Sorting Out Pointing Signs in Turkish Sign Language (TİD)

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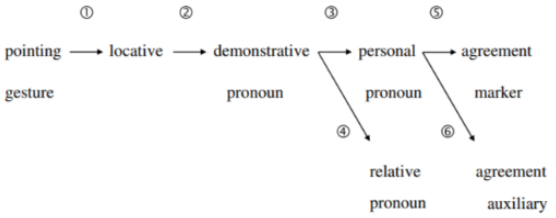
This paper aims to unfold the functional diversity of pointing signs in Turkish Sign Language (TİD) by using a set of complementary evidence. We show that the category of a pointing sign may be identified through syntactic evidence, as well as phonetic evidence which may sometimes consist of subtle cues and thus prove difficult to detect with impressionistic methods. For this matter, in order to improve categorization accuracy, we utilize a computer vision technique, i.e. Pose Estimation. Thus, the study employs a renovative method to more accurately elucidate phonetic cues, transforming them into solid numeric ranges upon which hypotheses can be built. Through this method, we detect spatial phonetic specifications that facilitate the disambiguation of mappings onto the two primary classes—nominals and locatives. Within the nominal domain, subcategories include *pronouns, demonstratives, and clitics*. Our categorization for TİD supports the grammaticalization path of pointing signs proposed by Pfau (2010), Fig.1.

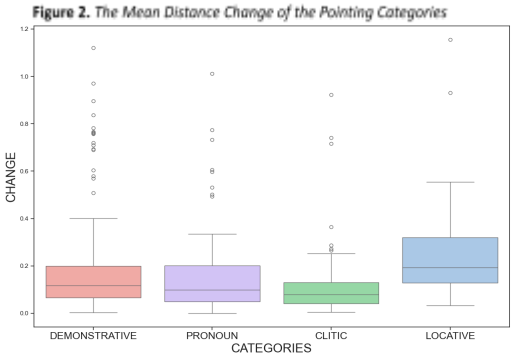
Figure 1. *The Grammaticalization Path*



We argue that the distinctive morpho-phonological features separating these classes predominantly utilize spatial information, especially the distances covered by these indexicals along the x (horizontal) and y (vertical) axes. When we assess the findings within the feature geometry framework developed by Harley and Ritter (2002) for the nominal domain in spoken languages and extended by Grose (2021) for sign languages, we propose that one should integrate Demonstratives (both free and clitic) into the geometry. Lastly, the results from pose estimation analyses not only provide compelling complementary evidence for the implications of feature geometry theory but also contribute to the broader understanding of pointing signs by unraveling their intricate nature through a fine-grained classification. With this computer vision method, we calculated the mean distance change on the x and y axes between the start and end points of the indices in comparison with the signer's body center for 381 pointing signs in total (Free-Demonstratives, 228; Clitic-Demonstratives, 73; Pronouns, 54; Locatives, 26). The results show that Locatives are articulated with the greatest distance

change followed by Pronouns and Free-Demonstratives while Clitic-Demonstratives are articulated with the least distance change. Our results indicate that the higher the number of features a category holds, the higher the amount of phonological specifications are, extending (Pfau,2010). Therefore, the arguably semantically strong class, Locatives, exploits not only the horizontal x-axis but also the vertical y-axis to the fullest while Free-Demonstratives and Pronouns include fewer and more grammatical features and thus are phonologically weaker, usually only employing the x-axis. Lastly, Clitic-Demonstratives, perhaps more accurately labeled as Clitic-Determiners, might be on the grammaticalization process of losing some space related formal feature, and thus do not independently utilize either axis but depend on their host signs for space utilization.

Figure 2. *The Mean Distance Change of the Pointing Categories*



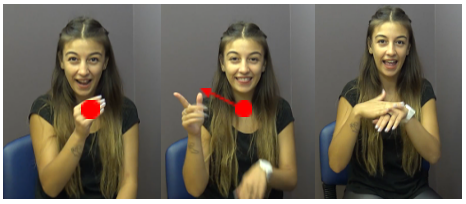
In summary, our comprehensive approach integrates insights from various domains, including distributional evidence, grammaticalization processes, feature geometry, and a novel computer vision method to offer a robust categorization perspective on the diverse functions of pointing in TİD.

(1) Clitic

FALL IX_{start} IX_{end} CAT**host**

'(The cat) has fallen (on its head.) The cat'

(2) Demonstrative



IX_{start} IX_{end} CAT

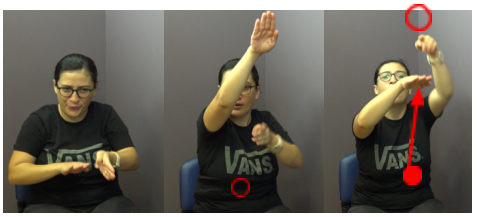
'The cat'

(3) Pronoun

ESCAPE IX WASH

'It escaped and washed (its hands.)'

(4) Locative



STEP IX_{start} IX_{end}

'Step is there.'

References: **Grose, D. (2021).** Person, Number and Location: A Feature Geometric Approach to Sign Language Pronoun. *Senri Ethnological Studies*, 65–86. **Harley, H., & Ritter, E.**

(2002). Person and number in pronouns: A feature-geometric analysis. *Language*, *78*(3), 482–526. **Pfau, R. (2010).** A point well taken. *Deaf around the World*, 144–163.