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Form and Meaning Relations of Head Nods Across Sign Languages

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Head nod in sign languages are proposed to have various functions across sign languages as conveying certainty in ASL (Shaffer 2008), in TİD (Karabüklü 2022, 2024), affirmation and feedback in DGS (Bauer et al. 2024), imperatives in ASL (Brentari et al. 2018), in TİD (Özsoy et al. 2018). Bauer et al. (2024) have shown that head nods in affirmation and feedback differ in terms of their duration and amplitude, suggesting that distinct phonetic layouts may map to distinct pragmatic roles in discourse. In this study, I investigate the phonetic features of two head nods occurring at the end of a clause and at the end of the sentence in ASL and TİD. Based on the peaks and duration of head nods, I propose that head nods differ based on their syntactic position and semantic mapping in TİD while they have peaks in both positions in ASL, yielding crosslinguistic phonetic-semantic mapping distinctions.

Both head movements in Figures 1 and 2 are labelled as *head nod* in sign linguistic literature. Although both have the same label, the naked eye can also spot the difference between them, that is, they act as mirror images of each other. Furthermore, they also appear in distinct syntactic positions in Turkish Sign Language (TİD). The former one is reported at the end of a phrase or clause in listing structures or contrastive topic – focus structures (Gürer & Karabüklü 2023), and acts as continuation rise in spoken languages whereas the latter one is reported mostly at the end of the sentence conveying signer certainty (Karabüklü 2022, 2024) or imperatives (Özsoy et al. 2018). While there has been no such distinction discussed in head nods in ASL, I will compare them to investigate any syntactic effects on the phonetics of head nods, and to have the complete crosslinguistic comparison between ASL and TİD.

10 TİD and 9 ASL signers signed what they were shown in 16 instrumental events yielding contrastive topic and focus structures as in *‘A man is (trying to) stirr(ing) the tea with a book (and fails), is stirring the tea with a teaspoon (and succeeds)’* . I will analyze the head nods occurring over the first predicate (CL-STIR^BOOK) which is the last sign in the clause, and the second predicate (CL-STIR^TEASPOON). By using the MediaPipe perception pipeline (Lugarasi et al. 2019), the face mesh coordinates for head rotation in the x axis are obtained. The number of peaks and troughs are calculated by using EnvisionBox module (Pouw 2024). By the time of the conference, the duration and the peaks of nods will be statistically analyzed for syntactic position and language by using the mixed effects models.

The initial results show that TİD marks the end of clause with a head nod which has a deeper trough (-12.46) and lacks the raise before it (Figure 3). Thus, the head nod becomes perceptually salient with its ending rather than reaching to its peak. In contrast, TİD marks the end of sentence with a head nod which has a clear peak (31.59) (Figure 3). The duration of the second head nod (1000 ms.) is also longer than the second head nod (550 ms.). In contrast, head nods in both positions in ASL have a peak; the first one is higher (13.39) than the second one (10.63). The nod at the end of sentence lasts longer (680 ms.) than the nod at the end of clause (580 ms.), but duration difference between them is much shorter than the difference between TİD nods. Thus, the initial results suggest that ASL and TİD signers use different phonetic features of head nods to signal the continuation in the sentence. Futhermore, TİD signers map distinct functions to distinct phonetic features as mapping continuation to a nod with a deep trough and success to a nod with a clear peak. Understanding phonetic features of nonmanuals with computational tools will enable us better to investigate which cue signers weight while processing them.

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Figure 1. Head nod occurring after a clause in TİD

Figure 2. Head nod occurring at the end of the sentence in TİD

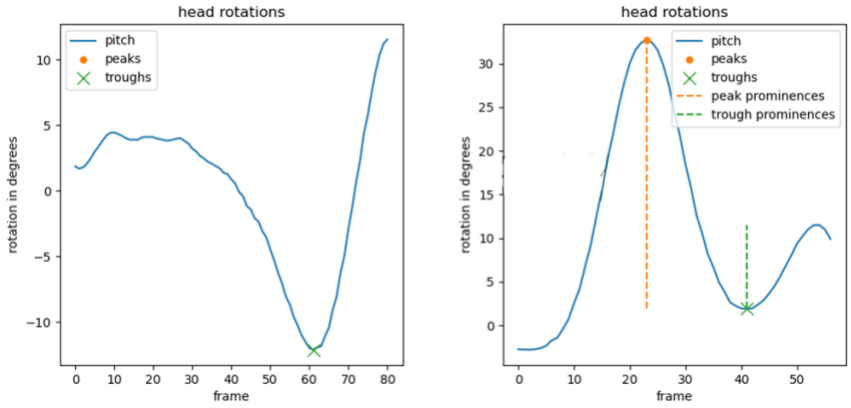

Figure 3. Phonetics of head nods in TİD. Left: at end of clause, right: at end of sentence

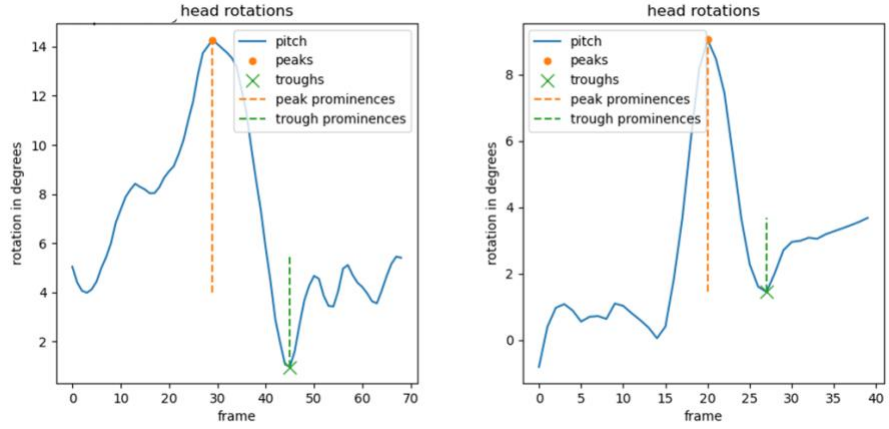

Figure 4. Phonetics of head nods in ASL. Left: at the end of clause, right: at the end of sentence

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