The Impact of Syntax on Sentence Comprehension in Bilinguals: A Comparative Study of English and Dhatki Language

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Abstract

This study investigates the role of syntax in sentence comprehension among English-Dhatki bilingual speakers and the mental processes involved when comprehending sentences in two languages with contrasting syntactic structures. English employs the Subject-Verb-Object (SVO) structure, while Dhatki follows the Subject-Object-Verb (SOV) structure. The study is concerned with how bilingual speakers comprehend syntactically complex sentences and whether syntactic transfer from one language to the other plays any role. Data were gathered from 40 bilinguals participant through a sentence judgment task, measuring comprehension accuracy and reaction time. Bilinguals showed faster comprehension when the sentence was less complex structurally but also had more difficulties and took more time to comprehend when syntactically more complex, especially with Dhatki. The results provided insights into cognitive processing in bilingualism and the effects of syntactic transfer, with implications for bilingual education and cognitive linguistics [Kroll &Bialystok, 2013;Odlin, 1989],

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Background

Bilingualism, i.e., using two languages in a competent way, is rooted in sophisticated cognitive processes conditioned by the syntactic forms of the two languages (Friederici, 2011). Syntax, which prescribes how words and phrases are to be put together to from meaningful sentences . Syntactic forms of different languages can vary immensely, and this influences the cognitive strategies that bilinguals deploy in processing sentences in each of the two languages.

English and Dhatki offer contrasting syntactic structures that provide a unique opportunity for study.

English is an SVO language with the verb coming after the subject and before the object. Dhatki is an SOV word order with the verb appearing at the end of the sentences.These syntactic contrasts offer a fascinating challenge to bilingual speakers in dealing with the conflicting syntactic rules when processing complex sentence (Odlin, 1989).

Sentence comprehension is a multi-faceted cognitive process comprising syntactic parsing, lexical retrieval, and integration of syntactic and semantics. Bilinguals are also challenged when faced with sentences with different syntactic structures and thus may establish syntactic transfer—where the syntax of one language affects the processing of sentences in the second language. Prior work has generally focused on bilinguals who speak languages of equivalent syntactic structures, e.g., Spanish-English or French-English bilinguals. Less research has explored bilinguals who speak languages with significantly different syntactic structures, for example, English and Dhatki (White, 2003; Sorace & Filiaci, 2006). This research sets out to fill this gap by investigating how bilinguals sentence process in the two typologically divergent languages.

Research Gap

Although there has been extensive research on sentence processing in bilinguals, most of the research has been conducted on language pairs with similar syntactic structures. For example, research on Spanish-English bilinguals (e.g.,White, 2003) and French-English bilinguals (e.g., Sorace & Filiaci, 2006) has been very informative regarding sentence comprehension in bilinguals. There is a large research gap, however, on bilinguals who use languages with different syntactic structures, like English and Dhatki. This gape highlights the importance of examining syntactic transfer and cognitive strategies in typologically distinct language pairs (Shackle, 1976; Masica, 1993).

Specifically, few studies have examined the effect of syntactic structures with contrasting word orders (SVO vs. SOV) on bilinguals' understanding of syntactically complex sentences (Jarvis & Pavlenko, 2008). The possibility of syntactic transfer between these two languages is an area not yet extensively researched in bilingual cognition. Dhatki is an Indo-Aryan language with syntactic structures that are very different from English, making it an ideal language to investigate how bilinguals process syntactic sentences in languages with different syntactic typologies. This study strive to address this gap by examining the contribution of syntax to sentence comprehension among English-Dhatki bilinguals.

Research Questions

1. How do English-Dhatki bilinguals understand syntactically complex sentences in English and Dhatki?

2. To what degree does syntactic transfer from English to Dhatki influence bilinguals' comprehension of complex sentences?

Research objective

1. To compare bilingual speakers' comprehension of syntactically complex sentences in English and Dhatki.

2. To analyze the effect of English-to- Dhatki syntactic transfer on bilinguals' processing of complex sentence.

Literature Review

Sentence comprehension studies in bilinguals have made impressive progress over the past few decades, and with it, the cognitive and linguistic subtleties of juggling two languages have become increasingly apparent (Kroll & Bialystok, 2013; MacWhinney, 2005). Syntax, as one of the most rule-bound parts of language, features prominently in bilingual sentence processing and interpretation play a crucial role in sentence comprehension. The majority of the empirical work on bilingual syntax processing has been done on well-documented language combinations such as English-Spanish or English-French (MacWhinney, 2005; Dussias & Sagarra, 2007), but sentence processing among typologically divergent pairs such as English (SVO) and Dhatki (SOV) has been sparsely carried out by few researchers.

Syntax and Sentence Comprehension

Syntax is the sentence fundamental scaffolding structure for sentences comprehension. It describes how words and phrases are assembled to convey meaning (Friederici, 2011). Sentence comprehension is a multi-faceted cognitive process comprising sytactic parsing, lexical retrievel, integration of syntax and semantics.Sentence parsing in monolingual understanding is highly dependent on the speaker's syntactic knowledge. Bilinguals experience greater cognitive load when parsing due to cross-linguistic interference or transfer, particularly when the two languages have dissimilar syntactic rules (Odlin, 1989; Tokowicz & MacWhinney, 2005). MacWhinney and Bates' (1989) Competition Model explain how bilinguals use the more dominant or more known syntactic cues in sentence processing, and this can lead to errors in the

less dominat language.

For example, a bilingual Dhatki-English speaker reading the English sentence:

“The man whom the girl saw was running.”

Object-relative construction and the embedded relative clause can be problematic because Dhatki favors explicit SOV structures with reduced embedding of relative clauses.

Cross-Linguistic Influence and Transfer

Cross-linguistic influence (CLI) is one of the most significant bilingual sentence processing effects. In response to the narrow view of transfer being limited to word-level or pronunciation transfer, Jarvis and Pavlenko (2008) posit that transfer extends to syntactic structures, particularly between typologically disparate languages. This claim is supported by the discovery of Hartsuiker, Pickering, and Veltkamp (2004), who documented syntactic priming across languages demonstrating that sentence structure in one language may influence syntactic choices in the other.

SVO and SOV languages differ not only in word order but in sentence planning and syntactic packaging (Comrie, 1981). These differences may lead to in errors or slower comprehension when bilinguals attempt to process complex structures like embedded clauses, relative clauses, and passive construction. Bilinguals may “mis-map” sentences according to L1 syntactic rules (Ellis, 2006), especially when L2 input is infrequent or less salient.

Differences in processing: English and SOV languages

Several studies have examined bilinguals’ processing of syntactic complexity in English when their L1 follows SOV word order. Vasishth et al. (2010) in a study on Hindi-English bilinguals, found that SOV speakers had difficulty with center-embedded and object-relative clauses in English due to an lack of transferable processing strategies. The same is likely to Dhatki speakers, as Dhatki and Hindi and Marwari share similar syntactic structures.

Özçalışkan and Slobin (2003) demonstrated that Turkish (SOV) speakers transfer clause ordering to english in both production and comprehension. They discovered that bilinguals produce grammatically well-formed but pragmatically awkward sentences that display strong syntactic interference. The results indicate that syntactic structure cannot be readily separated in the bilingual mind and tends to interfere even among proficient speakers.

Role of Working Memory and Cognitive Load

Working memory is also crucial for sentence comprehension,especially for bilinguals processing L2 syntactic complexity. Caplan and Waters (1999) and King and Just (1991) concluded that understanding complex syntax largely depends on an individual's working memory capacity. For bilinguals, this capacity is further strained due to the inhibition of one language while processing the other (Abutalebi & Green, 2007).

For instance, object-relative English clauses (e.g., "The boy that the girl hugged") are more difficult to process than subject-extracted relatives ("The boy that hugged the girl"), particularly for bilinguals with an SOV language background. The additional memory load to tracking non-canonical word order reduces comprehension (Felser & Roberts, 2007).

Language-Specific Studies and South Asian Context

In the context of South Asia, bilingual sentence comprehension has primarily been investigated in Hindi-English and Urdu-English speakers. Dey and Souza (2017) examined syntactic processing of English in Hindi-dominant bilinguals and found that difficulties arose exactly in handling clause embedding and passivization. Similarly, Gullberg and Indefrey (2006) show that Urdu speakers experience a processing delay when processing reduced relative clauses in English.

However, there remains a significant lack of research on languages such as Dhatki. Although Dhatki is widely spoken in Tharparkar and adjacent areas, it remains poorly documented, especially in terms of syntax and sentence processing. Shackle (1976) and Masica (1993) give short accounts of the Dhatki grammar but do not tackle it from psycholinguistic or bilingual angles. Since it is SOV in word order, postpositionality, and verb-dependence finaling within the clause, Dhatki likely would have high control over how the speakers parse English sentences with object-extracted clauses and non-linear dependencies.

Theoretical Frameworks in Bilingual Syntax Processing

The Unstructured Hypothesis of Clahsen and Felser (2006) suggests that L2 speakers do not construct deep syntactic representations while parsing complex structures but relying on lexical and semantic information. This is particularly true for low-proficiency or late bilinguals, which is often applies to Dhatki-English speakers learning English formally but using Dhatki in informal settings.

Additionally, Transfer Appropriate Processing (TAP) (Morris et al., 1977) explains that bilinguals employ comprehension strategies that are most compatible with the structural characteristics of their dominant language, which can result in errors or slower processing when these strategies are insufficient to the L2. Together,these models highlight the challenge posed by bilinguals operating between syntactically incommensurate languages.

Theoetical frameworks, including the shallow structure Hypothesis and transfer Appropriate processing, provide a foundation for understanding how bilinguals process sentences differently based on the syntactic structures of their L1 and L2. These frameworker account for L1 transfer, comprehesion strategies, and the role of working memory in processing complex sentences in bilinguals.

Methodology

The study employed a comparative mixed-methods approach to investigate sentence comprehension among Dhatki-English bilinguals.

Participants

Forty bilingual university students aged between 18–25 years from Tharparkar, Pakistan, participated in the study . All participants were native Dhatki speakers with a minimum of five years of formal English education.

Materials

Participants completed a sentence comprehension task consisting of 40 sentences (20 English, 20 Dhatki) covering various syntactic structures including simple such sentences, subject-relative clauses, and passive constructions.

Procedure

The experiment was conducted individually in a controlled environment . Sentences were presented in random order, followed by comprehension questions. Participants response time and accurancy were recorded, and semi-structure interviews were conducted afterward to collect qualitative.

Analysis

Quantitative data were analyzed using SPSS, employing t-tests and ANOVA to examine statistical significance. Thematic analysis was applied to qualitative interview responses to identify patterns of syntactic transfer and processing strategies.

Ethics

All Participants provided informed consent, and the study adhered to the ethical guidelines established by the institutional review board. This study employed a comparative mixed –method a comparative approach (Creswell, 2014) to investigate sentence comprehension among Dhatki-English binguals. Quantitative data were analyzed using SPSS, employing t-test and ANOVO (field, 2018), while qualitative interview responses were analyzed using thematic analysis (Patton, 2015) to identify patterns of syntactic transfer and processing strategie.

Findings

The section presents the major findings of the sentence comprehension task, including accurancy accuracy, response time, and qualitative patterns.

Comprehension Accuracy;

Participants better Dhatki across all sentences types.

Average accuracy is presented in Table 1: *Participants performed better is present*;

Observation: Accuracy decreased with increasing syntactic complexity in both languages; however, the decline was steeper in English, particulary for decreased more steeper object-relative and embedded clauses.

Response Time

Table 2 *shows average response times*

Observation: Dhatki sentences were processed faster than English sentences across all syntactic types, reflecting greater familiarity with L1 structures. Responses times increased with sentence complexity, particulary in English was read through faster by subjects, reflecting greater syntactic familiarity.

Error Patterns and Insights

Errors in English typically involved misidentification of the subject and object in complex sentences. For example, the sentence "The girl who the boy hugged was smilling" was frequently misinterpreted as thhe girl performing the action.

Interview Comments

Participants reported a preference for the Dhatki sentence structure and often mentally translated English sentences into Dhatki. Addirionally, urdu occasionally influenced comprehension, particularly with frequently occurring structures.

Discussion

The finding indicate that syntactic familiarity plays a crucial role in Dhatki-English bilinguals sentence comprehension. Participants performed better in Dhatki, especially for complex structures such as object-relative and embedded clauses, due to greater exposure to L1 syntactic patterns and alignment with their mother tongue (Odlin, 1989;Traxler, 2014).

Syntax Complexity and Performance

Comprehension accuracy decreased as sentence complexity increased, particulary for English embeddded and object-relative clauses. This pattern aligns with previous studies showing that L2 speakers

experience higher cognitive load when processing non-canonical syntactic structures (Traxler (2014) and Kidd et al. (2007); Felser & Clahsen, 2006)

First Language Transfer

The participants frequently processed English sentences by mentally them into Dhatki, demonstrating sustantial L1 r syntactic transfer (Odlin, 1989;Tokoics& MacWhinney,2005). While this strategy facilitated comprehension of familiar structures, with syntactic cinstructions that differ from Dhatki.

Processing Strategies

Participants primarily relied on word-order assumptions and partial syntactic cues, consistent with the shallow structure Hypothesis (Clahsen & Felser, 2006). Misinnterpretation of embedded clause roles in English contributed to a higher frequency of comprehension errors.

Urdu as a Mediator

Urdu influenced comprehension in both languages. Due to structural similarity to Dhatki, Urdu seemed to act as an intermediate processing facilitator, supporting bilingual strategies (Kroll & Tokowicz, 2005).

Implications in Education

English language instruction for Dhatki speakers should explicitly address differences in syntactic structures, particularly relative and embedded clauses. Implementing contrast teaching strategies that highlight the differences between SVO and SOV word orders can enhance syntactic awareness, improve comprehension accuracy, and reduce errors caused by L1 transfer (Sorace & Filiaci, 2006; Dey & Souza, 2017).

Conclusion

The present study investigated the impact of syntactic complexity on sentence comprehension among Dhatki-English bilinguals. The results demonstrate that participants comprehended sentences in their L1, Dhatki, more accurately and rapidly than in English, particularly for complex syntactic constructions such as object-relative and embedded clauses (Traxler, 2014; Felser & Clahsen, 2006). These findings indicate that comprehension is strongly influenced by familiarity with L1 syntactic structures, reliance on L1-to-L2 transfer, and employed processing strategies

The findings support the primacy of syntactic alignment in second language processing. English, as an SVO language, presents non-canonical structures for Dhatki speakers, imposing additional cognitive load

during comprehension (Odlin, 1989; Caplan & Waters, 1999). Participants' reliance on L1 syntactic patterns and the facilitative role of Urdu as an intermediate language illustrate an integrated multilingual processing model, highlighting cross-linguistic interactions in comprehension

From an educational perspective, these results emphasize the importance of explicitly teaching advanced English syntactic structures to Dhatki-speaking learners. Implementing contrastive instructional methods that clearly highlight structural differences between English (SVO) and Dhatki (SOV) may enhance syntactic awareness, improve comprehension accuracy, and reduce errors resulting from L1 transfer (Sorace & Filiaci, 2006; Dey & Souza, 2017).

Future research should incorporate longitudinal designs with participants of varying proficiency levels and speakers of additional regional languages to generalize the finding on bilinguals and trilinguals sentences comprehension. Such studies could further investigate the interactions among L1 transfer, cognitive load, and syntactic complexity over time, contributing to more complexity overtime, contributing to more comprehensive modals of multilingual processing (Abutalabi & Green,2007; Felser &Roberts,2007).

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