p = .015$, but not questions, $F(1, 39) = 0.30, p = .585$. Parents of the 36-month-olds used significantly fewer indirect mental-state statements ($M = 4.50, SE = 1.21$) compared to the parents of the 28-month-olds ($M = 8.94, SE = 1.21$). No other effects were significant, all F s < 1.29 , all p s $> .262$.

Comparison of direct and indirect mental-state talk

To examine whether the tendency to use direct versus indirect mental-state talk varied by parent education level, we calculated the proportion of parents' mental-state talk that was direct mental-state labels: direct labels / (direct labels + indirect references). We then conducted an ANOVA with the proportion as a dependent variable and parent education (HS or less, AA, BA, MA/PhD) and age group (28-month-olds, 36-month-olds) as between-subjects factors. There was a marginal effect for parent education, $F(3, 40) = 2.44, p = .078$. Parents in the Masters or professional degrees ($M = .82, SE = .06$), Bachelor's ($M = .71, SE = .05$), and Associate's degree ($M = .74, SE = .05$) groups used a higher proportion of direct mental-state labels than parents in the high school or less (M

² Note this estimated marginal mean is negative because the use of "both" as a referent was so infrequent it became negative when adjusting for the other factors in the analysis.

= .59, $SE = .06$) group who conversely used marginally more indirect references to mental states. No other results were significant, all F s < 1.36, all p s > .25

Discussion

Previous research has found that mental-state talk is important to numerous developmental outcomes. However, most of the work on the nature of parent mental-state talk has been conducted with high-SES participants; the few studies including lower SES families have produced mixed results. Thus, this study sought to gain knowledge about how parents from different SES backgrounds use mental-state talk, whether SES influences age-related changes in mental-state talk, and whether the standard coding approach used in research underestimates how parents can convey mental states to their children. We examined two types of mental-state talk, who the referent of mental-state talk was, and if it was used in a statement or question in a socioeconomically diverse sample of parents interacting with their children, who were from two different age groups.

The results of this study revealed several effects of SES on how parents talk to their children about mental states. We found that parents from higher SES backgrounds used more cognition terms with their children compared to the lower SES parents. We also found that parents from higher SES backgrounds used more references to the mental states of both parent and child. Finally, we found that parents from higher SES backgrounds use a marginally higher proportion of direct mental-state talk compared to lower SES background parents. However, we also found that regardless of SES, parents similarly spoke about emotions and desires, and referenced themselves, their children, and others at similar rates.

This suggests that SES might impact some aspects of mental-state talk, but not others. This could have implications for children's understanding of mental states. Specifically, we found differences in the use of cognition terms, but not for emotion terms. Cognition terms have been argued to be particularly important for fostering an understanding of beliefs, and several studies show a link between the use of these terms specifically and children's performance on false-belief tasks (Adrián, Clemente, Villanueva, & Rieffe, 2005; Ruffman, Slade, & Crowe, 2002; Slaughter, Peterson, & Mackintosh, 2007). If low SES parents use fewer cognition terms, this would perhaps explain why children from lower SES backgrounds lag behind others on false-belief tasks (Devine & Hughes, 2018). Conversely, using emotion and desire terms may not be as impactful for children beginning to understand the thoughts and beliefs of others. The comparable uses of these terms would predict that lower SES children might perform similarly on tests of desire and emotion.

We also found varying degrees of SES differences in how parents used mental-state talk in sentences and who the referent was. We found marginal effects of SES on the total use of questions and the use of open-ended questions versus yes/no questions. This difference is potentially important because previous findings have found links between open-ended questions and skills such as prosocial behavior (Brownell et al., 2013). Being asked a question evokes a response from children, thus children who are asked more questions could have more experience in talk related to mental states. This could be especially true for open-ended questions as they bring about more complex conversations

about mental states. Thus, children from higher SES backgrounds may also have a slight advantage in the amount of thinking and talking they do that relates to mental states due to the amount of questions they are asked.

With regards to the influence of SES on age-related changes, we found only one interaction of child age and SES. However, considering it was only for using “both” as a referent in indirect mental-state talk, which was very infrequent, this result should be interpreted with caution. Thus, this finding and our other analyses might suggest that in fact SES does not impact the age-related patterns of parent mental-state talk. A second way to examine whether SES influences age-based changes in mental-state talk is to compare our results with a lower SES sample to age trends in prior work with higher SES samples. We found that age played a role in the amount of direct references to cognition and emotion terms children would hear. The younger children heard more labels of emotion, while the older children heard more labels of cognition. This follows the findings of Taumoepeau and Ruffman (2006), which found the same pattern. Our findings suggest that SES is not playing a role in how parents shift focus of mental-state talk and provides further evidence that child age is a determining factor for parents changing the focus from emotion to cognition talk. Thus, parents from all SES backgrounds may follow these age-based patterns in a similar fashion. We also found that parents made more indirect references to emotion words to the younger children than the older children. Although no prior study has looked at indirect emotion talk, this pattern mirrors the trends that have been shown for direct emotion labels. This again suggests that perhaps this decrease in references to emotion with age holds across SES groups.

Younger children in our sample heard more references to the mental states of others in both direct and indirect talk, while the older children heard more direct mental-state words that referenced the child and parent, regardless of SES. This did not replicate the findings of Paine et al. (2018), which found younger children heard more references to their own mental states, while older children heard more references about their parent’s mental state. Considering the SES of the participants from previous research, we may have found a different pattern due to having an overrepresented sample of lower SES families. Thus, it is possible that these patterns are different in families from lower SES backgrounds and do not fall in line with previous findings. However, due to the differences in the materials that were used, our pictures may have encouraged an overall higher amount of talk about *others* than the task used by Paine et al. (2018). The task that Paine and colleagues used consisted of a topic sharing task involving an activity board and parents playing with an “Etch-a-Sketch” with their children.

We did not find any impact of child age on the type of sentences they would hear direct mental-state talk in. However, we found a marginal overall effect on sentence type for indirect mental-state talk. More specifically, older children heard fewer statements including indirect mental-state talk compared to the younger children. As children age, their parents may become aware of their stronger ability to converse, thus start asking more questions to further engage their child in mental-state talk.

Although we replicated prior research on age-related shifts in mental-state talk, we also did not replicate other past findings. This could be taken to indicate that SES impacts age-related shifts in parent mental-state talk. However, this conclusion is tentative because of the differences in procedures across age groups. The procedural

differences between our groups was that older children got a shorter book and a time limit. Further work is needed due to the difference in methods across age groups. It is difficult to say for certain whether these effects would hold if parents in the two age groups had the same book and instructions so further research is necessary.

Lastly, we predicted that the standard coding scheme might underestimate mental-state talk, especially in lower SES populations. We found a marginal overall effect of SES on the parents' tendency to use direct versus indirect mental-state talk. Parents from higher SES backgrounds used higher proportions of direct mental-state talk, while conversely, parents from lower SES backgrounds used higher proportions of indirect mental-state talk. These findings suggest that there might be qualitative differences in how parents from different SES backgrounds talk about mental states with their children.

This suggests the standard coding scheme underestimates the levels of parent mental-state talk, but it is unclear what this means for children's mental-state understanding. Prior studies on the impact of talk have focused solely on direct labels (Taumoepeau & Ruffman, 2006; Ruffman, Slade, & Crowe, 2003; Ensor & Hughes, 2008). One possibility is that children need to hear direct talk because direct talk will draw children's attention to mental states in a way that supports learning. Alternatively, it could be that indirect talk is as useful or meaningful in this regard. Thus, research needs to further explore the relationship between indirect references and children's mental-state understanding with a broader range of children and examine how these categories of talk influence developmental outcomes.

Conclusion

In this study, we assessed the relationship between socioeconomic status and parent mental-state talk. Analyzing parents' use of mental-state talk revealed few SES differences. Nonetheless, two notable differences were the use of cognition terms and indirect mental-state references by parents. Parents from higher SES backgrounds used more cognition labels than parents from lower SES backgrounds. Parents from lower SES backgrounds were more likely to make indirect references than parents from higher SES backgrounds. Together, these results indicate that there are differences in what mental states parents talk about and how they talk about them. These qualitative and quantitative differences might be relevant for children's development and should be investigated in future research.

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Table 1

Education Levels of the Participating Parent and the Highest Education in the Household

Highest degree completed	Participating Parent	Highest in Household
Less than High School	2	1
High School diploma	20	10
Associate's degree	10	16
Bachelor's degree	11	12
Master's degree	3	3
Professional degree (PhD/MD)	2	6

Table 2

Mental-state Terms Used by Parents in the Picture Book Activity

Mental-State Category	Words Used
Cognition	Believe, forget, know , remember, remind, sure, think , wonder
Emotion	Angry, bored, brave, disgusting, excited, frustrated, grumpy, happy , like , love, mad nervous, proud, sad, scared, shocked, surprise, unhappy, upset
Desire	Hope, need, want , would like

Note: Bolded terms were most common words used by parents in each category.

Table 3

Means (SD) of Parent Direct Mental State Talk, Separately by Age Group

	28-month-olds	36-month-olds
Type of term		
Cognition	5.42 (5.5)	7.88 (6.83)
Emotion	17.04 (12.57)	5.29 (5.52)
Desire	2.54 (2.21)	3.79 (3.59)
Referent		
Parent	2.21 (2.11)	3.38 (4.36)
Child	5.25 (4.73)	8.58 (5.67)
Both	.17 (.38)	.21 (.66)
Other	17.38 (12.61)	4.54 (5.12)
Utterance type		
Statement	14.12 (13.1)	6.04 (6.47)
Yes/no question	9.08 (7.58)	8.83 (6.08)
Open-ended question	1.79 (2.7)	2.08 (2.1)

Table 4

Means (SD) of Parent Indirect Mental State Talk, Separately by Talk Category and Age Group

	28-month-olds	36-month-olds
Type of term		
Cognition	0 (0)	.04 (.2)
Emotion	13.96 (10.73)	4.83 (4.35)
Desire	.04 (.2)	0 (0)
Referent		
Parent	1.58 (2.48)	1.37 (1.86)
Child	.67 (1.74)	.67 (.87)
Both	0 (0)	.08 (.28)
Other	12.25 (9.2)	2.8 (2.92)
Utterance type		
Statement	10.38 (8.36)	3.0 (4.28)
Yes/no question	5.5 (6.44)	2.33 (2.75)
Open-ended question	.96 (1.55)	.67 (.92)

Appendix

Descriptions and Examples of Indirect Mental-State Talk

All categories of indirect mental-state talk are listed below. These categories were meant to capture additional ways parents can describe mental states without using direct labels.

This included implied mental-state talk, mental-state actions, and reported speech.

Examples show how these categories were used in utterances by parents.

Implied mental-state talk	Words that convey how someone might think or feel without directly labeling that emotion or thought.	“Onions are <i>gross!</i>” “Is that a <i>yucky</i> face?” “Look at that <i>cute</i> puppy!”
Mental-state actions	Words that describe actions or behaviors one might take when <i>feeling</i> or <i>thinking</i> a certain way.	“Is she <i>hiding</i> from the dog?” “Look at the crying baby!” “Mom and baby are <i>smiling.</i>”
Reported speech	Utterances where the parent reports something or talks from another point of view.	“He is saying ‘<i>I’m hungry!</i>’” “She is going ‘<i>ohh.</i>’”