Mentalistic Vocabulary in the Speech of Primary School Children and the Influence of Social Contexts

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Abstract

The uses of mental state terms (MSTs) such as think, wanting, and happiness were compared among schoolchildren from urban marginalized and middle-class socioeconomic backgrounds in the city of Santa Fe, Argentina. Schoolchildren, regardless of their socioeconomic group, showed a higher frequency of cognitive terms (54%) compared to those related to desire (26%) and emotion (19%), which differs from studies in preschool children. No significant differences were found in the total number of MSTs produced between the two groups. However, lexical diversity was lower in children from urban marginalized backgrounds across all three types of MSTs. This is attributed to variations in linguistic input and the type of communicative practices, rather than a linguistic deficit. It is suggested that sociocultural differences in language development should be considered, and that interpretations based on middle-class standards should be avoided. The transition to schooling is associated with an expansion of mentalistic vocabulary, especially in the cognitive domain.

Keywords: Mental State Terms; Socioeconomic Level; Lexical Acquisition; School Development

Abbreviations

MST: Mental State Term; ToM: Theory of Mind

Introduction

Everyday adult speech uses expressions that refer to one's own mental state or that of others, alluding to beliefs, desires, or emotions. These states are often expressed by directly referring to one's own or another's mind, as in I am very convinced or She dreams of becoming a writer. In both cases, these are expressions modulated by the speakers' internal mental life. The study of this type of expression has become central in recent decades since it partially reveals the ordinary understanding that humans have of themselves and others, or what has come to be called a Theory of Mind (ToM). Beliefs are understood to refer to a general category of thoughts that encompasses knowledge, opinions, conjectures, convictions, and hunches, i.e. all mental states that attempt to reflect something (real or fictitious) about the world; meanwhile, desires are understood as a general category that includes, for instance, needs, impulses, and states of concern about something [1].

This approach, within what can be defined as folk or commonsense psychology, assumes that humans develop a ToM whose research attempts to characterize how people understand their own and others' actions and thoughts [1].

In this scenario, where ToM is widely present in adult life, a frequent inquiry has been about when children have/acquire this cognitive ability. Whether young children are innate mentalists of beliefs and desires or whether these states are learned inductively, it is important to trace the developmental steps of ToM as they grow older and as the types of relationships they establish within society vary, such as when they enter school.

Studying spontaneous speech has been a fruitful way to approach children's understanding of the mind because people's activities and moods are frequent topics in young children's conversations. People's actions and reactions feature prominently in toddlers' speech. Therefore, the term ToM has been used in a broad sense to refer to early abilities such as talking about mental states even before children can pass the so-called false belief test. The fact that infants already use MSTs by around age two suggests increasing sophistication in the understanding of mental states associated with age [2]. Thus, children's talk about the mind begins with terms expressing desire (e.g., want), which precede belief terms (e.g. know, forget) and are the most frequent type of terms used in conversation about mental states until age three [1]. Cognitive or belief terms appear in vocabulary around the middle of the third year and continue to increase in frequency over time [1]. Terms expressing emotions like happiness or shame also begin to be used (and understood) between the ages of three and four. The use of MSTs in preschool children has garnered particular interest not only because it reflects social cognition skills such as emotional intelligence [3], but also because its relationship with socioemotional development has been demonstrated, including affective communication, cooperation, conflict resolution, and management of emotions, among other aspects [4].

Besides the age-related variation in the use of MSTs, the impact of early linguistic input has been extensively researched. Several studies indicate that the qualitative and quantitative characteristics of the language to which children are exposed in their early years can influence various aspects of their linguistic development, including syntax, pragmatic skills, and, particularly, vocabulary [5], as well as their overall cognitive development [6]. Additionally, some research suggests that socioeconomic factors may partially explain the observed differences in linguistic and cognitive development among children from different social groups [7]. It has been found that in homes where there is more conversation about feelings or mental states, the development of ToM gets promoted in both young and older children. This development is favored in cooperative environments that encourage active discussions, as opposed to relying solely on experience or passive observation of one's own or others' emotions and beliefs by the child [8].

Research, predominantly conducted with English speakers from middle socioeconomic backgrounds, reveals that the quantity and type of emotional expressions present in children's language are a significant indicator of their socio-cognitive development. This development encompasses information processing and problem-solving, social interaction, empathy, and communication skills. In fact, emotional expressions have allowed for a better understanding of children's cognitive and emotional development across diverse cultures and interactive setups, such as peer discussions, spontaneous child-adult conversations, reading sessions, and cooperative play [1,9,10].

Studies that specifically address the mentalistic language of adult caregivers and/or children from families with different socioeconomic status are scarce and offer contradictory results. As some research points out [11], while some research suggests differences in the specific use of cognitive vocabulary by adults according to their socioeconomic status but not in emotion vocabulary [12], others find no such differences [13]. In addition, there were found differences in speech directed at children between families with high and low incomes: parents with low incomes used less MSTs, which he attributed to factors such as parental stress or a lack of opportunities for dialogue [14].

In research of Spanish language speakers, specifically in Argentina, the study in [9], based on audio recordings of children between 4 and 5 years old in spontaneous home situations, compared the production of MSTs in adult-child interactions on children from low socioeconomic backgrounds living in marginalized urban areas and from middle socioeconomic backgrounds. One of the study's goals was to examine the quantity and diversity of MSTs related to desires, cognitions, and emotions produced by children of such characteristics. In this regard, the authors found significant differences favoring the group from middle socioeconomic backgrounds, both in the diversity

and frequency of terms referring primarily to cognitive states. Given that the use of MSTs, and especially cognitive vocabulary, can be considered an indicator of the development of social understanding, these results coincide with those studies that indicate a significantly lower performance on ToM tasks such as the false belief test in children from low socioeconomic backgrounds [15].

Summarizing, the results of some published studies suggest that the quality of input influences the type, quantity, and diversity of MSTs that infants use, that the social environment in which children develop has a relevant role in the use of MSTs, and that these terms can constitute an index of the socio-cognitive development of children.

Materials and Methods

This study focus on MSTs and differs from the study by Rosemberg and colleagues [9] in that the population of children, also speakers of Rioplatense Spanish, are between 6 and 12 years old, an age range not yet explored. Thus, starting from the general hypothesis that the type of input plays a relevant role in the acquisition of MSTs, this study proposes to analyze the oral productions of children from middle and low socioeconomic status in order to evaluate whether the socioeconomic factor has an effect on MSTs production. Secondarily, it proposes, on the one hand, to characterize a developmental profile in MSTs production between the ages of 6 and 12 and, on the other hand, to analyze whether age and gender are factors that influence MSTs use in both social groups.

Participants

To determine if there are inter- and intra-group differences in the speech production of MSTs by children, 60 audio transcripts of 20-minute recordings were used. These recordings were made from interviews with schoolchildren in the city of Santa Fe, Argentina. Half of the schoolchildren came from middle socioeconomic backgrounds, with a mean age of 9.5 years (SD = 2.4 months), and the other half from low socioeconomic backgrounds, with a mean age of 9.6 years (SD = 2.4 months). The 60 transcripts were selected to create comparable age groups from a set of 138 samples, which were randomly obtained from a large population of students in public and private schools in the city. The study included schools in the city center and surrounding urban areas. All schoolchildren had normal or corrected vision; they had no history of language, neurological, or hearing problems, nor did they present with speech difficulties.

To define middle socioeconomic status (MSS) or low socioeconomic status (LSS), several aspects considered in other studies on the topic were taken into account, such as: education level and income level of tutors, material characteristics of their home places, ratio of inhabitants to bedrooms, and access to healthcare.

This study adheres to the ethical guidelines of the Declaration of Helsinki.

Materials

To encourage participants' speech production, the interviewers used strategies as following the children's interests, limiting interviewer interventions, using open-ended questions, and changing activities if the child lost interest. Interviews that were too short, had little cooperation, or had technical audio problems were discarded. The interviews were transcribed and coded using the CHAT system from the CHILDES database [16].

As stated in [1], it is not easy to trace children's concepts by examining their everyday language. On the one hand, children and adults can use terms like think, know, or want without any conception or reference to beliefs and desires. For example, they might say You know what? to capture a listener's attention without any deeper understanding of concepts or knowledge. Or they might say What do I know?, or in Spanish Qué sé yo, simply as a formula. These types of expressions are usually called "conversational," as opposed to "genuine," which do express mental content. Although language development does not correspond to conceptual development in any strict sense, discourse

analysis can nevertheless provide an important window into the conception of mental states [1]. It has been proposed, therefore, that the systematic examination of children's language provides considerable insight into their understanding of different psychological states.

Based on the above, to determine which mental states should be considered, lists were compiled containing the mental states of cognition, desire, and emotion commonly studied in previous research (such as knowing, wanting, happiness, etc.). Furthermore, as stated in [18], speaking with mental verbs does not exhaust references to mental states, even though these verbs constitute the typical way of communicating about the mind. For this reason, colloquial words/expressions from the geographical area of this study were added to the lists, primarily cognitive epistemic discourse markers (EDMs) with different nuances: es como que (degree of certainty, broadly translatable to it is as if); posta que (conviction); cayó en que (change in understanding, broadly translatable as he/she realized that, literally she fell onto), among others.

The CLAN subprogram freq was then used for the automatic tracking of lexical groups. freq output yielded the types and tokens for each EDM type per transcription. To ensure the inclusion of genuine EDMs, a verification by hand of each EDM in context was performed for each transcription, and conversational uses were excluded.

To determine significant inter- and intra-group differences, the non-parametric Mann-Whitney U and Wilcoxon tests were applied, respectively. Calculations were performed using the statistical package Infostat [19].

Results

Tokens analysis

General MSTs production

The audio recordings have an approximate length of 20 minutes, but not exactly. Thus, in a first approximation, in order to minimize a possible length effect on tokens and types, the proportion of total MSTs (tokens) to total nouns (tokens) of each transcription was calculated (See table 1).

MSS group (n = 30)							
Age	6	7	8	9	10	11	12
Males	0.24	0.15	0.28	0.17	0.16	0.25	0.42
	0.24		0.24 0.14	0.16			0.31
Females	0.09	0.17	0.19	0.2	0.22	0.17	0.24
	0.13	0.31	0.24	0.42	0.2	0.48	0.61
			0.16 0.16	0.22			0.57
Mean	0.18	0.21	0.2	0.23	0.19	0.3	0.43
n Participants	4	3	7	5	3	3	5
LSS group (n = 30)							
Age	6	7	8	9	10	11	12
Males	0.26	0.31	0.15	0.09	0.18	0.29	0.21
			0.13	0.15	0.31		0.44
			0.17	0.18 0.16	0.09		0.25

Females	0.17	0.05	0.31	0.12		0.04	0.41
	0.11	0.06	0.21	0.22		0.25	0.6
	0.11	0.14	0.05 0.17				
Mean n Participants	0.16	0.14	0.17	0.15	0.19	0.19	0.38
	4	3	6	6	3	3	3
Note: MST: Mental State Term; MSS = Middle Socioeconomic Status; LSS = Low Socioeconomic Status							

Table 1: *MSTs over total number of nouns by age in years. gender and social background.*

In the overall comparison of the proportion of MST tokens to total nouns between the MSS (mean = 0.25; SD = 0.13) and LSS (mean = 0.20; SD = 0.13) groups, no significant difference was found (p = .30). There were no significant differences in MSTs production by gender in the MSS group (p = .37): male (mean = 0.23; SD = 0.08) and female (mean = 0.27; SD = 0.15); nor was any gender difference found in the LSS group (p = .18): male (mean = 0.21; SD = 0.09) and female (mean = 0.19; SD = 0.16).

A developmental profile by age and social group of total TEM production was made with the obtained data (Figure 1).
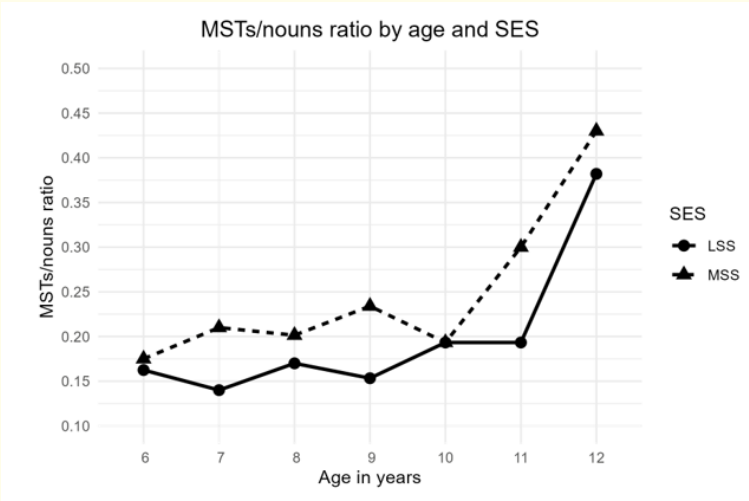
Figure 1

A similar development by group was observed, with a noticeable increase in production from 11 years onwards.

Production by MST type

The proportion of tokens for each MST type over the total MSTs produced per participant was adopted as input data for the statistical models (See table 2).

MSS group (n = 30)				
Gender	**Age**	**Cognition**	**Desire**	**Emotion**
Male	6	0.68	0.23	0.1
		0.71	0.22	0.06
	7	0.26	0.3	0.44
	8	0.57	0.3	0.15
		0.53	0.36	0.12
		0.43	0.29	0.26
	9	0.44	0.35	0.2
		0.35	0.38	0.26
	10	0.65	0.3	0.05
	11	0.41	0.25	0.33
	12	0.63	0.18	0.19
		0.6	0.18	0.24
Means for males				
Age		**Cognition**	**Desire**	**Emotion**
6		0.69	0.26	0.51
7		0.26	0.3	0.44
8		0.51	0.31	0.18
9		0.4	0.37	0.23
10		0.65	0.3	0.05
11		0.41	0.26	0.33
12		0.61	0.18	0.3
Gender	**Age**	**Cognition**	**Desire**	**Emotion**
Female	6	0.62	0.11	0.26
		0.38	0.28	0.34
	7	0.51	0.26	0.23
		0.51	0.26	0.23
	8	0.33	0.23	0.43
		0.25	0.27	0.47
		0.37	0.28	0.35
		0.42	0.33	0.24
	9	0.6	0.35	0.06
		0.52	0.33	0.15
		0.38	0.29	0.32
	10	0.34	0.28	0.38
		0.62	0.17	0.21
	11	-	-	-
		0.68	0.19	0.13
	12	0.4	0.39	0.22
		0.53	0.29	0.17
		0.52	0.26	0.21

Means for females			
Age	**Cognition**	**Desire**	**Emotion**
6	0.5	0.2	0.3
7	0.51	0.26	0.23
8	0.47	0.28	0.37
9	0.5	0.32	0.18
10	0.48	0.23	0.3
11	0.68	0.19	0.13
12	0.48	0.31	0.2
Overall means			
Age	**Cognition**	**Desire**	**Emotion**
6	0.6	0.21	0.19
7	0.39	0.28	0.34
8	0.49	0.3	0.28
9	0.45	0.35	0.2
10	0.57	0.27	0.18
11	0.55	0.23	0.23
12	0.55	0.25	0.25
	LSS group (n = 30)		
Gender	**Age**	**Cognition**	**Desire**	**Emotion**
Male	6	0.56	0.3	0.14
	7	0.46	0.22	0.32
	8	0.46	0.39	0.14
		0.21	0.52	0.26
		0.55	0.33	0.12
	9	0.5	0.4	0.1
		0.58	0.34	0.06
		0.46	0.33	0.22
		0.61	0.09	0.29
	10	0.5	0.43	0.08
		0.52	0.25	0.22
		0.44	0.22	0.33
	11	0.68	0.06	0.25
	12	0.57	0.3	0.14
		0.53	0.08	0.38
		0.75	0.21	0.04

Means for males			
Age	Cognition	Desire	Emotion
6	0.56	0.3	0.14
7	0.46	0.22	0.32
8	0.41	0.41	0.17
9	0.54	0.29	0.17
10	0.49	0.3	0.21
11	0.68	0.06	0.25
12	0.62	0.2	0.19

Gender	Age	Cognition	Desire	Emotion
Female	6	0.72	0.05	0.04
		0.73	0.13	0.13
		0.4	0.43	0.16
	7	0.33	0.5	0.17
		0.28	0.43	0.28
	8	0.49	0.4	0.1
		0.55	0.26	0.17
		1	0	0
	9	0.47	0.19	0.33
		0.42	0.19	0.38
	11	0.8	0.2	0
		0.61	0.3	0.09
	12	0.62	0.26	0.1
		0.47	0.2	0.32

Means for females			
Age	Cognition	Desire	Emotion
6	0.62	0.2	0.11
7	0.31	0.47	0.23
8	0.68	0.22	0.09
9	0.45	0.19	0.36
10	-	-	-
11	0.71	0.25	0.05
12	0.55	0.23	0.21

Overall means			
Age	Cognition	Desire	Emotion
6	0.59	0.25	0.13

7	0.26	0.35	0.28
8	0.55	0.32	0.13
9	0.5	0.24	0.27
10	-	-	-
11	0.7	0.16	0.15
12	0.59	0.22	0.2
Note: MST = Mental State Term; MSS = Middle Socioeconomic Status; LSS = Low Socioeconomic Status (-) No data available for this specific subgroup			

Table 2: *MST classes over total MSTs by age in years. gender and social background.*

In general, considering all students in both social groups, the average frequency of use of cognition tokens was the highest (54%), compared to desire tokens (26%) and emotion tokens (19%).

Considering the total number of cognition tokens, no difference was found between social groups (p = .44; mean MSS = 0.51; SD = 0.07 and mean LSS = 0.53; SD = 0.14). When considering cognition tokens by gender, in the LSS group (male: mean = 0.54; SD = 0.09 and female: mean = 0.54; SD = 0.14), there was no difference (p = .24); nor in the MSS group (p = .32; male: mean = 0.54; SD = 0.09; female = 0.50; SD = 0.16).

No significant difference was found between social groups in the total MST scores for desire, p = .50 (LSS: mean = 0.25; SD = 0.06 and MSS: mean = 0.27; SD = 0.05). Comparing by gender, no differences were found in either group: for LSS p = .06 (male: mean = 0.25; SD = 0.11 and female: mean = 0.25; SD = 0.10); for the MSS group p = .25 (male: mean = 0.28; SD = 0.06 and female: mean = 0.26; SD = 0.05).

There was no significant difference between social groups for the MST scores regarding emotion tokens, p = .40 (LSS: mean = 0.20; SD = 0.07 and MSS: mean = 0.24; SD = 0.06). The difference between genders was significant (p = .01) in the MSS group (male: mean = 0.20; SD = 0.14 and female: mean = 0.23; SD = 0.08) with a higher mean in the female subgroup, but not in the LSS group, p = .31 (male: mean = 0.21; SD = 0.06 and female: mean = 0.20; SD = 0.13).

Types analysis

To obtain a measure of lexical diversity, total number of cognition, desire and emotion MST types over total types were calculated for each transcription and arithmetic means were calculated by age and socioeconomic group. Based on this, statistical tests were conducted to determine if there were significant differences between the LSS and MSS groups.

Significant intergroup differences were found in all three cases. For cognitive expressions, the p-value was .04; LSS group: mean = 6.71; SD = 3.77 and MSS group: mean = 12.3; SD = 5.06; with higher means in the LSS group. The production of these expressions starts from an average of approximately 5 different types of expressions at age 6 in both groups, and increases progressively in the MSS group to between 15 and 20 types of cognitive expressions at age 12. In the LSS group, the increase in diversity is slower and does not exceed 15 different words around age 12 (Figure 2).
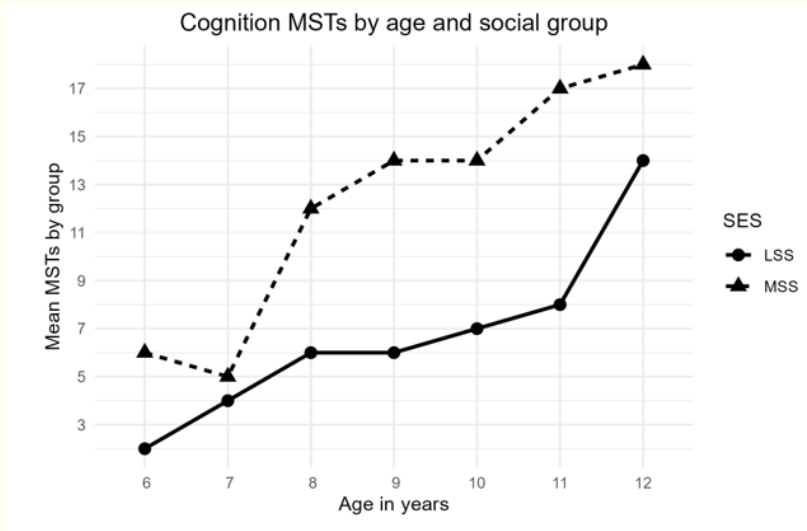
Figure 2

In the case of desire MSTs (p = .03); LSS group: mean = 3.0; SD = 0.82 and MSS group: mean = 4.86; SD = 2.54; with higher means in the MSS group. Both social groups start at age 6 using an average of 2 different desire expressions, then maintain similar productions until age 10. At age 11, the variety of desire MSTs increases markedly in the MSS group, reaching values close to 10 different words, while in the LSS group, the average does not exceed 4 different MSTs (Figure 3).
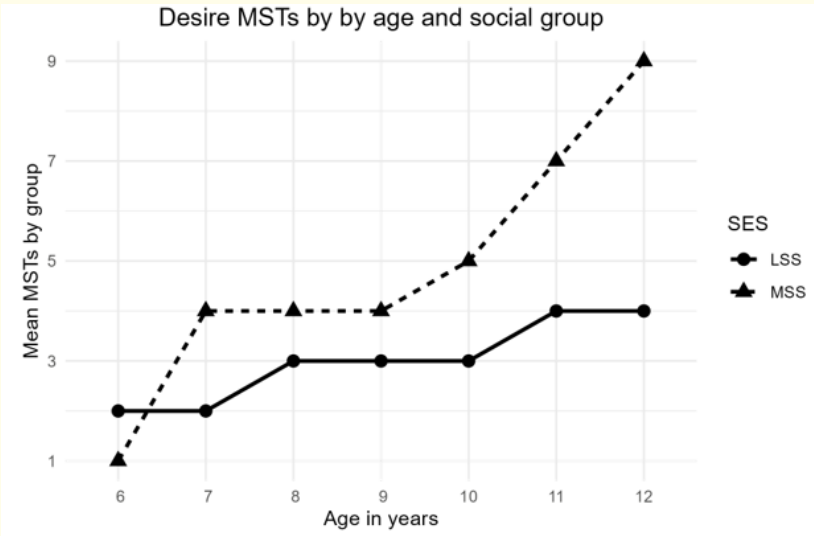

Figure 3

Regarding the emotion MSTs (p = .005); LSS: mean = 4.71; SD = 2.21 and MSS: mean = 13.6; SD = 6.45; here too with higher means in the MSS group. The diversity in the production of these MSTs is similar up to age 9, from then on the MSS group experiences a marked increase to about 10 different MSTs, while LSS children do not exceed an average of 4 (Figure 4).
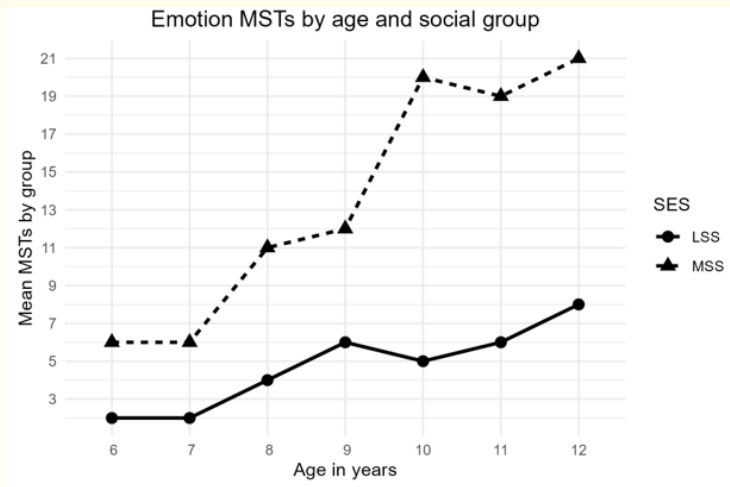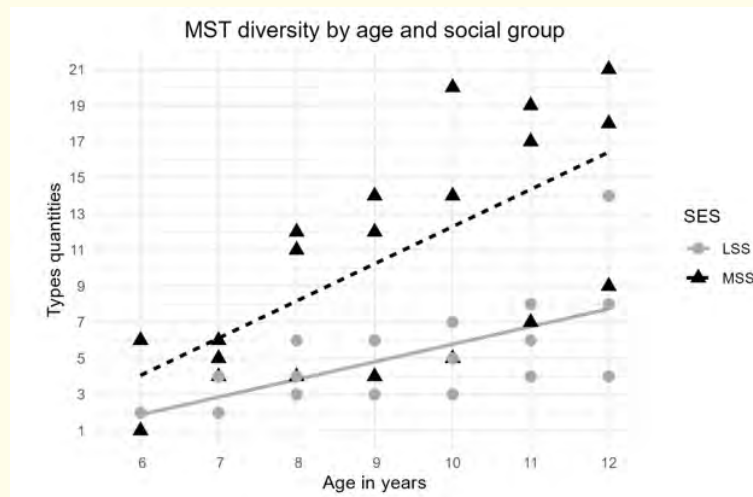

Figure 4

Finally, to verify whether socioeconomic status and age have a significant effect on the diversity of students' mentalistic vocabulary, a multiple linear regression analysis was carried out considering the mean proportions of types by type, by age, and by social group. The results are presented in table 3 and figure 5.

MST diversity produced by schoolchildren (n = 60)				
	β	SE	t	p
Intercept	-14.28	3.13	-4.56	< 0.0001
Age	1.52	0.28	5.33	< 0.00001
SES	5.43	1.14	4.76	< 0.00001
R^2 (adjusted) = 0.5; Multiple Correlation Coefficient = 0.7				

Table 3

These results suggest that both age and socioeconomic status have a significant impact on the psychological vocabulary used by the participants in the sample. The relative weight of the variables under study is shown in figure 5.

Figure 5

Discussion

The main goal of this study was to analyze the characteristics of token production in schoolchildren and to evaluate the potential impact of socioeconomic factors.

Considering all schoolchildren from both social groups, the frequency of use (tokens) of cognition tokens was the highest (54%) compared to desire tokens (26%) and emotion tokens (19%). These results contrast with those of studies involving younger children (between 2 and 5 years old), in which a higher frequency of use was observed for desire tokens compared to those of cognition and emotion [1,9]. This may be related to a developmental sequence tied to the developing capacities characteristic of these ages. Desire tokens appear earlier in preschool speech because they are instrumental in nature, allowing the child to modify a state of affairs by 'wanting something' in a given context. Thus, the properties of desire MSTs enable their use in different contexts and therefore result in a higher frequency of use. Conversely, terms related to cognition and emotion (which are in turn linked to desires and beliefs) imply a representational use, since they describe internal states and tend to explain reality by appealing to these states. Therefore, it has been suggested that cognition and emotion MSTs in preschoolers tend to be cognitively more demanding and used in more complex and specific situations than desire MSTs [3,9]. Coincidentally, it has been observed that mothers tend to initially expose their children to emotion and desire terms, and that later, around age three, they begin to refer more frequently to the cognition of different people [17]. Furthermore, ToM related to cognition appears to mediate emotional-related mental processing, along with the development of empathy, as it allows for reasoning about the intentions of actors in events that affect them [20]. It has also been noted that a child's entry into school usually implies a significant expansion of the size of the social group in which they can interact and an increase in social interactions. Correlations exist between the size of an individual's social network and the size of cortical areas related to ToM, as well as the individual's own ToM competence [21].

In contrast to this scenario with young children, the greater frequency of cognition tokens used by older children in this study may be linked to the broader process of vocabulary acquisition in general, its close connection to cognitive and social development upon entering school, and the development of syntax and pragmatic skills [22]. Additionally, interviews being conversational, require speakers to position themselves regarding what they know or don't know, or about the knowledge of others mentioned. This could influence the overall volume of MSTs and the preponderance of cognition MSTs in the corpus.

On the other hand, no significant difference was found in the total number of MST tokens produced by schoolchildren from homes with different social contexts. Both social groups, as they aged (Figure 1), showed a similar developmental profile, with MST tokens used at approximately 20% of content word (noun) production between the ages of 6 and 11. From this age onwards, a marked increase was observed, reaching values close to 40%. This considerable volume of MST tokens is directly related to the type of interview interaction and the nature of the elicitation tasks (narratives, descriptions, everyday questions), which inherently require reference to mental states, including responses that explicitly demonstrate knowledge or lack thereof within the context of the interaction.

These results suggest that socioeconomic conditions do not appear to have an impact in the volume of MST produced. The intergroup parity in MST usage frequencies may be due to the method employed in this study, which considers mentalistic expressions from lists emerged from the analysis by researchers of the participants' own productions instead of counting terms according to a pre-existing list. The study was based on the premise that mental states can manifest in diverse ways depending on children's linguistic realities and the social interactions in which they participate. As observed in the sample data, both groups use a similar volume of MSTs consistently over time, and at age 11, setting aside individual differences, they experience a sharp increase. They do so with the terms they know and use in their respective environments.

Regarding gender differences in MSTs use, the study reveals a similarity between boys and girls in both socioeconomic groups for the different types of MSTs analyzed. However, a significant exception stands out in the production of emotionally charged MSTs among girls in the middle socioeconomic group, who showed a considerably higher average compared to boys in the same group. This finding contrasts with that reported in [9], but aligns with previous research conducted with middle-class preschoolers, which has also shown a tendency in girls to produce a greater number of emotion MSTs [23].

One possible explanation for this gender divergence lies in the emotional regulation dynamics specific to different social groups. In this regard, Lutz's perspective [24] underscores how concepts of emotion are deeply rooted in cultural and popular theories about their interpretation and function within social interactions. Therefore, the semantic and conceptual development of these expressions must be analyzed within the context of language socialization practices. Related research explores the influence of social context on gender differences in both the expression and perception of emotions [25], as well as the processes by which children are socialized to express or inhibit certain emotions based on their gender [26]. Consequently, the higher frequency of MSTs used by middle-class girls could be attributed to specific conversational patterns characteristic of their social group.

The scenario changes with regard not to the quantity but to the lexical diversity in types of the mentalistic vocabulary on the three MST categories. There was a differentiated usage according to social group: students from marginalized urban contexts had a less varied output than their more privileged counterparts in all three types of mentalistic vocabulary (Figure 2-4).

It is worth asking why, if the total volume of words used is similar in both groups, there are marked differences in the diversity of mentalistic vocabulary. The answer may be related to certain characteristics of the social context.

According to some studies [27], children from socioeconomically disadvantaged homes show lower levels of overall oral language proficiency than children from more privileged backgrounds in measures of language comprehension and production, from early childhood through secondary school, and this gap can widen with age. Lexical diversity thus appears to be the aspect of language most sensitive to the effects of socioeconomic status. Differences in vocabulary size between children from professional families and children from working-class and low-income families have been documented, observable almost from the onset of speech and increasing with development [28]. Research conducted with preschool and early school-aged children, has highlighted the relevance of parental input as a critical factor for the acquisition and use of MSTs [8, 29]. Children from severely disadvantaged backgrounds are less exposed to

intellectual debates and receive fewer routine questions that require them to reflect on what they know and how to express this awareness [30], a skill that becomes central in formal education [31].

From a linguistic processing perspective, it is observed that around the age of six, most children demonstrate a remarkable ability to understand and produce complex linguistic structures. In this regard, syntactic processing models [32] emphasize the fundamental importance of lexical access, noting its vulnerability to the frequency and complexity of the words used. In addition to the social context, various environmental factors, considered by Blasiman and Was [33] to be more unstable, temporary, and reversible than contextual factors, can negatively impact working memory and, consequently, verbal processing. These factors include negative emotions, stress [34] and diet [35].

So far, the main finding has been that the group of schoolchildren from low socioeconomic backgrounds showed less lexical diversity in their MSTs compared to their peers from middle socioeconomic backgrounds. However, a broader interpretation of these findings, in line with previous studies by [7,37], suggests that these differences should be contextualized within sociocultural variations in language use and the dominant expectations that structure the assessment of language development.

From a traditional perspective, the lower lexical diversity of the MSTs in children from low socioeconomic backgrounds could be interpreted as a language deficit. However, this view overlooks the fact that differences in verbal production respond to distinct sociocultural norms, which do not necessarily reflect lower cognitive or communicative competence. Hoff., et al. [37] emphasize that the linguistic practices of different social groups are shaped by their own communicative needs, values, and interaction norms. In this regard, the language that develops in LSS households can differ depending on the socialization contexts, conversation patterns, and prioritized pragmatic functions in those environments, without implying a reduced capacity for children to understand or express mental states.

For example, in certain LSS environments, verbal communication may be more focused on direct instruction and pragmatic action than on the explicit verbalization of internal states. This difference is not a deficiency, but rather an adaptation to a social context where interaction often prioritizes other aspects of language. Hoff [7] has pointed out that children from bilingual or minority groups may exhibit a different linguistic repertoire than children from MSS, which can be mistakenly interpreted as a lack of development, when in reality it reflects a different and equally valid acquisition pattern within their community.

A problem related to this dominant interpretation of language development is the application of standardized tests designed based on middle-class standards. Hoff and Ribot [36] warn that these tests tend to assess language knowledge from a perspective that favors the performance of children from middle socioeconomic backgrounds, without considering the pragmatic and discursive skills developed in other contexts.

In this sense, the results of the present study can be interpreted from a broader perspective, considering that the lower lexical diversity in the mental states of children from LSS does not imply a cognitive or linguistic limitation, but rather a manifestation of the communicative practices characteristic of their environment. Instead of focusing on these differences as deficiencies, it is crucial to recognize the value of the various forms of linguistic socialization and the diverse ways in which children construct and express knowledge about mental states according to their sociocultural context. Thus, future research could focus on exploring how these children use alternative strategies to communicate internal states and how their language skills can be better assessed within their own normative frameworks, rather than being measured solely with reference to dominant standards.

Conclusion

The results of this study suggest a hierarchy in the frequency of use of MSTs, with a predominance of terms related to cognition in the analyzed school population. This aligns with developmental models that explain the early emergence of desire MSTs by their

instrumental function and the subsequent increase in MSTs related to cognition and emotion with cognitive, pragmatic, and syntactic development, consistent with previous studies [3,9]. The transition to schooling emerges as a crucial factor in this expansion, particularly for the cognition vocabulary, suggesting that the demands of the educational environment stimulate its production [22].

Regarding the impact of socioeconomic status, the results reveal a dissociation between the total number of MSTs produced, which did not differ significantly between groups, and lexical diversity, which was consistently lower in children from disadvantaged backgrounds. This disparity underscores the influence of linguistic input, corroborating previous studies that link vocabulary richness to the characteristics of the family and social environment [6,27]. However, it is important to interpret these differences in lexical diversity not as an inherent deficit, but as a reflection of differentiated discourse practices shaped by the sociocultural context. The literature on language acquisition has indicated that conversational norms and pragmatic functions of discourse vary among social groups, and that less explicit expression of mental states in certain environments does not necessarily indicate lower cognitive competence, but rather an adaptation to different styles of verbal socialization [7]. Thus, the assessment of linguistic development must adopt a perspective sensitive to these contextual variations.

Additionally, the production of MSTs, especially cognitive ones that are often embedded in complex syntactic structures, may be modulated by factors related to syntactic processing and working memory [38]. The cognitive demand of manipulating these structures suggests that working memory capacity could influence the production of certain types of MSTs. While environmental factors such as stress or nutrition can affect language processing [34,35], their impact must be considered in interaction with the child's sociocultural conditions [39].

In summary, this study reinforces the need to adopt a multidimensional perspective to understand the development of mentalistic vocabulary, considering both the evolutionary trajectory inherent in linguistic and cognitive development and the shaping influence of socioeconomic context and associated discourse practices. The higher frequency of cognition MSTs in schoolchildren highlights the role of the educational environment, while differences in lexical diversity according to socioeconomic status underscore the importance of linguistic input. Following Hoff and Ribot [36], future research should explore in greater detail the dynamics of family and school interactions in the acquisition and use of MSTs, and develop assessment methodologies that more equitably capture linguistic competencies across diverse sociocultural groups.

Conflict of Interest

The researchers have no conflict of interest related to the subject of research.

Bibliography

1. Bartsch Karen and Henry M Wellman. "Children talk about the mind". Oxford university press (1995).

2. Jenkins Jennifer M., *et al*. "A longitudinal investigation of the dynamics of mental state talk in families". *Child Development* 74.3 (2003): 905-920.

3. Wellman Henry M. "Making minds: How theory of mind develops". Oxford UP (2014).

4. Dunn Judy., *et al*. "Family talk about feeling states and children's later understanding of others' emotions". *Developmental Psychology* 27.3 (1991): 448-455.

5. Bloom Howard S and Christina Weiland. "Quantifying variation in head start effects on young children's cognitive and socio-emotional skills using data from the national head start impact study". SSRN 2594430 (2015).

6. Fernald Anne., *et al*. "SES differences in language processing skill and vocabulary are evident at 18 months". *Developmental Science* 16.2 (2012): 234-248.

7. Hoff Erika. "Interpreting the early language trajectories of children from low-SES and language minority homes: implications for closing achievement gaps". *Developmental Psychology* 49.1 (2013): 4-14.

8. Ruffman Ted., *et al*. "The relation between children's and mother's mental state language and theory-of-mind understanding". *Child Development* 73.3 (2002): 734-751.

9. Rosemberg Celia., *et al*. "Una ventana a la comprensión socioemocional en la infancia: el léxico de estado mental en las interacciones en hogares de diferente grupo socioeconómico". *Revista de Psicología* 25.1 (2020): 9-19.

10. Reynolds Elizabeth., *et al*. "Mothers' and fathers' mental state talk: Ethnicity, partner talk, and sensitivity". *Journal of Marriage and Family* 82.5 (2020): 1696-1716.

11. Ebert Susanne., *et al*. "Links among parents' mental state language, family socioeconomic status, and preschoolers' theory of mind development". *Cognitive Development* 44 (2017): 32-48.

12. Ruffman Ted., *et al*. "What mothers say and what they do: The relation between parenting, theory of mind, language and conflict/ cooperation". *British Journal of Developmental Psychology* 24.1 (2006): 105-124.

13. Mcquaid Nancy., *et al*. "Maternal mental state language and preschool children's attachment security: Relation to children's mental state language and expressions of emotional understanding". *Social Development* 17.1 (2008): 61-83.

14. Hendry Carol-Anne. "Parental use of mental state language in shared book reading". Diss. University of Guelph, (2004).

15. Devine Rory T and Claire Hughes. "Family correlates of false belief understanding in early childhood: A meta-analysis". *Child Development* 89.3 (2018): 971-987.

16. MacWhinney Brian. "The CHILDES Project: Tools for Analyzing Talk". 3rd edition, Lawrence Erlbaum Associates (2000).

17. Álvarez Carolina., *et al*. "Mentalization in Chilean mothers with children aged 12 and 30 months: Relation to child sex and temperament and family socioeconomic status". *Journal of Child and Family Studies* 28.4 (2019): 959-970.

18. Shatz Marilyn., *et al*. "The acquisition of mental verbs: A systematic investigation of the first reference to mental state". *Cognition* 14.3 (1983): 301-321.

19. InfoStat, Infostat. Versión 2008. Manual del Usuario. Editorial Brujas (2008).

20. Sapolsky Robert M. "Behave: The biology of humans at our best and worst". Penguin (2017).

21. Powell Joanne., *et al*. "Orbital prefrontal cortex volume predicts social network size: an imaging study of individual differences in humans". *Proceedings of the Royal Society B* 279.1736 (2012): 2157-2162.

22. Tolchinsky Liliana. "The nature and scope of later language development". Language Development Across Childhood and Adolescence (2004): 233-247.

23. Fivush Robyn., *et al*. "Gender differences in parent-child emotion narratives". *Sex Roles* 42.3-4 (2000): 233-253.

24. Lutz Catherine A. "Unnatural emotions: Everyday sentiments on a Micronesian Atoll & their challenge to Western theory". University of Chicago Press (1988).

25. Feldman Barrett Lisa. "How emotions are made: The secret life of the brain". Houghton Mifflin Harcourt (2017).

26. Zahn-Waxler Carolyn., *et al*. "Disorders of childhood and adolescence: gender and psychopathology". *Annual Review of Clinical Psychology* 4.1 (2008): 275-303.

27. Huttenlocher Janellen., *et al*. "Sources of variability in children's language growth". *Cognitive Psychology* 61.4 (2010): 343-365.

28. Hart Betty and Todd R Risley. "Meaningful differences in the everyday experience of young American children". Paul H. Brookes (1995).

29. Le Sourn-Bissaoui Sandrine and Michel Deleau. "Discours Maternel et Compréhension des États Mentaux Émotionnels et Cognitifs à 3 Ans". *Enfance* 53.4 (2001): 329-348.

30. Neitzel Carin and Anne Dopkins Stright. "Mothers' scaffolding of children's problem solving: establishing a foundation of academic self-regulatory competence". *Journal of Family Psychology* 17.1 (2003): 147-159.

31. Meloth Michael S and Paul D Deering. "The role of the teacher in promoting cognitive processing during collaborative learning". Cognitive perspectives on peer learning. Routledge (2014): 235-255.

32. Corrêa Letícia MS and Marina RA Augusto. "Computação lingüística no processamento on-line: soluções formais para a incorporação de uma derivação minimalista em modelos de processamento". *Cadernos de Estudos Lingüísticos* 49.2 (2007): 167-183.

33. Blasiman Rachael N and Christopher A Was. "Why is working memory performance unstable? A review of 21 factors". *Europe's Journal of Psychology* 14.1 (2018): 188-231.

34. Visu-Petra Laura., *et al*. "Effects of anxiety on memory storage and updating in young children". *International Journal of Behavioral Development* 35.1 (2011): 38-47.

35. Green Michael W., *et al*. "Impairments in working memory associated with naturalistic dieting in women: no relationship between task performance and urinary 5-HIAA levels". *Appetite* 40.2 (2003): 145-153.

36. Hoff Erika and Krystal M Ribot. "Language development: Influence of socio-economic status". (2015): 324-328.

37. Hoff Erika., *et al*. "Social contexts and language development: past, present and future". Language Development: Individual Differences in a Social Context (2022): 23-40.

38. Montgomery James W., *et al*. "Working memory and specific language impairment: an update on the relation and perspectives on assessment and treatment". *American Journal of Speech-Language Pathology* 19.1 (2010): 78-94.

39. Obradović Jelena. "Physiological responsivity and executive functioning: implications for adaptation and resilience in early childhood". *Child Development Perspectives* 10.1 (2016): 65-70.

Volume 18 Issue 1 January 2026