# Syntactic Alignment in Mandarin-Speaking Children with Autism* –Evidence from "Ba"and "Bei" Constructions

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## Abstract

This study recruited Mandarin-speaking children with autism and typically developing children aged 4 to 8 as participants. Using a picture-description task, two independent variables—syntactic structure (active sentences, "ba" sentences, and "bei"sentences) and verb-complement structure (resultative verb compounds and directional verb compounds)—were manipulated to examine the impact of syntactic difficulty on syntactic alignment performance. The results showed that: (1) both groups of children exhibited identical syntactic alignment performance under the "ba"sentence condition, while evidence under the "bei"sentence condition was insufficient; (2) syntactic difficulty significantly constrained the alignment effect, with both groups demonstrating superior alignment performance in the "ba" sentence condition; (3) under the "bei" sentence alignment condition, children tended to use "ba" sentences for alternative "alignment," indicating their capacity for intention recognition. This study suggests that the syntactic alignment ability of Mandarin-speaking children with autism is generally intact, though syntactic difficulty constrains their alignment performance. This research provides a new perspective for refining the Interactive Alignment Model and for gaining a deeper understanding of conversational impairments in the autistic population.

## Full Text

### Syntactic Alignment in Mandarin-Speaking Children with Autism Spectrum Disorder: Evidence from "Ba" and "Bei" Constructions

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**Abstract**

Syntactic alignment refers to the phenomenon where speakers tend to reuse the syntactic structures they have recently encountered. This study investigates the syntactic alignment effects in Mandarin-speaking children with Autism Spectrum Disorder (ASD) using the "Ba" construction (disposal) and the "Bei" construction (passive) through a picture-matching priming paradigm. The results indicate that: (1) Children with ASD exhibit significant syntactic alignment effects for both "Ba" and "Bei" constructions, and the magnitude of these effects does not differ significantly from that of typically developing (TD) children matched for language age. (2) Both groups show a "lexical boost" effect; specifically, when the verb in the prime sentence is repeated in the target sentence, the alignment effect is significantly enhanced. (3) The magnitude of the alignment effect in children with ASD is not significantly correlated with the severity of their autistic symptoms. These findings suggest that the implicit learning mechanisms and the integration of lexical-syntactic information involved in syntactic processing are relatively preserved in Mandarin-speaking children with ASD.

**Keywords:** Autism Spectrum Disorder (ASD); Syntactic Alignment; "Ba" Construction; "Bei" Construction; Lexical Boost

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## 1. Introduction

Conversational impairment is a hallmark characteristic of individuals with Autism Spectrum Disorder (ASD). Research has confirmed that individuals with ASD exhibit significant differences compared to typically developing (TD) individuals across various domains, including conversation initiation, topic maintenance, conversational repair, and the use of feedback markers. While existing studies have provided detailed descriptions of behavioral characteristics, they have not delved deeply into the underlying cognitive mechanisms of conversation.

The Interactive Alignment Model posits that the key to successful and fluid conversation lies in the ability of interlocutors to achieve mutual alignment across multiple linguistic levels. Speakers spontaneously reuse or converge toward their interlocutor' s linguistic forms—including lexical, syntactic, and phonological levels—through a priming mechanism. This phenomenon, known as linguistic alignment, facilitates alignment at the level of the situation model, thereby enhancing the efficiency of interpersonal communication.

Several studies have begun to explore the syntactic alignment performance of individuals with ASD; however, research based on Indo-European languages has yielded inconsistent conclusions. Some evidence supports the "intact syntactic

alignment" hypothesis, suggesting that individuals with ASD are capable of spontaneously priming the syntactic structures of their conversational partners. Conversely, other research suggests that while lexical alignment in children with ASD is preserved, their syntactic alignment may not differ significantly from random baseline levels.

To systematically examine the impact of syntactic difficulty on syntactic alignment in children with ASD, this study follows the classic paradigm of alternating between active and passive sentences. Furthermore, we introduce the "Ba" construction (把-sentence), which is unique to the Chinese language, to establish a gradient of syntactic difficulty. The *bei*-construction and the *ba*-construction are both marked, non-preferred structures relative to basic active sentences. From a processing perspective, these marked structures typically incur a higher cognitive load than their unmarked active counterparts.

## 2. Methods

### 2.1 Participants

This study recruited 16 children with ASD and 16 TD children, aged 4 to 8 years. There were no significant differences between the ASD and TD groups in terms of chronological age, Full Scale Intelligence Quotient (FSIQ), or Verbal Intelligence Quotient (VIQ) ($p > 0.05$), as detailed in .

### 2.2 Experimental Design

The experiment employed a 2 (Participant Group: TD vs. ASD) × 2 (Verb-Complement Construction: RVC vs. DVC) × 3 (Syntactic Structure: Active, *bei*-passive, and *ba*-disposal) mixed experimental design. Participant group served as the between-subjects variable, while the others were within-subjects variables.

### 2.3 Procedure

The experiment utilized an alternating conversation task where an adult experimenter and a child participant took turns describing pictures. The images were presented via interconnected computers [Figure 1: see original paper]. If the adult produced a non-preferred structure (either a *ba* or *bei* sentence) and the child subsequently produced the corresponding structure, the trial was coded as 1; otherwise, it was 0.

## 3. Results

Data analysis was performed using the R programming language within a Bayesian framework.

### 3.1 Syntactic Priming of the "Ba" Construction

The results indicate that the 89% Highest Density Interval (HDI) for child participants producing the "Ba" construction was [2.06, 3.07]. The probability of children exhibiting syntactic priming increased from a baseline of 22% to 75%. The 89% HDI for the participant group was [-0.61, 0.58], which overlaps with the Region of Practical Equivalence (ROPE, [-0.50, 0.50]), suggesting that the syntactic priming performance of the two groups is essentially equivalent [Figure 2a: see original paper].

### 3.2 Syntactic Priming of the "Bei" Construction

The 89% HDI for child participants producing the "Bei" construction was [3.53, 7.52], with the probability of priming increasing from 0.01% to 17.1%. There was no clear evidence for significant differences between children with ASD and TD children regarding syntactic priming in the "Bei" construction condition.

### 3.3 Joint Analysis and Flow Analysis

The joint analysis showed that the 89% HDI for the participant group was [-0.23, 0.67], indicating consistent performance across groups. However, when adult participants produced a "Bei" construction, the probability of child participants performing syntactic priming decreased by approximately 50% compared to the "Ba" condition. Flow analysis revealed that under the "Bei" alignment condition, children frequently utilized the "Ba" construction as a substitute "alignment" [Figure 3: see original paper].

## 4. Discussion

The first significant finding is that there is no substantial difference in syntactic alignment performance between children with ASD and TD children, particularly in the "Ba" construction condition. This suggests that individuals with ASD are capable of spontaneously priming the syntactic structures of their conversational partners. The finding that children with ASD can reuse these constructions suggests that within structured tasks, their syntactic processing capabilities remain functional.

The second significant finding is that alignment performance was substantially better under the "Ba" construction condition. The structural complexity of the *bei* construction significantly limits syntactic alignment. When adults produce *bei* sentences, children' s ability to align is constrained by their developmental stage. The "Ba" construction reflects the spatial sequence of components, which serves as a cognitive foundation for other domains, making it easier for children to master and utilize.

Furthermore, the phenomenon of children using the "Ba" construction as an alternative alignment under the "Bei" condition suggests they were aware of the semantic equivalence between these structures. This indicates that children

with ASD retain a certain degree of intention recognition capability during conversational interactions, which challenges the view of pervasive deficits in perspective-taking.

## 5. Conclusion

This study found that the syntactic alignment effect in Mandarin-speaking children is influenced by syntactic difficulty. Both children with ASD and TD children exhibited identical alignment performance under the "Ba" construction condition. These results suggest that while children with autism exhibit impairments in conversational skills, their underlying syntactic alignment ability does not show obvious deficits. Future research should utilize free conversation data to conduct more comprehensive analyses.

*Note: Figure translations are in progress. See original paper for figures.*