Children's expression of emotional and cognitive mental states in their story generation from pictures

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The ability to tell stories requires an understanding of linguistic, cognitive, and social domains (Tager-Flusberg & Sullivan, 1995). An effective narrator not only has to structure the story in an intelligible way so that the listener understands the setting, characters, events, and outcomes of the story (Rumpf, Kamp-Becker, Becker, & Kauschke, 2012), but also needs to consider the perspectives of the characters in order to explain their motivations and reactions (Stein & Glenn, 1979). Models of story knowledge such as Story Grammar attempt to capture information that adults and children consider important to include in stories; this model has been used clinically describe and measure children's knowledge of stories (Schneider, Hayward, & Dubé, 2006). Children frequently omit story grammar units that involve characters' thoughts and feelings, such as internal responses and plans (Hughes, McGillivray, & Schmidek, 1997). However, even very young children will describe thoughts and emotions in their personal narratives (Peterson, 2010). It is possible that children may express their understanding of characters' thoughts and feelings in more indirect ways, for example, through the use of *mental state terms*, which are words that describe the internal feelings and thoughts of others. Mental state terms can be divided into subcategories, such as emotional terms ("happy," "sad," "feel") and cognitive ones ("think," "remember," "know"). Understanding and use of mental state terms in language tasks show a developmental progression (Leonard & Sheldon, 1985; Hughes & Dunn, 1998) .The use of mental state language in narratives would indicate an understanding of characters' feelings and thoughts and that characters can have different perspectives on the same event. Narratives have been used to compare the difference in mental state term use between monolingual and bilingual children of different languages (Fuste-Herrmann, Silliman, Bahr, Fasnacht, & Federico, 2006) and between children with and without language impairment (Johnson, Miller, & Tallal, 2001) and cognitive delay (Rumpf et al, 2012). An investigation of mental state terms in typically developing children's stories across a range of ages could shed light on the development of children's expression of the feelings and thoughts of fictional characters.

There is some evidence to suggest that the patterns of acquisition for different types of mental state terms are different for emotional and cognitive subtypes. Longitudinal studies have revealed a developmental progression in the type of mental state language children use in spontaneous speech, with mental state verbs that refer to the emotional, volitional, and perceptual states of others emerging before those referring to cognitive states (Bretherton & Beeghly, 1982). Rumpf et al. (2012) found that school-aged children with Asperger Syndrome used less cognitive mental state language during storytelling compared to typically developing controls, but no difference was observed in their use of emotional mental state language. Considering this evidence, it seems likely that typically developing children use different subtypes of mental state language in their narratives at different times in development.   The aim of the current study is to investigate the relationship between age

and mental state terms in stories told by 4-9-year-old children with typical development, and whether there are different developmental patterns for cognitive and emotional mental state terms.

Methods

Participants were drawn from a sample of 300 typically developing children from 4 to 9 years old who comprise the normative sample of the Edmonton Narrative Norms Instrument (ENNI; Schneider, Dubé, & Hayward, 2005). The ENNI stimuli consist of 2 sets of wordless picture series, each with three levels of length and complexity, which are presented in a story generation task. The stories depict situations involving opportunities for describing cognition and emotional responses of the characters. Children in the normative sample were shown each picture set and asked to tell a story based on the pictures to the examiner, who could not see the pictures. Sessions were audio recorded, and the children's stories were transcribed in Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2012) format.

Transcripts were selected from the ENNI database from children aged 4-9 (10 per age group, typically developing, equal numbers of boys and girls at each age). A list of all words used in the entire ENNI database was first generated using SALT. The list was then examined and all cognitive and emotional mental state terms were identified. These words were put into two lists, one for cognitive words and the other for emotional, which were used to generate lists of each type of word in the subsample of participants. The generated lists were examined to verify that the words were used as mental state terms in the subsample. The four researchers who verified the words met and discussed questionable items and decided on inclusion and exclusion by consensus. Reliability of the final scoring was conducted on 20% of the data. Word-by-word agreement was 97%.

Results

To examine relationships between age and the two types of mental state terms, we conducted two tests of bivariate regression with age as the predictor variable and cognitive and emotion mental state terms as the criterion variables. A significant model emerged for number of emotion words, adjusted R^2 = .249, F (2, 57) = 20.613, p < .001. The Beta for age was .512, p < .001. In contrast, number of cognitive mental state terms did not predict age, adjusted R^2 = -.13, F = .27, p = .605; Beta = -.068, p = .605. The figures below illustrate the relationships between age and emotional and cognitive words respectively. Children aged 4-9 used some emotion and cognitive terms to describe characters' mental states, but only emotional terms increased with age. Thus, children do appear to develop in their expression of characters' feelings in stories using mental state terms throughout this age range, but do not increase in their expression of characters' thoughts during this period.

No. of Emotional State Words

No. of Cognitive State Words
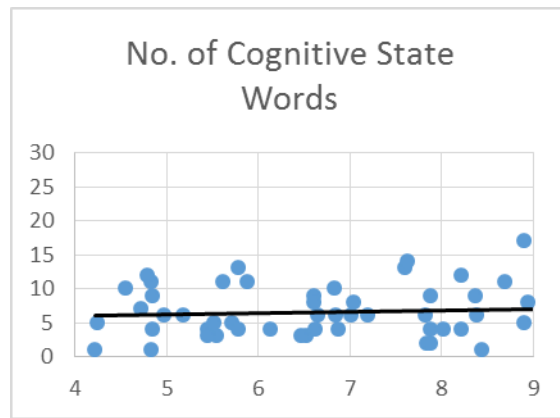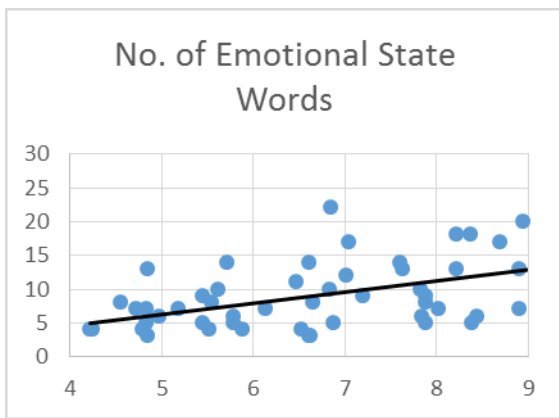
Discussion

Children in our sample used more emotion words with age, while cognitive words did not increase. A graph showing use of the two mental state word types by age group is shown below. We have also included data from a group of 10 adults who retold the ENNI stories; these data indicate greater use of both types of words as compared to children. This suggests that cognitive words do undergo development in older childhood or adolescence. Future research should be directed to this age range in order to capture development of cognitive mental state words.
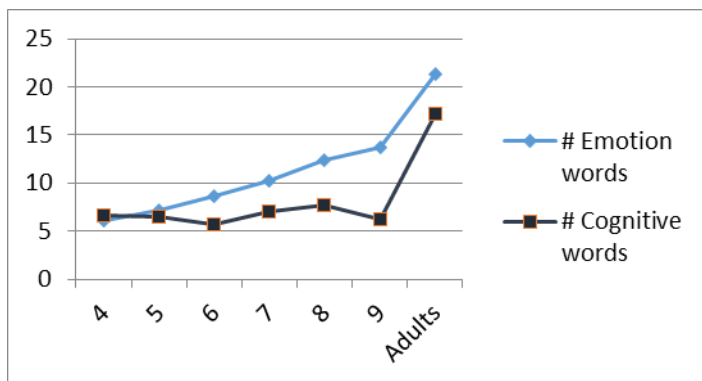
Conclusion

It is important to distinguish between emotion and cognitive mental state terms. Given the lack of development in the use of cognitive terms in this storytelling context, it is possible that we would not find a difference between children with and without language impairment in cognitive terms, but we might find a difference in emotion words. To understand children's use of mental state terms, it is necessary to look at the terms separately.

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