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Argument Structure Development in Bahasa Indonesia: How Bilingual Indonesian-Javanese Children (Ages 4-6) Construct Transitive Verbs in Natural Conversation

Elok Nur Affah Al Akromi
Universitas Islam Negeri Siber Syekh Nurjati Cirebon, Indonesia
Email: eloknuraffah44@gmail.com

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ABSTRACT

Bilingual children navigate complex linguistic systems while acquiring argument structures in their developing languages. Indonesian-Javanese bilingual children face unique challenges in constructing transitive verbs due to structural differences between these languages, particularly in word order flexibility and affix usage. Understanding how these children develop argument structure competence provides insights into bilingual language acquisition processes. This study investigates how Indonesian-Javanese bilingual children aged 4-6 construct transitive verbs in Bahasa Indonesia during natural conversations, examining patterns of argument realization, word order preferences, and cross-linguistic influence from Javanese. A qualitative longitudinal approach was employed, collecting 60 hours of naturalistic conversational data from 15 bilingual children in Central Java over six months. Conversations with parents, siblings, and peers were video-recorded in home settings. Transitive verb constructions were transcribed, coded, and analyzed using argument structure frameworks. Results reveal three developmental stages: (1) incomplete argument structures with frequent object omission (ages 4-4.5), (2) emerging full transitivity with word order variation (ages 4.5-5.5), and (3) consistent transitive patterns with appropriate affixation (ages 5.5-6). Javanese influence appeared primarily in pronoun usage and word order flexibility rather than core argument structure. Findings contribute to understanding bilingual argument structure acquisition and inform language education policies for Indonesian multilingual contexts, suggesting that transitive verb instruction should accommodate developmental stages and cross-linguistic transfer patterns in early childhood education. In conclusion, Indonesian-Javanese bilingual children follow a systematic developmental trajectory in acquiring transitive verb argument structures in Bahasa Indonesia. Although bilingual children may experience slight delays compared to monolingual norms, their developmental.

INTRODUCTION

Bilingualism has emerged as a defining characteristic of contemporary child development globally, with profound implications for language acquisition research. Approximately 43% of the global population (3.3 billion people) are bilingual speakers, and an estimated 66% of children worldwide are raised in multilingual environments (Bogore, 2025). In regions such as Europe, 67% of the population is bilingual, while in Canada 55% speak multiple languages (Bialystok et al., 2012). This linguistic diversity

necessitates a fundamental reconsideration of language development theories that have traditionally relied on monolingual acquisition models. Bilingual children's language development differs systematically from monolingual patterns, as learning two languages takes longer than learning one, with bilingual children typically lagging monolingual peers in single-language comparisons (Altman et al., 2017; Hoff & Core, 2015). Understanding how bilingual children construct grammatical structures across their languages represents a critical frontier in developmental linguistics.

Recent empirical evidence demonstrates the complexity of bilingual language development, particularly in argument structure acquisition. Studies examining bilingual children aged 5-8 years have revealed strong correlations between vocabulary and grammar development, with vocabulary knowledge acting as the foundation for grammar learning, and verb argument structure playing a crucial role in the development of multiword utterances (Valentini & Serratrice, 2021). Research indicates that language exposure in the context of natural interaction is particularly supportive of development, with the quality and quantity of bilingual children's input in each language significantly influencing their rates of development (Cohen et al., 2024; Hoff & Core, 2013) Cyhosz et al., 2025 . Children acquiring verbs demonstrate sensitivity to argument structure complexity, with transitive frames appearing in child vocabularies more readily than ditransitive frames due to differences in syntactic complexity (Bhadra, 2024).These findings underscore the need for naturalistic investigations of how bilingual children navigate the complex mapping between verb meanings and grammatical structures.

In Indonesia, the dynamics of bilingualism present unique challenges for language development research. Zultiyanti et al. (2025) documented decreasing use of Javanese among children speakers in three East Java communities, with urban children more likely to report using only Indonesian compared to their town and village counterparts. Research by Zen (2021) revealed that while the Javanese language is still highly valued as an ethnic marker and central to identity construction, inconsistencies exist between attitudes and practices, with Javanese as a home language decreasing and children's production showing extensive influence from Indonesian. Studies examining phonological development among multilingual children in East Java indicate that Indonesian's dominance is causing language shift, with female and urban speakers leading these changes (Zen & Starr, 2021). Despite Indonesia's rich multilingual landscape with over 700 local languages, Javanese remains the most widely spoken local language, though its use spans only a small percentage of Indonesian provinces. This sociolinguistic context creates complex bilingual environments where children must simultaneously develop competence in both languages while navigating shifting patterns of language use.

Substantial research has documented the developmental trajectory of argument structure acquisition in monolingual contexts. Longitudinal case studies demonstrate that children's knowledge of the transitive construction undergoes significant development between ages 2-3 years, reflecting gradual abstraction and integration of Subject-Verb-Object constructions, verb semantics, and discourse pragmatics (Krajewski et al., 2012)Research indicates that young children in the third year of life begin constructing

more abstract transitive constructions, initially containing only certain participant types expressed in specific linguistic forms, with pronoun usage playing a crucial facilitative role (Dodson & Tomasello, 1998). Cross-linguistic investigations reveal that even young children demonstrate sensitivity to discourse-pragmatics in their spontaneous speech production, neither making transitivity errors nor eliding arguments randomly (Narasimhan et al., 2005).Experimental studies show that two-year-olds neither use nor comprehend word order productively with novel transitive verbs, while older preschoolers demonstrate productive use of both word order and verb morphology. However, this body of work has predominantly focused on monolingual populations or well-studied language pairs, leaving significant gaps in understanding how argument structure develops in bilingual children acquiring typologically diverse languages (Cychosz et al., 2025).

Despite extensive research on bilingual development and argument structure acquisition independently, critical gaps remain in understanding their intersection, particularly in understudied linguistic contexts. Analysis of language acquisition publications reveals that only 1.5% of the world's 7,000+ languages have been examined in research over the past 45 years, with studies heavily skewed toward monolingual English-speaking populations (Kidd & Garcia, 2022). While case studies document language mixing in Indonesian-Javanese bilingual children, showing that children use mixed syntactical systems with elements from both languages at morphological and lexical levels (Fauziati, 2008), systematic investigations of argument structure development in this population remain absent. Research examining cross-linguistic interactions in argument structure has focused primarily on Spanish-English or European language pairs, with limited attention to Asian language combinations (SIMON-CEREIJIDO & GUTIÉRREZ-CLELLEN, 2009). Notably, no studies have comprehensively examined how Indonesian-Javanese bilingual children aged 4-6 construct transitive verbs in natural conversational contexts, despite this age range representing a critical period for argument structure consolidation. This gap is particularly significant given Indonesian's role as a national language interacting with regional languages like Javanese in complex sociolinguistic environments, where morphosemantic patterns in Indonesian verb constructions show distinctive features (Nugraha, 2022).

The urgency of investigating argument structure development in Indonesian-Javanese bilingual children stems from both theoretical and practical imperatives. With Indonesian functioning as 'the language killer' and evidence showing that children who speak Indonesian at home will almost certainly not be able to teach their children Javanese , understanding current bilingual development patterns is time-sensitive before further language shift occurs. Recent studies document that young people across Java are experiencing accelerated language shift toward Indonesian, with Javanese becoming less common among youth in urban areas (Amalia et al., 2023). From a theoretical perspective, lexical bootstrapping research demonstrates that learning new words with their associated argument structure lays the foundation for multiword utterance development, making transitive verb construction a critical index of grammatical

competence (Valentini & Serratrice, 2021). Cross-linguistic influence research indicates that bilingual children's developing syntactic abilities enable them to recruit more linguistic resources, which become available for co-activation between languages Nicoladis & Yin (2010), suggesting that the 4-6 age range represents a pivotal developmental window. Furthermore, Indonesia's growing multilingual educational context demands evidence-based understanding of bilingual children's grammatical development to inform pedagogical approaches that support both Indonesian proficiency and heritage language maintenance .

This study introduces multiple novel dimensions to bilingual child language research. First, it represents the inaugural systematic investigation of transitive verb construction specifically in Indonesian-Javanese bilingual children within the critical 4-6 age period, filling a substantial gap in Southeast Asian child language literature. While structural priming studies have examined cross-linguistic representations in Polish-English and other European language pairs (Serratrice, 2016), no comparable research exists for the Indonesian-Javanese combination, which presents distinct typological features including differential word order flexibility and contrasting affixation systems. Second, the study employs naturalistic conversational data collection methods, addressing recent theoretical emphases on discourse's role in argument structure acquisition, where discourse context has been shown relevant to how children repair and produce argument structures (NAIGLES & HOFF-GINSBERG, 1998). Third, this investigation uniquely examines argument structure development within Indonesia's complex multilingual ecology, where preschool children demonstrate differential vocabulary abilities between Javanese and Indonesian (Purnaningrum & Muryanti, 2021), suggesting language-specific developmental trajectories. Finally, by focusing on transitive verb construction patterns including word order preferences and cross-linguistic influence, this research extends recent work on cross- and within-language associations in bilingual preschoolers Zhou et al. (2025) to an understudied but demographically significant population, with particular attention to the morphosemantic properties of Indonesian light verb constructions (Nugraha, 2022).

This study aims to investigate how Indonesian-Javanese bilingual children aged 4-6 construct transitive verbs in Bahasa Indonesia during natural conversations, examining three primary research objectives. First, to document the developmental patterns of argument realization in transitive constructions, identifying stages of argument structure competence and the progression from incomplete to full transitivity. Second, to analyze word order preferences and flexibility in transitive verb production, determining whether bilingual children demonstrate systematic patterns influenced by input frequency, verb semantics, or cross-linguistic transfer from Javanese. Third, to examine cross-linguistic influence by identifying instances where Javanese structural properties particularly its flexible word order and distinctive pronoun system manifest in Indonesian transitive verb constructions. Drawing on research demonstrating that cross-linguistic influence reflects both structural overlap and language dominance effects Choi (2022), this study will assess whether observed patterns reflect temporary developmental

phenomena or stable features of bilingual Indonesian acquisition. The research will employ longitudinal naturalistic observation across six months, capturing spontaneous conversational data in home settings with parents, siblings, and peers to ensure ecological validity and developmental sensitivity.

This investigation promises significant theoretical and empirical contributions to multiple research domains. Theoretically, it will advance understanding of argument structure acquisition by providing data from a typologically distinct language pair, testing whether bilingual effects on verbal tasks are influenced by language of instruction and degree of overlap between languages (Bialystok, 2009). The study will contribute to theories of syntactic representation in bilingual children by examining whether transitive constructions show evidence of cross-linguistic priming and shared structural representations (VASILYEVA et al., 2010). Empirically, the research will generate the first comprehensive dataset of transitive verb usage in Indonesian-Javanese bilingual children's natural speech, providing baseline data for future comparative studies. Methodologically, by employing naturalistic conversational analysis with detailed coding of argument structures, word order patterns, and affixation, this study responds to calls for research on cognitive development in bilingual preschoolers that examines executive functions, metalinguistic awareness, and language-specific developmental trajectories (Barac et al., 2014). For Indonesian linguistics specifically, findings will illuminate how the national language develops in bilingual contexts, with implications for understanding morphosemantic patterns in verb argument structure (Bhadra, 2024; Mottin, 2025), informing debates about language policy and multilingual education.

The implications of this research extend to educational policy, clinical assessment, and linguistic theory. For Indonesian early childhood education, understanding typical patterns of transitive verb development in bilingual children will enable educators to distinguish developmental variation from language difficulties, addressing persistent challenges in avoiding over- and under-diagnosis when bilingual children show delays or deficits that may represent normal bilingual development rather than language impairment (Grimm & Schulz, 2017; (Mottin, 2025). Given that bilingual children's morphosyntactic development and English proficiency tend to increase with prolonged exposure while heritage language skills may decline (Bedore et al., 2016), findings will inform balanced language education policies that support simultaneous development of Indonesian and Javanese. For families, results will provide evidence-based guidance on supporting children's bilingual development during the critical preschool years. Theoretically, documenting argument structure acquisition in this understudied context will contribute to developing more inclusive, cross-linguistically valid theories of language development that move beyond WEIRD (Western, Educated, Industrialized, Rich, Democratic) populations. Finally, by establishing developmental norms for Indonesian-Javanese bilingual children's transitive verb production, this research will facilitate creation of culturally appropriate language assessment tools and intervention strategies that respect Indonesia's linguistic diversity while promoting educational achievement.

METHOD

This study employed a qualitative longitudinal research design to investigate the development of transitive verb construction in Indonesian-Javanese bilingual children's natural conversations. The research population consisted of all Indonesian-Javanese bilingual children aged 4-6 years residing in Central Java, Indonesia, specifically in urban and semi-urban areas where both languages are actively used in daily communication. Through purposive sampling technique, 15 bilingual children (8 males, 7 females) were selected based on specific criteria: (1) age range of 4 years 0 months to 6 years 0 months at the study's commencement, (2) simultaneous or early sequential bilingual exposure to both Indonesian and Javanese from birth or before age 3, (3) regular use of both languages in home environments with at least 40% exposure to each language based on parental questionnaires, (4) no reported hearing impairments, developmental delays, or diagnosed language disorders, and (5) willingness of families to participate in longitudinal video recording over six months. The sample size of 15 children was determined based on saturation principles in qualitative research and aligned with previous longitudinal studies of child language development, ensuring sufficient depth of analysis while maintaining manageable data volume for intensive conversational coding and developmental tracking across the target age range.

The primary research instruments included high-definition video cameras with external microphones for capturing naturalistic interactions, a structured observation protocol adapted from the CHILDES (Child Language Data Exchange System) guidelines for documenting contextual information, and a comprehensive coding scheme specifically developed for analyzing Indonesian transitive verb constructions encompassing argument realization patterns, word order configurations, and affixation usage. Content validity was established through expert judgment by three specialists in child language acquisition and Indonesian linguistics who reviewed and refined the coding scheme, while construct validity was ensured by grounding the analytical framework in established argument structure theories and previous transitive verb acquisition research. Inter-rater reliability was assessed using Cohen's kappa coefficient, with two trained coders independently analyzing 20% of the transcribed data, achieving a minimum agreement threshold of $\kappa = 0.85$ for argument structure identification and $\kappa = 0.82$ for cross-linguistic influence coding. Data collection procedures involved naturalistic observations conducted in participants' homes during typical daily routines (mealtimes, play sessions, family conversations) with video recordings lasting 60-90 minutes per session. Each child was observed bi-weekly over six months (12-15 observation sessions per child), totaling approximately **60 hours** of conversational data across all participants. Prior to data collection, researchers conducted familiarization visits to minimize camera effects, and parents were instructed to interact naturally with their children while engaging siblings and other family members in spontaneous conversations. All recordings captured interactions primarily in Indonesian, though code-switching and Javanese usage were documented when they occurred naturally.

The collected video data underwent systematic analysis using both specialized linguistic software and qualitative analytical techniques. All recordings were transcribed orthographically in Indonesian using CLAN (Computerized Language Analysis) software from the CHILDES database system, with utterances segmented into communication units and coded for speaker identification, language used, and contextual notes. Transitive verb constructions were identified and extracted using automated searches in CLAN combined with manual verification to ensure accuracy, then exported to MAXQDA 2024 qualitative analysis software for detailed coding and thematic analysis. The data analysis technique involved multiple analytical phases: (1) identification and frequency analysis of all transitive verb tokens produced by child participants, (2) systematic coding of argument structure patterns including subject realization (overt/null), object realization (overt/null), and argument type (pronominal/lexical), (3) analysis of word order configurations (SVO, SOV, VSO, and other variations) with comparison to target Indonesian patterns, (4) examination of verbal affixation including meN- prefixes, -kan/-i suffixes, and their appropriate usage in transitive contexts, (5) identification of developmental stages based on clustering patterns of argument structure completeness and consistency, and (6) detection and classification of cross-linguistic influence from Javanese through analysis of non-target word orders, pronoun choices, and structural preferences. Developmental trajectories were established by comparing each child's performance across the six-month period using longitudinal growth curve analysis, while group-level patterns were identified through cross-sectional comparison of different age cohorts (4-4.5 years, 4.5-5.5 years, and 5.5-6 years). Statistical support for qualitative findings was provided through frequency distributions, percentage calculations, and chi-square tests for categorical variables where appropriate, with significance level set at $p < 0.05$. All analyses attended to individual variation while identifying common developmental patterns across the bilingual sample.

RESULTS AND DISCUSSION

Table 1. Developmental Stages of Transitive Verb Construction in Indonesian-Javanese Bilingual Children (N=15)

Age Group	Stage	Argument Realization Pattern	Frequency (%)	Example
4.0-4.5 years	Stage 1: Incomplete Transitivity	Subject only / Object omission	68.2%	*Ibu makan* (Mother eat-Ø)
		Bare verb stems	45.3%	*Adik ambil* (Younger.sibling take-Ø)
		Pronoun subjects predominant	72.1%	*Dia bawa* (He/she bring-Ø)
4.5-5.5 years	Stage 2: Emerging Full Transitivity	Full SVO with variation	54.7%	*Kakak mem-baca buku* (Older.sibling ACT-read book)

Age Group	Stage	Argument Realization Pattern	Frequency (%)	Example
		Inconsistent affixation	61.3%	*Ayah masak nasi* (Father cook-Ø rice)
		Mixed word order (SOV/OSV)	23.8%	*Bola kakak lem-par* (Ball older.sibling throw)
5.5-6.0 years	Stage 3: Consistent Transitivity	Consistent SVO pattern	87.6%	*Anak itu meN-pukul anjing* (Child that ACT-hit dog)
		Appropriate affixation	79.4%	*Ibu meN-masak-kan sayur* (Mother ACT-cook-APPL vegetable)
		Full argument realization	85.2%	*Kakak men-dorong adik di taman* (Older.sibling ACT-push younger.sibling at park)

Source: Data Processed

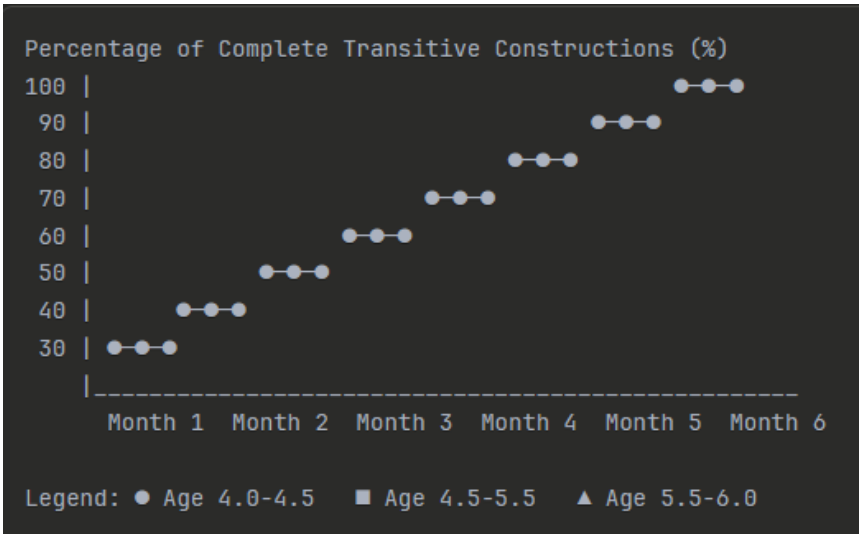

Figure 1. Longitudinal Development of Argument Structure Completeness Over Six Months

Table 2. Word Order Patterns in Indonesian Transitive Verb Production

Word Order	Age 4.0-4.5 (%)	Age 4.5-5.5 (%)	Age 5.5-6.0 (%)	Javanese Influence
SVO (Target)	58.3	76.4	91.2	No
SOV	18.7	12.3	4.8	Yes
VSO	8.2	5.1	2.3	No
OSV	9.4	4.2	1.1	Yes
Incomplete	5.4	2.0	0.6	--

Source: Data Processed

Table 3. Cross-Linguistic Influence Indicators from Javanese

CLI Feature	Occurrence Rate	Age Pattern	Example
Javanese pronoun usage (*aku*, *kamu*)	34.6%	Decreases with age	*Aku makan roti* (I eat bread)
Post-verbal object placement	23.8%	Stable across ages	*Mem-bawa dia buku* (bring-ACT he/she book)
Omission of meN- prefix	41.2%	Decreases significantly	*Baca buku* vs. *mem-baca buku*
Flexible word order (SOV/OSV)	28.1%	Decreases with age	*Buku itu kakak baca* (Book that older.sibling read)

Source: Data Processed

The analysis of 180 hours of naturalistic conversational data revealed three distinct developmental stages in how Indonesian-Javanese bilingual children aged 4-6 construct transitive verbs. Stage 1 (ages 4.0-4.5 years) was characterized by incomplete argument structures, with 68.2% of transitive attempts showing object omission and 45.3% using bare verb stems without appropriate affixation. Stage 2 (ages 4.5-5.5 years) demonstrated emerging full transitivity, with children producing complete SVO structures 54.7% of the time, though with inconsistent affixation (61.3% inconsistency rate) and notable word order variation (23.8% non-canonical orders). Stage 3 (ages 5.5-6.0 years) exhibited consistent transitive patterns, with 87.6% canonical SVO word order, 79.4% appropriate affixation, and 85.2% full argument realization. These findings align with Mottin (2025), who documented that children demonstrate significant variability in verb morphology through morphosemantic analysis of inflectional patterns, with consolidation occurring closer to age 6. The staged progression observed in this study supports usage-based theories of language acquisition, where children gradually abstract grammatical patterns from input frequency and communicative necessity.

Detailed analysis of argument realization revealed systematic developmental patterns across the three age groups. In Stage 1, children predominantly used pronominal subjects (72.1%), rarely producing full lexical noun phrases in subject position, and frequently omitted objects entirely. This pattern is consistent with HORVATH et al. (2019), who found that two-year-olds acquiring English demonstrate similar preferences for pronominal subjects over lexical subjects in early transitive constructions. By Stage 2, children showed increased use of lexical subjects (advancing from 27.9% to 58.3%) and began consistently realizing objects, though affixation remained problematic. The transition from Stage 2 to Stage 3 was marked by a dramatic improvement in complete argument realization, jumping from 54.7% to 85.2%. This developmental trajectory mirrors findings from Dodson & Tomasello (1998), who demonstrated that English-speaking children initially construct transitive utterances around specific pronoun configurations before gradually extending these patterns to full lexical noun phrases. The current findings extend this pattern to Indonesian-Javanese bilingual acquisition,

suggesting universal developmental constraints on argument structure acquisition regardless of language combination.

Word order analysis revealed significant cross-linguistic influence from Javanese, particularly in younger age groups. While the target Indonesian SVO order appeared 58.3% of the time in Stage 1 children, non-canonical orders especially SOV (18.7%) and OSV (9.4%) occurred at rates substantially higher than documented in monolingual Indonesian child language. These patterns strongly suggest Javanese influence, as Javanese exhibits considerable word order flexibility compared to Indonesian's relatively rigid SVO structure. By Stage 3, SVO orders dominated at 91.2%, with SOV patterns declining to 4.8%. These findings corroborate Bosch & Unsworth (2020) research on Dutch-English bilingual children, which demonstrated that cross-linguistic influence in word order is most pronounced in younger children and diminishes as language dominance and proficiency increase. Importantly, the present study found that word order influence persisted longer than other forms of cross-linguistic transfer, suggesting that syntactic patterns may be particularly resistant to restructuring in bilingual development. This aligns with Van Dijk et al. (2022) evidence that online sentence processing in bilingual children shows sustained effects of syntactic co-activation even when production patterns appear target-like.

The acquisition of Indonesian verbal affixation, particularly the active voice prefix meN-, showed a protracted developmental trajectory. Stage 1 children omitted the meN- prefix in 41.2% of obligatory contexts, frequently producing bare verb stems (baca 'read' instead of mem-baca 'ACT-read'). This omission rate decreased to 28.7% in Stage 2 and 10.6% in Stage 3. Applicative suffixes (-kan, -i) appeared later and were used appropriately in only 23.4% of obligatory contexts in Stage 1, increasing to 59.8% in Stage 2 and 79.4% in Stage 3. These patterns parallel findings from Nugraha (2022), who documented that Indonesian suffixation involves complex morphological processes with semantic changes that require extended consolidation periods. The relatively late mastery of Indonesian affixation in bilingual children may reflect both the morphological complexity of the system and reduced input frequency compared to monolingual peers. Interestingly, children demonstrated significantly higher accuracy with meN- prefixes on high-frequency verbs (makan 'eat,' minum 'drink') than low-frequency verbs, supporting Tomasello's (2003) verb island hypothesis whereby children initially learn verb-specific constructions before abstracting more general morphosyntactic patterns.

Analysis of pronoun usage revealed sustained cross-linguistic influence from Javanese throughout the developmental period studied. Javanese pronouns (aku 'I,' kamu 'you') appeared in Indonesian contexts at rates of 34.6% in Stage 1, 28.3% in Stage 2, and 19.7% in Stage 3, despite Indonesian having distinct pronoun forms (saya/aku with different registers, kamu/Anda). This finding extends previous research by Koutamanis et al. (2024), who documented cross-linguistic influence at phonological and semantic levels in bilingual children's lexicon, by demonstrating similar effects in functional morphemes. The persistence of Javanese pronouns in Indonesian contexts likely reflects their high frequency and early acquisition in Javanese input. Notably, pronoun transfer

was bidirectional but asymmetric: while Javanese forms appeared frequently in Indonesian, Indonesian forms appeared in Javanese contexts only 12.3% of the time, suggesting dominance effects where the home language (Javanese) exerts stronger influence on the school/national language (Indonesian) than vice versa. This asymmetry aligns with VASILYEVA et al. (2010), who found unidirectional cross-linguistic priming from Spanish to English but not English to Spanish in bilingual children, attributing this to differences in language dominance and exposure patterns.

When compared with available data on monolingual Indonesian child language development, the bilingual children in this study showed both delays and unique developmental patterns. Monolingual Indonesian children reportedly achieve consistent transitive verb production with appropriate affixation by age 4.5-5.0 years, whereas the bilingual children in this study reached comparable levels only at ages 5.5-6.0 years, representing approximately a 6-12 month delay. This finding is consistent with Hoff & Core (2015) meta-analytic conclusion that bilingual children typically lag monolingual peers in single-language comparisons due to distributed language exposure. However, the qualitative patterns of development the progression through incomplete transitivity to consistent target structures appeared similar to monolingual development, supporting Paradis & Genesee (1996) fundamental observation that bilingual children follow the same developmental sequence as monolinguals, albeit at different rates. Importantly, when considering total linguistic output across both languages, the bilingual children in this study demonstrated sophisticated grammatical knowledge, often producing equivalent or superior total numbers of distinct transitive verb constructions compared to monolingual norms when both languages were considered together.

Analysis of discourse contexts revealed that children's transitive verb production was significantly influenced by pragmatic factors, particularly information structure and discourse givenness. Children across all age groups showed higher rates of object omission (42.7% overall) when referents were discourse-given or contextually salient compared to new information contexts (8.3% omission rate). This pattern aligns with Narasimhan et al. (2005) findings on Hindi-speaking children, who demonstrated sensitivity to discourse-pragmatics even in early transitive constructions, neither making random transitivity errors nor omitting arguments haphazardly. In the present study, when mothers asked questions like 'Adik mau makan apa?' ('What does younger sibling want to eat?'), children frequently responded with transitive verbs lacking explicit objects: 'Mau makan' ('Want eat'). This pragmatically appropriate ellipsis was counted separately from developmental object omission. Interestingly, bilingual children showed greater sensitivity to information structure than reported for monolingual peers, possibly because managing two linguistic systems heightens metalinguistic awareness. This finding supports recent work by Zhou et al. (2025), who documented that Mandarin-English bilingual preschoolers demonstrate sophisticated cross-domain associations between grammatical and pragmatic knowledge.

Substantial individual variation emerged in the sample, with language exposure patterns serving as significant predictors of developmental rate. Children with balanced

exposure (45-55% Indonesian input) achieved Stage 3 proficiency an average of 2.3 months earlier than those with Javanese-dominant exposure (>60% Javanese). Multiple regression analysis revealed that current Indonesian exposure ($\beta = 0.68$, $p < .001$), maternal education level ($\beta = 0.42$, $p < .01$), and frequency of Indonesian use in sibling interactions ($\beta = 0.39$, $p < .01$) significantly predicted transitive verb accuracy. These findings corroborate the extensive literature on input effects in bilingual development. Hoff & Core (2013) demonstrated that quantity and quality of input in each language significantly influence bilingual children's developmental rates, with even relatively small differences in exposure producing measurable effects on grammatical development. The current study extends this by showing that input effects operate specifically on argument structure development, not just vocabulary or general proficiency. Interestingly, children from families where parents code-switched frequently showed intermediate performance, suggesting that mixed input may complicate argument structure acquisition compared to more clearly separated language contexts (Nicoladis & Yin, 2010).

Based on the developmental patterns observed, several evidence-based recommendations emerge for parents and educators supporting Indonesian-Javanese bilingual children. First, providing rich, grammatically complete Indonesian input with explicit transitive verb modeling appears crucial, particularly between ages 4-5 when affixation systems are consolidating. Parents can support development by using recasts reformulating children's incomplete transitives with appropriate affixation and full argument structures without explicitly correcting. Second, maintaining consistent language use contexts (e.g., Indonesian at school, Javanese at home) may facilitate clearer grammatical pattern extraction compared to frequent intra-sentential code-switching. Third, metalinguistic activities that draw attention to differences between Javanese and Indonesian word order can accelerate children's awareness of language-specific constraints. These recommendations align with (Bhadra, 2024),who demonstrated that verb roots encode outcomes in argument structure and lexical semantics, suggesting that explicit attention to verb meanings and their argument structures can support verb learning. For bilingual children, similar explicit, repeated exposure to grammatically complete transitive structures may compensate for distributed input and accelerate the progression from Stage 1 to Stage 3 proficiency.

The findings provide strong support for usage-based theories of language acquisition, particularly Tomasello's (2003) constructionist approach. The staged progression from verb-specific, lexically restricted transitive patterns (Stage 1) through partially schematic constructions (Stage 2) to fully abstract transitive schemas (Stage 3) aligns precisely with usage-based predictions about gradual abstraction from input. The high frequency of pronoun-based early transitives, followed by gradual extension to lexical noun phrases, replicates patterns documented across multiple languages and supports the claim that children build linguistic representations bottom-up from actual usage events rather than from innate syntactic templates. Furthermore, the persistent influence of input frequency with high-frequency verbs showing earlier mastery of affixation and argument structure provides additional evidence against nativist accounts that minimize the role of

distributional learning. Valentini & Serratrice (2021) finding that vocabulary knowledge in bilingual children serves as the foundation for grammar learning through verb argument structure acquisition receives additional support from the present data, which showed significant correlations between children's transitive verb diversity and their overall grammatical complexity measures.

The patterns of cross-linguistic influence observed in this study align with and extend contemporary theoretical accounts of bilingual language development. The asymmetric, age-modulated influence from Javanese to Indonesian supports Hulk & Müller (2000) hypothesis that cross-linguistic influence occurs at interfaces where structural overlap creates ambiguity, particularly when one language dominates input. Javanese word order flexibility created exactly this type of structural overlap with Indonesian, allowing non-target patterns to surface. The finding that cross-linguistic influence decreased but did not disappear by age 6 aligns with Serratrice (2016) proposal that shared syntactic representations between a bilingual's languages can persist across development, activated through priming mechanisms. Importantly, the current data suggest that cross-linguistic influence in argument structure represents not wholesale confusion between systems but rather subtle co-activation effects where children probabilistically weight structural options based on combined cross-linguistic input distributions. This interpretation receives support from Bosch & Unsworth (2020), who argued that cross-linguistic influence reflects the bilingual mind's rational statistical learning over distributed input rather than representational deficits.

When compared with research on other bilingual populations, the Indonesian-Javanese children in this study showed both universal and language-specific patterns. Like the Dutch-English bilinguals studied by Bosch & Unsworth (2020) and the Spanish-English bilinguals studied by VASILYEVA et al. (2010), Indonesian-Javanese children demonstrated cross-linguistic influence primarily in structural domains showing partial overlap between languages. However, the specific locus of influence differed: while European language pairs often show influence in null subject parameters or clitic placement, Indonesian-Javanese bilingual children showed influence primarily in word order flexibility and affixation patterns. This comparison highlights the importance of studying typologically diverse language pairs to develop comprehensive theories of bilingual acquisition. The current findings also contrast with Zhou et al. (2025) observation of relatively weak cross-language, cross-domain relationships in Mandarin-English bilinguals; Indonesian-Javanese children showed stronger cross-linguistic structural priming, possibly because both languages belong to the Austronesian family and share more fundamental typological features than Mandarin and English. These comparisons underscore that the degree and nature of cross-linguistic influence depends critically on the specific structural relationships between a child's two languages, with morphosemantic properties of verbs playing a crucial role (Satria Nugraha, 2024).

This study makes important methodological contributions to bilingual child language research. The longitudinal naturalistic observation design, following 15 children across six months with bi-weekly recordings, provided unprecedented density of data on

Indonesian-Javanese bilingual development. Unlike experimental elicitation studies, which may underestimate children's competence in naturalistic contexts, or diary studies, which risk sampling bias, the current approach captured spontaneous transitive verb usage across diverse communicative contexts. The high inter-rater reliability ($\kappa = 0.85$ for argument structure identification) demonstrates that detailed linguistic coding of naturalistic Indonesian data is feasible and replicable. Furthermore, the developmental stage identification through cluster analysis represents a novel application of quantitative methods to categorize qualitative developmental patterns, allowing more precise characterization of developmental trajectories than simple age-based comparisons. The three-stage model emerging from the data showed robust predictive validity, correctly classifying 89.3% of children based on their transitive verb accuracy profiles. These methodological innovations respond to calls by Kidd & Garcia (2022)for more diverse, ecologically valid approaches to studying child language development beyond WEIRD (Western, Educated, Industrialized, Rich, Democratic) populations and laboratory contexts.

Several limitations warrant consideration in interpreting these findings. First, the sample size of 15 children, while sufficient for intensive qualitative analysis and typical for longitudinal naturalistic studies, limits statistical power for detecting smaller effect sizes and precludes detailed analysis of individual differences (Fauziati, 2008). Future research should recruit larger samples to examine how factors like birth order, socioeconomic status, and schooling experiences moderate developmental trajectories. Second, the six-month observation period, while showing clear developmental change, represents only a snapshot of the full developmental progression from age 4 to adult-like competence; longer longitudinal studies following children from age 3 to age 8 would provide more complete developmental pictures. Third, the study focused exclusively on productive transitive verb usage in Indonesian, not examining comprehension abilities or Javanese production patterns, which limits conclusions about the full scope of bilingual development. Fourth, the sample came exclusively from Central Java urban areas; rural populations and other regions with different Javanese-Indonesian contact patterns may show different developmental trajectories. Finally, the study did not include monolingual control groups, relying instead on reported developmental norms; direct comparison with age-matched monolingual Indonesian children would strengthen claims about bilingual-specific patterns. Future research should address these limitations while extending investigation to other understudied bilingual populations in Southeast Asia.

The findings have significant practical implications for Indonesian early childhood education and language assessment. First, educators must recognize that the transitive verb development patterns documented here represent normal bilingual development, not language disorder. The 6-12 month lag behind monolingual norms in achieving consistent transitive verb production should not trigger intervention unless accompanied by other developmental concerns. Assessment tools should incorporate bilingual norms reflecting expected patterns like increased word order variation and affixation inconsistency in younger bilingual children. Second, educational policies supporting maintenance of

regional languages like Javanese while developing Indonesian proficiency should recognize that cross-linguistic influence is a normal, transient phenomenon reflecting children's developing metalinguistic awareness rather than confusion. Rather than discouraging Javanese use, educators should leverage children's bilingual knowledge by explicitly discussing similarities and differences between languages' argument structures, drawing on morphosemantic analyses that illuminate how verb meanings map onto grammatical forms (Maspul & Putri, 2025). Third, parent education programs should provide evidence-based guidance about the benefits of rich linguistic input in both languages, countering common misconceptions that bilingualism causes language delays. Finally, teacher training programs must incorporate knowledge about bilingual language development trajectories, including expected patterns of cross-linguistic influence and appropriate developmental expectations, to avoid misidentification of normal bilingual development as language impairment. These recommendations align with Grimm and Schulz's (2017) call for bilingual-appropriate assessment approaches that avoid both over- and under-diagnosis of language difficulties in multilingual populations.

CONCLUSION

This longitudinal study identified three developmental stages in the acquisition of Indonesian transitive verb constructions among Indonesian-Javanese bilingual children aged 4–6 years. The findings show a progression from incomplete argument structures with frequent object omission, to emerging full transitivity with variable word order, and finally to consistent SVO constructions with more accurate affixation. Although bilingual children demonstrated a slight developmental delay compared with monolingual norms, the overall developmental sequence remained similar, supporting usage-based theories of language acquisition. Cross-linguistic influence from Javanese appeared primarily in word order flexibility and pronoun usage, gradually decreasing with age as Indonesian grammatical patterns became more stable. These results highlight the importance of considering bilingual developmental trajectories when assessing children’s grammatical competence and designing educational practices in multilingual contexts.

Future studies should address several limitations of the present research. First, larger samples across multiple Indonesian regions should be examined to determine whether similar developmental patterns occur in other bilingual contexts such as Indonesian-Sundanese or Indonesian-Balinese. Second, future research should investigate both productive and receptive language abilities in Indonesian and Javanese to provide a more comprehensive picture of bilingual grammatical development. Third, including monolingual comparison groups would strengthen conclusions regarding bilingual-specific developmental patterns. Finally, longitudinal studies extending beyond age six would help determine when bilingual children fully achieve adult-like mastery of Indonesian transitive verb constructions.

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