

# Multimodal grammaticalization of mouth activities in Turkish Sign Language: Is Route III possible?

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## Abstract

This paper presents the first comprehensive analysis of the forms and functions of mouth activities in Turkish Sign Language and focuses on the role of Turkish full/reduced mouthings (i.e., /var/, /va/, /vi/) and mouth gestures (i.e., biting lips) in existential constructions with/without the manual existential markers VAR1 and VAR2. The findings indicate that the construction [SIGN<sub>non-existential</sub> + mouthing /var/] first gains an existential/possessive function through morphosyntactic development. The phonological structure of the Turkish full mouthing /var/ then undergoes a reduction, resulting in the articulation of /va/ or /vi/. Ultimately, it evolves into the biting lips mouth gesture, representing the initial sound of /var/, 'v', which is a labiodental fricative. The evolving biting lips pattern, derived from the mouthing of /var/, provides a compelling case for re-evaluating the classification of "mouth gesture" in the literature. The preceding observations regarding the development of mouthings to mouth gestures thus lead to a number of theoretical questions concerning the nature of multimodal grammaticalization. In order to address these inquiries, the present study proposes an additional route, referred to as Route III, which builds upon the multimodal constructional development and differs from Wilcox's Route I and II in that it pursues the objective of "gesturalization".

**Keywords:** mouthings; mouth gestures; existential construction; grammaticalization; gesturalization.

## 1. Introduction

### 1.1 The existential signs in Turkish Sign Language

The topic of existential constructions (ExCs) in the signed modality seems to be quite challenging and has not been widely examined in most sign languages (SLs). Zeshan and Perniss (2008) maintain that the majority of SLs employ existential elements in possessive constructions and particular lexical verbs, such as 'have', to indicate existence, in a manner analogous to spoken languages. Similarly, the lexical signs VAR1 and VAR2 in Turkish Sign Language (TİD), which correspond respectively to the English words "there" and "have," are

used to form existential/possessive constructions (Figure 1). Although several studies have been previously devoted to the subject of ExCs (Zeshan & Perniss, 2008; Arık & Wilbur, 2008; Dikyuva et al., 2017; Makaroğlu, 2024), a comprehensive account of these lexical existential signs in TİD remains to be provided.



**Figure 1:** The existential marker VAR1 and VAR2 in TİD (Makaroğlu & Dikyuva, 2017).

To date, numerous scholars have posited that the primary function of VAR1 is to encode the notions of existentiality and possession in predicate position (Zeshan & Perniss, 2008; Arık & Wilbur, 2008; Dikyuva et al., 2017) (see 1–2). However, more recently, Makaroğlu (2024) suggested that in the post-verbal position, VAR1 is also employed in other linguistic functions with three distinct meanings: (i) habitual, (ii) evidential, and (iii) assumptive (see 3–5). Then, he maintained that in this position, the manual unit frequently comprises the simultaneous mouthing of the Turkish word ‘var’ ‘have/exist’, devoid of any discernible linguistic function. In other words, his preliminary observations lead to the conclusion that the case can be regarded as an example of ‘redundant mouthing’. Although VAR2 is documented within the TİD dictionary (Makaroğlu & Dikyuva, 2017), no studies have been identified in the literature that investigate its function and distribution.

- |     |  |               |                        |
|-----|--|---------------|------------------------|
| (1) | SCHOOL PROBLEM VAR1                              | (existential) | (Makaroğlu, 2024: 505) |
|     | ‘There is a problem at the school.’              |               |                        |
| (2) | POSS <sub>1</sub> CAR VAR1                       | (possessive)  | (Makaroğlu, 2024: 505) |
|     | ‘I have a car.’                                  |               |                        |
| (3) | SISTER IX <sub>1</sub> TOGETHER SWIMMING GO VAR1 | (habitual)    | (Makaroğlu, 2024: 506) |
|     | ‘I go swimming with my sister.’                  |               |                        |

<sup>1</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/0007/degiske/07-01\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/0007/degiske/07-01_cr_0.5.mp4)

<sup>2</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/0007/degiske/07-02\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/0007/degiske/07-02_cr_0.5.mp4)

- (4) IX<sub>1</sub> UNIVERSITY ENTER VAR1 (evidential) (Makaroğlu, 2024: 506)  
'I entered the university.'
- (5) MONEY COME SOON MONEY COME VAR1 (assumptive) (Makaroğlu, 2024: 506)  
'Money will come soon.'

## 1.2 Multimodality, translanguaging and mouth activity

Despite a growing consensus among language sciences scholars that language is inherently multimodal and primarily expressed in face-to-face communication (e.g., Perniss, 2018; Holler & Levinson, 2019; Hagoort & Özyürek, 2024), the term multimodality is inherently ambiguous, with various interpretations. It can be understood to refer to different physical channels of transmission, such as auditory and visual, or to the combination of linguistic structures with more pictorial and less conventionalized expressions, regardless of transmission mode (see Sandler, 2022 for detailed discussion). In the present study, the term 'mode' is adopted from Sandler (2022) and is defined as referring exclusively to the specific characteristics of communicative expression, rather than being limited to the physical channel. Building upon Sandler's definition, the notion 'multimodal' denotes the coexistence of linguistic and/or gestural modes, irrespective of the physical channel of transmission. To illustrate this point, the combination of speech (e.g., you) and co-speech hand gestures (e.g., pointing to an addressee); manual gesture in SLs (e.g., PALM.UP) and mouthings (/ama/ 'but'); conventionalized/lexicalized sign in SLs (e.g., YOK 'non.exist' in TİD) and mouthings (/yok/ 'non.exist' in Turkish); conventionalized/lexicalized sign in SLs (e.g., WORK) and adverbial mouth gestures in SLs (e.g. pursued lips), the combination of word and paralinguistic intonation (e.g. yessssss!) can be perceived as a multimodal construction. The employment of this terminology is advantageous due to its capacity to do without assumptions about which acts of meaning are or are not "linguistic," an issue that has been an ongoing discussion in the SL linguistics literature (see Lillo-Martin & Meier, 2011; Schembri et al., 2018). Multimodality studies are frequently conceptualized as providing analyses of social interaction, examining phenomena that are inherently related to language, yet not focusing exclusively on language per se (see Mondada, 2016 for a comprehensive overview). Recent research lends further support to a multimodal perspective on language. According to this view, phenomena that have historically been classified as non-linguistic may in fact be encompassed within the domain of grammar and susceptible to grammatical description.

The field of multilingualism research has recently undergone significant changes due to the introduction of the concept of 'translanguaging'. Contemporary researchers have advanced

beyond the conception of code-switching or code-mixing as a comprehensive explanation of the linguistic behavior exhibited by bi- and multilingual speakers (Li, 2017). These individuals do not engage in the act of switching between or mixing different ‘codes’, as defined by formal language systems. Instead, they demonstrate a capacity for adaptable utilization of a multifaceted array of semiotic resources. In light of the parallels observed between the focus on a diverse semiotic repertoire and dynamic language practice, Kusters et al. (2017) emphasize the merits of integrating these fields and propose that the language practices of signers can provide distinctive insights into the use and exploration of multimodal and multilingual repertoires. Thus, the study of SLs underscores the inherent multimodality and semiotics of language. In addition, a noteworthy thought experiment was posited by Vigliocco et al. (2014) that offers an intriguing perspective on this approach by posing the following question: What if the study of language had initiated with the study of signed language as opposed to spoken language? If the study of language had initiated with signed language, the multichannel/multimodal nature of language would have been a central focus from the very beginning. This underscores the importance of adopting a more holistic approach to language, encompassing both spoken and signed languages, while recognizing the diverse channels of expression and conceptualizing language within the context of its communicative functions. With regard to the mouth activities in SLs, an increasing number of linguists are coming to view mouthings as instances of translanguaging. This perspective is informed by the recognition that languages lack fixed boundaries in multimodal and multilingual ecologies. Furthermore, deaf individuals employ a variety of semiotic resources to fulfill their communicative needs (see Holmström & Schönström, 2018; Proctor & Cormier, 2023; Jaraisy & Stamp, 2024).

Due to its capacity for independent articulatory function, the mouth is capable of expressing multiple types of linguistic information simultaneously, in addition to the hands. This mouth activity has been found in virtually every SL studied so far (Johnston et al., 2016). This phenomenon has also received much interest in the last three decades and remains an area of fruitful research and ongoing debates, especially with its linguistic status (Crasborn et al., 2008; Bank et al., 2011; Mohr, 2014; Johnston et al., 2016; Giustolisi et al., 2017; Bauer & Kyuseva, 2022; Bisnath, 2024). Boyes Braem and Sutton-Spence (2001) discuss the mouth activity observed in signers, which can be divided into mouthings, which are derived from the surrounding spoken language, and mouthing gestures (or so-called multichannel signs, Johnston & Schembri, 2007), which are not.

Mouthings<sup>3</sup> serve various purposes in SLs, including disambiguating polysemous signs that have multiple related meanings; for example, in TİD, the sign for SAMPLE<sup>4</sup> (/örnek/<sup>5</sup> in Turkish) can also mean TEST<sup>6</sup> (/deneme/ in Turkish) or COURSE<sup>7</sup> (/kurs/ in Turkish) depending on the context and/or mouthing. Mouthings are therefore readily accessible to signers and help to express meaning by providing visually salient cues that help to disambiguate or clarify the signs being manually produced (Bank et al., 2011). Since, using different output channels, manual signs and vocal speech can be produced simultaneously without articulatory constraints. On the other hand, mouth gestures are categorized as an inherent category of SL and are distinct from mouthings. They usually serve as empty semantic components of signs or provide additional adjectival or adverbial semantic information beyond that provided by the manual signs (Crasborn et al., 2008). To illustrate, in TİD, the mouth gesture of tooth-clenching with verbs conveys an adverbial meaning, indicating that the action is performed with considerable difficulty as demonstrated in (6).

- (6) Mouth: tooth-clenching  
Manual: ROCK MOUNTAIN SLOPE WALK  
'I walked up the mountain slope with difficulty.' [06.015 S:00:35 E:00:37]



Crasborn et al. (2008) put forth a detailed typology of mouth activities to differentiate between mouth gestures and mouthings. This typology is based on three key properties: (1) the independent or dependent meaning conveyed by the mouth; (2) whether the mouth action is or is not lexically connected to the manual sign; and (3) whether the mouth component is or is not borrowed from the surrounding spoken language. Although the binary classification of mouth activities was accepted unquestioningly in most studies, as Vogt-Svendsen (2001) and Schermer (2001) note, the distinction between mouthings and mouth gestures is not always clear-cut. The signer's prior experience may influence the perception of a given mouth pattern as a word in the surrounding language. Lewin and Schembri (2011) observed various instances of tongue protrusion in their dataset with the British Sign Language (BSL) sign for 'nothing' that were unclear whether they represented the semantically empty mouth gesture [θ] or [θ] as a reduced mouthing of the word 'nothing'. In her study of mouthing activity in Hong Kong Sign

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<sup>3</sup> Mouthings are not instances of spoken Turkish. Rather, they are the result of a kind of silent mouthing of a Turkish word that is produced while signing.

<sup>4</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/0946/degiske/946-01\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/0946/degiske/946-01_cr_0.5.mp4)

<sup>5</sup> The segments between the forward slashes are mouthings.

<sup>6</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/1424/degiske/1424-01\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/1424/degiske/1424-01_cr_0.5.mp4)

<sup>7</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/0546/degiske/546-03\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/0546/degiske/546-03_cr_0.5.mp4)

Language (HKSL), Siu (2007) interviewed a deaf native signer and recorded her opinions on whether her own mouthing was mouthing or gesturing, which did not always agree with the opinions of another deaf native HKSL user acting as a reviewer. In a previous study, Bergman and Wallin (2001) also conducted a preliminary analysis of the visual segments of mouthing gestures in comparison to mouthings. The results of this study suggest that mouthings follow the same native pattern as mouthing gestures. Specifically, when mouthing a Swedish target word with multiple phonemes, it tends to be reduced to just one or two segments, such as opening and closing. Furthermore, mouthings can be shortened to mirror that of a single syllable or segment, as demonstrated in the Dutch Sign Language (NGT) mouthing example 'see' which changed from 'zien' to 'z' (Bank et al., 2015). One of the earliest studies on mouth activities, Schermer (1990) even goes so far as to argue that temporally reduced mouthings are similar to mouth gestures, in that they can no longer be identified by themselves as spoken lexical items. The aforementioned observations give rise to a number of significant theoretical inquiries. To what extent must the syllabic structure of a given mouthing be reduced before it can be classified as a mouth gesture? What linguistic evidence exists to prove that existing mouth gestures are not derived from mouthings? Is the identification of mouth activity as either mouthing or a mouth gesture based on the audience's perception?

### 1.3 Research questions

VAR1 is sufficient to fulfil the function of an existential/possessive marker without any mouthings, as illustrated in (7), and the accompanying redundant mouthings are usually semantically congruent. However, an analysis of the corpus data revealed that in certain instances, the full /var/ (8), reduced /va/ (9) Turkish mouthings and biting lips (bl) (10) occur with other non-existential manual signs simultaneously and can be considered as existential/possessive constructions<sup>8</sup>.

(7) Mouth : *(no mouth activity)*  
 Manual: DAY+ VAR1 INSHALLAH  
 'There are many more days, inshallah.' [42.002 S:00:20 E:00:22]



(8) Mouth : \_\_\_\_\_/var/  
 Manual: PT5.close.bend:PRO1 SOMETIMES PT5.open:PRO1  
 'I sometimes made (mistakes).' [38.001 S:09:25 E:09:27]




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<sup>8</sup> Although previous studies (Vogt-Svendsen, 2001; Suwiryono, 2013) have emphasized the cooccurrence of distinct meanings of manual signs and mouthing, often described as "complementation" and "simultaneous compounding," this study employs the term "construction" based on Cognitive Grammar.

(9) Mouth : \_\_\_\_\_ /va/  
Manual: PT1:PRO1 WORK PT5.close.bend:PRO1  
'I have a job.'

[42.009 S:03:37 E:03:38]



(10) Mouth : \_\_\_\_\_ bl  
Manual: FRIEND PT1 MONEY POCKET  
'My friend had money in his pocket.'

[07.009 S:01:40 E:01:42]



These cases show that it is necessary to examine the obligatory versus optional nature of mouthings and its variations in order to better understand the nature of the relationship with existential/possessive constructions. The current paper explores potential analogies between the Turkish mouthings of /var/ and mouth gesture “biting lips” in existential/possessive function and their grammaticalization pathway by investigating their co-occurrence with non-existential signs in more detail. More precisely, it addresses previous questions about whether reduced mouthings can be grammaticalized into mouth gestures via the gesturalization route, while also addressing the following research questions:

- i. What is the linguistic motivation for the emergence of the existential construction [SIGN<sub>non-existential</sub> + mouthing /var/]?
- ii. Does the Turkish existential mouthing /var/ undergo a multimodal development into the biting lips gesture via the gesturalization pathway?
- iii. In comparison to Wilcox's theory of the grammaticalization of gestures, what is the grammaticalization route that underlies the development from mouthings to mouth gestures?

As has been widely documented, SLs, including TID, have a dearth of historical written records, with most available video recordings pertaining to the past 40–50 years. Consequently, an analysis of grammaticalization from a synchronic perspective represents a crucial methodology for elucidating constructional change in the signed modality. To address the research questions listed above, the current research employs the synchronic method to uncover the grammaticalization pathway of the Turkish existential mouthing /var/.

## **1.4 The structure of the article**

This corpus-based study provides systematic constructional analyses of the multimodal construction [SIGN<sub>non-existential</sub> + mouthing /var/], and is structured as follows: Section 2.1 surveys the literature on the mouthings and Section 2.2 outlines the descriptions and functions of mouth gestures. Section 3 describes Wilcox's theory on grammaticalization of gestures. Section 4 presents the corpus used in the analysis and the methodology of the current study. Section 5.1 traces the emergence of the construction [SIGN<sub>non-existential</sub> + mouthing /var/] by examining phonological changes. Section 5.2 examines the distribution of mouth activities in ExCs. Section 5.3 proposes the possible development path of the multimodal construction named as Route III. Finally, Section 6 concludes and offers theoretical insights for future studies.

## **2. Mouth activities in signed modality**

### **2.1. Mouthings: Description, form, and function**

Crosslinguistically, the term "mouthings" is defined as movements of the mouth that signal specific words, spoken in synchrony with the surrounding spoken language (Boyes-Braem & Sutton-Spence, 2001). For more than 30 years, the analysis of mouthings has constituted a central topic within the field of linguistic research, with pioneering works by Vogt-Svendsen (1981) and Schermer (1990) at the forefront of this research area. However, there is still a paucity of detailed descriptions of mouthings in a significant number of SLs, including TID (see Bisnath, 2024 for the detailed typology of mouthings).

Despite the extensive research conducted, particularly on NGT, Australian Sign Language (Auslan), BSL, German Sign Language (DGS), Russian Sign Language (RSL), and Irish Sign Language (ISL), there is a notable divergence of opinion regarding the ascribed status due to a lack of consensus regarding its production and ideological variations, both between and within SLs. The question that has thus far occupied a central position within the ongoing debate whether is mouthings represent constitutive units of SLs or instances of code mixing (see Bauer, 2019 for a detailed discussion). In this discussion, some scholars posit that it is a category that belongs to the phonological description of a sign, alongside other categories such as handshape, location, and movement (see Boyes-Braem & Sutton-Spence, 2001; Sutton-Spence & Day, 2001; Vogt-Svendsen, 2001; Crasborn et al., 2008; Hosemann, 2015; Steinbach, 2016). Moreover, Lin (2019) presents evidence indicating that mouthing is a crucial element in determining the precise meaning of interrogatives in Chinese Sign Language. Additionally, Bauer and Kyuseva (2022) contend that the RSL data exemplify a distinct function of mouthing,



termed the "discourse function," due to its association with the phenomenon of turn-taking. In contrast, others refer to mouthings as instances of code-blending, whereby signers can simultaneously and unrestrictedly combine linguistic components of spoken and sign languages (see Ebbinghaus & Heßmann, 2001; Hohenberger & Happ, 2001; Vinson et al., 2010; Bank et al., 2011, 2016; Johnston et al., 2016; Giustolisi et al., 2017; Perniss et al., 2020). It is also explicitly excluded from the formal grammars of SLs (Johnston et al., 2016; Giustolisi et al., 2017).

It has been posited by various studies that mouthings are a communicative alternative that has emerged as a result of the hearing majority's use of spoken language. This phenomenon can thus be attributed to the systematic linguistic contact between the hearing and deaf communities (Johnston et al., 2016; Giustolisi et al., 2017). The study on metalinguistic awareness conducted by Fontana and Ferrara (2019) revealed that signing without mouthings is perceived by native speakers as being non-fluent and inauthentic. Mouthings are also regarded as an indispensable and integral component of the linguistic repertoire of deaf native signers in monolingual settings (Mohr 2012, 2014; Bauer & Kyuseva, 2022). Furthermore, Bank (2014) notes that mouthing is a ubiquitous phenomenon in the production of SL among deaf native signers. Johnston et al. (2016) presents a parallel observation, namely that mouthings occur even during signed conversations between native signers in the absence of a hearing individual. A study of the DGS corpus revealed that over 80% of all utterances included at least one instance of mouthing. This indicates that mouthings are a ubiquitous feature of typical signed utterances (Ebbinghaus & Heßmann, 1995). In the case of Auslan data, it was also observed that over 70% of all mouth activities were of the mouthing variety (Johnston et al., 2016). Similarly, in the context of NGT data, over 80% of all mouth activities were identified as mouthing (Bank et al., 2011). In their analysis of the RSL corpus, Bauer and Kyuseva (2022) found that while 88% of all manual signs were accompanied by some form of mouth activity, such as mouthing or mouth gesture, the rate of mouthing among manual signs in the studied data was only 44%.

While there are various categorizations based on form, mouthings can be classified into four primary categories: fully pronounced, inflected, temporally reduced, and spread across neighboring manual signs (see Bank et al., 2011; Mohr, 2014; Bauer, 2018; Bauer & Kyuseva, 2022 for detailed information). In **full mouthing**, a manual sign is combined with a complete and unreduced word, which is then articulated in a distinct and recognizable manner. This is

exemplified by the sign BABA<sup>9</sup> (father) in TİD, which is typically accompanied by the corresponding spoken word in Turkish, /baba/. The term **reduced mouthing** is used to describe instances where the components are not visually discernible, with only select syllables or even specific elements or sounds of a lexical item being articulated. To exemplify, the TİD sign HAZIRLIK<sup>10</sup> (preparation) is articulated with the mouthing of hazır(lık), with the portion of the lexical item enclosed in brackets not being visible on the lips. Furthermore, it should be noted that mouthings is lexically contrastive in TİD (Taşçı, 2020: 86).

A study of Swedish Sign Language (SSL) conducted by Mesch and Schönström (2021) revealed that deaf signers of an L1 utilize reduced mouthings with greater frequency than L2 learners. In contrast to the inflectional characteristics of Finnish, Pimiä (1990: 117) reports that mouthings are mostly uninflected. In a similar vein, Hohenberger and Happ (2001: 160) note that spoken inflection doesn't accompany mouthed verbs in DGS. In a more recent study, Bauer (2019) argues that when a mouthing is borrowed from a spoken language, it typically displays the citation form of the corresponding word or undergoes a reduction in its morphological features. To date, two distinct perspectives have been proposed to explain why the mouthings of the signers contain only partial components of the spoken words in the literature. The first assumption is that the reduced mouthing corresponds to the rhythm of the (mono)syllabic form of the manual sign (Sandler & Lillo-Martin, 2006: 105). The second assumption is that it is the stressed part of the spoken word that is usually mouthed. For example, Bank (2014: 40) observed in NGT corpus data that mouthing reduction only affected unstressed syllables, leaving the stressed syllable of the correspondent spoken Dutch word always visible. Likewise, the findings from the Auslan and DGS data showed that the reduction of voicing typically occurs through the deletion of a consonant or syllable at the end of a word that is normally not stressed in Germanic speech (Ebbinghaus & Heßmann, 1995; Johnston et al., 2016).

The concept of **inflected mouthing** has been identified as a form that bears resemblance to an inflected spoken lexical item. The usage of these inflected forms for any morphosyntactic category in mouthings reveals that not only is the lexicon of the spoken language employed in the process of signing, but also that its grammar is in use. As illustrated in the provided example (11), the data indicates that mouthings in TİD function as an indirect evidential marker on the verb.

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<sup>9</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/0025/degiske/25-01\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/0025/degiske/25-01_cr_0.5.mp4)

<sup>10</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/1162/degiske/1162-01\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/1162/degiske/1162-01_cr_0.5.mp4)

- (11) Mouth: problem var- -mıŝ  
 problem have PST.INDIR  
 Manual:PROBLEM VAR [07.009 S:07:24 E:07:25  
 ‘He had a problem.’

The notion of **overlapping mouthing**, also referred to as "spreading mouthing," denotes a mouthed form that either anticipates or extends beyond the boundaries of manual production. In the RSL data, as exemplified by Bauer and Kyuseva (2022: 11), the mouthing of čúv(stvovat') 'to feel'" binds the head of the verb phrase without the argument and the subject. Given that the subject is represented by a pointing sign and occupies a position prior to the verb, the spreading can be classified as regressive as in (12).

- (12) Mouth: no čúv(stvovat')\_\_\_\_\_ Rossija (Bauer & Kyuseva, 2022: 11)  
 Manual: BUT IX-1 FEEL PU RUSSIAN  
 ‘But I feel Russian [power].’

As with the various classifications of mouthings, numerous functional typologies have been proposed (Schermer, 1990; Boyes Braem, 2001; Bank et al., 2011; Mohr 2012, 2014; Bank, 2014; Lin, 2019; Bauer & Kyuseva, 2022). This paper will examine four fundamental functions, which encompass the most prevalent types discussed in previous studies: congruent (also known as standard), morpho-phonological, morpho-syntactic, and free. In **congruent constructions**, the mouthings correspond to the manual sign. To illustrate, in RSL, the mouthings for the Russian word "dom" (meaning "house") are produced during the formation of the manual sign for "house" as shown in (13). It is plausible that this type of mouthing is part of the phonological representation of the sign or may enhance the perception of well-formedness.

- (13) dom ('house')  
 CL:HIGH HOUSE CL:HIGH  
 ‘There is a high building’ [RSL] (Bauer 2018: 12)

In **morpho-phonological constructions**, mouthing serves a phonological role in differentiating signs that have the same manual form (cf. Ebbinghaus & Hessman, 2001), also known as disambiguation (Kuhn & Wilbur, 2006; McKee, 2006; Crasborn et al., 2008; Hendriks, 2008; Lin, 2019). For instance, the Auslan sign for "spouse" uses the English pronunciation of "wife" or "husband" (Johnston & Schembri, 2007). In **morpho-syntactic constructions**, the manual sign and the mouthing have their own specific meanings. These meanings are also referred to as complementation and simultaneous compounding (Vogt-Svendsen, 2001; Suwiryo, 2013). When these two elements are combined, they form a complex morpho-syntactic construction with a composited meaning. Moreover, it lacks a semantic relationship with the manual sign, yet it offers a subtle nuance of meaning. To illustrate, in

NGT, the sign for "to eat" is followed by the mouthing of brood (or "bread") to convey the meaning of "to eat bread", as in (14)

- (14) brood ('bread')  
ETEN ('to eat')  
'eat bread' [NGT] (Crasborn et al., 2008: 48)

In **free constructions**, mouthing occurs without an accompanying manual sign (also called independent, solo, and added mouthing (Bank, 2014: 91), which are not included in Mohr's (2012) typology). Bank (2014) differentiates between solo mouthing and added mouthing: in solo mouthing the hands are at rest, whereas in added mouthing the hands are in a transitional phase. As shown in (15), he also provides examples of free mouthing strings in NGT. These strings are used to confirm propositions and provide backchannel feedback.

- (15) ja ('yes') klopt ('right') mooi ('nice') weer ('weather')  
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'Yes, that's right, the weather was good' [NGT] (Bank, 2014: 97)

## 2.2. Mouth gestures: Description and function

In principle, a mouthing gesture is often considered to be an oral component that is not deduced from spoken language. It can also be defined as a single or multiple unvoiced syllables or an exhalation. Furthermore, it is postulated that they emerge within the context of SL and are perceived as the instinctive use of the mouth by a native signer. Crasborn et al. (2008) proposed a more detailed classification and identified four categories of mouth gestures: (i) adverbial or adjectival mouthing (A-type), (ii) echo or semantically empty mouth gestures (E-type), (iii) enacting or "mouth for mouth" gesture (4-type), (iv) mouth as part of the whole face activity (W-type).

In **adverbial or adjectival mouth gestures**, these gestures are employed to modify the semantic value of a manual sign. To illustrate, in most SLs, the act of sucking in the cheeks is utilized to convey the notion of something that is diminutive or slender in form. In their respective works, Liddell (1980) and Sutton-Spence and Woll (1999) present examples of the adverbial use of mouthing in American Sign Language (ASL) and BSL. They contend that the act of protruding the lips slightly and closing them indicates that the action signified by the verb associated with the mouthing has been completed.

**Echo or semantically empty mouth gestural types** (E-types) are defined by Woll (2014: 2) as "characterized by echoing certain hand articulatory activities on the mouth". This suggests that such mouth gestures may be understood as the mouth's automatic response to the

way the hands move. As a result, these mouth gestures are typically devoid of additional meaning, functioning merely as echoes of hand movements. For example, TİD signers employ a consistent set of mouth gestures to produce the sound of a heartbeat /pa-pa-pa/ when using the manual sign HEARTBEAT. This suggests that the mouth gesture is deeply rooted in perceptual experience and must be articulated in synchrony with the manual sign. Hence, the number of repetitions of the mouth gesture should align precisely with the number of repetitions of the co-occurring manual sign. In the **enacting or mouth-for-mouth gesture** (4-type), the mouth is seen to perform actions of its own movement, such as yawning or chewing. An illustrative example of this type of mouth gesture is the repeated movement of the tongue to lick ice cream, while concurrently producing the manual ICE-CREAM<sup>11</sup> sign in TİD. In the **mouth as part of the whole face activity** type (W-type), mouth gestures must be evaluated within the context of the overall facial expressions, which typically indicate emotions such as anger, surprise, and disgust.

Although the vast majority of studies on mouth gestures in the TİD literature do not directly address the concepts of grammaticalization or constructional change, it has been previously documented that mouth gestures are capable of performing a number of grammatical roles in TİD, including negation, aspect, evidentiality, and pluractionality. The summary of these previous studies on the grammaticalization of mouth gestures in TİD is presented in Table (1).

**Table 1:** The summary of previous studies on the grammaticalization of mouth gestures in TİD.

Reference	Form	Function
Zeshan, 2003; Makaroğlu, 2021a	Puffed cheeks	Negation marker
Kubuş, 2008	Tongue protrusion	Completive aspect
Kubuş & Rathmann, 2009	Tongue protrusion (called as a ‘pt’),	[+past, +telic] marker
Dikyuva, 2011	Tongue protrusion (called as a ‘bn’),	Completive marker
Dikyuva, 2011	Protruding the tongue slightly between the teeth and flicking it up and down repeatedly (called as a ‘lele’)	Continuative/durative marker
Dikyuva, 2011	Gritting the teeth and pulling back the corners of the mouth (called as a ‘ee’)	Inceptive aspect marker

<sup>11</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/1730/degiske/1730-01\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/1730/degiske/1730-01_cr_0.5.mp4)

Karabüklü, 2016; Karabüklü & Wilbur, 2021	Tongue protrusion (called as a ‘bn’),	perfective marker
Dikyuva et al., 2017	Holding air in mouth (called as a ‘ap’)	Negative completive aspect marker
Karabüklü & Wilbur, 2019	Lowering mouth corners (also known as “horseshoe mouth”)	Evidential marker
Makaroğlu, 2021b	Repeating the act of holding and releasing breath with puffed cheeks (approximately /pa-pa-pa/)	Pluractional marker
Makaroğlu, 2023	Closing lips and protruding in a single movement by a brown frown	Disapproval marker
Güçlütürk & Öztürk, 2024	Lowering mouth corners (also known as “horseshoe mouth”)	Irony marker (sarcasm)

Although previous studies have explored these aspects of mouth gestures, there is still much to be discovered about the potential links between mouthings and mouth gestures, or what is commonly referred to as the "spoken-sign language interface".

### 3. Wilcox's theory on gesture grammaticalization

Despite decades of research into the precise relationship between gestures in incommunicative contexts, such as co-speech gestures, facial expressions, and emblems, scholars have only within the past thirty years begun to comprehend the intricate interrelationship between SL and gesture (Armstrong et al., 1995; Wilcox 2004, 2007). With regard to the grammaticalization of gestures, as proposed by Wilcox (2004, 2007), there appear to be two distinct routes through which gestures enter the SL system (16). Wilcox developed this theory on the basis of cross-linguistic and historical data from four different signed languages.

(16) **Route I:** *gesture* → *lexical morpheme* → *grammatical morpheme*

**Route II:** *gesture* → *prosody/intonation* → *grammatical morpheme*

The source of the Route I is a free-standing, non-conventional gesture which develops into as a lexical unit as shown in spoken languages. The lexical elements undergo a semantic extension, that is, a grammaticalization trajectory by which modal markers develop. The Route II starts with a ‘bound’ gesture (e.g., facial expression) that is first incorporated into the linguistic system of SL in the intonation contour of language expression. Route II differs from Route I in that it does not involve a stand-alone gesture that goes through the process of lexicalizing. In this route, the source gesture can be defined as a specific movement of a manual gesture or sign, including facial, mouth, and eye movements (Wilcox, 2004). In particular, this path follows a

developmental trajectory from gesture to prosody to grammatical morphology, skipping over any and all lexical stages (Wilcox et al., 2010: 332). Gestures that follow Route II are unconventional and rely on other autonomous constructs; in other words, this type of gesture presupposes the existence of other constructs for it to manifest (Wilcox, 2004: 59).

Examples of the Route I have been reported in a variety of SLs (e.g., Wilcox & Wilcox, 1995; Shaffer, 2000, Zeshan, 2000; Janzen & Shaffer, 2002; Wilcox, 2004; Janzen, 2012). For an instance, the sign THANK in Indo-Pakistani Sign Language is derived from a very similar gesture used by people. This gesture has the same semantic meaning, but its use is limited to beggars (Zeshan, 2000). Janzen and Shaffer (2002) identified the source of ASL's future morphemes as an ancient Mediterranean gesture, still used by the hearing population of the Mediterranean region as a sign of departure. This gesture first developed as the lexical morpheme PARTIR, meaning 'to depart.' The full grammaticalization path thus appears to be: [gesture signaling departure] > PARTIR "leave/depart" > FUTURE. In another example from TİD, the sign TEACHER<sup>12</sup> is gesturally represented by a wagging index finger (from the back to the front), a gesture that is still commonly used among people in Turkey to signal a reprimand. The motivation behind these extensions can thus be attributed to pragmatic inferences (Traugott & König, 1991) and metaphoric interpretations (Heine et al., 1991).

As Wilcox (2014) asserts, the raised eyebrow in ASL functions as a grammatical marker for interrogatives, topics, and conditionals. This is an illustration of Route II grammaticalization, which has its roots in the "surprise gesture" documented by Darwin (1872). Moreover, Janzen postulates that the eyebrow raising of polar questions underwent further grammaticalization to become a marker for topic constructions in ASL, and that the second stage of the grammaticalization pathway was motivated by the fact that topic constructions imply the polar question "Do you know X?", as shown in (17) (Janzen and Shaffer 2002; Janzen 2012):

(17) Generalized questioning gesture > polar questioning marking > topic marking

Consistent with Janzen's suggestion, Pfau (2015) suggests that the head shaking used by people to express negatives has been grammaticalized to become the nonmanual marker of the negation in SLs, and this can be seen in all SLs known so far. Zeshan (2006) also provides robust evidence for the grammaticalization of headshakes. The evidence shows that headshakes are synchronized with manual negative signs and their scope of spreading is subject to language-

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<sup>12</sup> [https://tidsozluk.aile.gov.tr/vidz\\_proc/0094/degiske/94-02\\_cr\\_0.5.mp4](https://tidsozluk.aile.gov.tr/vidz_proc/0094/degiske/94-02_cr_0.5.mp4)

specific constraints. In his evolutionary path for headshakes in SL negation, Pfau (2015) postulates that in the emergent stage of a SL, deaf signers only use a manual negative sign to perform a negation function, and headshakes are occasionally used to emphasize. As it becomes more common, it is grammaticalized to become a negative morpheme, occurring together with the manual negation.

#### 4. Methodology

As mentioned above, while some previous studies briefly mention mouthing activities in TID, no studies have yet been carried out to provide a detailed analysis of the distribution of mouthings. This paper provides the first comprehensive analysis of the forms and functions of mouth actions, with a particular focus on ExCs. A multimodal perspective on the analysis of mouth activities presents a promising avenue for advancing our understanding of the underlying mechanisms through which mouthings are grammaticalized into linguistic markers as a result of language contact. This section is a description of the study's methodology and an outline of the research questions that will be addressed in the remainder of the article.

##### 4.1. Data collection and selection

The primary data source for the present study was the TID Corpus (as detailed in Dikyuva et al., 2017), which represents a diverse group of 116 native signers from 26 cities across Turkey. The signers, who ranged in age from 12 to 65, were either born deaf or became deaf before the age of three after early exposure to TID. In this way, it is possible not only to identify synchronous variation, but also to examine it in relation to age groups, thus allowing the estimation of micro-diachronic change using Labov's Apparent Time Hypothesis<sup>13</sup>, as shown in Table (2).

**Table 2:** TID signers according to age group.

Group	Age	Born	Person (n)	Tokens
Young adults	16-28	1987-1999	28	44588
Middle-Aged Adults	29-44	1986-1971	20	37459
Older Adults	45-62	1970-1953	10	19090

This study involved the analysis of 860 minutes of dyadic video conversations of 58 native TID signers from 15 different cities in Turkey, namely Adana, Ankara, Antalya,

<sup>13</sup> It assumes that a person's language does not change significantly after puberty and inferred diachronic changes from synchronic data collected from different age groups (Labov 1963).



Balıkesir, Bursa, Çanakkale, Diyarbakır, Edirne, Eskişehir, İstanbul, İzmir, Kars, Kayseri, Kocaeli, and Konya. The dataset comprised 101,137 sign tokens, representing approximately 12.64% of the TİD corpus. Furthermore, the study sample comprised 1,024 ExCs including manual existential markers (i.e., VAR1 and/or VAR2) and/or existential mouth activities (i.e., Turkish full/reduced mouthings such as /var/, /va/, /vı/ or mouth gestures with/without VAR1 and VAR2).

## 4.2. Analysis and procedure

The free annotation tool ELAN (<http://tla.mpi.nl/tools/tla-tools/elan/>) for multimedia resources developed by the Max Planck Institute for Psycholinguistics, the Language Archive, Nijmegen, The Netherlands (Sloetjes & Wittenburg, 2018) was used to annotate all manual signs and mouth activities. A code scheme was assigned to each token in the TİD corpus, indicating its geographical location, video file, and start/end time. To illustrate, the code [city.code:video.file-S:start-E:end] represents an exemplary token from Ankara, video file 05, beginning at 03:45 and concluding at 03:47. Despite the TİD corpus having been previously coded by deaf native signers of TİD, further research was required to provide detailed annotations especially regarding the mouth activities, as the existing annotations were unable to meet the specific requirements of this research. In the first step, based on the research questions, existential/possessive constructions including manual existential markers (i.e., VAR1 and/or VAR2) and/or existential mouth activities (i.e., Turkish full/reduced mouthings such as /var/, /va/, /vı/ or mouth gestures with/without VAR1 and VAR2) were identified in the corpus data. In a second step, the linguistic features of these constructions were annotated in order to categorize the aspects of these constructions. Therefore, additional ELAN tiers were added to define the characteristics of the constructions to be analyzed. In this detailed coding, the sample of 1,024 ExCs was then coded for (i) clause position, (ii) mouthing type and spreading behavior, (iii) mouth gesture type and spreading behavior, and (iv) function. The coding scheme, which is largely based on the approach outlined by Bauer and Kyuseva (2022), is presented in Table (3).

**Table 3:** The coding scheme was used in ELAN.

Category	Subcategory	Description
R1	<i>gloss</i>	First signer's right hand
L1	<i>gloss</i>	first signer's left hand
R2	<i>gloss</i>	second signer's right hand
L2	<i>gloss</i>	second signer's left hand
Ex-ID-gloss	VAR1	-
	VAR2	-
Pre-location	<i>gloss</i>	a manual sign in L1 position

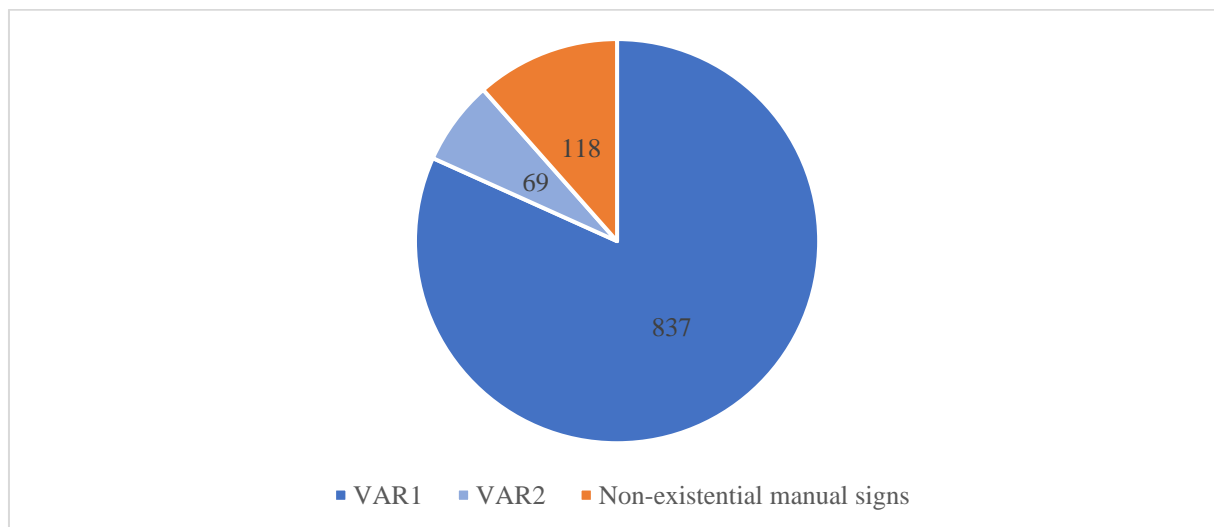
Post-location	<i>gloss</i>	a manual sign in R1 position
Type of mouthing	full	a manual sign is accompanied by a complete mouthing (i.e. /var)
	inflected	It is a linguistic form that is similar in structure to an inflected Turkish lexical element (i.e. /varmıŝ)
	reduced	a specific type of mouthing in which only a subset of syllables or even individual phonemes from a lexical item are articulated (i.e. /va)
	free	a mouthing behavior that is not accompanied by a manual sign
	variant	a form of spoken lexical word that varies from the congruent mouthing
	unreadable	an undetectable mouthing
Type of mouth gesture	biting lips	-
	other	other mouth gestures except from biting lips (i.e. tongue protrusion, pursued lips etc)
Mouthing-spreading	single	a mouthing doesn't spread
	double	a manual sign is accompanied by two different mouthings
	right left	mouthing spread progressively to the next manual sign mouthing spread regressively to the previous manual sign
Mouth gesture-spreading	single	a mouth gesture doesn't spread
	right left	mouth gesture spreads the next manual sign mouth gesture spreads the past manual sign
Function	ex	existential
	poss	possessive

The annotated forms and translations of the exemplars were coded by a hearing researcher who has a proficient level of TİD. The degree of visibility of parts of the target Turkish word in the mouthing can vary from one instance to another. As a result, it can sometimes be challenging to ascertain the characteristics of a mouthing and associate it with a targeted Turkish word. To ensure accurate categorization of mouth activity tokens, where low visibility exists, three native deaf TİD signers who are employed as TİD lecturers at the university were consulted.

### **5. The multimodal constructional development: redundant mouthings to grammaticalized mouth gesture**

The present study offers valuable insights regarding the frequency characteristics of mouth activities in TİD. As illustrated in Figure (2), the statistical analysis reveals that the most prevalent type of VAR1 in the database accounts for 81.74% of the current sample, comprising 837 tokens. Furthermore, the other manual existential marker, VAR2, represents 6.74% of the total with 69 tokens. It is noteworthy that non-existential manual signs, including mouthings

(e.g., /var/) and/or mouth gestures (e.g., biting lips), comprise 11.52% of the data, with 118 tokens. These findings clearly indicate that, while VAR1 exhibits a high frequency distribution, non-existential manual signs with mouth activities have a notable frequency distribution and are more frequent than VAR2.



**Figure 2:** Distribution of manual signs in the existential/possessive constructions.

Table (4) provides an illustration of the distributional tendencies of types of existential/possessive constructions. The results indicate that VAR1 and VAR2 are the first two in the frequency list, in that order. In contrast, in addition to these two existential manual signs previously discussed, 20 non-existential signs also encode the existential/possessive role together accompanied by the mouth activities. While function words such as PT5.close and PT1 are ranked relatively high, content words such as WORK and POCKET can also be considered existential/possessive constructions when in conjunction with the mouth activities.

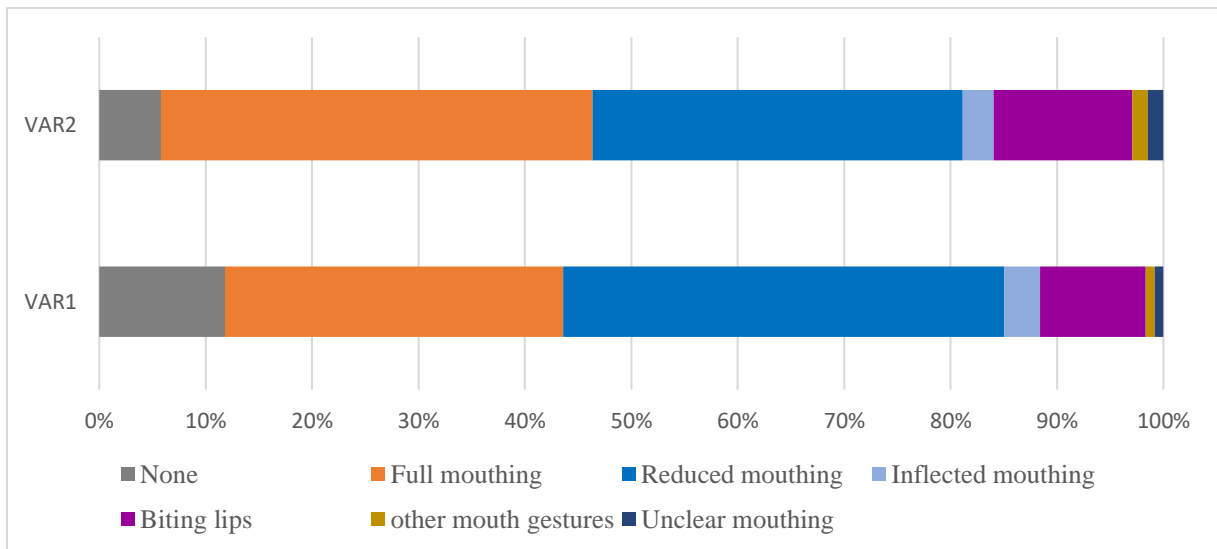
**Table 4:** Rank frequency profile of the existential/non-existential manual signs.

Gloss type (n= 22)	Token (n)	Proportion (%)
VAR1	837	81,74
VAR2	69	6,74
PT5.close	39	3,81
5open.horizantal.top.down	20	1,95
5open.vertical.top.down	13	1,27
PT5.close.bend:PRO1	12	1,17
PT1	9	0,88
WORK	5	0,49
PT5.open:PRO1	3	0,29
PT1:PRO1	3	0,29
PT5.open	2	0,20

POCKET	2	0,20
AWAY	1	0,10
ROAD.DISTANCE	1	0,10
GROUP	1	0,10
HOUR	1	0,10
DEAF	1	0,10
HAND.MONEY	1	0,10
PALM.UP	1	0,10
HEAD	1	0,10
DISGRACE	1	0,10
OWNER	1	0,10

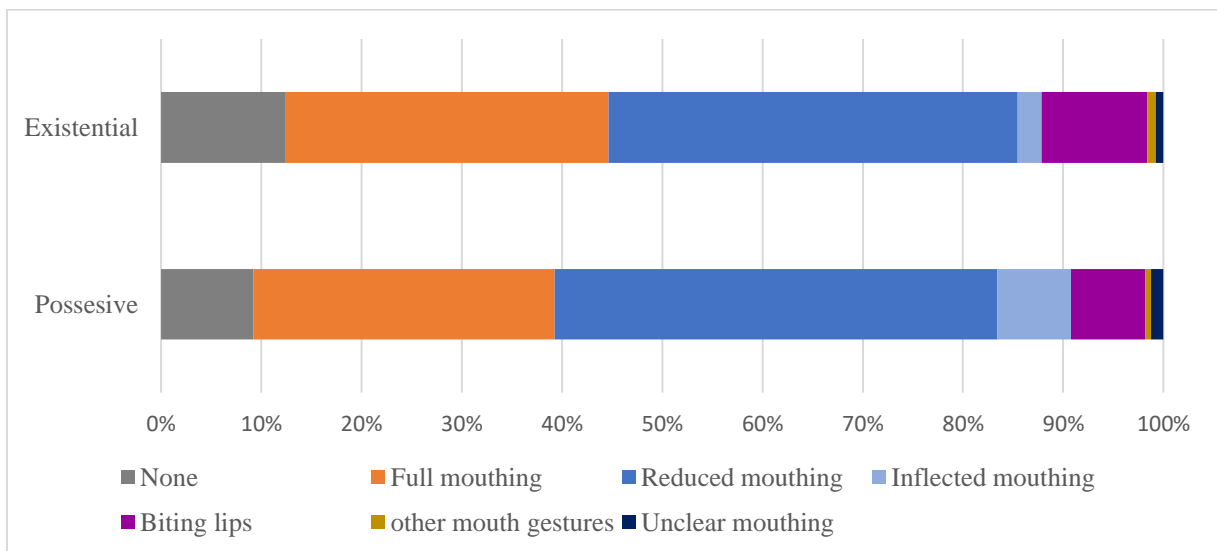
### 5.1. The distribution of mouth activities in existential/possessive constructions

The question of mouth activities is central to understanding grammaticalization existential/possessive constructions in TİD. The data demonstrate that Turkish mouthings frequently co-occur with existential manual signs VAR1 (n= 837) or VAR2 (N=69). While reduced mouthings are uncommon in Auslan, as observed by Johnston et al. (2016: 21), a substantial proportion (77.42%) of all VAR1 tokens in the TİD corpus are accompanied by mouthings, encompassing their full, reduced, and inflected forms (Figure 3). In comparison, the mouthing rate of VAR2 tokens in the corpus data reaches 79.71%. Additionally, the occurrence of mouthings for these two manual existential signs in the TİD exhibit a relatively higher frequency than that observed in the overall distribution of mouthings in other SLs described in previous studies (see, for example, NGT, 73% Bank et al., 2011; Auslan, 56% Johnston et al., 2016; RSL, 44% Bauer & Kyuseva, 2022). Regarding the occurrence of mouth gestures, it was observed that 9.92% of all VAR1 tokens in the TİD corpus were accompanied by biting lips. In the case of VAR2 tokens in the corpus data, the rate of biting lips is 13.04%. This indicates that only 11.83% of all VAR1 and 5.80% of all VAR2 tokens were not accompanied by either mouthings or mouth gestures. The occurrence of inflected mouthings was observed in only 3.35% of all cases in VAR1 and 2.90% in VAR2. Also, the majority of these inflected mouthings of VAR1 and VAR2 can be classified into three distinct categories: (i) question (i.e. /var mɪ/, var Q-PAR), (ii) tense (i.e. /var-dɪ/, var-PST), and (iii) evidential (i.e. /var-mɨʃ/, var-PST.IND) forms.



**Figure 3:** Mouth activities with existential manual signs VAR1 and VAR2 in TĪD.

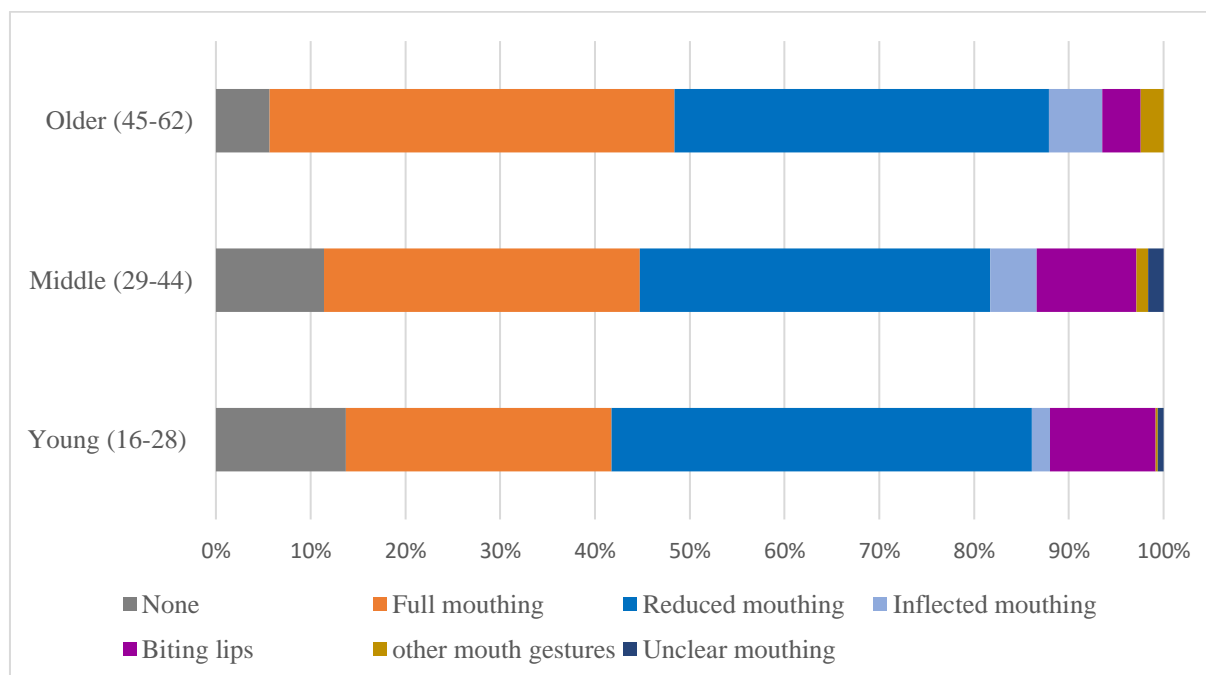
Figure (4) provides an overview of the distribution profile of the mouth activities of VAR1 in terms of functions. At first glance, the difference between the existential function (n=674) and the possessive function (n=163) is obvious: The absence of any mouth activities is more frequently observed in the existential function of VAR1 than in its possessive function (LL= -11.34, diff= -26.16%). In a similar way, the biting lips mouth gesture is more frequently observed in the existential function of VAR1 than in its possessive function (LL= -15.64, diff= -30.11%).



**Figure 4:** Mouth activities of VAR1 in terms of functions.

One of the central questions in the field of sociolinguistics is whether the accompanying mouth activities change with age (see McKee & Kennedy, 2006; Mohr, 2012, 2014). As illustrated in Figure (5), the distribution of mouth activities accompanying VAR1 differs significantly across

age groups. A decline in the frequency of full mouthing and inflected mouthings is observed as age decreases, while the occurrence of no mouthing activity increases gradually. With respect to mouth gestures, TID signers in middle and younger age groups exhibit differences compared to those in older age groups, with a higher prevalence of biting lips.



**Figure 5:** Mouth activities with existential manual signs VAR1 across different age groups.

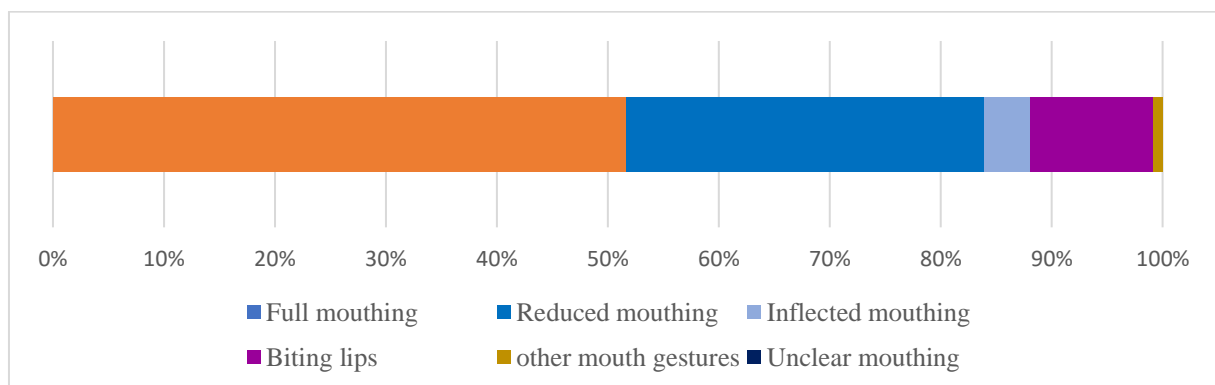
In corpus linguistics, log-likelihood scores may be employed as a means of evaluating the extent of significant differences observed between language corpora of disparate sizes for the purposes of detailed corpus profiling (Rayson & Garside, 2000). On the basis of a 3.84 LL ratio significance level ( $p < 0.05$ ), a statistically significant difference was identified in the majority of comparisons between young adults ( $n=467$ ) and both middle-aged ( $n=246$ ) and older adults ( $n=124$ ), as illustrated in Table (5).

**Table 5:** Log-likelihood (LL) ratio of the mouth activities with existential manual signs VAR1 across different age groups.

Type	Comparison group		LL	Diff. (%)
	Young	Older		
None	Young	Middle-aged	-5.44	-16.95
	-	Older	-64.30	-58.81
	Middle-aged	Older	-36.99	-50.40
Full mouthing	Young	Middle-aged	4.88	18.83
	-	Older	18.78	52.37
	-	-	-	-

	Middle-aged	82	Older	-	5.23	28.23
Reduced mouthing	Young	207	Middle-aged	91	-5.17	-16.54
	-		Older	49	-1.26	-10.85
	Middle-aged	91	Older	-	0.36	6.82
Biting lips	Young	52	Middle-aged	26	-0.44	-5.08
	-		Older	5	-82.08	-63.79
	Middle-aged	26	Older	-	-67.09	-61.85

Figure (6) offers an overview of the distribution of mouth activities observed in non-existential manual signs. The data indicate that a total of 88.14% (n=104) of all non-existential manual signs are accompanied by mouthings, either in their full, reduced, or inflected forms. In light of the occurrence of mouth gestures, it was observed that 11.02% (n=13) of these constructions were carried out in conjunction with biting lips. Upon exclusion of the type in which no mouth activities are observed from the VAR1 data, it is noted that the proportion of biting lips in the total occurrence rises to 11.25%. In this respect, it could be posited that the biting lips mouth gesture accompanying VAR1 and non-existential manual signs exhibit a similarity in their respective distributions.



**Figure 6:** Distribution of mouth activities of non-existential manual signs.

## 5.2. The emergence of the construction [SIGN<sub>non-existential</sub> + mouthing /var/]

The preceding section provided an account of the various aspects of mouth activities in TĪD, categorizing them in terms of function and age and situating them in a broader context in terms of frequency. This section is devoted to an examination of the co-occurrence of mouth activities with non-existential manual signs in existential/possessive constructions without VAR1 or VAR2 from a descriptive standpoint.

As noted briefly above, the term "reduced mouthing" is used to describe a situation in which only some of the components of the mouthing behavior are visible. In mouthings with more than one syllable, a common phenomenon is the reduction of the mouthings to a single

syllable. Given that 'var' in Turkish represents the equivalent of VAR1/VAR2 in TİD, it is to be expected that the reduction does not occur at the syllable level, but rather at the sound level, since it consists of a single syllable. In alignment with previous studies (Ebbinghaus & Heßmann, 1995; Johnston et al., 2016), the reduction of mouthings seems to occur in a temporal sequence, progressing from the final to the initial phonological segments within words. Consider the examples of reduction of the mouthings /var/ given in (18–19).

(18) Mouth :        /va/  
 Manual: NOW COMPLEX WAR VAR1  
 ‘It's a mess now, there's a war.’ [26.016 S:02:19 E:02:22]

(19) Mouth :        /va/  
 Manual: HOME WATER SHIP SUPER PT1 HOLLAND GOOD VAR1  
 ‘The houseboats are great, there were some very nice ones in  
 Holland.’ [06.001 S:02:40 E:02:42]



It should be noted that a complete survey of the reduction patterns of the mouthings in TİD is beyond the scope of this paper, but the observations made throughout indicate that phonological reduction in TİD invariably occurs in the final syllable(s) of the word. In Turkish, stress accent and highly agglutinative language, the stress is predominantly positioned at the final syllable of a word (Kabak & Vogel, 2001). In other words, with the inflection of each new suffix, regardless of quantity, the word stress is relocated to the newly designated final syllable of the prosodic word. At first glance, these observations lead to the conclusion that Turkish mouthings provides substantial evidence against the stressed-syllable hypothesis for SLs and serves as an effective tool for evaluating the reduction of mouthings in spoken languages with strictly word-final stress.

It is crucial to highlight that when the reduction of mouthing with multiple phonemes proceeds temporally, it is anticipated to evolve into a single or two segments, particularly those that are visually discernible, such as opening and closing. Such a progression aligns with the pattern observed during mouth gestures, and this transition can be regarded as the threshold between mouthings and mouth gestures. In consideration of the reduction in mouthings /va/, the labiodental fricative sound "v" becomes a visibly discernible element. Consequently, when categorized as a mouth gesture, it can be classified as biting lips. As illustrated in (20), the existential manual sign VAR2 is accompanied by the mimicking articulation of only the initial sound of "var." These examples provide a preliminary basis for the hypothesis that the reduction of mouthing does not cease even when a single, identifiable sound remains.



(20) Mouth : \_\_\_\_\_ bl  
Manual: TEACHER NEW TEACHER SIGN.INTERPRETING VAR2



‘The new teacher had knowledge of sign language interpreting.’

[07.011 S:01:04 E:01:07]

Mouthings that are synchronous with, and conveying a similar meaning to, their accompanying signs are referred to as congruent mouthings (Bank et al. 2011; Bank 2014). As previously indicated, VAR1 is sufficient to serve the function of an existential/possessive marker in the absence of any mouthings (see 7). Therefore, Turkish mouthing /var/ can be classified as a redundant congruent mouthing. Nevertheless, the co-occurrence of Turkish /var/ mouthing with non-existential manual signs results in the emergence of an existential/possessive construction. Therefore, it can be concluded that this is a free form of mouthing that does not necessitate a manual counterpart. This is exemplified by the TID examples in (21) and (22).

(21) Mouth : \_\_\_\_\_ /var/  
Manual: FACE.BLOOD.FLOW PT1:PRO1 SEE<sub>+</sub> PSYCHOLOGY PT5.close.bend:PRO1



‘I saw blood running down their faces, (so) I have trauma.’

[26.016 S:02:19 E:02:22]

(22) Mouth : \_\_\_\_\_ /var/  
Manual: HEAD FORGET NO.NO BABY PT5.close



‘I can’t forget, there was a baby.’

[06.001 S:02:40 E:02:42]

In SLs, pointing signs are employed for a variety of functions, including pronominal reference, the use of personal pronouns, and numerous other purposes (see Cormier et al., 2013). In (21), the full mouthing /var/ does not have the same meaning as the manual sign ‘PT5.close.bend:PRO1’ it co-occurs with. This entails that the mouthing enables the pointing, which refers to a first-person entity, to be interpreted as a possessive construction. When used for abstract reference, a pointing gesture is directed at a random location within the signing space, with the intention of referring to an object or concept that is not physically present within the actual discourse context. As illustrated in the example (22), the full mouthing allows for the pointing to be interpreted as an existential construction.

In consideration of directionality, spreading may be classified as either progressive or regressive. However, as illustrated by the example in (23), the distribution of the full mouthing /var/ does not align with this binary classification, rendering it unsuitable for categorization as spreading. This is because the full mouthing /var/ is accompanied by PT5.close.bend:PRO1 in the end-of-sentence position, despite the presence of the manual sign VAR1 in the sentence. It can thus be argued that the term "migration" is more accurate than "spreading" in this instance.

Although the threshold at which the new construction emerges is very difficult to pinpoint in grammaticalization studies, this example clearly illustrates the transition of redundant congruent mouthing /var/ to a morpho-syntactic function.



- (23) Mouth: \_\_\_\_\_ /var/  
Manual: FRIEND VAR1 PT5.close.bend:PRO1  
‘I have a friend.’ [42.002 S:09:14 E:09:16]

It is worthy of note that the evolution of biting lips from mouthings can be traced by the co-occurrence of manual sign VAR1/VAR2. However, this mouth gesture, which serves an existential/possessive function, can fulfil this role when used in conjunction with other non-existential manual signs, thereby avoiding the necessity for a manual existential host, as evidenced in (24).



- (24) Mouth : \_\_\_\_\_ bl  
Manual: NOW DEAF GROUP  
‘Now there is a deaf group.’ [34.019 S:02:58 E:03:00]

Many linguists have hypothesized that gestures and speech are closely timed and have a reciprocal relationship as each contributes to the meaning of the utterance. This synchronicity and reciprocity between gestures and speech is important to consider in understanding communication. McNeill (1992, 2005) maintains that gestures have a function in the process of thinking for speaking and form a unit with speech in that they convey another dimension of meaning. Following that perspective, Fontana (2008) argues that there are similar characteristics between mouth actions and SL, as well as between co-verbal gesture and speech. However, as illustrated in (24), contrary to Fontana's claim, the manual sign and the mouth gesture can simultaneously represent different grammatical concepts.

Although the mouth gesture of biting lips represents a temporarily reduced form of mouthings /var/, both mouth activities can be observed during the same period. This serves to demonstrate that the grammaticalization process is still at an early stage of development. As illustrated in example (25), the pointing gesture is accompanied by biting lips, which serves to form an existential construction. This is also followed by the production of the VAR1 manual sign accompanied by the full mouthing /var/. In (26), it is also observed that the single manual existential sign VAR1 is accompanied by both biting lips and full mouthing /var/. This specific form of spreading (or sharing) behavior is rarely addressed in the literature.

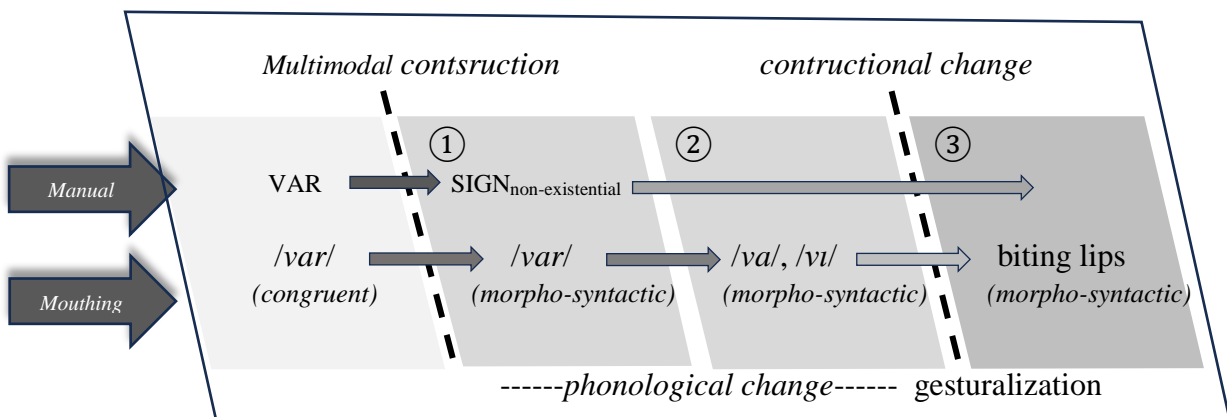
(25) Mouth : bl /var/  
 Manual: GRANDFATHER PT1 VAR1  
 ‘There was my grandfather (behind me)’ [26.014 S:03:13 E:03: 14]



(26) Mouth: bl + /var/  
 Manual: GOOD VAR1  
 ‘There was a good (thing).’ [42.003 S:08:50 E:08:51]



In the light of the observations, in addition to the phonological analogy, the co-occurrence of the mouthing /var/ and the mouth gesture "biting lips" with VAR1/VAR2, and their functional equivalence in the absence of the manual existential sign, provide compelling evidence that the multimodal new construction is formed. The field of grammaticalization studies is confronted with a significant challenge: the need to analyze the dynamic nature of linguistic structures and the progressive nature of grammatical change in a way that is consistent with the fundamental principles of systematization, description, and explanation adequacy. It is therefore essential to establish a feasible and plausible explanatory scenario that takes into account the gradual nature of linguistic change. This paper puts forth the hypothesis that the construction [SIGN<sub>non-existential</sub> + mouthing /var/] gains an existential/possessive function through morphosyntactic development and subsequently evolved into [SIGN<sub>non-existential</sub> + mouth gesture "biting lips"] in the distinct stages of constructional change, as evidenced by the corpus data (see Figure 7).



**Figure 7:** The grammaticalization schema of the construction [SIGN<sub>non-existential</sub> + mouthing /var/] in TID.

In the first stage, the redundant congruent mouthing /var/ is found to co-occur with the non-existential sign in a predicate position, resulting in the function of an existence/possessive interpretation without the presence of manual existential markers. At this stage, a new form-meaning mapping emerges, and a newly-created construction, [SIGN<sub>non-existential</sub>+ mouthing /var/] gains a morpho-syntactic role. In the second stage, the phonological structure of the Turkish full mouthing /var/ goes through a reduction, resulting in the articulation of /va/ or /vi/. The final stage represents a constructional change of construction [SIGN<sub>non-existential</sub>+ mouthing],

wherein the labiodental fricative sound "v" becomes an only visually discernible element (thus classified as a mouth gesture "biting lips"). The findings of this research have prompted a re-evaluation and re-formulation of the hypotheses concerning the grammaticalization of the mouth gesture phenomenon. The following sub-section addresses the proposed Route III, which builds upon this multimodal constructional development.

### **5.3. The new route: Route III**

The central problem in understanding the nature of gesture in SL has been the difficulty in distinguishing between gestures and signs that share the same modality, and the lack of objective criteria for making this distinction. According to Wilcox (2004, 2007), SLs have an additional pathway whereby a facial gesture or manual gesture movement first appears as part of a signed language's linguistic system as prosody or intonation, which then develops into a grammatical morpheme. Wilcox argues that Route II is a language-internal process in which primitive gestural elements used in signing communication enter the linguistic system and acquire grammatical functions. This is distinct from Route I, which involves borrowing a highly conventional gesture from the hearing community into a SL. Since, the eyebrow raising for polar questions originated as a paralinguistic gestural element in questioning contexts. It then evolved into a prosodic/intonational element and finally became a grammatical marker for polar questions in SLs. If the grammaticalization trajectory of eyebrow raising resembles that of manner of movement (i.e., Route II), it follows that such a process is intralinguistic rather than involving crossmodal borrowing. In both Wilcox's Route I and Route II, gestures must satisfy modality-specific phonological/intonational requirements before they become grammatical morphemes. This stage of the gesture-language interface appears to be at the very beginning of the grammaticalization pathway, because the source gesture is able to satisfy modality-specific constraints rather than being developed into a grammatical function. In contrast, Route III involves the grammaticalization of mouthings, which are inherently lexical/grammatical in nature. Thus, this route differs from Route I and II in that the ultimate goal is to have reached the stage of "gesturalization" in order to meet the phonological/intonational constraints of SL, as illustrated in Table (6).

**Table 6:** A summary of the key characteristics of the grammaticalization routes.

	<b>Language-internal</b>	<b>Source</b>	<b>Target</b>	<b>Interface</b>
<b>Route I</b>	-	Conventional gesture	Lexicalized and Grammaticalized	Gesture-Sign
<b>Route II</b>	+	Non-conventional gesture	Grammaticalized	Gesture-Sign
<b>Route III</b>	-	Mouthings	Grammaticalized and Gesturalized	Spoken-Sign (mouth gesture)

The source of the Route III is congruent mouthings, which are characterized by a specific lexical and grammatical structure in spoken language. This redundant mouth formation subsequently undergoes morpho-syntactic extension, thereby resulting in the emergence of novel construction. Subsequently, the mouthings undergo a phonological reduction, whereby the reduced form becomes an element that is only discernible visually. In other words, it becomes a mere mouth gesture, as shown in (27)

(27) Route III: congruent mouthings → grammatical mouthings → grammatical mouth gestures

It can be argued that mouthings represent a cross-modal language contact, as proposed by Capek et al. (2008). In the configuration of grammaticalization, as illustrated in Table (6), units with different linguistic contents originating from two distinct channels can merge in the visual-gestural modality. Given that the act of mouthing is borrowed from spoken language, it is necessary to inquire as to the manner in which SL, the recipient language, undergoes a process of nativization. In the process of phonological nativization in spoken languages, there are various ways in which unfamiliar sounds and sound sequences are adapted to align with the native language's sound pattern (see Brunner, 2014 for structural nativization). The perception stance model is predicated on the assumption that borrowing occurs exclusively in the nativization-through-perception scenario (Silverman, 1992; Kenstowicz, 2003). It is thus apparent that a novel term is necessary to elucidate the phenomenon of gestural nativization in crossmodal borrowings, given the distinction between the modalities of spoken and signed languages. This cross-modal nativization is based on the assumption that mapping is exclusively contingent upon the phonetic and visual similarities between the reduced mouthings of the donor and the visible mouth gestures of the recipient language. Such instances are most commonly addressed through the conceptual framework of code blending. Furthermore, the visible components of the mouthings serve to define the overall appearance of the mouth

gesture. In this scenario, the adjustments that are observed in the loan-mouthings take place during the production of SL.

## **6. Summary and conclusion**

While some aspects of mouthings have been the focus of previous research, numerous topics related to the use of this cross-modal contact phenomenon in SLs have yet to be investigated. As previously stated in the introduction, there is a general consensus among scholars that mouth activities can be classified into two main categories: mouthings, which are derived from the surrounding spoken language, and mouthing gestures, which are not. This paper proposes that the construction [SIGN<sub>non-existential</sub> + mouthing /var/] gains an existential/possessive function through morphosyntactic development. As one would expect, the temporal reduction in the single-syllable word "var" occurs in the form of the deletion of the word-final consonant 'r'. In conclusion, this ultimately develops into the biting lips mouth gesture, representing the initial sound of /var/, "v", which is known as a labiodental fricative. This is consistent with the position that mouthings are more accurately conceptualized as discrete units derived from the surrounding spoken language and can be combined with the non-equivalent manual sign simultaneously. The present study employed Labov's (1963) Apparent Time Hypothesis to trace the emergence of the construction. The changes in functions across three generations of TID signers were examined to ascertain whether there was a decline in the frequency of full mouthing and inflected mouthings as age decreased. Additionally, TID signers in middle and younger age groups exhibited differences compared to those in older age groups, with a notable increase in the prevalence of biting lips. Traditionally, this issue has been studied in terms of mouthing derived from spoken words; however, emerging patterns require a more nuanced understanding, especially from a cognitive perspective.

There is a corpus of evidence that lends support to the hypothesis that mouthing is fully integrated into both the SL lexicon and its phonology. Furthermore, the findings on the construction are decisive evidence that mouthing is a fundamental component of the linguistic system of SLs. One of the most compelling arguments for recognizing mouthing as a fully integrated aspect of the linguistic system of SLs is the observation that it appears to follow a distinct grammaticalization pathway, diverging from the pathways previously identified for Routes I and II. To return to the primary focus of this study, the following arguments have been put forth in order to provide support for the hypothesis that the source of Route III is characterized by congruent mouthings, which exhibit a distinct lexical and grammatical structure in spoken language. Then, a redundant mouthing formation undergoes morpho-

syntactic extension, which gives rise to novel constructions. Subsequently, the mouthings undergo a phonological reduction, whereby the reduced form becomes an element that is discernible only visually. In particular, the discussion regarding the two routes proposed by Wilcox (2004, 2007) must be updated with the consideration of more recent research on the gesture/sign dichotomy. Recent studies (e.g., Wilcox et al., 2025) have proposed the hypothesis that the boundaries between these modalities are more fluid than previously thought.

In conclusion, the results of this study necessitate a reevaluation and reformation of the hypotheses pertaining to the grammaticalization of the mouth gesture phenomenon. The present analysis provides further evidence to support the hypothesis that SLs have also undergone multimodal grammaticalization as a consequence of language contact with spoken languages. It is evident that an analysis of mouth activities from a multimodal perspective represents a fundamental approach to achieving a deeper understanding of grammaticalization phenomena in the signed modality. Also, the proposed route represents a novel approach to the Wilcox binary classification and offers an opportunity to further our understanding of the linguistic characteristics of mouth gestures. The preliminary discussion outlined above calls for further elaboration and clarification, as well as the inclusion of additional cross-linguistic data.

### **Data availability statement**

Once accepted for publication, metadata and videos of samples will be available in the Open Science Framework. Furthermore, the corpus samples are now made available via QR code.

**Ethics statement:** The ethical procedure of the TİD Corpus Project was reviewed and approved by the Ministry of Family and Social Services (Turkey). All participants in the TİD Corpus project provided written (in Turkish) and signed (in TİD) informed consent to participate in that research. Then, the individuals gave their written consent forms for the publication of their images or data.

**Competing interests:** The author has no competing interests to declare.

### **Glossing abbreviations**

/abc/	mouthing
bl	biting lips

CL	classifier
ExC	existential construction
INDIR	indirect
IX	a pointing action with the index finger
PT	pointing
POSS	possession
PRO	pronoun
PST	past
PU	PALM.UP
rl	rounded lips
SIGN	manual signs are glossed in small caps
____nonmanual	
SIGN	indicates nonmanual marking
SIGN.SIGN	indicates that a sign requires several spoken words to be fully translated
SIGN+	number of repetitions of a TID word
Q-PAR	question particle

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