Intact but Atypical Lexical and Syntactic Alignment in Spontaneous Speech of Children with Autism Spectrum Disorder

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What is Conversational Alignment, and How Can We Measure It?

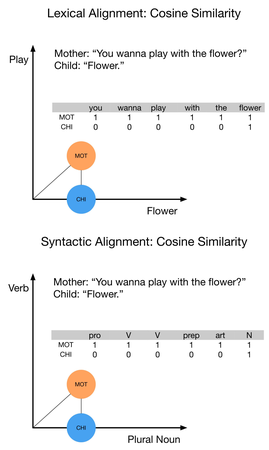

Figure 1: Edmund C. Tarbell, "Marjorie and Little Edmund"

Conversational Alignment is the re-use of an interlocutor's words and syntax, and helps establish common ground (Clark and Brennan 1991). We calculated alignment in turn-by-turn utterances in the conversations of 67 parent-child dyads over 2 years (approx. ages 2-4).

What Predicts Whether Children Align With Parents' Utterances?

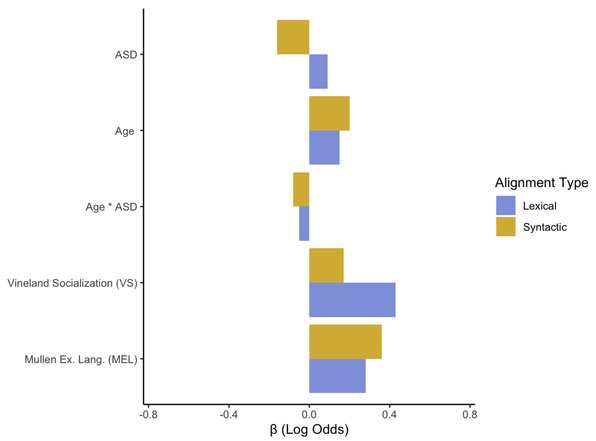

Figure 2: Factors influencing liklihood of child aligning any tokens

Older children aligned more often, although less so in children with ASD. VS and MEL scores were the best predictors of children producing an utterance with aligned tokens.

What Does Alignment Actually Look Like?

Table 1: Lexical Alignment

Speaker	Utterance	Cosine Similarity
CHI	I want the new balloon	0.3779645
MOT	there you go ready say thank you Rose	0.0000000
CHI	thank you Rose your chips are empty	0.5270463
MOT	Kevin look look what I'm gonna do	0.1005038

Table 2: Syntactic Alignment

Speaker	Utterance	Cosine Similarity
MOT	where did it go you gonna find it AR look where is it turn around where's the balloon	0.5533986
CHI	where is it	0.6250000

What Predicts Exact Repetition of Parents' Utterances?

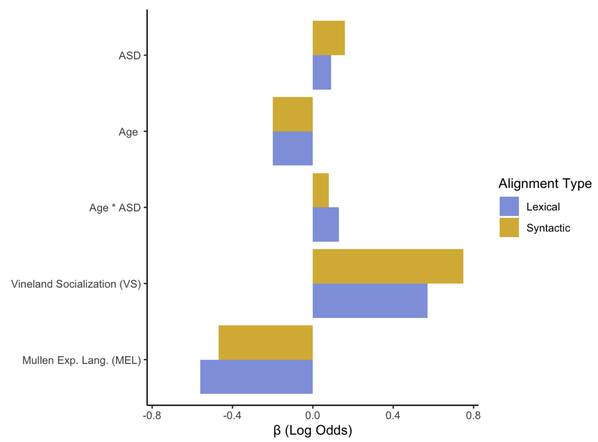

Figure 3: Factors influencing liklihood of child aligning all tokens

Older children were less likely to produce an exact repetition of their parent's utterance, although this was less so in children with ASD. High scores on VS predicted exact repetition positively, while high scores on MEL predicted exact repetition negatively.

What Predicts the Level of Partial Alignment?

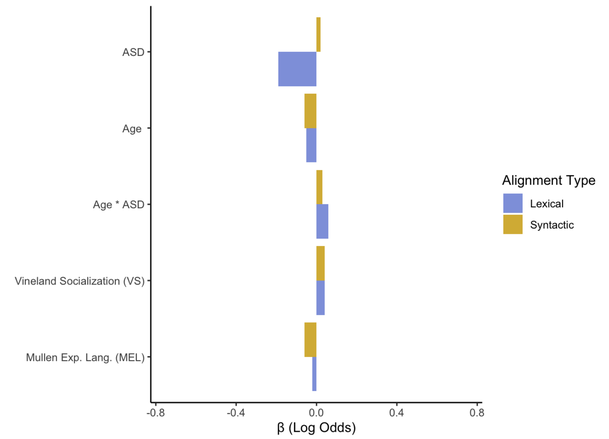

Figure 4: Factors influencing amount partial alignment

Older children aligned less, and chldren with ASD produced fewer aligned lexical tokens than TD children.

Conclusion and Next Steps

Children with ASD do align lexically and syntactically, but show a slightly different pattern than TD children. An important next step will be to take a closer qualitative look at the exchanges between parents and children, to see *what* sort of tokens they align, and under what circumstances. Another important step will be to assess children's alignment measures as a predictor of later language outcomes.

Technical details

Cosine similiarity (CS) was calculated using the ALIGN Python library (Duran, Paxton, and Fusaroli 2019). We used a Bayesian multilevel zero-and-one-inflated beta regression approach, which models alignment as a distribution with three parameters, accounting for the propensity of children to align at all (CS = 0), exact repetitions (CS = 1), and the number of linguistic forms aligned on average when the children actually align (CS > 0 < 1), as a function of diagnostic group, age (visit), Vineland Socialization, Mullen Expressive Language and Mullen Visual Reception.

References

Clark, Herbert H, and Susan E Brennan. 1991. "Grounding in Communication." American Psychological Association.

Duran, Nicholas D, Alexandra Paxton, and Riccardo Fusaroli. 2019. "ALIGN: Analyzing Linguistic Interactions with Generalizable techNiques—A Python Library." *Psychological Methods* 24 (4). American Psychological Association: 419.