The Phonological Structure of American Sign Language -ASL and zmânî âmâžaî kurdî - ZAK

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Abstract:

This paper deals primarily with the phonological structure of American Sign Language (ASL) and zmânî âmâžaî kurdî (ZAK) -Kurdish Sign Language. It is concerned with sign language (SL) and the types of sign language. One type is primary sign languages which are used by the Deaf people. Sign language is a visual-gestural language which relies on the use of the hands, facial expressions and body movements.Generally, there are myths about SLs. People believe that SLs are universal and have no grammatical structure. However, sign languages, as spoken languages, have lexicon, phonology, morphology and syntax. As far as the phonological structure of SLs includes handshape, location, movement and orientation of the hand. Therefore, some questions have been raised focusing on ASL and ZAK phonological structure. One of the questions is that: are the parameters of the phonological structure of ASL and ZAK the same? The aim of the paper is to apply ASL phonological aspects on ZAK. In this study, a mixed method is adopted. What is related to the hypothesis is that ZAK has three phonological parameters. One of the findings is that both ASL and ZAK have the same phonological parameters. As far as recommendation is concerned, more work can be carried out on the differences between ASL and ZAK at all linguistic levels.

Keywords: Sign Language, Manual, ZAK, Phonological Parameters, Sequentiality.

Article Info:
DOI: 10.26750/Vol(9).No(4).Paper8
Received: 21-December -2021
Accepted: 17-January-2022
Published: 29-September-2022
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Key of Abbreviations-Sign Language Acronyms

ASL	American Sign Language
BSL	British Sign Language
ISL	Israeli Sign Language
LIS	Lingua dei Segni Italiana-Italian Sign Language-
LSF	Langue des Signes Francaise-French Sign Language
SL(s)	Sign Language(s)
ZAK	zmânî âmâžaî kurdî -Kurdish Sign Language

Other Abbreviations and Notational Conventions for SLs

SIGN	Lexical sign
Deaf	Capital “D” refers to Deaf native signer

Key to Kurdish Phonemic Symbols

Consonants

/ P /	/ p /	is a voiceless bilabial stop as in PÂPULA *butterfly*
/ B /	/ b /	is a voiced bilabial stop as in BRO *eyebrow*
/ T /	/ t /	is a voiceless dental stop as in TÂC *crown*
/ D /	/ d /	is a voiced dental stop as in DÂR *tree*
/ K /	/ k /	is a voiceless velar stop as in KÂĽAK *melon*
/ G /	/ g /	is a voiced velar stop as in GUĽ *flower*
/ F /	/ f /	is a voiceless labio-dental fricative as in FŘOKA *plain*
/ V /	/ v /	is a voiced labio-dental fricative as in MIROV *human*
/ S /	/ s /	is a voiceless alveo-dental fricative as in DAST *hand*
/ Z /	/ z /	is a voiced alveo-dental fricative as in BARIZ *high*
/ Ŝ /	/ ŝ /	is a voiceless alveo-palatal fricative as in BÂŜ *good*
/ Ž /	/ ž /	is a voiced alveo-palatal fricative as in ŽÎR *wise*
/ Ç /	/ ç /	is a voiceless alveo-palatal affricate as in ÇÎ *what*
/ C /	/ c /	is a voiced alveo-palatal affricate as in CÂMÂNA *turban*
/ M /	/ m /	is a voiced bilabial nasal as in MANUSA *don’t write*
/ N /	/ n /	is a voiced dental nasal as in NÂBÎST *deaf*
/ Ŋ /	/ ŋ /	is a voiced velar nasal as in DAŊ *sound*
/ H /	/ h /	is a voiceless glottal fricative as in BAHÂR *spring*
/ Ĥ /	/ ĥ /	is a voiceless pharyngeal fricative as in ĤAUT *seven*
/ L /	/ I /	is a voiceless velarized lateral as in LEW *lip*
/ Ľ /	/ ľ /	is a voiced dental lateral as in BAĽĚN *promise*
/ R /	/ r /	is a voiced alveolar flap as in PANIR *cheese*
/ Ř /	/ ř /	is a voiced alveolar trill as in ŘAŊ *color*
/ X /	/ x /	is a voiceless velar fricative as in XĚZÂN *family*
/ X̂ /	/ x /	is a voiced velar fricative as in X̂AMBÂR *sad*
/ Q /	/ q /	is a voiceless uvular stop as in LÂQ *foot*
/ Y /	/ y /	is a palato-alveolar glide as in YÂR *lover*
/ W /	/ w /	is a labiovelar rounded glide as WUSBA *be quite*

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Vowels

/ Â /	/ â /	low central unrounded long vowel as in ŘÂW *hunting*
/ Ĕ /	/ ĕ /	mid very close front unrounded long vowel as in SĔ *three*
/ I /	/ i /	high close front unrounded short vowel as in MIL *neck*
/ Î /	/ î /	high close front unrounded long vowel as in FŘÎ *flew*
/ U /	/ u /	high open back rounded short vowel as in KURT *short*
/ Û /	/ û /	high close back rounded long vowel as in SÛD *profit*
/ O /	/ o /	mid open back rounded short vowel as in GOŜT *meat*

1. Introduction

Sign language is a fully-developed language used by Deaf signers and hearing non-signers. Each community has its own SL. Sign language is a visual-gestural medium having a rich system of grammatical structure (Johnston and Schembri, 2007, p.11). The phonological structure of SLs is based on parameters such as handshape, location, movement and orientation (Brentari, 2012, p. 22).

The majority of people believe that SLs are universal and have no internal structure. This causes problems. Accordingly, some questions have been raised focusing on ASL and ZAK: first, are the parameters of the phonological structure of ASL and ZAK the same? second, do ASL and ZAL have the same number of manual alphabets? third, does ZAK have simultaneity and sequentiality as ASL? and fourth, do sign locations represent tense in ZAK? The aim of the paper is to demonstrates the phonological structure of ASL and ZAK. Moreover, it presents the similarities and differences between the two SLs. The paper is based on some hypotheses. One of the hypotheses is that ZAK has three phonological parameters. It also hypothesized that both ASL and ZAK have primary and secondary movements as well as locations.

The study is expected to be of value to experts in Deaf studies, sign linguists, researchers, Deaf teachers, hearing teaching staff of the Deaf, sign interpreters and hearing people. It is crucial for hearing people becuase they can find a job for being a sign interpreter. The study is significant to the educational sector for setting new curriculum for the Deaf students.

2. Literature Review

The section of the literature review is about the types of SL particularly primary sign language. In order to have a better understating about the phonological structure of SLs, the following subsections deal with handshape, location, movement and orientation of ASL signs. Furthermore, it concerns with the simultaneity and sequentiality in ASL.

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2.1 Sign Language: Types of Sign Language

As viewed by Pfau (2012, p. 513), sign languages are natural languages having complex grammatical structures which are the means of communication of Deaf people. Green (2014, p.12) describes two types of SLs: primary sign languages and (secondary) alternate sign languages. In this paper the focus is on primary sign language and its phonological structure.

2.1.1 Primary Sign Languages

McGregor (2015, p.282) refers to a primary sign language, also called Deaf SLs, as the first language of the Deaf people who do not use a spoken language. They are natural languages used in Deaf communities. Ethnologue, a listing of the SLs in the world, lists 173 primary sign languages. Primary sign languages are distinct languages which do not share similar signs. British Sign Language (BSL) is different from ASL which has more in common with Langue des Signes Francaise-French Sign Language (LSF). Primary sign languages are young languages. They arise when Deaf people come together to form signing communities. The establishment of many schools played a crucial role in the development of many primary sign languages. In America, these schools helped the formation of Deaf communities and accessed the expansion of gestural systems into full ASL.

2.1.2 Alternate (secondary) Sign Languages

According to Pfau (2012, p.528), Bauer (2014, pp. 10-20) and McGregor (2015, p.293), alternate or secondary sign language is a system of hand signs or gestures used by hearing speakers in a certain situation where speech medium is inappropriate. These signals are called gestural communications developed in hearing communities for religious orders and in particular situations. Restricted secondary sign languages are used in religious customs where there are rules of silence and by occupational individuals such as saw millers. Among some Australian Aboriginal groups, there are periods when speech is avoided. Less elaborate secondary sign languages are used in working, e.g., in exchanges traders are signaling to each other. The users of secondary sign languages have their first spoken language. The gestures are used as substitutes for spoken expressions. Secondary sign languages are not fully-fledged natural SLs. Pfau (2012, p. 528), Green (2014, pp.12-3) and Bauer (2014, p.20) describe four types of secondary SLs: Sawmill Sign Language, Aboriginal Sign Languages, Plains Indian Sign Language, and Monastic Sign Languages.

In the view of what has been presented, it is clear that primary sign language is a natural human language used by the Deaf people. Secondary sign language is a system of hand signs used by hearing speakers in a certain situation where speech is inappropriate.

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3. The Structural Features of Primary Sign Languages

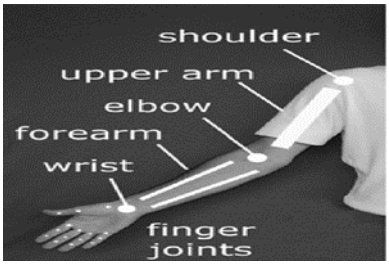
It is mentioned by Tennant and Brown (1998, p.14), Sutton-Spence and Woll (1999, p. 154), Morgan and Woll (2002, p. xii), Taub (2004, p.27) and Crasborn (2012, p.8) that SLs have a level of structure where meaningless elements are combined in rule-governed ways to create meaningful forms. In SLs, manual and facial gestural elements are combined to create signs. Signs are simultaneous combinations of handshape, location, movement, orientation and non-manual features. The articulation of signs is by using handshapes directed in a certain orientation and performing different movements at a location or locations in the signing space or on the signer's body. Some signs may be accompanied by a particular non-manual feature. These five gestural features are parameters of sign production. The following is the structural features of SLs dealing with the phonetics and phonological descriptions of signs especially in ASL.

3.1 Phonetics and Phonology of Sign Languages (ASL)

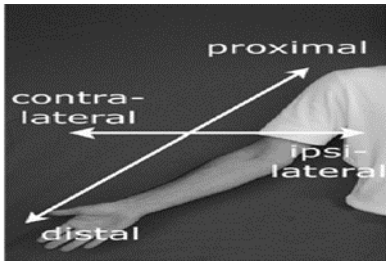
What is related to the phonetic and phonological descriptions of SLs particularly ASL has been clarified in the following subsections:

3.1.1 Phonetic Articulation of Signs

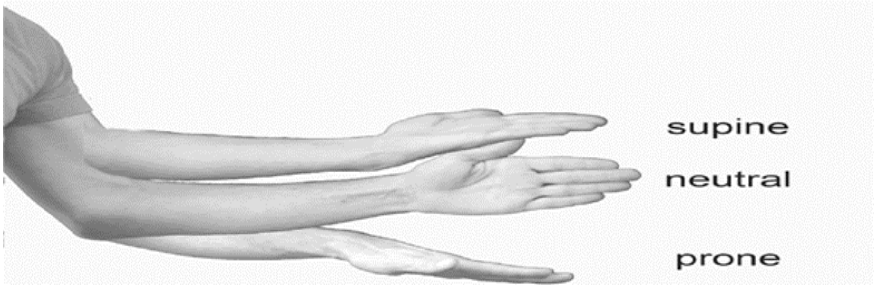
Crasborn (2012, pp.8-10) argue that the phonetic study involves the production and perception of manual and non-manual signs. Articulatory terms are used for the orientation such as prone and supine referring to the rotation of the forearm. It is the distal end that realizes the phonological values for location and movement. The terms distal and proximal refer to the location: the line of the arm and hand (**Figure 3.1 a, and b**).



a. body parts and joints



b. location terms



c. Rotation states of the forearm

Figure 3.1: Terminology used for the description of manual signs (Crasborn, 2012, p.12)

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Crasborn (2012, p.12) further add that describing manual articulation in terms of the state of the different joints starts from the shoulder to the distal finger joints. The (elbow, wrist and shoulder) joints have degrees of movement. For sign description the focus is on the hand: its shape, orientation, location, and movement. Non-manual articulations can be involved for the phonetic description of signs: the articulations of the jaw and head can be described as the arms and hands. In facial articulations, the lower jaw bone is movable. Sutton-Spence and Woll (1999, p. xviii) and Crasborn (2012, p.17) describe handedness as the parameter of phonetic realization, i.e., whether a signer is left-dominant or right-dominant. Handedness is not contrastive in SLs. The same is true in ASL. No signs specified to be produced on the right or left hand. Signers use their dominant hand as the main articulator whether a signer is left-handed or right-handed. For the right-handed signer, the dominant hand is the right hand. This is the signer's stronger, more controlled hand. The non-dominant hand is the weaker, less manipulated hand. The dominant hand will move, while the non-dominant hand is stationary.

3.1.2 The Phonology of Sign Language: The Building Blocks of Signs

This subsection is about the phonological structure of SLs particularly ASL.

3.1.2.1 Phonological Parameters of Signs in ASL

Johnston and Schembri (2007, pp. 284-6) and Meir and Sandler (2008, p.22-3) claim that signs are made up of smaller elements similar to the phonemes of spoken languages which are meaningless. In all SLs as well as in ASL, the parameters of handshape, location, orientation and movement are not meaningless. Some features of spoken language phonology have no counterparts in SLs. Spoken language words consist of consonants and vowels. The handshape and location together act as consonants because these elements have the most formational contrasts, while movement is similar to a vowel. Spoken languages use 20-40 phonemes; while SLs have a large number of handshapes, locations and movements combined to form signs. The traditional model of handshape, location, movement and orientation were of equal importance. (**Figure 3. 2**)(Karnopp, 2002, pp.30-3).

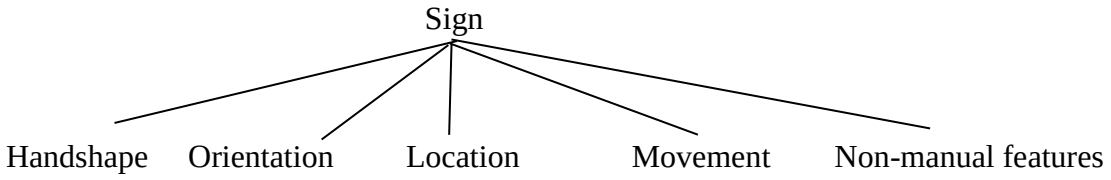

Figure 3.2: A traditional model of sign structure

As Sutton-Spence and Woll (1999, p.154), Sutton-Spence (2005, p.5), Johnston and Schembri (2007, p.79) and Meir and Sandler (2008, pp.24-6) explain that signs were considered to be unanalyzable with no internal structure and they could not be broken down into smaller segments. However, signs have internal structures which are produced using a

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number of gestures as words using a number of sounds. In earlier research the term *cherology* (Greek cheir-*hand*) was used. These aspects are called *cheremes a*nalogous to the phonemes. The phonology of signs is modality-specific: consonants are not found in signs and handshapes have no roles in spoken language. Signs in ASL consist of four manual parameters: handshape, location, movement, orientation along with nonmanual features.

3.1.2.1.1 Handshape

Handshape is defined by Wilcox (2007, p. 1114) as the configuration by the hand when producing the sign. Sutton-Spence and Woll (1999, p.6) and Schirmer (2001, p. 6) points out that different types of handshapes are physically possible. Each SL uses a limited number of handshapes for creating signs. The T handshape in ASL is not found in European SLs. All known SLs share a number of handshapes, but there are still some infrequent handshapes in few SLs. Greek signers do not use a handshape with the fist closed and the little finger and ring finger extended. American Sign Language does not have the handshape with the fist closed and the middle finger extended. Handshape has been analyzed most successfully (Brentari and Eccarius, 2010, p. 284).

Emmorey (2002, p.33) and Johnston and Schembri (2007, p.79) concentrate on such issues that the hand has a great number of different configurations depending on how many fingers are selected or on whether the selected fingers are extended, bent, hooked or curved. The hand may be closed into a fist, or the fingers may be spread out or held together. It may be bent at the wrist, or the fingers may be bent at the joints. The thumb may be extended, held parallel to the fingers or held across the palm or closed fist. The index, middle, ring or little finger may be extended, bent, or in contact with each other. The two phonological structures of handshape are the joints and the selected finger (**Figure 3.3**)

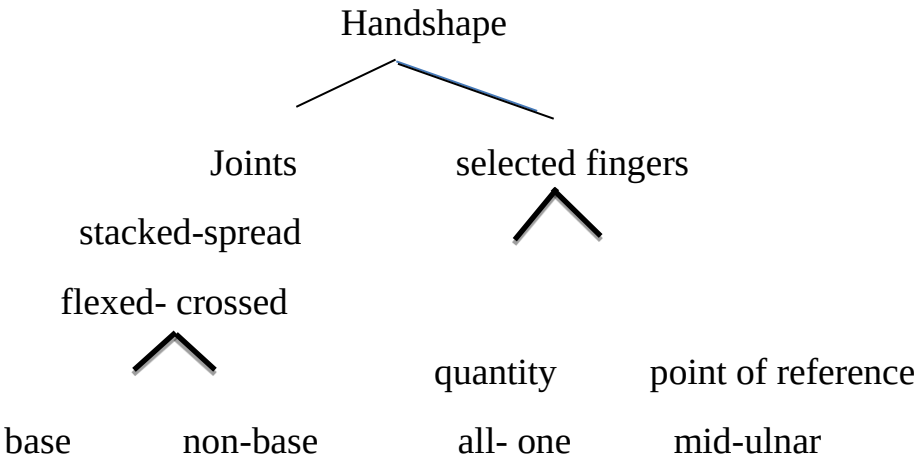

Figure 3.3: The phonological structure of handshape

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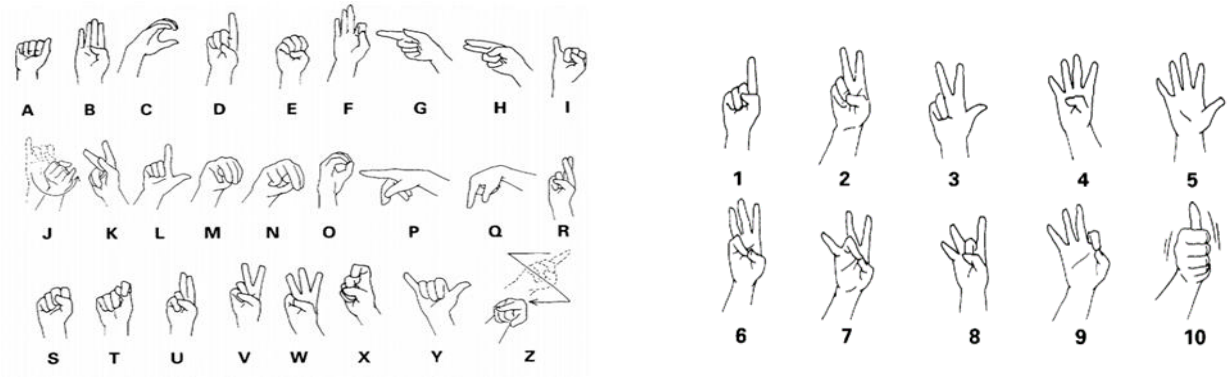
The joints may be stacked, spread, flexed and closed. Selected fingers make contact with another part of the body. The number of fingers is expressed by quantity, and their point of reference can be ulnar (pinkie/little finger) mid (part of the hand referencing the middle finger).



a) ASL one-handed manual alphabet b) ASL numbers

Figure 3.4: ASL manual alphabets and numbers

American Sign Language uses the one-handed manual alphabet. The signer uses the dominant hand as the key articulator whether he/she is right-handed or left-handed. Non-manual signs are multifunctional used simultaneously with manual and non-manuals. They play an important role in all level of grammar functioning as negation, interrogatives and sentence type, (**Figure 3.4**) (Tennant and Brown, 1998, pp. 26-8; Rambhau, 2013, pp.1-2).

3.1.2.1.2 Location

Taub (2004, p.27) and Wilcox (2007, P.1115) define location as the place where the sign is articulated. Signs differ in terms of the place where they are made on the body. They can have fixed place of articulation on body. **Figure 3.5** illustrates two ASL signs differing in location.

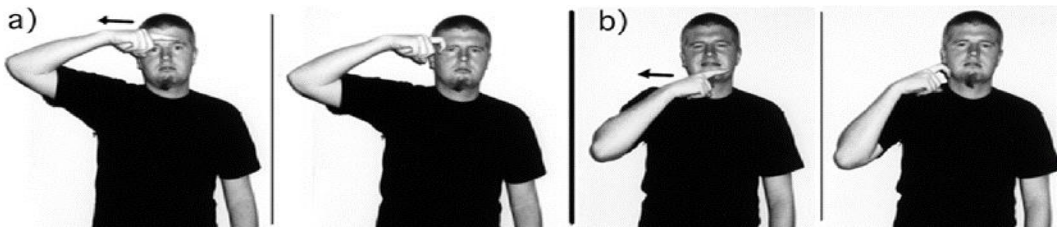


Figure 3.5: Two signs differing in location in ASL: (a) SUMMER and (b) DRY

Types of sign contact are two: signs on the body and those on hands. Locations on the body are called primary locations and those on the hand are secondary locations. The majority of signs are articulated within the signing space: an area from above the head to the waist, and in width from elbow to elbow when the arms are bent. In NOT-KNOW, the hand is articulated near the head (Johnston and Schembri, 2007, pp.80-1). According to Sutton-Spence and Woll

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(1999, p.7) and McGregor (2015, p. 287) location is used grammatically for temporal relations. In Israel Sign Language (ISL) past time is located behind the signer and future in front, e.g., YESTERDAY and TOMORROW are of the same handshape and location, but differ in direction: in YESTERDAY the hands move backwards but in TOMORROW it moves forwards (see more Sandler and Lillo-Martin, 2006, p.174).

3.1.2.1.3 Movement

Wilcox (2007, p.1115) defines movement as the motion made by the Deaf signer while producing the sign. Johnston and Schembri (2007, p.80) and Takkinen (2008, p.101) refer to movement as the most complex of the three parameters. Both the handshape and the direction of the palm and fingers may be changed. Signs are identified by simple movements or complex combinations of different movement. All the physically possible movements of the fingers, hands and arms are used. Movements are of two types: primary and secondary. Primary movements are movements from one place to another: towards or away from the signer; in a circle or spiral and downwards or upwards with changes of handshape and orientation in opening or closing the hand. Secondary movements are repeated changes of handshape or orientation, e.g., the ASL sign *rubbing* (Schirmer, 2001, p.6).

3.1.2.1.4 Orientation (Palm Orientation)

McGregor (2015, P. 284) refers to orientation as different direction of the palm and fingers while producing the sign: left, right, up, down, towards or away from the signer. Johnston and Schembri (2007, pp.80-1) show orientation in the ASL sign MOTHER: the palm of the dominant hand moves down away from the signer.

3.2 Sign Minimal Pairs

Many signs differ in one parameter. The signs WORK and TALK are similar in orientation, location, and movement but different in handshape. The signs ON and TRUE differ in orientation. BEAUTIFUL and WELL differ in location, and BROTHER and PAPER differ in movement (Johnston and Schembri, 2007, p. 82). The signs CHEW and WASH are similar in all aspects except facial expression (Sutton-Spence and Woll, 1999, p.157).

3.3 Syllables: The Structure of Sign Syllables

According to Emmorey (2007, p.704) syllables are found in SLs and ASL is one of them. A sign syllable contains a movement. Brentari (2012, p. 28) refers to movements as the nuclei of the syllable because of the relation between the function of movements in signs and the function of vowels in words. Movements are the medium which make signs visible, as vowels make words audible. The arguments for the syllable structure are:

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3.3.1 The Manual Babbling

Marschark (2002, pp.17-21) and Jantunen and Takkinen (2010, p.319) state that manual babblings appear in Deaf children at the same time as hearing children start producing syllabic babbling. Manual babbling includes repetitions of the same movement. The period of manual babbling develops into the first signs just as syllabic babbling continues into the first words.

3.3.2 The Minimal Word

This argument has been discussed by Supalla and Cripps (2008, pp.180-1), Jantunen and Takkinen (2010, p.318) and Brentari (2012, pp. 28-33) explaining that all well-formed words must contain one syllable. In SLs a movement is inserted to ensure well-formedness. American Sign Language and Lingua dei Segni Italiana (LIS) produce signs without a movement, such as the numeral signs ONE to NINE, and add a small movement as independent words. Signs consist of a single segment and repeated in rhythmic pattern, e.g., WATCH, in ASL, is a monosyllabic sign. WORK is a reduplicated monosyllabic sign. The handshape moves to the location of the other hand making one syllable, but the movement is repeated to show reduplication. Syllables in SLs differ from syllables in spoken languages. Sign segments consist of movements and locations. Onset and rhymes are not present in sign syllables. There are weight distinctions, i.e., heavy vs. light syllables based on differences in movement. In ASL, signs of one movement behave as light syllables, e.g., SIT, and those of more than one movement are heavy syllables, e.g., THROW. As viewed by Emmorey (2002, p.434) that signs can be both monosyllabic and polysyllabic because affixes are attached simultaneously onto the stem.

3.4 Simultaneity and Sequentiality in ASL Sign Structure

According to Liddell (2003, p.6-8) signs are simultaneous bundles of manual and nonmanual features. Sutton-Spence and Woll (1999, p.159) and Sutton-Spence (2005, p.10) confirm that it is impossible to produce a handshape that is not in some location on or near the body, and to produce a movement that does not involve a change in location and handshape, e.g., WOMAN in ASL, the handshape, location, movement, orientation and non-manual features are produced simultaneously. This simultaneous characteristic differentiates signs from the words. Spoken words result from the sequential combination of phonemes (Sandler and Lillo-Martin, 2006, p.120). It is that sequential contrasts of phonemes that form the minimal pairs. Many minimal pairs in SLs are described as simultaneous contrast, e.g., WHEN differs from HOW MUCH in location (**Table 3.1**). There is also sequential patterning in which the movement has a sequence of movements from one handshape to another or from one location to another. The sign HEARING uses a sequence of locations: the handshape first contacts the ear and then moves to the chin. Compound signs consist of the sequential combination of two signs. The sign PARENTS in ASL is a combination of the signs MOTEHR and FATHER. Reversing the sequence

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of HEARING (i.e., moving the handshape from chin to ear) and PARENTS (i.e., combining in reverse order as in FATHER MOTHER) does not produce acceptable signs. The elements are organized into segments and then to syllables (Johnston and Schembri, 2007, pp.109-10).

Table 3.1: Signs showing simultaneous contrast

	WHEN	HOW MUCH
Handshape	5 handshape	5 handshape
Location	on the check	on the chin
Movement	wriggling movement	wriggling movement

4. Methodology

This section presents the methodological considerations associated to analyzing the phonological structure of ASL and ZAK.

4.1 Method

The study adopts the mixed method for the analysis of the phonological parameters of ASL and ZAK. Such analysis of the visual-gestural modality between these two SLs is to demonstrate that each SL is a separate language consisting of structures of their own.

4.2 Participants

One of the requirements of the nature of SL study requires researchers to visit the Deaf community and to be in closer contacts with the participants. The aspects under analysis were videotaped at Hiwa Deaf Institute and it was done in ZAK. Six Deaf native signers participated in the tasks. All of them were born Deaf of hearing parents. Two other participants were staff members of the institute for the interview: a hearing fluent signer and a Deaf native signer. Both have the role of interpreters (see the consent form and the interview questions).

4.3 Stimulus Visual Materials: Instruments and Tools

Janke and Marshall (2019, p. 246) mention that SL studies highlight the use of different tools to analyze SL data. Types of equipment are materials as pictures and video camera. Both the picture tasks and video-recording tasks are taken into accounts for the analysis. Some aspects of recording such as the setting, camera position, privacy of the participants and presence of other hearing people are taken into consideration.

4.4 Data Collection

In this paper, a number of resources have been employed ranging from books and articles focusing mainly on ASL. However, to collect data on ZAK, there were problems because of the lack of resources whether, books, articles and videotapes. Furthermore, no official website has

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been found. For conducting a study, relevant data was collected depending on the Kurdish dissertation source on ZAK, video recording for pair conversation and picture/video description task. Besides, information was also taken from the hearing staffs as native signers in the institution. The data have been gathered from Deaf native signers, Deaf and hearing teachers, and observations. Interviews have also been made with Kurdish Deaf signers and hearing signers. The analysis of aspects of ASL and Zak is based on video data and picture data.

4.5 Procedure

The data have to be analyzed: spontaneous dialogues of pair conversation and stimulus-based elicited data. the following tasks can be used as a procedure to analyze the phonological aspects of ZAK.

4.5.1 The Stimulus-based Task

The current paper is based on several receptive and productive tasks so as to analyze the selected aspects chosen for the analysis of ZAK signs. The objective behind each task is to describe an aspect and analyze it. The way the signs are performed and produced is all taken into consideration in analyzing the aspects of ZAK. For the sake of reaching accurate results, 6 Deaf native students from hearing parents have been chosen to participate in the tasks. They all showed acceptance to participate in the study (see the consent form). All the tasks are video recorded. The tasks are as follows:

4.5.1.1The Picture-based Task

Several picture-based tasks have been selected to analyze the aspects chosen to describe and analyze signs indicating lexicon and grammatical structure, particularly the phonological structure. The cartoon pictures from the dictionaries have been chosen deliberately for two reasons: first to attract the attention of the Deaf participants and to make the tasks more enjoyable and second, they are familiar pictures from the curriculum dictionary that can easily be recognizable by them. The picture-based tasks are as follows:

4.5.1.2 Sign Selection Task

This task is characterized by being both receptive and productive designed to assess the participant's comprehension and production of the signs. The objective is to analyze the phonological; structure from handshape, location, movement and orientation of the signs. In addition, other aspects are also analyzed such as lexicon signing space and handedness. Each participant has been asked to give the correct answer. The instructions of all the tasks have been translated by a hearing teacher and a Deaf assistant teacher known as Radeef within the Deaf community. The pictures are from the dictionary for the Deaf (2002).

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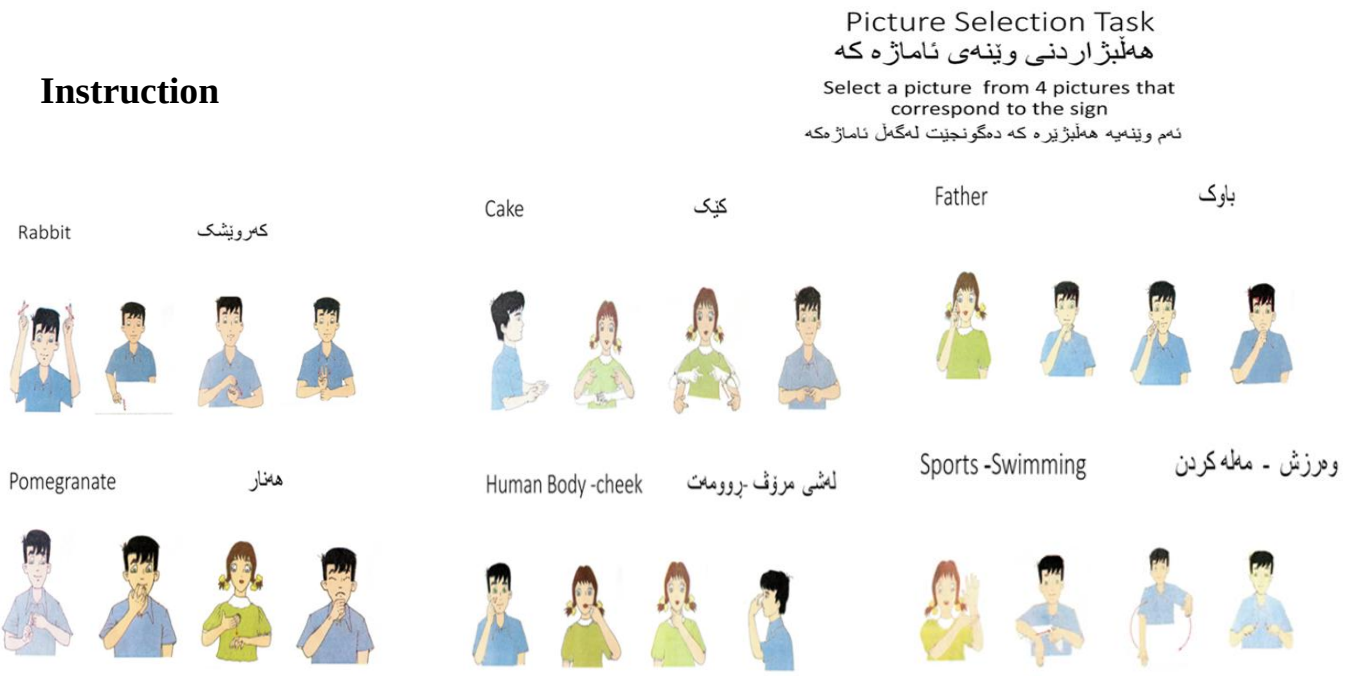
Instruction

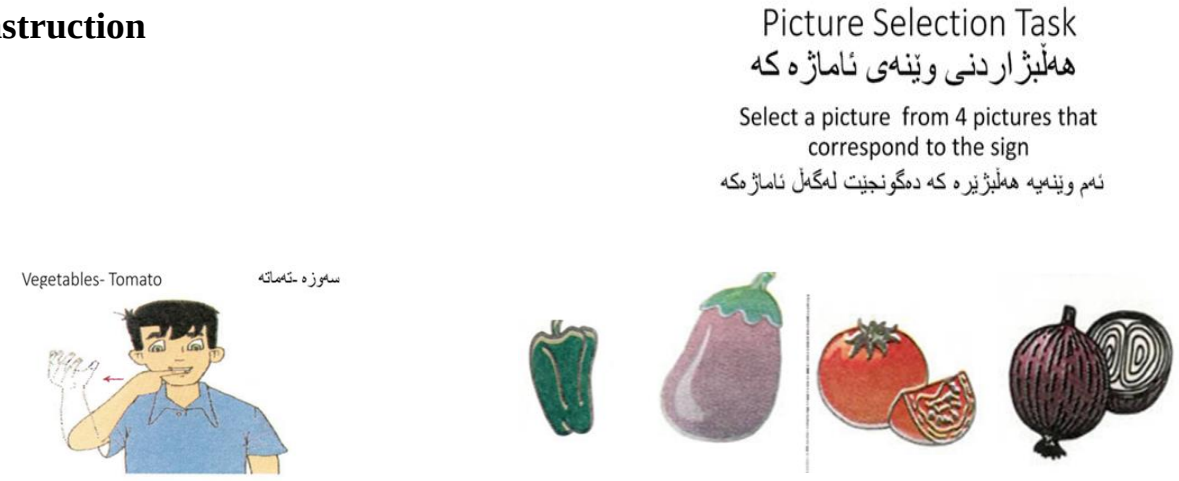


The following link demonstrates the sign selection task performed by the Deaf participants in the classroom: https://drive.google.com/file/d/1dPIxav0w28g5RfqQtZweD2BlJFR7qTTi/view?usp=sharing

4.5.1.3 Picture Selection Task

This task is designed to analyze the recognition and the production of the signs. It is preferred to design the task having planned formal dialogic interactions. The task is performed by two participants: one looks at a sign and then describes the sign to his/her partner who then has to select the correct picture that corresponds to the sign from the four pictures. It analyzes the phonological parameters, lexicon, signing space and the use of manual and non-manual signs. the following is about the picture selection task.

Instruction



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Transport -motorbike گواستنەوە-ماتۆر

Music-violin کەمانجە-مۆسیقا

Clothes-Kurdish Scarf جل و بەرگ چارۆگە

Jobs- teacher کار -مامۆستا

Kurdish clothes-turban جلی کوردی- جەمەدانی

https://drive.google.com/file/d/1UQ-M-PipUhgO2sW0c5b1KkZYMI6NZUiD/view?usp=sharing

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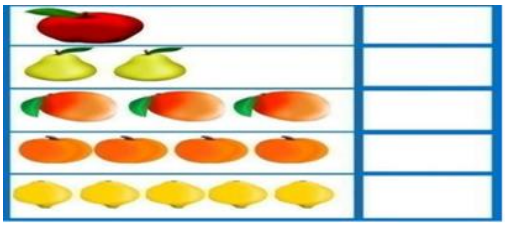
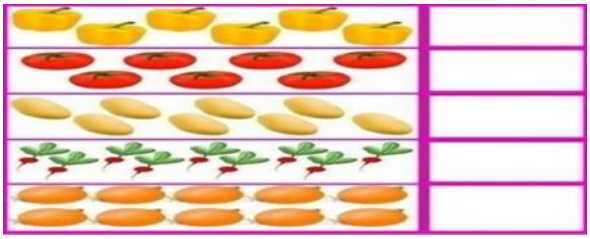
4.5.1.4 Picture-based Task for Numbers

This picture-based task is designed to analyze the numbers. It is a receptive and productive task where each participant has to look at the picture and recognize the number and show the number in ZAK sign. This task also analyzes the phonological structure of the number signs.

Instruction

سەیری وێنەکان بکە وژمارەکان
بە ئاماژە نیشان بدە
Look at the pictures and
then sign the numbers





The following link describes the productive task of ZAK numbers performed by the participants:

https://drive.google.com/file/d/1EBP20BNysDOx946o1TNmDD5wgLLT3dsy/view?usp=sharing

4.5.1.5 Video-based Task

The video-based task is designed to analyze several aspects in ZAK. It is preferred to \base the analysis on the video-recording of the actual interaction of pair conversation between the participants. The task is the expressive language skill based on pair conversation between two participants. All the six participants took part in the conversation. It is a planned formal conversation focused on analyzing lexicon, phonological structure and numbers. The details of the pair conversations are found in the following links:

https://drive.google.com/file/d/1P51j8tIbxQTFRnDwdP3JBAAsIRsM6vUf/view?usp=sharing

https://drive.google.com/file/d/1Yk6Z2YX-zl3wf_gRrTqrjD8bwEUbheNJ/view?usp=sharing

https://drive.google.com/file/d/1BEUGabVIJ78KWpzQ1Y6DR0PJBwIkxzUV/view?usp=sharing

https://drive.google.com/file/d/1v-mxiZ7IQeC8njstBbW0fpkiu3rNJjal/view?usp=sharing

https://drive.google.com/file/d/1O7nk93UHvX-ecfMetR59A8GQHYIws0Ak/view?usp=sharing

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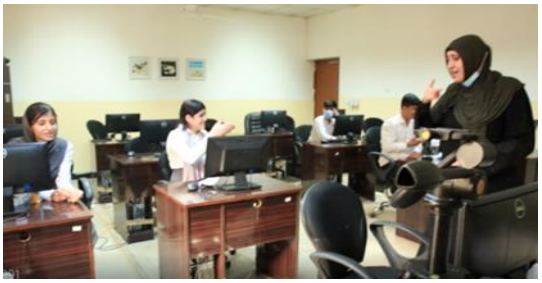
4.5.1.6 Classroom Observation

The task of observation is conducted throughout all the tasks where the aspects have been observed and noted by the researcher. In addition to that, the live classroom observation has a great role in analyzing nearly most of the phonological aspects which have been selected for the analysis. Three classes have been chosen for observation: the 3rd, the 5th and 6th classes where the focus was on phonological structure, numbers and signing space. The links below show the classroom observations of three classes of Hiwa institute.



https://drive.google.com/file/d/10Z45Dk0npXJLKRKSE0Y5a8kkvH_KnvXo/view?usp=sharing

https://drive.google.com/file/d/1TGNmRUWYVSbwK1gRx2L31-hC-p2-y5Um/view?usp=sharing

https://drive.google.com/file/d/1x-iWKkJ-z3zZUjmYFiOMaV5dxdL7BPWs/view?usp=sharing

https://drive.google.com/file/d/15c4z3f7sx4sgJoY0RYRHHBFE-VAWwkCH/view?usp=sharing

https://drive.google.com/file/d/1TUxf055IcxpW_X9aFX6QkQfuXdHQelk4/view?usp=sharing

4.5.1.7 Interview

The study is also based on interviews for describing and analyzing the aspects. For having the reliability of the results, interviews have been arranged with two of the staff members of Hiwa institute: a hearing teacher skillful in ZAK and an assistant teacher (Radeef). They answered some questions and their answers have been documented, analyzed and video recorded. The interviews were based on focusing on the numbers of ZAK manual alphabets, handedness, phonological structure of signs (see the form of the questions). The link below is about the interviews video recorded with two members of Hiwa institute for the Deaf.

https://drive.google.com/file/d/18F2pSij2e4B7OHesHhvjSMshJCZ26QEi/view?usp=sharing

https://drive.google.com/file/d/1-PF1lpJK1VDfILjiWkedgH0lMbW5diTs/view?usp=sharing

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5. The Phonological Structure of ZAK

In this subsection, the phonological structure, minimal pairs and syllables are discussed.

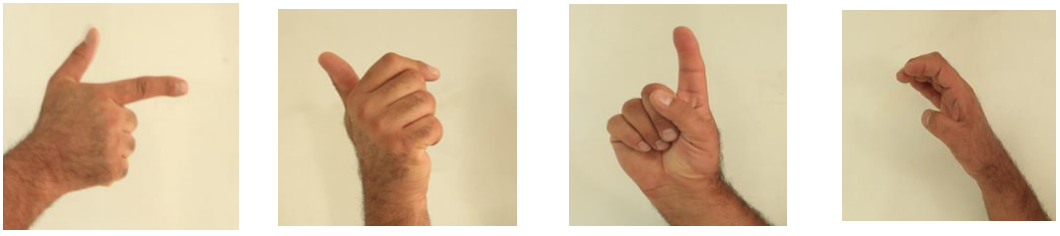
5.1 The Phonological Parameters of Signs in ZAK

The basic important elements of phonological structure ranging from the handshape, location, movements, orientation, and nonmanual gestures have also been recognized in ZAK. As mentioned in the above sections that handshape is the shape and the position of the thumb and fingers, the location is the place of articulation in space or on the body where the sign is articulated, the movement is the movement of the hands, arms or fingers, the orientation of the palm upwards, downwards or sideward. Meanwhile, the non-manuals have also been recognized as parameters of the phonological structure. The realization of these parameters has been discussed by (Moen, 2015, p. 25). The analysis of these parameters has been realized through the basic dictionary of the Deaf (2000 and 2013). According to the Dictionary of the Deaf (2000 and 2013), the stimulus-based elicited data such as picture-task data (picture selection task and picture description task), video-task data (video recording), classroom observation and the interviews, the aspects in ZAK have been clearly observed and analyzed (see the description and the objective of each task). The following is the detail of the aspects:

5.1.1 Handshape

The behavior of handshape plays a prominent role in the phonological structure of the signs. There are also *basic or neutral* handshape, *central* handshapes, and *marginal* handshapes which are found in ZAK similar to ASL or the other SLs which have been studied so far.

Basic handshapes are the most frequent of all handshapes, the most acquired by the children, can be found in all SLs, for example, ه ،ش ،س ،ک ،د ،ب ،آ and ئ (**Figure 5.1**). The 5 ٥) (handshape is identified as the basic sign. As the C and O handshapes are frequent in ASL, the signs mentioned above are frequent in ZAK. In Addition, there are some handshapes which are not found in ASL, such as پ.ێ،وو،ڵ،ع،غ،ژ،ڕ،چ ،ۆ ،ه (**Figure 5.2**).



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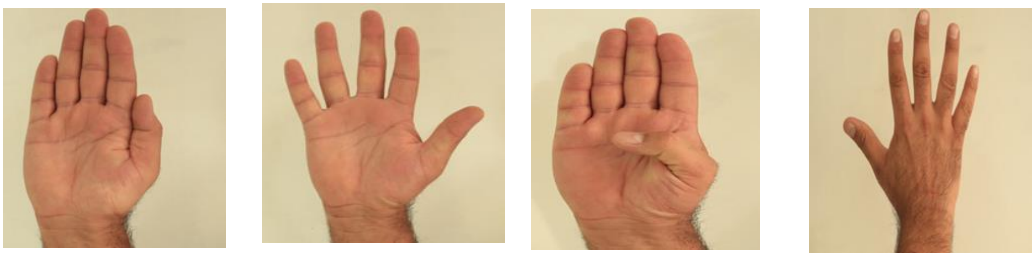


Figure 5.1: The most frequent basic handshapes in ZAK

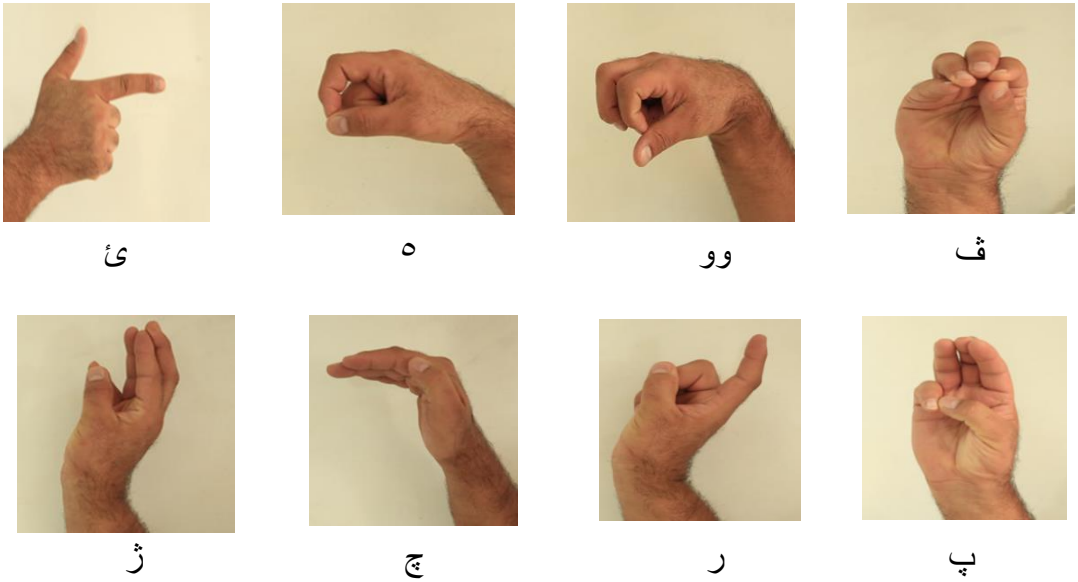
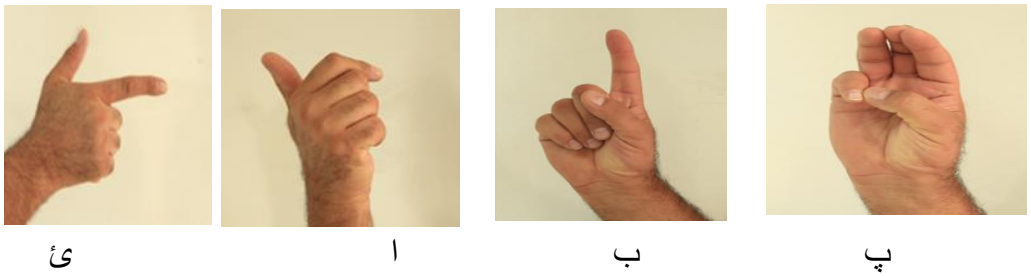


Figure 5.2: Several handshapes in ZAK not in ASL

Central handshapes play an important role in ZAK because a great number of signs are articulated with this handshape. There is a considerable variation within this type. These handshapes make up a set of central handshapes. For example, آ ، ب ، گ ، ف (see ZAK manual alphabets **Figure 5.3**).

Marginal are those whose appearance is iconically motivated. Very limited number occurs in this set. These signs are understandable by hearing people ،for example, ه ،ر ،د ،ا. Handshape like fingerspelling is another type of marginal handshapes. According to information taken from the Deaf and hearing staff in the interview as well as the dictionaries, the number of ZAK alphabets is **36** signs. They are shown in (**Figure 5.3**) pictured during the task.



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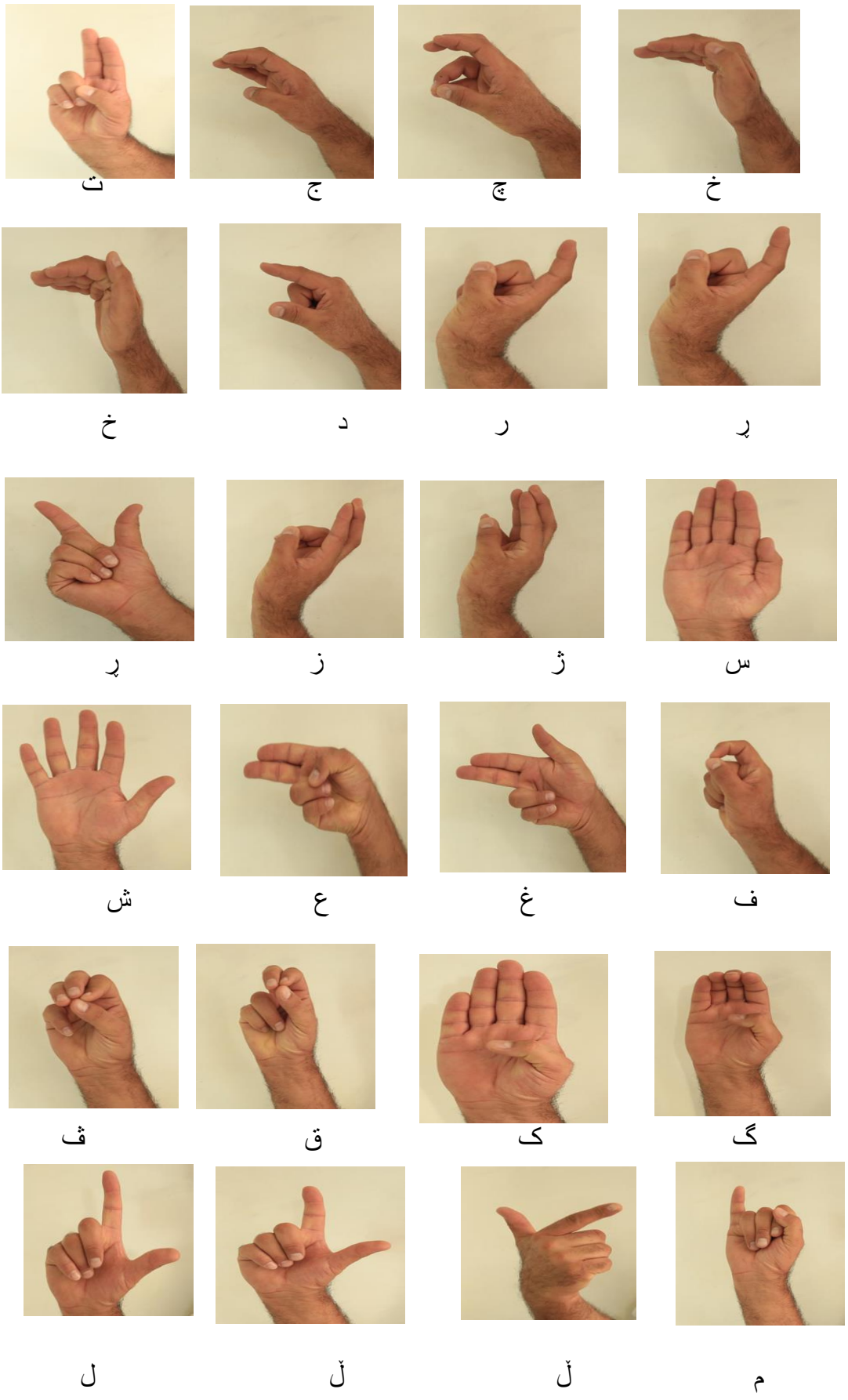

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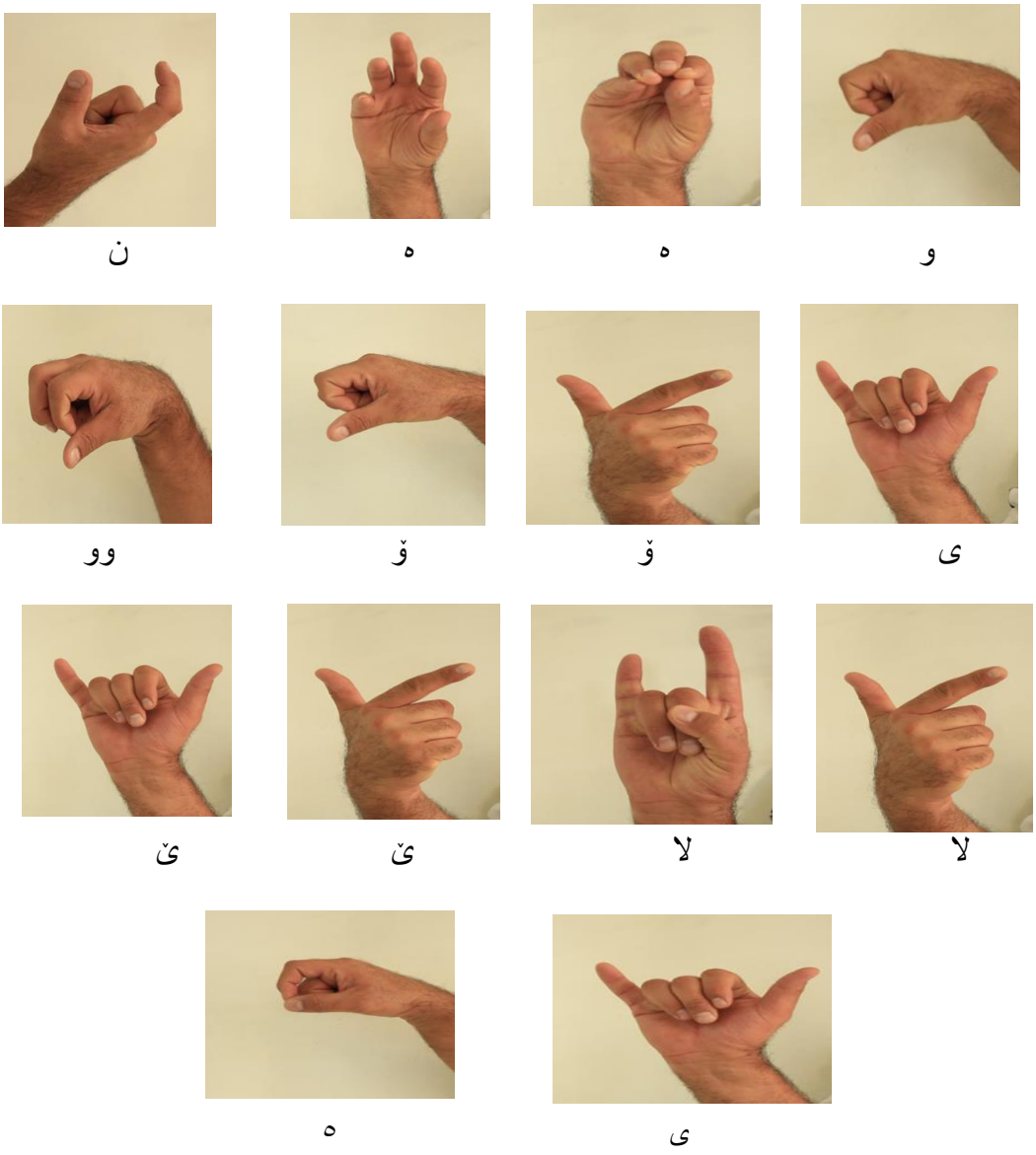

Figure 5. 3: ZAK Manual alphabets

Handshapes in SLs are regarded as phonemes in spoken languages. As in ASL handshapes are composed of distinctive features, e.g., *full* (four fingers are extended such as ش ،س, *cross* (cross fingers) ت ,م ،ژ ،ز *touch* (contact between thumb and finger tips) ە ،ق ،چ ،ف ،ه ،ڤ.Besides their phonemic value, handshapes carry meaning which are called classifiers that represent typical characteristics such as animals, human, small and round, large and round. The use of handshape to refer to noun classes holds for all SLs and this is applicable to ZAK, e.g., ح is like a snake and ۆ is like a rabbit.

It has become clear that each letter in ZAK like ASL represents a specific sign. The aspect of handshape also plays a significant role in the structure of signs in ZAK. The priority of movements is performed by the hands or fingers in the signing space to express the lexicon and the grammatical structure of the signs (**Figure 5.4**) (Dictionary, 2000). The following link is about the pictures of all the handshapes of the manual alphabets and numbers in ZAK.

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https://drive.google.com/file/d/1etp1NSND0TrJ6HhvVX4oxjxa5DtZwOX9/view?usp=sharing

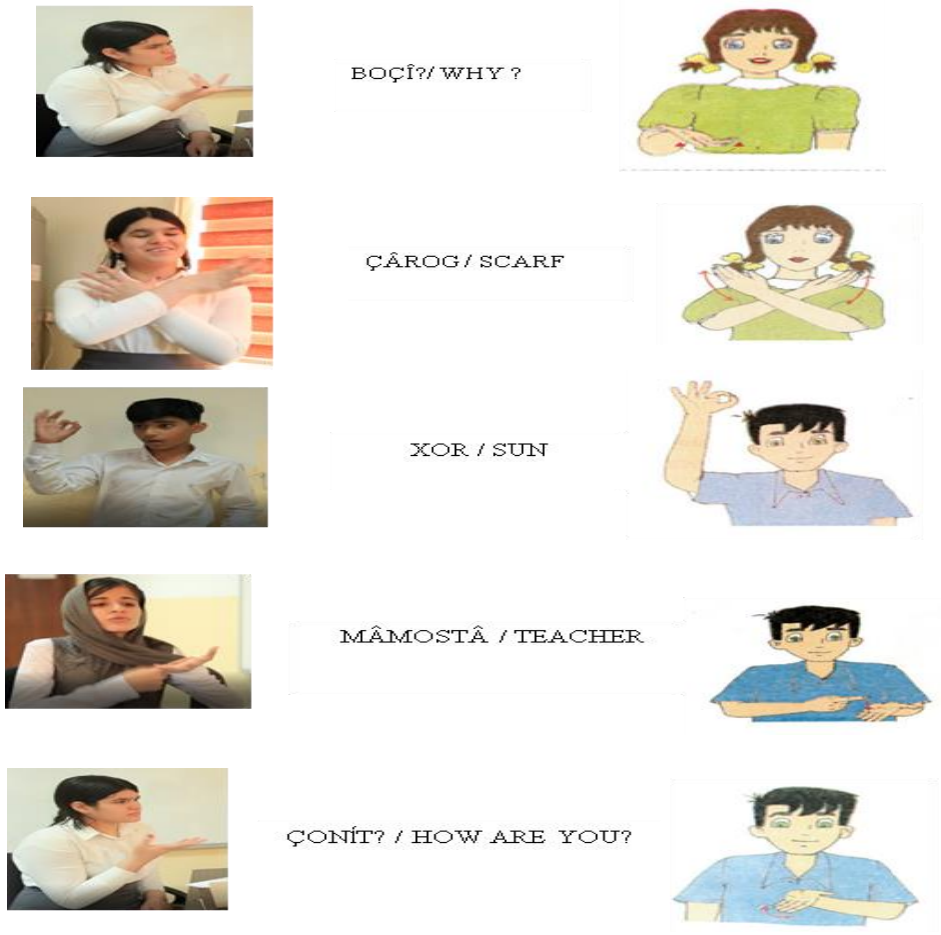

Figure 5.4: Handshape signing the lexicon and grammatical structure of ZAK

According to the stimulus elicited data particularly the picture-task and the dictionary for the Deaf, ZAK sign numbers are as follows (**Figure 5.5**):

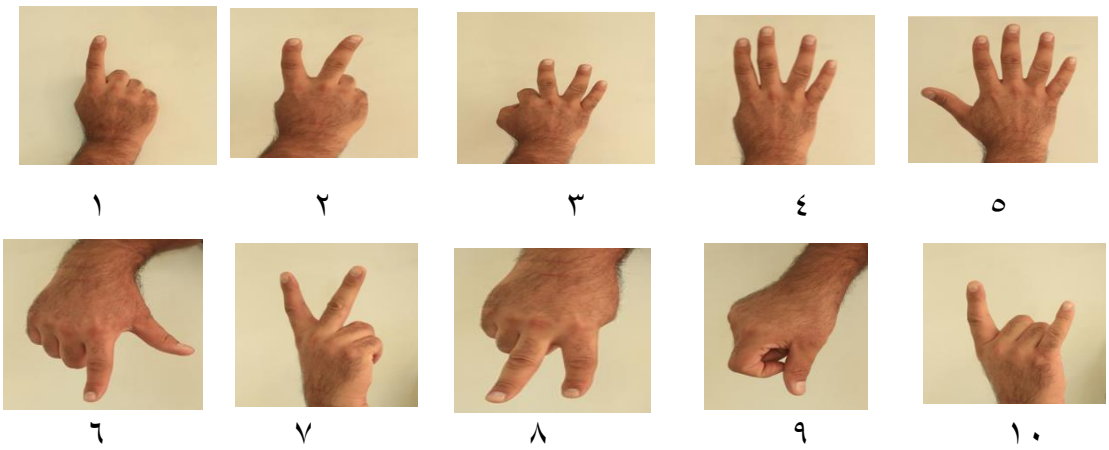

Figure 5.5: ZAK numbers

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The numbers have also been analyzed through the use of elicited data, particularly picture-task, for recognizing and producing sign numbers. The tasks are both comprehension and productive ones produced by Deaf participants in the classroom (**Figure 5.6**).

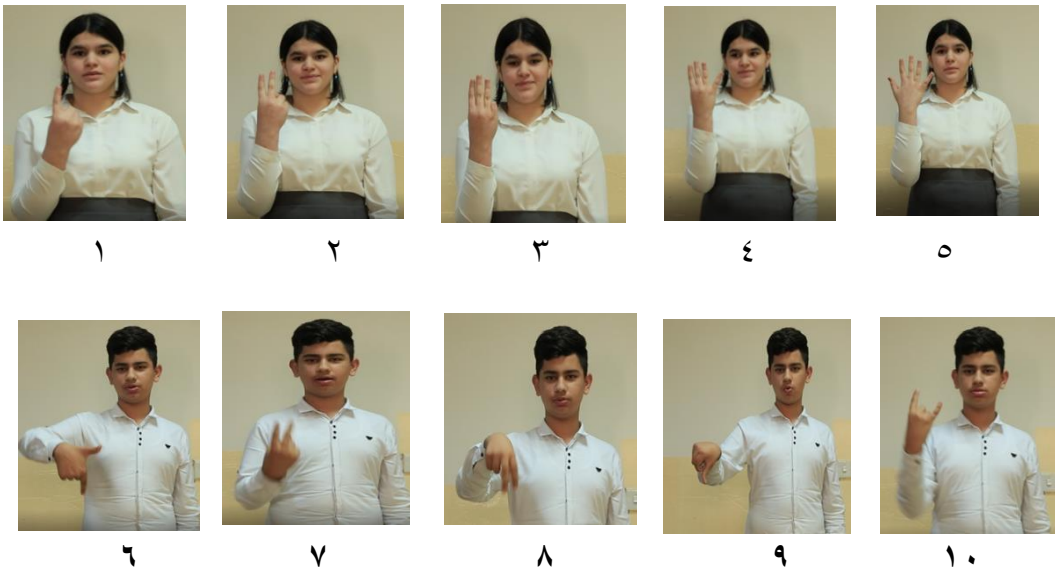

Figure 5.6: ZAK numbers from the picture elicited productive-task

So as to fix the reliability of the exact sign numbers, they have been analyzed and documented in all other tasks particularly the pair conversation task while the participants asked each other personal questions (**Figure 5.7).**

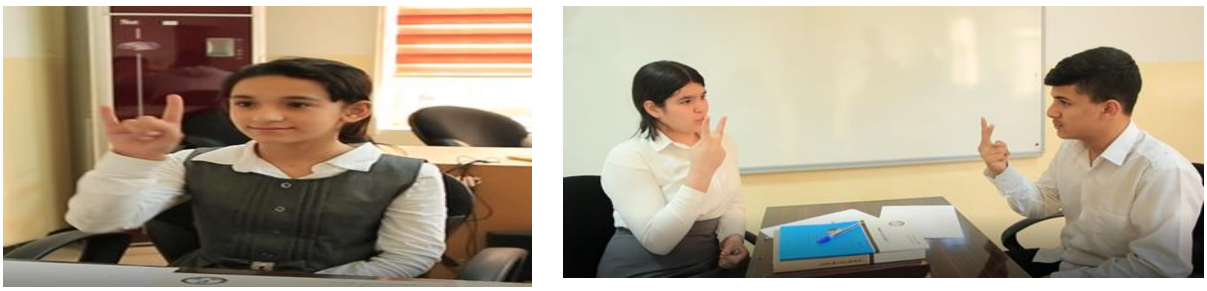

Figure 5.7: ZAK numbers pair during the pair conversation

5.1.2 Location

The second aspect of the phonological structure identified as location has its own importance in sign discourse and to specify the grammatical structure in using it for temporal relations, e.g., DWĚNĚ *yesterday* and AMRO *today* differ in direction (**Figure 5.8 a and b).** The pointing finger of the dominant hand is moved down towards the location (earth) twice in AMRO to the present while in DWĚNĚ the dominant hand is moved towards the back of the head to

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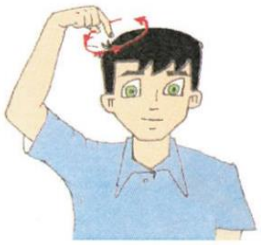
express the past. Each phonological aspect starting from the handshape, location, movement and the orientation to the non-manual signs is a sign discourse indicating the lexicon, grammatical structure of the whole utterance. It has been obvious that the two types of location: the primary location (on the body) as in (**Figure 5.8 a**) and secondary location (on the hand) (**Figure 5.8 b**) exist in ZAK. The majority of signs are articulated within the signing space. The signing space in ZAK is also the area from above the head to the waist similar to the existing SLs being researched so far. (**Figure 5.9**) is an example of the signing space from above the head such as CAMADÂNÍ / *turban* to the waist such as KARWĚŜK / *rabbit.* (Dictionary, 2000).

a) DWĚNĚ/ *yesterday*

b) AMRO / *today*

Figure 5.8: Sign discourse for grammatical structure differ in location



a) CAMADÂNÍ / *turban*

b) KARWĚŜK / *rabbit*

Figure 5.9: The signing space in ZAK

5.1.3 Movement

Through all the elicited data, it has been obvious that the two types of movement: the primary movement and secondary movement exist in ZAK in which the direction of the hands, palms and fingers are changed to demonstrate the simple and complex movements of signs during the sign discourse. As it has been mentioned in (3.1.2.1.3) by Johnston and Schembri (2007, p. 80) and Wilcox (2007, p.1115) that all the physically possible movements of fingers, arms and hands are usable. This is also applicable in ZAK. The following examples are of primary movements (**Figure 5.10 a, b, c and b**) that the hands move away from the signer, towards the signer downwards or upwards in a circle with changes of handshapes in opening and closing the hand. (**Figure 5.11 a and b**) is an example of secondary movements of repeated changes of the handshapes or orientation (Dictionary, 2000):

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a) BIŽÎ *well done* b) LA XIZMAT DÂM *at your service*


c) BARDAWÂMÎ *continuous* d) BÊ HEZ *weak*

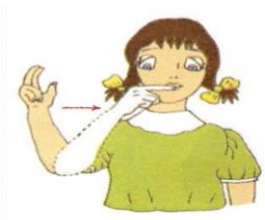
Figure 5.10: Primary movement in ZAK


a) LÛS *smooth* b) ZBIR *rough*

Figure 5.11: Secondary movement in ZAK

5.1.4 Orientation

From the following examples, taken from the elicited data, it has become obvious that signs in ZAK, as in ASL, are articulated having different orientations: left, right, up, down or towards or away from the signer's body. The above examples indicate downward orientation in (**Figure 5.10 a and d**), upward orientation **(Figure 5.10 b**). More examples of the right (**Figure 5.12 a**) and the left orientation (**Figure 5.12 b**) are shown (Dictionary, 2000, pp.54-57)

a) ŜÛTÎ *watermelon* b) HAĹUŽA *plum*

Figure 5.12: Orientation to right and left

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5.2 Sign Minimal Pairs in ZAK

Regarding the minimal pairs in ZAK, there are many examples where the signs are articulated differing in one parameter among the five parameters, e.g., KURTA *brief*, DREŽA *long-winded news or speech*. Both signs are similar in all parameters but they differ in movement but having the same handshape, location and orientation (**Figure 5.13 a and b**) (Dictionary, 2000).

a) KURTA b) DREŽA

Figure 5.13: Two ZAK minimal pair

5.3 The Structure of Sign Syllables in ZAK

As there is a manual and nonmanual visible movement as well as location as parameters of phonological structure, syllables are found in ZAK like other SLs. Like ASL, ZAK produces signs such as numeral signs ONE to NINE adding a small movement. ZAK signs consist of single segment such as BAHĚZ *strong* which is a monosyllabic sign, and ÂW *water* is a reduplicated monosyllabic sign (**Figure 5.14 c**). Light syllables such as BAHĚZ and heavy syllables as SĹÂW *greeting* are also found (Dictionary, 2000).

a) BAHĚZ b) SĹÂW c) ÂW

Figure: 5.14: Syllables in ZAK.

5. 4 Simultaneity and Sequentiality in ZAK

Signs are produced simultaneously where handshape should have a location in the signing space or the movement should have a change in the location or the orientation. The characteristic of simultaneous patterning is applicable in ZAK, e.g., CAMADÂNÎ *turban* is signed by the circle movement of the dominant hand from the rest position to the location to the head (**Figure 5.15 a**) and SĹÂW *greeting* is signed by moving the dominant hand from the head to the breast **(Figure 5.15 b and c**).

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a)

b)

c)

Figure 5.15: Simultaneity in ZAK

A sequential patterning is also possible in ZAK, e.g., a sequence of movement from one handshape to another or from one location to another, e.g., if the sequences of the signs are reversed, unacceptable signs will be produced, ZMÂNAWÂNÎ linguistics where it is signed with moving the index finger (the dominant hand has the shape of ب sign) to the location of the mouth and then moving it down with changing the shape of the hand extending the index finger and the middle one accompanied by a finger movement. However, reversing the location and movement produces an unacceptable sign (**Figure 5.16 a and b**) (Dictionary, 2013, p. 54).

a)

b)

Figure 5.16: Sequentiality in ZAK (ZMÂNAWÂNÎ)

6. Conclusions

This paper has demonstrated the importance of SL as a real human language. It has presented that, through the study of two SL linguistics, particularly the phonological structure, many grammatical features can be explored regarding the handshape, location, movement and orientation of the hand when articulating a sign in ASL and ZAK.

It has become evident, from the theoretical background, all the picture and video tasks, interviews and class observations that both ASL and ZAK have the same parameters of the phonological structure including the handshape, location, movement and orientation. However, the two SLs have different numbers of manual alphabets. The number of ZAK manual alphabets is more than ASL It has been clear that there are frequent handshapes in ZAK. In addition, ZAK

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has a number of handshapes that are not found in ASL. Both SLs have primary and secondary locations and the signs are articulated in the same signing area from above the head to the waist. Location in both SLs shows grammatical structure. Similarly, regarding the parameter of movement, both have primary and secondary movements in articulating the sign. As far as orientation is concerned, signs are articulated having the right, left, upward and downward orientation in both of them. Furthermore, minimal pairs are found in both SLs where the signs are different in one of the phonological parameters. Concerning the syllables, both ASL and ZAK have heavy and light syllables. The aspects of simultaneity and sequentiality exist in both SLs. It has been obvious that the majority of aspects related to phonological structure are found in ASL and ZAK. This indicates that SLs have phonological structure as spoken language based on the use of manual articulators.

It has been evident, from the interview with the Deaf and Hearing staff of Hiwa institute for the Deaf, that the majority of the Deaf participants have hearing parents. However, the Deaf participants do not use ZAK with their parents at home.

As the study of SLs has blossomed in recent years, it is recommended more emphasis has to be put on studying SLs linguistically at all levels since there is a need to know more about the hidden aspects of SLs particularly ZAK. Establishing a committee from all districts to discuss the issues related to ZAK is a good step toward the realization ZAK as a real language within the Kurdish spoken community. There should be a language planning and policy to standardize ZAK to be enlisted among the SLs in the world. The governmental authority, particularly the educational sector, has to work on improving ZAK through establishing more schools for the Deaf in each district and plan for the special curriculum to be applied in educational process.

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Journal of University of Raparin گۆڤاری زانکۆی ڕاپەڕین E-ISSN: 2522 – 7130 P-ISSN: 2410 – 1036

بنەماکانی دەنگسازی زمانی ئاماژەی ئەمەریکی ASL و زمانی ئاماژەی کوردی ZAK

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[1+2] بەشی زمانی ئینگلیزی، کۆلیژی زمان، زانکۆی صلاح الدین، هەولێر، هەرێمی کوردستان، عێراق.

پوختە:

ئەم توێژینەوەیە دەربارەی پێوەرەکانی دەنگسازیە لە زمانی ئاماژەی ئەمەریکی ASL و زمانی ئاماژەی کوردیZAK وە هەروەها لە جۆرەکانی زمانی ئاماژە دەکۆڵێتەوە کە یەکێکیان زمانی ئاماژەی سەرەکیە کە لە لایەن کەسانی نابیستەوە بەکاردەهێنرێت. زمانی ئاماژە بەوە پێناسە دەکرێت کە زمانێکی دەستەکی بینراوە وبەندە لەسەر بەکارهێنانی دەست ودەربڕینی دەموچاو وجوولەی جەستە. بە شێوەیەکی گشتی چەند بۆچوونێکی هەڵە لەلایەن خەڵکەوە هەیە دەربارەی زمانی ئاماژە کە ئەویش ئەوەیە زمانی ئاماژە زمانێکی جیهانیە و بنەمای ڕێزمانی نیە. بەڵام زمانی ئاماژە وەکو زمانی قسەکردن هەموو بنەماکانی زمانەوانی وەکو لێکسیک و دەنگسازی ووشەسازی و ڕستەسازی تایبەت بە خۆی هەیە. ئەوەی پەیوەندی بە بنەماکانی دەنگسازی زمانی ئاماژەوە هەیە ئەوەیە کە هەموو پێوەرەکان وەکو شێوازی دەست و شوێنی بەرکەوتنی دەست لەگەڵ بەشەکانی تری جەستە و جووڵە وئاڕاستەی دەست دەنگسازی زمانی ئاماژە دیاری دەکەن. لەم توێژینەوەیە هەندی پرسیار دروست بووە سەبارەت بە لایەنی دەنگسازی لەسەر هەردوو زمانی ئاماژەی ئەمەریکی وزمانی ئاماژەی کوردی. یەکێک لەو پرسیارانە ئەوەیە کە ئایا پێوەرەکانی دەنگسازی هەردوو زمانی ئاماژەی ئەمەریکی وکوردی وەک یەکن. مەبەست لەم توێژینەوەیە جێبەجێکردنی پێوەرەکانی دەنگسازیی زمانی ئاماژەی ئەمەریکی لەسەر زمانی ئاماژەی کوردی وە هەروەها پیشاندانی پێوەرەکانی دەنگسازی لە هەردوو زمانەکەدا. ئەوەی پەیوەندی بە گریمانەکانی ئەم توێژینەوەیە هەیە ئەوەیە کە زمانی ئاماژەی کوردی تەنها سێ پێوەری دەنگسازی هەیە. یەکێک لە ئەنجامەکانی ئەم توێژینەوە ئەوەیە کە هەردوو زمانی ئاماژەی ئەمەریکی و کوردی هەمان ژمارەی پێوەری دەنگسازیان هەیە و پێشنیار دەکرێت کە توێژینەوەی زیاتر بکرێت لە نێوان زمانی ئاماژەی ئەمەریکی و زمانی ئاماژەی کوردی و بەراوردکردنی ئاستەکانی تری زمانەوانی.

کلیلە وشەکان: زمانی ئاماژە، دەستەکی، زمانی ئاماژەی کوردی، پێوەرەکانی دەنگسازی، بەدوایەکداهاتن.

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Appendix 1 **Participant's Consent Form**

Name: Dyar Hmadamin

Age (date of birth): 2008- 13 years

Class: 6th

History of Deaf: from birth

Deaf relatives: 2 brothers

Do you agree to participate in the tasks of the study? **Yes** No

Do you want to appear in the video? **Yes** No

Does your family use ZAK with you at home? **Yes** only with 2 brothers No

When did you start using ZAK? At School

Appendix 2 **Participant's Consent Form**

Name: Aveen Aras

Age (date of birth): 2011- 10 years

Class: 6th

History of Deaf: from birth.

Deaf relatives: one brother

Do you agree to participate in the tasks of the study? **Yes** No

Do you want to appear in the video? **Yes** No

Does your family use ZAK with you at home? **Yes** only with brother No

When did you start using ZAK? At School

Appendix 3 **Participant's Consent Form**

Name: Frishta Ghazi

Age (date of birth): 2006 - 15

Class: 6th

History of Deaf: from birth

Deaf relatives: no one

Do you agree to participate in the tasks of the study? **Yes** No

Do you want to appear in the video? **Yes** No

Does your family use ZAK with you at home? **Yes** No

When did you start using ZAK? At school

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Appendix 4 **Participant's Consent Form**

Name: Himdada Nawzad

Age (date of birth): 2007 -14

Class: 6th

History of Deaf: from birth

Deaf relatives: 3 bothers

Do you agree to participate in the tasks of the study? **Yes** No

Do you want to appear in the video? **Yes** No

Does your family use ZAK with you at home? Yes **No**

When did you start using ZAK? At school

Appendix 5 **Participant's Consent Form**

Name: Sawen Salah

Age (date of birth): 2008- 13 years

Class: 6th

History of Deaf: from birth

Deaf relatives: one sister (not attended school)

Do you agree to participate in the tasks of the study? **Yes** No

Do you want to appear in the video? **Yes** No

Does your family use ZAK with you at home? Yes **No**

When did you start using ZAK? At school

Appendix 6 **Participant's Consent Form**

Name: Abdulbary Abbas

Age (date of birth): 2007 – 14

Class: 6th

History of Deaf: from birth

Deaf relatives: one brother (not attended school)

Do you agree to participate in the tasks of the study? **Yes** No

Do you want to appear in the video? **Yes** No

Does your family use ZAK with you at home? Yes **No**

When did you start using ZAK? At schoo

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Appendix 7

چاوپێکەوتن

ناو: سەیران شێخ محمد

تەمەن: ٤٤ ساڵ

پیشە: مامۆستا لە پەیمانگای هیوای نابیستان

١ -ژمارەی ئاماژە دەستیەکانی زمانی ئاماژە چەندن لەZAK؟ ٣٦ ئاماژە

٢ -ئایا زمانی ئاماژەی کوردی یەک دەستییە یاخود دوو دەستیە؟ یەک دەستیە

٣ -ئایا بنەماکانی دە نگسازی لە شێوازی دەست و شوێن و جووڵە و ڕاستەی و ئاماژە نا دەستییەکان بوونیان هە یە لە ZAK؟ بەڵێ

٤ -ئایا ئەم نابیستانە هەر ZAK بەکاردەهێنن لە ماڵەوە؟ نەخێر

٥ -ئایا دایک و باوکیان نابیستن یان دەیستن؟ دەبیستن

Appendix 8

ناو: ئەحمەد عەجیب علی

تەمەن: ٤٠ ساڵ

پیشە: مامۆستای یاریدەدەر (Radeef) لە پەیمانگای هیوای نابیستان

١- ژمارەی ئاماژە دەستیەکانی زمانی ئاماژە چەندن لەZAK؟ ٣٦ ئاماژە

٢- ئایا زمانی ئاماژەی کوردی یەک دەستییە یاخود دوو دەستیە؟ یەک دەستیە

٣- ئایا بنەماکانی دە نگی لە شێوازی دەست و شوێن و جووڵە و ڕاستەی و ئاماژە نا دەستییەکان بوونیان هە یە لە ZAK؟ بەڵێ

٤- ئایا ئەم نابیستانە هەر ZAK بەکاردەهێنن لە ماڵەوە؟ نەخێر

٥- ئایا دایک و باوکیان نابیستن یان دەیستن؟ دەبیستن

Interview

Name:

Age:

Profession:

1- How many manual alphabets are there in ZAK?

2-Are the manual alphabets one-handed or two handed?

3-Are the phonological parameters of handshape, location, movement and orientation found in ZAK?

4-Do the Deaf participants use ZAK at home?

5- Are their parents Deaf or hearing?

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