Does phonological change in Bengali-verb guide communicative intent?

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Abstract

This paper investigated how phonological change in verb lead to change in communicative intentions in Bengali. We conducted (a) Likert scale experiment (LS) and (b) online recognition of intention probes (Reaction Time) to record the degree of intention ascribed to the form of verb and the underlying psycholinguistic process involved in the recognition of that intention. The LS results show that the *order* and *request* acts are higher for our hypothesised category. In ANOVA test we found a strong effect of Speech Act on the response ($p<0.0002$, $F=47.78$). RT experiment results demonstrated that order intention recognition time for CategoryA was 2.50s (Accuracy=71.4%), while request intention recognition time for CategoryB was 3.36s (Accuracy=70.69%).

Keywords: speech act, intention, vowel minimal pair, Bengali, ANOVA

Introduction

Illocutionary acts capture speaker's intention and the recognition of intention is necessary for a successful communication. Listeners use several linguistic and extralinguistic cues to understand communicative intent and the linguistic cues are generated by speakers.

Communication is a complex cognitive process which involves in instantiating the speaker's intention and the listener's recognition of that intention (Holtgraves, 2008). Contemporary theories posit that usually listeners employ pragmatic inference to decode the complexity of the message communicated. Complexity of intention lies in the fact that a sentence has the potential to have multiple intentions (Gisladottir et al., 2015). However, understanding of the intention depends on several issues - contextual information, grammatical cues, lexical cues and also from the acoustic (prosodic) cues. It is crucial to grasp the underlying pyscholinguistic process involved in recognition of intention and how different linguistic aspects are related to instantiate a particular intention. Under the speech act theory (Austin, 1962) the illocutionary act closely captures speaker's intention. Specific illocutionary acts such as order, request, reminding, suggesting are considered as communicative intentions. In this study we investigated how phonological change in a syllabic layer can change the communicative intentions. In Bengali,

a few verb forms with CVCV syllable structure can be represented as the grammatical information of present and future tense only, while the vowel of first syllable is changed. However, we hypothesized that this change not only represents the change in grammatical information but also can be interpreted as the change of intentions.

Methodology

Data

Bengali has a complex verbal structure, where multiple forms can be used to indicate single grammatical information (Thompson, 2010). For example:

1. /kor.o/ ~ /kor.b.e/
   do.FUT.2 do.FUT.2

Both the forms communicate the same grammaticality. While other forms with its minimum phonological and morphological distinctions changes the meaning and functionality of the verb imparting different grammatical information. For example:

2. / lek^{h}o/ ~ / lik^{h}o /
   write.PRST.2 write.FUT.2

We have selected Bengali verbs in minimal-pairs with the 2nd person familiar (e.g. /tumi/, /tomra/) agreement to meet the particulars of our assumptions. All the selected verbs are in CVCV pattern (e.g. /lek^{h}o/ ~ /lik^{h}o/). We assign Category A and B to both pairs respectively.

We have divided all the selected verb forms into five categories of phonological change pattern. We defined five different classes of verbs (in pairs) which illustrate their similarities in phonological change. So, each class indicates a unique change in one particular vowel from present to future, such as /u/ to /o/, /o/ to /ɔ/, /i/ to /e/, and /e/ to /æ /.

We selected 15 pairs of verbs, 3 pairs from each class in our experiments.

Participants

In Likert scale experiment fifteen (N=15, female 8 and male 7) students were participated. The number of participants in the recognition of probe and RT experiment was twelve (N=12), where 5 participants were female.

Experiment 1: likert scale

We conducted a Likert Scale (LS) experiment to record the degree of intention for each form of verb carries with it. Each form of verb carries more than one intention with it and this overlapping of intention has a certain pattern.

In this set of Questionnaires, we have given 15 sentences (3 verbs from each class) to the participants and along with the sentences five intentions namely, 'order', 'offer', 'remind', 'suggestion' and 'request' are also given. Then the participants are asked to mark the degree of each intention the given sentence carries in it in a pointer scale of 1 to 5, where point '1' is 'least likely' and point '5' is 'most likely'.

Experiment 2: probe recognition test

We have prepared an online intention recognition experiment to record the reaction time and do error rate analysis. If the participants can identify the intentions embedded in each sentences with different forms of verbs and match them with the probe intention words that follows each sentences.

In this online experiment we prepared visual stimuli in PychoPy where 15 pairs of target sentences and 5 pairs of filler sentences i.e. altogether 40 sentences followed by probe word representing the intention are given as stimuli to the participants. The visual stimuli of sentences without prior context were presented proceed by fixation cross and followed by a probe word representing the intention. The participants were asked to confirm through 'yes' or 'no' if the shown sentence carries the same intention as the probe word.

Results and discussion

The Likert Scale experiment result comparing each intention between categories show that mean scaling of order is higher (Mean=3.57) for CategoryA, request is higher in CategoryB (Mean=3.18), reminder is higher in CategoryB (Mean=3.09) and, suggestion is higher in CategoryA (Mean=3.27).

Then, ANOVA was performed where we observe how scale varies over an interaction between Speech-Act and Category. We found a strong effect of Speech Act on the response ($p<0.0002$, $F=47.78$), but the effect of Category was found insignificant ($p=0.33$, $F=0.93$) unlike interaction with the Speech-Act. The interaction effect (Speech-Act: Category) was found highly significant ($p<0.000024$, $F=6.67$), suggesting effect of Speech-Act on the responses Scale that depends on the levels of Category, and vice versa. The t-test was performed on ANOVA results to compare responses between two levels of Category for specific Speech-Acts. Statistical significances are as order ($p=0.006$, $t=2.76$), request ($p=0.02$, $t=-2.32$), and reminder ($p=0.0003$, $t=-3.59$). Suggestion ($p=0.49$, $t=0.68$) and offer ($p=0.66$, $t=0.43$) were not significant.

RT experiment results demonstrated (Figure 1) that order intention recognition time for CategoryA was 2.50s (Accuracy=71.4%), while request intention recognition time for CategoryB was 3.36s (Accuracy=70.69%).

The results from the two experiments accept our first hypothesis that a subtle change at the phonological level leads to the change in intention. In the

Likert Scale experiment, the participants identified the request and remind speech acts in the category 'A' sentences, and the order and suggestion acts were marked in higher scale for the category 'B' sentences. Since the category 'A' sentences consist of the present tense form and category 'B' for future tense form and the transformation from one form to the other is only due to the change of single vowel.

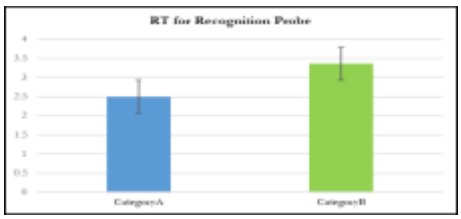

Figure1. Reaction time for probe recognition.

Moreover, the reaction probe task result helped to understand the psychological processing of intention recognition. The higher RT of the request intention for the category 'B' sentences entail that these sentences consist of more overlapping intentions and those intentions are harder to dissociate. For instance, the act of reminding someone is not possible through the act of ordering, rather it would be always in the form of request. However, suggesting someone can be made in both ways - with order and request. This study found that not only these two intentions are prevailing in these categories, but there are several other related intentions associated with it.

Conclusion

The complex underlying psychological processing was found in course of intention recognition. Here, the higher cognitive load was found in processing more overlapped and complex intentions (such as *request act*) than lesser complex intention (such as *order act*). This paper proposes to explore how the intonation of the vowel change posits the interpretation of intention, both from the perspective of acoustic analysis and psycholinguistic processing of auditory stimuli.

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