Processing Subject and Object Agreement in Light Verb Construction: Electrophysiological Insights from Hindi

Verb agreement, as an argument-verb dependency relation, is extensively studied in several languages (Baker, 2008). However, cross-linguistic research mostly focuses on the processing of subject-verb agreement in all phi-features, with gender being the least explored agreement feature (Molinaro, Barber & Carreiras 2011). Furthermore, only a handful of studies have investigated object-verb agreement, predominantly in comparison to subject-verb agreement from ergative languages such as Basque and Hindi (Zawiszewski, Friederici, 2009; Zawiszewski, Gutierrez, Fernandez, and Laka, 2011; Díaz, Sebastián-Gallés, Erdocia, Mueller, & Laka, 2011; Choudhary, 2011; Bhattamishra, 2021; Gulati 2021). Taken together, these studies reported varied ERP patterns, concluding that there is no universal processing pattern for computing different types of argument-verb agreement dependencies.

The present study investigated the processing of subject and object gender agreement in Hindi, a split-ergative language. The aim of the study was threefold: first, to compare subject versus object gender agreement violations and determine whether they engender qualitatively similar or different neurophysiological correlates. Second, to verify if subject and object agreement patterns would show a difference when placed within complex predicate structures. Third, to scrutinize whether the subject argument features would impact the verb agreement comprehension in Hindi, a language which implements a case-dependent agreement system. To examine this, a 2 x 2 factorial design was constructed, which altered the type of verb agreement, i.e. subject and object agreement relation, by manipulating the case marking on the sentence-initial subject argument (ergative and nominative case). The gender agreement marker occurring on the sentence-final light verb was altered between masculine and feminine markers, which either matched or mismatched in gender with the gender of the subject or, alternatively, the object argument. This experimental manipulation led to grammatical or ungrammatical subject/object gender agreement relations, which became apparent only at the position of the light verb (second verb) within a transitive compound light verb construction. Event-related brain potentials were recorded from thirty-one native Hindi speakers, grand-averaged at the critical position of the light verb. A linear mixed-models analysis confirmed an early positivity effect between the time windows of 100-400ms and a late positivity effect between 600-1000ms, elicited for the processing of both subject and object gender agreement violations. The early positivity can be plausibly interpreted as a task-related P3b (P300) effect, which occurs when structural violations necessitate increased cognitive functioning and attentional demands for stimulus categorization and improved decision-making (Polich, 2007). The late positivity is interpreted as the P600 effect reflecting repair and reanalysis processes associated with agreement violations (Bornkessel-Schlesewsky & Schlesewsky 2009). Additionally, both the time windows showed that the difference between the agreement type (correct versus incorrect gender agreement) was statistically significant in the object-light verb gender agreement conditions. An ergative case marked argument at the initial position itself blocks the subject agreement relation, forcing the next nominative case marked argument to establish an object agreement relation. Stronger prediction for a grammatically sound object agreement relation to occur places a greater processing load on the parser. When that is not met, the violations in the ergative case-induced object-light verb gender agreement conditions become more prominent than the violations in the subject-light verb gender agreement conditions. These findings imply that subject and object agreement relations are processed similarly in Hindi light verb structures. However, the quantitative differences observed between the subject and object agreement suggest that neurophysiological differences stemming from the language, such as argument-specific features like case or structure-specific features like light verb structures, might play an integral role in processing verb agreement dependencies in the Hindi language. However, this claim remains to be further tested.

Keywords: Agreement, Subject, Object, Gender, Light verb

Examples

Subject-light verb gender agreement/disagreement :

Aadmi *ped* *ukhad* *daal-ta* */ *daal-ti* *hai*
Man.NOM.3SG.M Tree.NOM.3SG.M uproot put.IMPFV.3SG.M / *put.IMPFV.3SG.F Aux.Prs
“The man uproots the tree.”

Object-light verb gender agreement/disagreement :

Aadmi ne *ped* *ukhad* *daal-a* */ *daal-i* *hai*
Man-ERG.3SG.M Tree.NOM.3SG.M uproot put.PFV.3SG.M / *put.PFV.3SG.F Aux.Prs
“The man uprooted the tree.”

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