TEMPORAL CLAUSES IN TURKISH SIGN LANGUAGE

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DECLARATION OF ORIGINALITY

I, Aslı Özkul, certify that

- I am the sole author of this thesis and that I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced and published by another person or institution;
- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;
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Date.... 3 December 2020

ABSTRACT

Temporal Clauses in Turkish Sign Language

This dissertation aims to investigate the typological, structural, and semantic properties of temporal clauses in Turkish Sign Language (TİD). It is shown in this thesis that temporal clauses that denote sequentiality, simultaneity, duration, and frequency are attested in TİD. Some of these are headed by postpositional subordinators AFTER, BEFORE, DURATION, and GÖRE. Syntactically, temporal clauses must occur in the pre-verbal area, i.e. either to the left of the matrix clause or between the matrix subject and the matrix verb. They also display characteristics of subordinated clauses: They form constituents with the postpositional subordinators and they are usually marked by a non-manual marker, head thrust, which functions as a clausal boundary marker in TİD. The presence of semantically vacuous negation in BEFORE-clauses also provides evidence for subordination. Moreover, temporal clauses in TİD provide visible evidence for a number of abstract semantic notions proposed previously: (i) temporal and matrix clauses as Ground and Figure (Talmy, 1975), (ii) spatiotemporality, i.e. topographic relations between temporal arguments (Demirdache and Uribe-Extebarria, 1997), (iii) properties of durational and locating temporal markers, and (iv) loci as temporal variables. Regarding the last topic, this thesis extends Schlenker's (2013, 2017) analysis of loci as temporal variables to a complex sign -DURATION- in which {duration} is the bound root and temporal pronouns attach to this root in the form of clitics. Finally, a new timeline which has not been observed in any other sign language before is proposed.

ÖZET

Türk İşaret Dilinde Zaman Cümlecikleri

Bu tez, Türk İşaret Dilinde (TİD) zaman tümceciklerinin tipolojik, yapısal ve anlamsal özelliklerini incelemeyi amaçlamaktadır. Bu tezde, TİD'de sıralılık, eşzamanlılık, süre ve sıklığı ifade eden dört tür zaman tümceciğinin bulunduğu gösterilmektedir. Bunların bazılarının başı ilgeçsel yantümleyiciler olan SONRA, ÖNCE, SÜRE ve GÖRE'dir. Sözdizimsel olarak, zaman tümcecikleri yüklemden önce gelmelidir, yani ana tümcenin solunda veya ana tümcenin öznesi ile yüklemi arasında yer almalıdır. Ayrıca, zaman tümcecikleri, yan tümce özellikleri gösterirler. Yan tümce ilgeçleri ile kurucu oluştururlar ve genelde TİD'de yan tümceler için sınır işaretçisi olarak işlev gören el dışı hareket olan başı öne doğru çıkartma ile işaretlenirler. ÖNCE tümceciklerinde anlamsal olarak boşuna olumsuzluğun görülmesi de, yantümcelemeye dair başka bir kanıttır. Bunlara ek olarak, TİD'deki zaman tümcecikleri, anlamsal özellikleri açısından, daha önce alanyazında önerilmiş soyut anlam kavramlarının görünürlüğüne dair kanıt sağlar: (i) Zemin ve Şekil olarak zaman tümcecikleri ve ana tümceler (Talmy, 1975), (ii) uzamzamansıllık, yani zaman bildiren ögeler arasındaki yer-betimsel ilişki (Demirdache ve Uribe-Extebarria, 1997), (iii) süre bildiren ve süre bildirmeyen zaman tümceciklerin özellikleri ve (iv) zamansıl adıllar olarak göndergeler. Son konu hakkında bu tez, Schlenker'in (2013, 2017) zamansıl değişkenler olarak gönderge noktaları analizini, {süre}'nin bağlı bir kök olduğu zamansıl adılların bu köke biçimce şeklinde eklendiği karmaşık bir işaret olan -SÜRE- ile genişletmektedir. Son olarak, bu çalışma daha önce başka hiçbir işaret dilinde gözlemlenmemiş yeni bir zaman çizgisi önermektedir.

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Özkul, A. (2019). Deontic and epistemic necessity in Turkish Sign Language (TİD). *Poznan Studies in Contemporary Linguistics*, *55*(3), 543-577.

Kelepir, M., Özkul, A., & Tamyürek-Özparlak, E. (2018). Agent-backgrounding in Turkish Sign Language (TİD). In G. Barberà & P. Cabredo Hofherr (Eds.) *Special Issue in Sign Language & Linguistics: Reference Impersonals in Sign Languages, 21*(2), 258-284. John Benjamins Publishing Company.

Book Chapter
Özkul, A. (2016). Türk İşaret Dilinde araçsıl isim-fiil çiftlerine birimbilimsel bir bakış. In Arık, E. (Ed.), *Ellerle konuşmak: Türk İşaret Dili araştırmaları* (pp. 211-232). İstanbul: Koç Üniversitesi Yayınları.

Proceedings
Kelepir, M., Özkul, A., & Tamyürek-Özparlak, E. (2017). Expressing the clusivity distinction in nonspecific indefinite pronouns in TİD. *Proceedings of the 54th annual meeting of the Chicago Linguistic Society* (pp. 167-180). Chicago, IL: CLS.

Özkul, A. (2015). Türkçede -lA eki ile türemiş eylemlerin olay ve temel öge yapısı. *Proceedings of the 29th National Congress of Linguistics.* Kocaeli Üniversitesi, Kocaeli.

Eryiğit, C., Karabüklü, S., Özkul, A., Torunoğlu, D., Köse, H., Eryiğit, G., Kelepir, M., & Özsoy, S. (2015). Türk İşaret Dili sözcüklerinin çevirimiçi ortamda birleştirilmesi çalışmaları. *Proceedings of the 29th National Congress of Linguistics.* Kocaeli Üniversitesi, Kocaeli.

Ketrez, F. N., Kamiloğlu, F., Özkul, A., & Yıldız, E. (2015). Early vocabulary size: Twins vs. singletons. In D. Zeyrek, Ç. Sağın-Şimşek & R. Rehbein (Eds.), *Proceedings of the 16th International Conference on Turkish Linguistics.* TURCOLOGICA Harrassowitz Verlag.

Özkul, A. (2014). Across-the-board wh-questions in Turkish: A sideward movement analysis. *Proceedings of International Linguistics and Language Conference* (pp. 123-129). Istanbul.

Conference Talks & Posters
Özkul, A., & Karabüklü, S. (2019). A morphological analysis of number signs in TİD. Poster presented at *TISLR 13*. Hamburg, Germany, September 26-28.

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Özkul, A. (2017). Necessity modal in Turkish Sign Language. *International Conference on Turkish Linguistics.* Cukurova University, Adana, February 24-26.

Özkul, A. (2015). Lexical or classifier verbs: An investigation of instrumental verbs in Turkish Sign Language (TİD). *Linguistic Approaches to Endangered Languages: Theory and Description.* Boğaziçi University, İstanbul, July 28-30.

Özkul, A., & Kelepir, M. (2015). Passive-like constructions with inanimate themes in Turkish Sign Language. Poster presentation at *Formal and Experimental Advances in Sign Language Theory*. University of Pompeu Fabra, Barcelona, May 4-6.

Özbek, A. (2012). Verbal complexity in Turkish Sign Language: Instrumental verbs and classifiers. Poster presented at *45th Annual Meeting of the Societas Linguistica Europaea.* Stockholm University. August 29– September 1.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

SIGN LANGUAGES

ASL	American Sign Language	
CTSL	Central Taurus Sign Language	
FinSL	Finnish Sign Language	
HKSL	Hong Kong Sign Language	
IsL	Israeli Sign Language	
LIS	Italian Sign Language	*La Lingua Italiana dei Segni*
LSC	Catalan Sign Language	*Llengua de Signes Catalana*
LSE	Spanish Sign Language	*La Lengua de Signos Espanola*
LSF	French Sign Language	*Langue des Signes Française*
NGT	Sign Language of the Netherlands	*Nederlandse Gebarentaal*
RSL	Russian Sign Language	
TİD	Turkish Sign Language	*Türk İşaret Dili*
VGT	Flemish Sign Language	*Vlaamse Gebarentaal*

NON-MANUAL MARKERS

bl	body lean
bl-f	body lean forward
bn	tongue protruding
br	brow raise
hn	head nod
ht	head tilt
hth	head thrust
neg	negation
re	raised eyebrow

OTHERS

abl	ablative
acc	accusative
APV	agent-patient-verb
AST-T	assertion time
comp	complementizer
contra	contralateral
CL	classifier
CP	complementizer phrase
çl	çoğul (plural)
erg	ergative
D&UE	Demirdache & Uribe-Extebarria
ET	event time
EVH	Event Visibility Hypothesis
fut	future
GI	gösterme imi (index sign)
H1	dominant hand
H2	non-dominant hand
ipsi	ipsilateral
IX	index sign
iy	iyelik (possessive)
neg	negative marker
NMM	non-manual marker
PAV	patient-agent-verb
pl	plural
poss	possessive
pst	past
ptp	participle
REF-T	reference time

sg	singular
SOV	subject-object-verb
ST	speech time
TAC	temporal adverbial clause
temp	temporal marker
tns	tense
TP	tense phrase
upw	upwards
UT	utterance time
vP	little v-Phrase

CHAPTER 1

INTRODUCTION

1.1 Aim of the study

The objective of this research project is to investigate the syntactic and semantic properties of temporal clauses and the strategies for temporal marking and subordination of temporal clauses in TİD. In this dissertation, I focus on an understudied topic in sign language linguistics, temporal clauses, which is a subtype of adverbial clauses.

A temporal clause is a type of adverbial clausal temporal expression which locates an event or state with respect to another state or event. In example (1), the event in the first clause is situated in time with respect to the time of the event in the second clause:

(1) I woke up when the phone rang.

The types of temporal clauses are identified based on the relationship between the temporal clause and the main clause of a complex structure. The temporal relations could be anteriority, posteriority, simultaneity or duration. Though there is a large body of literature investigating clausal complexity in spoken languages, sign languages have only recently been under investigation regarding the complexity of clauses. It is hard to distinguish not only complex clauses from simplex clauses but also coordinated clauses from subordinated clauses in sign languages. By focusing on some structures that have not been studied extensively in TİD, this research project shows the structural properties of these clauses and draws a sketch of the common properties of the complex clause types in TİD.

Based on the aims of this study, the preliminary research questions could be summarized as below:

1) Does TİD have temporal clauses? If yes,

a) What are the ways of marking temporal clauses?

b) What are the types of temporal clauses?

b) What is the internal structure of the temporal clauses?

c) What is the position of the temporal clause with respect to the matrix clause?

2) Can temporal clauses be expressed in a simultaneous way (i.e. with each hand expressing a different clause)? If yes, which types of temporal clauses are available in this category?

3) What do temporal clause types in TİD have in common in terms of their structure?

4) How does the use of space function while expressing the temporal relations in TİD?

To answer the research questions 1, 2, and 3, the main criteria to be looked into in this study are word order (head-adjunct order restrictions) and constituency, accompanying non-manual markers (NMMs) and their spreading domains, and other available means that may mark complexity in TİD. Use of space is the focus of the research question 4 whose objective is to examine how syntax and semantics interact in temporal expressions.

The first question is addressed both in Chapters 4 and 5. I show in Chapter 4 that TİD has temporal clauses and there are four different types of them. These types are the clauses which denote sequentiality (2a), simultaneity (2b), duration (2c) and frequency (2d). See the corresponding examples for each category below:

(2) a. Ali left the work after/before he finished his project.

b. While Bulut is reading books, I am baking his favorite cake.

c. Since Aslı found a job, she has been living in the city center.

d. Whenever I go to the market, I buy milk for Niko.

I also answer the question (1a) by describing the ways of marking temporal clauses both manually and non-manually in the same chapter. The description of these different types of temporal clauses in TİD are made in Chapter 4, the internal structure of temporal clauses and the syntactic position of a temporal clause in a complex construction are discussed in detail in Chapter 5. In Chapter 5, I argue that the relationship between the temporal clause and the matrix clause is subordination and the order of the clauses is fixed. Furthermore, I propose that temporal markers in TİD are postpositional elements based on the characteristics of their complements.

The second question is answered across several chapters. In Chapter 4, I provide a descriptive analysis of the data to show that simultaneously expressed propositions may have the structure of complex clauses containing a temporal clause. In Chapter 5, I analyze their structure. And finally, in Chapter 6, I argue that simultaneous temporal clauses provide visible evidence for Hale's (1986) use of the semantic opposition: [+/- central coincidence] for temporal structures.

The third question which is about the common features of the structure of temporal clauses is also addressed in different chapters. In terms of typology, temporal clauses are classified based on their structural diversity in Chapter 4: (i) whether they are expressed sequentially or simultaneously, and/or (ii) whether they are expressed with or without a manual marker. Regarding the clausal architecture of the temporal clauses in TİD, I argue in Chapter 5 that they are subordinate clauses and temporal clauses precede the matrix clause. Lastly, I discuss how form and

meaning overlap in the context of temporal expressions in a sign language and how the signing space is used systematically to encode and anchor time and temporal relations in Chapter 6.

The fourth question is addressed at different levels in different chapters, as well. In Chapter 4, I display that temporal relations are encoded within the signing space, especially in the case of duration. In Chapter 5, I highlight that the use of space is specifically important for simultaneously expressed propositions in terms of investigation of both form and meaning. Chapter 6 is the section in which use of space is the focus of attention. Here, I argue that use of space plays an important role in conveying the temporal meaning through (i) Talmy's (1975) Figure-Ground analysis, (ii) Demirdache and Uribe-Extebarria's (1997 and later works) spatiotemporal analysis, (iii) Wilbur's (2003, 2008, 2010) Event Visibility Hypothesis, (iv) timelines, and (v) Schlenker's (2013, 2017, 2018) analysis of the use of loci for temporal anaphora.

1.2 Significance of the study

The findings of this study contribute to the understanding of typological, structural and semantic properties of temporal expressions in TİD that (may) also have some cross-linguistic implications.

The first contribution of this thesis is that it investigates the types of temporal clauses in TİD and the similarities and differences between these types. It shows which temporal clause types are available in TİD and displays their general characteristics.

Providing a structural analysis of the temporal expressions in TİD is another contribution of the present study. It shows the structural characteristics of temporal

clauses in contrast to simplex temporal phrases and it draws a general picture of the word order preferences of temporal clauses, the structural relations between the clauses which have temporal relations, and the structural properties of manual temporal markers in TİD. The evidence from stand-alone tests, the use of non-manual marker head thrust, BEFORE-clauses, center-embedding of temporal clauses, and simultaneous constructions indicate that the structural relationship between the temporal clause and the matrix clause is subordination.

The third contribution of this thesis is on the visibility of temporal relations in TİD. Visibility refers to the transparency of the meaning expressed through iconic forms in sign languages. This study has theoretical implications for the visibility of meaning in sign languages and the contributions of this thesis in terms of providing evidence for the visibility of meaning in a sign language are multifold. First of all, this study shows that the Figure-Ground relation offered for the semantic analysis of temporal clauses in spoken languages is a fundamental mechanism to express temporal relations in TİD in addition to its use to convey locational relationships. Secondly, this research indicates that sign languages iconically express the spatiotemporality which was originally coined for temporal relations in spoken languages. This study shows that sign languages have the potential to express events that overlap temporally through the use of multiple articulators (i.e. simultaneously occurring events can be signed simultaneously by different articulators). Thirdly, it is shown in this study that the form corresponds to the meaning in durational vs. non-durational signs. Another visibility that is observed in this study is that the timelines serve to convey temporal meaning and some parts of the space have specific temporal meanings whereas some parts of the signing space are underspecified in that sense. Finally, this study shows that sign languages make use of loci for

temporal anaphora not only through simplex signs such as pointing, as in French Sign Language (LSF) and American Sign Language (ASL) but also in complex signs such as DURATION in TİD.

Having stated the aim of the dissertation in this section, I will give a brief overview of TİD, its signers and the linguistics literature on TİD in the next subsection.

1.3 Notes on Turkish Sign Language

TİD is the language signed by the majority of the members of the Deaf community in Turkey. Though the exact number of its users is not known, it is stated in the Turkey Disability Survey (2002) that the number of people with 'hearing disability' is 250,000, which means the ratio of people with hearing disability to overall population of Turkey is 0.37% (Kemaloğlu & Kemaloğlu, 2012, pp. 66-67). Based on alternate estimations, the population of TİD signers is considered to be between 187,500 and 337,500 (Taşçı, in press-a).

There are also two local village sign languages in Turkey which are Mardin Sign Language and Central Taurus Sign Language (CTSL). These languages have developed as local languages because of the hereditary deaf population in these two local areas of Turkey. However, no genetic relationship has been articulated so far between these village sign languages and TİD or between TİD and any other sign language in the world (Dikyuva, Makaroğlu, & Arık, 2015).

The earliest findings in Anatolia regarding deafness date back to Hittites whereas later findings belong to the 15th and 19th centuries (Ottoman times) (Taşçı & Göksel, in press). Miles (2000) suggests that TİD could be one of the oldest sign languages based on the proposal that the sign language used in Ottoman Palace is the

ancestor of TİD. However, it is not certain whether modern TİD is the continuation of that sign language or not (Taşçı & Göksel, in press; Zeshan, 2002, 2003).

Most of the deaf children are born to hearing families, which affects the access to sign language of deaf newborns. Thus, the schooling of deaf plays an important role in sign language education especially for those children who do not have access to sign language at home. Children who cannot be exposed to a sign language via their family members can have access to the sign language at school around the age of 6 or 7, which means a big delay in terms of first language acquisition. Thus, the degree of nativeness of the TİD signers may differ depending on the immediate family and school environments (Özsoy, Arık, Göksel, Kelepir, & Nuhbalaoğlu, 2013).

The foundations of deaf education lie in the Ottoman times tracing back to the earlier times of the twentieth century. The earliest record for a deaf school belongs to 1902 (Deringil, 2002). Later records date back to the 1950s when there were public deaf schools in which the medium of instruction and communication were not sign language but the oral language (Kemaloğlu & Kemaloğlu, 2012). TİD was recognized officially as a language only in the early 2000s. And with the passing of the Disability Law, TİD was aimed to be used to some extent in the schools (Taşçı, in press-a). Today, there are deaf schools which only deaf students attend whereas some deaf students enroll in mainstream schools with individual education programs. However, the rate of schooling of the deaf children is only 10% and the use of TİD as a medium of instruction is still not the case even in deaf schools though there are some developments regarding the recognition and the current status of TİD (Taşçı, in press-a).

Linguistic studies on TİD were initiated in the early 2000s. The first study, which was a typological documentation of TİD, was Zeshan (2002). Until the scientific studies on TİD started, TİD was regarded as a basic method of communication but not as a real language in Turkey (Taşçı, in press-a). Since then, a comprehensive body of literature has developed. Dikyuva, et al. (2015) and Dikyuva, Makaroğlu, and Arık (2017) are reference grammar books in Turkish and English, respectively. Kelepir (in press) is an edited online reference grammar book. Typological characteristics of TİD (Zeshan, 2002, 2003); phonological and morphological characteristics of TİD (Kubuş, 2008; Makaroğlu, 2018, Özkul, 2013; Taşçı, 2012), sentence types (Açan, 2007), syntactic characteristics of TİD (Gökgöz, 2009; Göksel & Kelepir, 2013; Kelepir & Göksel, 2013; Makaroğlu, 2012, 2013; Sevinç, 2006;); syntax-semantic interface issues in TİD (Karabüklü, 2016; Kelepir, Özkul, & Tamyürek Özparlak, 2018; Saral, 2019); spatial relations and classifier constructions (Arık, 2010, 2013; Özyürek, Zwitserlood, & Perniss, 2010; Sümer, Zwitserlood, Perniss, & Özyürek, 2013) (age of) language acquisition (Sevgi, 2019; Sümer, 2015) are among the topics investigated so far.[1] Some of these syntactic and semantic works that are immediately related to the subject of this study will be presented in detail in Chapter 2 (see Taşçı & Göksel (in press) and Taşçı (in press-a) for further information on the socio-historical background of TİD, the Deaf community in Turkey, and the linguistic studies on TİD).

[1] A frequently updated and up-to-date bibliography of TİD is available at: http://turkishsignlanguage.enginarik.com/bibliography

1.4 Layout of the dissertation

The inner organization of the sections of the thesis will provide the description of the phenomena, subtypes of relevant complex clause as given in the literature, results of the tests, analysis and discussion, and conclusion together with challenges and new insights into sign language linguistics.

Chapter 2 reviews the relevant literature about temporal clauses as a subordinate clause type in general and the ways of expressing time in sign languages in specific. This chapter also presents the previous studies that discuss how visibility serves to convey the meanings of abstract semantic notions in sign languages.

Chapter 3 describes the methodology used in this dissertation in detail. It gives details about the participants, data collection procedure for both corpus data and the elicited data and how the data have been described and analyzed.

Chapter 4 presents the findings of the study and it describes the ways of expressing (clausal) temporal relations in TİD. Based on findings from corpus and elicited data, four types of temporal clauses are observed in TİD and these are duration, sequence, simultaneity, and frequency denoting clauses. According to the findings of this study, temporal clauses can be expressed with such manual temporal markers as DURATION, BEFORE, AFTER and GÖRE. It is also possible in TİD that temporal clauses are expressed without any manual temporal markers. Moreover, this chapter highlights the findings that are specific to TİD and/or sign language modality. It shows that a non-manual marker can function as a boundary marker which helps to identify temporal clauses in TİD. Another modality specific finding is that simultaneity denoting events can be expressed both simultaneously and sequentially in TİD.

Chapter 5 discusses the structural properties of temporal clauses in TİD. It provides evidence for the following claims: (i) temporal clauses are subordinated in TİD, (ii) temporal clauses always precede the main clause, and (iii) temporal clause markers carry postpositional properties.

Chapter 6 analyzes the findings of the study from a semantic point of view. It mainly focuses on the relationship between the use of space and temporal meaning through Figure-Ground relations, timelines, and loci as variables. It is argued in this chapter that (i) simultaneity denoting temporal clauses in TİD display properties of subordination based on Talmy's (1975) Figure-Ground analysis of temporal clauses; (ii) temporal clauses in TİD provide visible evidence for spatiotemporality between temporal arguments which shows whether the events overlap temporally or not; (iii) the form of a temporal expression in TİD reflects its semantic content (i.e. whether it is durational or non-durational); (iv) TİD makes use of timelines and use of space for temporal encoding; and (v) any locus in the signing space could be assigned a temporal reference (Schlenker, 2013, 2017, 2018) and this is shown through the sign DURATION which is a complex one in which temporal pronouns realize as clitics.

Chapter 7 concludes the dissertation, summarizes the findings of the study, and discusses the implications of the study for the existing literature and further research.

CHAPTER 2

EXPRESSION OF TEMPORAL RELATIONS AND VISIBILITY

This chapter provides an overview of previous studies in terms of typological and structural properties of temporal expressions in spoken and sign languages and how visibility of the meaning is attested in sign languages. These topics are relevant to the description and the analysis of the TİD data discussed in the following chapters of the thesis.

In Section 2.1, I focus on the typology of temporal clauses and the structural relation between a temporal clause and a matrix clause. In Section 2.2, I elaborate on the ways of expressing time and temporal relations in sign languages. In Section 2.3, I provide an overview of the studies that investigate the expression of abstract linguistic notions through visibility in sign languages.

2.1 Temporal clauses: A brief overview

The time and duration of an event is conveyed through temporal adverbials, and a temporal adverbial can be simplex (3a) or clausal (3b).

(3) a. I woke up at 7.00.

b. I woke up when the phone rang.

When it is clausal, a temporal adverbial locates an event or state with respect to another state or event.

In (3a) temporal meaning is conveyed through a certain time reference, *at 7.00* whereas in (3b) the temporal relation is conveyed by the temporal subordinator *when*. Moreover, in (3b), the event in the first clause is situated in time with respect to the time of the event in the second clause. Sæbø (2011) argues that while the

difference between (3a) and (3b) is that the latter makes an indirect temporal reference, both of them anchor events or states in time. Similarly, Johnston (1994) claims that temporal clauses are equivalent to other temporal non-clausal expressions in terms of their functions in a clause. According to him, both of the following temporal expressions, a temporal clause, *when she was in the office*, and a prepositional phrase, *between nine and ten o'clock*, denote the same temporal relation, which is duration, as exemplified in (4):

(4) a. Jane responded the e-mails when she was in the office.

b. Jane responded the e-mails between nine and ten o'clock.

2.1.1 Types of temporal clauses

Different classifications of temporal clauses have been suggested in the literature, based on different criteria. Hengeveld (1991) classifies them as anteriority-, posteriority- and simultaneity-denoting clauses and his typology mainly covers *before, after*, and *when/while*-clauses across languages. Quirk et al. (1985) use another classification of temporal clauses and the authors argue that temporal clauses denote position, duration or frequency. Sæbø (2011) classifies temporal clauses into three types based on their temporal semantics: (i) *after-before* clauses, (ii) *until/since*-clauses, and (iii) *when-while* clauses. In this thesis, I adopt Sæbø's classification in the description and the analysis of the TİD data.

The first temporal clause category proposed by Sæbø (2011) is sequence-denoting clauses. He puts *after*-clauses and *before*-clauses in this category. The second category is the duration-denoting temporal clauses. Under this category he analyzes *since*-clauses as well as *until*-clauses. The function of both of these adverbial constructions is to mark the beginning and/or the ending point of the time

interval of an event or state. Consider the examples (5a) and (5b) adapted from Sæbø:

(5) a. He has been looking for a job since he was fired.
b. He kept looking for a job until he found a new one.

In (5a), the initiation point of the time interval is marked with *since* and in (5b) the endpoint of the event of the matrix clause is marked with *until*. Sæbø (2011) also points out that whereas the use of *since* is limited to past tenses in languages, the use of *until* is not limited to past or future.

For the last category of temporal clauses, Sæbø (2011) states that both *when* and *while*-clauses denote temporal reference on single eventualities or time intervals. However, whereas *when*-clauses are used with telic events, *while*-clauses are used with atelic events.

Sæbø (2011) classifies *when*-clauses into two classes: existential and universal. When the predicate of the temporal clause is a state, it yields the existential reading and the temporal conjuncts can be reversible:

(6) a. When she was five, she learned how to read and write.
b. She was five when she learned how to read and write.

In (6), for every event runtime of 'she be five', there is an event runtime of 'learning how to read and write'.

Sæbø sees *while*-clauses as a subtype of existential *when*-clauses: *When* and *while* can be used for the same temporal meaning, but *while* requires atelic and imperfective predicates and *while* usually denotes simultaneity and/or inclusion:

(7) While she was getting prepared for the project, she reviewed a book.

In universal *when*-clauses, on the other hand, "the eventuality type described by the predicate can have several maximal instantiations", which means the temporal clause functions as the restrictor of a "covert habituality operator" (Sabeo, 2011, p. 1424). See the following example:

(8) When she had a quarrel with her friend, she felt overwhelmed.

In (8), in one reading, an event of 'feeling overwhelmed' occurs for every event of 'having a quarrel with the friend', which shows the temporal clause has a universal reading.

Besides existential-universal distinction in *when*-clauses, there are different meanings maintained by the subjunctor *when*. Johnston (1994) analyzes different interpretations of *when*-clauses and he concludes that the temporal meaning conveyed by *when* is dependent on other factors such as telicity of the events both in the matrix clause and the subordinate clause and the presence of quantifiers, which affects the interpretation of *when*-clauses. Johnston proposes that the two interpretations of *when*-clauses are the runtime of the eventuality as in (9a) (similar to simultaneity or inclusion denotation of *when*-clauses as suggested by Sabeo (2011)) and also the aftermath of the eventuality as in (9b). Compare the examples below:

(9) a. When she was in the shopping center, she bought four items. (inclusion)

b. When she died, everyone got upset. (aftermath)

Sæbø (2011) summarizes the semantic correspondences of *when*-clauses and he states that (i) *when*-clauses can refer to a time interval as in (10a), (ii) may relate clauses temporally based on immediate vicinity as in (10b); and they have generic readings as in (10c):

(10) a. I was homesick when I was at the boarding school.

b. When she got over the illness, everybody cheered up.

c. Babies cry when they are hungry.

The semantic categories of *when*-clauses which are of interest in this dissertation are the examples like (10a) which denote simultaneity and examples like (10b) which denote sequentiality with a focus on immediate vicinity of the states or events temporally (see Chapter 4 for the classification of sequentiality and simultaneity denoting temporal clauses in TİD and see Chapter 5 for their structural analyses).

Having presented different approaches to the classification of temporal clauses in this section, I will focus on the structural properties of temporal clauses in the next subsection.

2.1.2 Temporal clause as a type of subordinate clause

Temporal clauses are generally considered to be subordinated to the main clause. A subordinated clause, by definition, is a clausal constituent of a complex clause. It can be an argument such as the subject or the complement of the main verb, but it can also have an adverbial/modifier function such as relative clauses and adverbial clauses. Temporal clauses, a sub-type of adverbial clauses, are thus analyzed as a clausal constituent of the complex clause, expressing the time of the event/state denoted by the main verb.

Temporal clauses may display overt properties of subordination such as the presence of a subordinator[2] as shown in (11a), non-finiteness of the subordinated predicate as shown in (11b), and/or word order restrictions between the clauses as

[2] Various terms are used for these items: complementizer (e.g. in van Gelderen, 2010), subjunctor (e.g. in Sæbø, 2011) or subordinator/subordinating conjunction (e.g. in Quirk, Greenbaum, Leech, and Svartvik, 1985).

shown in (11c) with an example from Lezgian in which temporal clauses have to precede the main clause.

(11) a. After Serpil read the book, she watched its film.

b. Having left the office early, he visited some shops.

c. Wuna ne-da-j-la, za-ni ne-da.
[you:erg eat-fut-ptp-temp] I:erg-also eat-fut
'When you eat, I will eat, too.' (Haspelmath, 1993, p. 383)

The temporal relation that the clause denotes (e.g. sequentiality or simultaneity) can be expressed by the subordinator which is usually assumed to head the clause. In English, for instance, these are *when, while, as* etc. as well as *before* and *after*.

The syntactic categories that *before* and *after* belong to have been discussed in the literature and Geis (1970), for instance, argues that they are ambiguous in terms of their status as prepositions or subordinating conjunctions. Johnson (1988) exemplifies this ambiguity with the following sentence:

(12) Liz left before you said she had. (p. 586)

According to Johnson, it is not certain in (12) whether Liz left 'before the time of your saying' or 'before the time of her leaving'. He argues that *before* takes 'the time' as its complement in each case and structurally it builds a relative clause. Geis (1970), Johnson (1988) and Larson (1990) analyze *before* and *after* as prepositions and the temporal clauses with these prepositions as relative clauses. The prepositional nature of *before* and *after* will be crucial in my analysis of TİD BEFORE and AFTER in 5. 3.

2.1.3 Temporal clause as Ground in Figure-Ground relation

There are various approaches to the semantic analysis of the relations between temporal clauses (de Swart 1991; Dixon & Aikhenvald, 2009; Heinämäki, 1978; Johnston, 1994; Quirk et al., 1985; Sæbø, 2011, Talmy, 1975). Here I focus on Demirdache and Uribe-Extebarria's (D&UE, henceforth) (2000, 2004, 2007) approach based on Talmy (1975) since I argue later in Chapter 6 that TİD provides visible evidence for the abstract semantic features they propose.

Following Talmy (1975), D&UE (2000, 2004, 2007), in their semantic analysis of complex constructions with temporal clauses, take the temporal clause as Ground and the matrix clause as the Figure. Figure and Ground are in fact cognitive-semantic notions that are used to express the events of motion or location (Talmy, 1975). Figure is the object whose movement or location is defined based on the characterization of the ground object which is the reference point (Talmy, 1975, p. 419). Figure is the smaller object and it is the focus whereas Ground is the bigger object and it is backgrounded (Özyürek et al., 2010). The relationship between a Ground and a Figure can vary: there might be a containment relationship as in 'the ball is in the box' or a movement relation as in 'the ball has fallen off the stairs' (Levinson & Wilkins, 2006).

Talmy (1975) extends this spatial-locational Figure-Ground relation to the relation between temporal events and he states that "the temporal site of the Figure event is considered as a variable whose particular value receives characterization with respect to a Ground event, considered as a reference-point set in a temporal reference-frame (usually, the one-dimensional time-line)" (p. 423). In a sentence like the one below, the event of 'telling' is the Figure event whereas the event of

‘watching’ is the backgrounded event, Ground event, when the semantic notions of locational relations mentioned above are applied to temporal structures:

(13) ‘After you watch the video, tell me (about it).’

In this sentence, the event of ‘watching’ is the referent event and the event of ‘telling’ is established on the timeline based on the ‘watching’ event. Thus, according to Talmy, a sentence like (14) below is different from the sentence in (13) in terms of the figure-ground relation:

(14) ‘Before you tell me about it, watch the video.’

In the sentence (14) above, the Ground event is ‘telling’ on which the event of ‘watching’ is based. Thus, the Figure event is ‘watching the video’ in (14) as opposed to the example (13) in which it is the Ground event.

Regarding the asymmetrical relationship between the two clauses, both Talmy (1975) and D&UE (2000, 2004, 2007) claim that the internal element (temporal clause) is the Ground and the external element (matrix clause) is the Figure.

D&UE’s further contribution to this semantic analysis is that they analyze temporal adverbials as spatiotemporal predicates which order two temporal arguments, just as tense and aspect are analyzed in the literature (see Klein, 1995; Stowell, 1993; Zagona, 1990 for the analysis of tense as a two-place predicate). These arguments can be time denoting determiner phrases (DPs) or clauses with a time reference (which they call Zeit-Phrases, following Stowell, 1993). See the example below:

(15) Franny left after Christmas. (D&UE, 2012, p. 2)

In this example, 'after' is semantically the temporal predicate. It takes two arguments: Christmas is a time denoting DP and 'Franny left' is a clause with a time reference.

D&UE further argue that temporal markers such as *after* and *before* are not only two-place predicates but they are also spatiotemporal (i.e. "these predicates establish a topological relation between their temporal arguments" (D&UE, 2012, p. 1)). They base their analysis on a basic semantic opposition: +/-central coincidence in the location of the Figure with respect to the Ground (Hale, 1986). [+ central coincidence] refers to the situation in which the two entities overlap whereas [– central coincidence] refers to the situation in which the two entities do not overlap. This semantic opposition is applied to the relation between the temporal arguments as represented in Table 1.

Table 1. Semantic Opposition: +/- Central Coincidence in Temporal Relations

	-central coincidence AFTER (subsequence)	+central coincidence WITHIN (inclusion)	-central coincidence BEFORE (precedence)
Tense	Past	Present	Future
Aspect	Perfect	Progressive	Prospective
Locating temporal markers	*after* DP/CP	*at, in, during* DP, *when* CP	*before* DP/CP
Durational temporal markers	*from* DP, *since* DP/CP	*for* DP, *while* CP	*until* DP/CP

Source: Adapted from D&UE, 2012, p. 1

The topological relations -inclusion, subsequence and precedence- between temporal arguments in this model are represented through the notion of central versus non-central coincidence. D&UE (2000) highlight that expressing temporal relations with three basic primitives -WITHIN, AFTER and BEFORE- help to constrain the number of logically possible temporal relations between the arguments which are

realized as determiner phrases (DPs) or complementizer phrases (CPs) in natural languages (pp. 157-158). In terms of the topological relation between the temporal arguments, WITHIN expresses "inclusion" and it encodes [+ central coincidence]. AFTER and BEFORE express "subsequence" and "precedence" respectively and they encode [– central coincidence][3].

The relevance of D&UE's works to the present study is three-fold. First of all, this model makes use of the abstract Figure-Ground relation established between the temporal arguments to place these arguments in time with respect to each other. I argue in Section 6.1 that the sign language modality specific ways used in Figure-Ground constructions that TİD (and other sign languages) take advantage of in locative expressions are also used in certain temporal clauses and moreover, present a potential sign language specific indication of subordination. Secondly, I also argue in 6.2 that the presence of the binary semantic feature [-/+ coincidence] in temporal clauses is "visible" in the phonology of temporal clauses in TİD. Lastly, D&UE distinguish durational temporal markers from locating ones in their framework in order to define the contribution of the adverbial to the presence or absence of temporal coincidence. In 6.3 I discuss how TİD distinguishes between durational and locating temporal markers with respect to another time denoting argument in the same structure and how visibility plays a role in the iconic representation of these signs.

[3] D&UE use this semantic opposition to explain the relation between the temporal arguments not only in temporal adverbials but also with tense and aspect to show that all temporal relations are spatiotemporal. However, since the focus of this study is the way durational and locational temporal markers are represented in TİD, I refer the reader to D&UE (2000) for the details of the implementation of this model on tense and aspect.

2.2 Ways of expressing time in sign languages

This section aims to overview the temporal expressions that denote time reference as proposed in the sign linguistics literature. Expression of time reference in sign languages is through (i) tense markers (manual and non-manual), (ii) timelines, (iii) simplex temporal adverbials, and (iv) clausal temporal adverbials. These are described in detail in the following subsections.

2.2.1 Tense markers

Sign languages do not generally show verbal inflection for tense as many spoken languages do (Cogen, 1977; Friedman, 1975; Pfau, Steinbach, & Woll, 2012). Tense morphology on the verb is either absent or occurs only with a small number of verbs (except for Italian Sign Language (LIS), see below). Temporal reference is mostly conveyed through the use of what is called "tense markers" or time adverbials (Quer et al., 2017). Tense markers are signs that indicate whether the event/state denoted by the predicate happened in the past or will happen in the future.

Tense markers have been observed only in ASL and the two tense markers used in ASL are FUTURE and PAST (Aarons, Kegl, & Neidle, 1995; Neidle, Kegl, MacLaughlin, Bahan, & Lee, 2000). The following exemplifies the future tense marker in ASL:

(16) JOHN FUTURE$_{tns}$ BUY HOUSE
'John will buy a house.' (Neidle et al., 2000, p. 79)

In addition to the manual tense markers mentioned above, it has been proposed that in LIS verbs can be inflected for tense non-manually (Zucchi, 2009). Zucchi observes that the position of the shoulder while signing the verb marks tense information. If

the shoulder is tilted towards the back, it encodes past tense and if the shoulder is tilted towards the front, it encodes future tense.

There are also some spoken languages such as Chinese in which verbs are not inflected for tense and the temporal reference for an event or state is made through the use of adverbials (Comrie, 1985; Lyons, 1977). Such languages are called 'tenseless languages' (Binnick 1991; Comrie, 1985; Lyons, 1977). Based on this definition, sign languages have also been categorized as tenseless languages (see Karabüklü (2018) and references therein). However, this categorization is slightly misguiding because sign languages do encode tense information semantically but not always in the form of verbal inflection. In other words, inflection for tense is rarely observed on the verb in sign languages.

Following this terminology, TİD has also been reported to be a tenseless language in a number of studies and the time adverbials have been argued to convey tense/time information (Arık, 2012; Dikyuva et al. 2017; Karabüklü, 2016; Zeshan, 2002, 2003). Moreover, no tense marker such as PAST or FUTURE has been noted in the literature for TİD. The ways of expressing temporal information in TİD are timelines and temporal adverbials, as discussed in the following subsections. Since TİD conveys the meaning of past time and future time reference through these tools, I refrain from classifying sign languages including TİD as tenseless languages in this study.

2.2.2 Using timelines in a variety of temporal expressions

Timelines are sign-language-modality-specific notions. Pfau et al. (2012) describe timelines as the metaphorical use of space for encoding temporal meaning. Figure 1 shows the seven timelines identified in Sinte (2013) as used across sign languages.

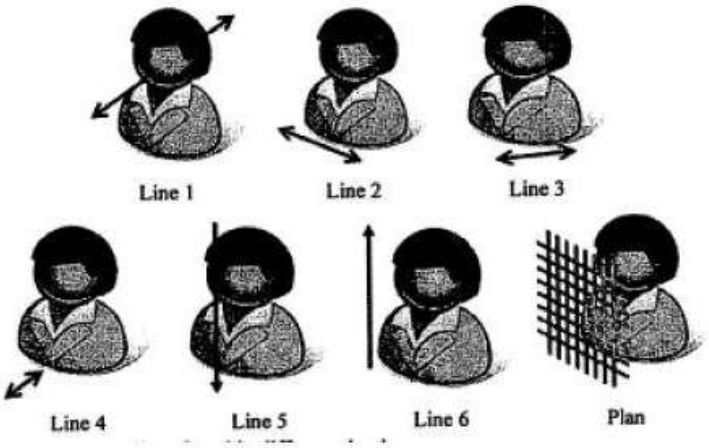


Figure 1. Timelines used in sign languages
Source: Sinte, 2013, p. 207

A sign language may use all of these seven timelines or a subset of them. In many sign languages, tense markers such as PAST and FUTURE and/or time adverbials such as YESTERDAY and TOMORROW are signed on Line 1 above.

Let me illustrate this with examples from TİD. Similar to other sign languages, TİD makes use of Line 1, an imaginary horizontal line over the signer's ipsilateral shoulder in which the part of the line behind the signer's body represents the past whereas the front of the body represents the future (Arık, 2012; Dikyuva et al., 2017). Dikyuva et al. (2017) argue that the locations of time adverbs in TİD are linearized on this timeline. See Figure 2.

a. YESTERDAY b. TOMORROW
Figure 2. Locations of time adverbs on Line 1
Source: Karabüklü, 2016, p. 77

In these examples, YESTERDAY is signed by pointing towards the back of the body over the shoulder whereas TOMORROW is signed by pointing towards the front of the signer's body.

More complex temporal expressions can also make use of timelines and timelines other than Line 1 (or their combinations) may be involved. Karabüklü (2016) argues that temporal phrases such as FROM_MARCH_ON make use of the combination of Line 2 and Line 6 as shown in Figure 3:

MARCH DURATION_1A

Figure 3. From the sentence 'After March, the project will go on.
Source: Karabüklü, 2016, p. 91

In conclusion, tense information in TİD has been previously argued to be conveyed through the timelines and time adverbials. In Section 6.4, I discuss in detail which timelines are used in TİD and how these timelines serve for the visibility of temporal reference and temporal relations. In the next subsections, I present data showing that sign languages including TİD also make use of simplex and complex adverbials to convey temporal information and temporal relations.

2.2.3 Temporal adverbs and simplex temporal phrases

Temporal adverbs are lexical items that express temporal references such as 'today', 'tomorrow', 'yesterday' etc. By simplex temporal phrases, I mean non-clausal

phrases that express temporal reference in the syntactic form of phrases other than adverbs. Most temporal phrases are prepositional phrases in English such as 'in the afternoon', 'two years ago' etc. Sign languages also employ temporal adverbs and simplex temporal phrases to express the time of an event or a state.

In terms of the syntactic positions of temporal adverbs, Pfau et al. (2012, p. 188) state that they occur mostly in the sentence initial position across sign languages. They also acknowledge that it is also possible for temporal adverbials to be at the sentence initial, sentence middle (between the subject and the verb), and sentence final positions, showing the same distributional variation in spoken languages. They present examples from Aaron's (1994, p. 238) work on ASL.

(17) a. TOMORROW J-O-H-N BUY CAR [ASL]
'John will buy a car tomorrow.'

b. J-O-H-N BUY CAR TOMORROW
'John will buy a car tomorrow.'

c. J-O-H-N TOMORROW CAN BUY CAR
'John can buy a car tomorrow.' (as cited in Pfau et al., 2012, p. 188)

In another sign language, LIS, it has been shown that the temporal adverbials are mostly in the sentence initial position:

(18) a. TOMORROW GIANNI HOUSE BUY
'Tomorrow Gianni will buy a house.' (Zucchi, 2009, p. 101)

b. IN_THE_PAST GIANNI HOUSE BUY
'In the past Gianni bought a house.
(adapted from Cecchetto, Geraci, & Zucchi, 2006, p. 953)

The temporal expressions are usually in the form of temporal adverbs such as TOMORROW or IN-THE-PAST as shown in the examples above. There are many examples of these simple temporal phrases such as PAST WEEK (19a) or 1492 (19b) in the sign linguistics literature as well and their syntactic categories are usually not

questioned (i.e. assumed to be the same as their spoken language counterparts). Below are such examples from Spanish Sign Language (LSE):

(19) a. PAST WEEK MEETING START TEN END QUARTER TO THREE
'Last week the meeting started at ten and ended at a quarter to three.'
(Cabeza Pereiro & Fernández Soneira, 2004, p. 69)

b. 1492 HIMSELF SIGN[columbus] DISCOVER AMERICA
'Columbus discovered America in 1492'
(Cabeza Pereiro & Fernández Soneira, 2004, p. 68)

Unlike spoken languages, sign languages make infrequent use of temporal expressions with adpositions even with hours and years. There are usually no adpositions as the head of the temporal phrase as shown in (19a) and (19b) above. On the other hand, sometimes temporal markers such as BEFORE and AFTER are used to convey temporal relations through simplex temporal phrases as shown in the examples from LIS:

(20) a. MARIA EAT PIZZA TIME 7. GIANNI (EAT PIZZA) 10 MINUTE BEFORE
'Maria ate pizza at 7pm. Gianni 10 minutes before.'
(Aristodemo, 2017, p. 99)

b. GIANNI ARRIVE HOUR 10 AFTER
'Gianni arrives after 10.'
(Aristodemo, 2017, p. 100)

Açan (2007) provides a list of utterances that she collected from her informants in her study on the sentence types in TİD and some of those utterances have lexical items that are possibly temporal adverbs and temporal phrases. In (21) below, EVENING can be considered to be a temporal adverb and ONE WEEK IN a temporal phrase.

(21) a. AKŞAM MISAFIR GELMEK VAR[4]
EVENING GUEST COME THERE_IS
'In the evening, there will be guests.' (p. 127)

b. TAMAM BIR HAFTA IÇINDE ALMAK
OKEY ONE WEEK IN BUY
'Alright, I will buy it (the bike) in a week.' (p. 128)

Additionally, BU-TİD Corpus provides TİD utterances in which simplex temporal adverbials are used. The corpus provides a number of such simplex adverbials with the sign BEFORE:

(22) FOUR FIVE YEAR BEFORE
'Four five years ago'

I assume that in examples such as the one above, BEFORE heads the phrase. I argue in 5.3 that it forms a head-final postpositional phrase.

Temporal adverbial phrases in TİD have been observed to occur mostly in the utterance initial position:

(23) FOUR FIVE YEAR BEFORE SAME IX
'Four five years ago it was the same.'

There are also bare NP type adverbials in TİD without a postposition such as BEFORE. In the following example the temporal phrase [HIGH_SCHOOL 1 GRADE] again occurs sentence-initially:

(24) [[LISE 1 SINIF] TANIŞMAK] EVLENMEK BIT OĞUL DOĞMAK
[[HIGH_SCHOOL 1 GRADE] MEET] GET_MARRIED FINISH SON BE_BORN
'We met at high school grade 1. We got married and we had a son.'

[4] Following the conventions of sign language linguistics, glosses written in small caps in the examples in this thesis represent the approximate translation of the signs in Turkish and in English. Glosses that contain underscore '_' represent the signs whose Turkish or English translations contain multiple words. The diacritic '^' represents combination of more than one morpheme. Some of these combinations include incorporated signs, clitics, or compounds. If two glosses are separated by a dot '.', this means the sign contains two morphemes but the morphs are not identifiable, as for instance, in the case of suppletion.

I describe and discuss the syntactic properties of simplex temporal phrases in more detail in Chapters 4 and 5.

In this sub-section I have presented some data that include non-clausal, simplex temporal adverbs and temporal phrases. Even though the main focus of this dissertation is clausal expression of temporal relations, it has been crucial to investigate the nature of these simplex time adverbials (i) to be able to understand how a verb is modified temporally in TİD in general and (ii) to be able to distinguish simplex temporal phrases from clausal ones.

2.2.4 Temporal clauses (and subordination)

Temporal clauses, as opposed to phrases, are by definition temporal expressions that are clausal. As stated in the previous section, syntactic categories of temporal phrases are usually assumed to be the same as their spoken language counterparts and are not further analyzed. However, the syntactic nature of the constructions that express temporal relations between two propositions in sign languages is much less straightforward and more controversial. This is usually due to two main factors: (i) the absence of straightforward indications of clausal boundaries (Johnston & Schembri, 2007) and (ii) the absence of the overt markers of subordination mentioned in 2.1.2. Therefore, before I focus on the subordination of temporal clauses in sign languages, let me first provide a brief overview of the discussion of subordination in sign languages in general (see also Branchini & Kelepir, 2017; Tang & Lau, 2012).

Subordination is one of the understudied topics in sign language linguistics. Being the first study on subordination in sign languages, Thompson (1977) claimed that ASL does not have subordination, mainly due to the absence of overt

subordinators. Later, many researchers looked for sign language modality-specific indicators of subordination. These studies mostly focused on complement clauses. Some offered some syntactic tests that provide evidence for the presence of subordination (Padden, 1988), others showed that dependent clauses may be marked through non-manual markers (Liddell, 1980).

The syntactic tests offered by Padden for subordination in ASL (1988) are subject pronoun copy, wh-extraction from the embedded clauses, and spreading of the non-manual markers. However, studies on other sign languages show that these tests do not apply cross-linguistically. For instance, sign languages such as Sign Language of the Netherlands (NGT), ASL and Hong Kong Sign Language (HKSL) show different properties with respect to the constraints they display in terms of wh-extraction (Tang & Lau, 2012). ASL allows wh-extraction out of embedded clauses whereas HKSL does not (van Gijn, 2004).

A recent study on the complexity of LSF has found that both complementizers (i.e. $\text{WHAT}_{\text{comp}}$) and non-manual markers are the common ways of marking subordination in LSF (Hauser, 2020). Hauser, for instance, makes use of extraction and isolation tests to investigate the relationship between the relative clause and the main clause, and she concludes that the structural relation is subordination between these clauses.

Another indication of subordination suggested in the literature is related to the way embedded negation interacts with matrix clause (Branchini & Kelepir, 2017). When a verb like *think* takes a semantically negated complement, negation can appear on the matrix clause instead of the embedded clause. This is a case of neg-raising (Collins & Postal, 2014). In the example in (25) below, for instance, it is

the embedded verb which is semantically negated even though negation appears in the matrix clause level.

(25) She does not think you are angry. (Branchini & Kelepir, 2017)

Following Göksel and Kelepir (2016), Branchini and Kelepir (2017) suggest that if a similar phenomenon is observed in a sign language, it should be taken as an indication of complementation (and thus, subordination).

Word order is another issue discussed in the literature in terms of structure of complex clauses. LIS is one of the languages which shows restrictions with regard to word order when there is subordination. LIS generally has an SOV word order but when the object is a clause rather than a simple phrase, it obligatorily appears either at the right or at the left periphery of the matrix clause (Branchini, 2007), and not in the pre-verbal position, as would be predicted from its basic word order. So, clausal complementation may change the word order (see also Göksel and Kelepir (2016) for the interaction between clausal complementation and word order in TİD).

The use of non-manual markers may play an important role in determining the complexity of a clause. One or a bundle of non-manual markers may indicate subordination in two different ways: if the non-manual marker is a spreading one, for instance, brow raise, then its spreading domain may be marking subordinated clause or if the non-manual marker spreads from the matrix clause into the subordinated clause, this may indicate dependency between the two clauses. Another type of non-manual marker is of the non-spreading nature. This one, for instance, eye blink or head thrust may be argued to be a clausal boundary marker.

Even though it does not seem to be a reliable criterion (Tang & Lau, 2012), the use of non-manual markers has been investigated in several languages indicating that NMMs may mark sentential complementation. For example, Van Gijn (2004)

states that there is no standard marking for sentential complementation in the complex clauses in NGT, however, there is evidence for the complexity of some constructions in NGT based on the presence of non-manual negation marker in addition to the availability of left-dislocation with a pronoun, distributional dependency test and extraction of wh-clauses. She concludes that the results of these tests indicate the presence of syntactic subordination in NGT. Van Gijn proposes that the fact that the NMM of the negation of the matrix clause spreads over the second clause can be used as a diagnostic for subordination in NGT. Liddell (1980) shows that the non-manual markers mark the subordinate clause in ASL in his analysis of relative clauses. He argues that the non-manuals head tilt, raised eyebrows and tensed lips occurring together mark the relative clauses in ASL and the presence of these non-manual markers indicates that the clause is not a conjoined one but a dependent one. Petronio and Lillo-Martin (1997) also show that NMMs mark the embedded complex wh-objects in ASL. When the wh-objects are embedded in ASL, they do not have canonical NMMs for wh-questions, but they have a different NMM which spreads over both the matrix clause and the embedded wh-object:

(26) _____hn
I KNOW HOW SWIM
'I know how to swim.' (Petronio & Lillo-Martin, 1997, p. 43)

Non-manual markers may indicate complementation also by marking the clause boundaries. Even though Johnston and Schembri (2007) report that no standardized methodology is available to identify clause boundaries in sign languages, Tang and Lau (2012) proposes, for instance, that eye blink may be functioning as a clause boundary marker for HKSL. There may be other clause boundary markers in other sign languages. Moreover, Sandler (1999) does not argue for a specific non-manual marker of clausal boundaries but proposes that across-the-board changes of non-

manual markers such as head position and eye direction or the change of facial expression indicates clause boundaries. See also the discussion of Göksel and Kelepir (2016) below.

Regarding TİD, Göksel and Kelepir (2016) investigate the complementation strategies in TİD and they argue that TİD has complex clauses based on both syntactic and prosodic evidence. Their prosodic evidence is that the NMM negation of the verb of the matrix clause spreads over the verb of the subordinate clause (non-neutral brow position-nbp) in complex constructions with complement clauses in TİD. They also claim that a specific non-manual marker, static body posture, marks clausal complexity. Head thrust is another non-manual that they propose as the possible clause boundary marker indicating the presence of complex clauses in TİD.

However, many of the syntactic tests that have been suggested to identify complement clauses are not applicable to the identification of subordination for a clausal temporal expression. There are a few studies which were conducted to investigate temporal clauses in different sign languages (LIS by Aristodemo, 2017 and Aristodemo, Geraci, & Santoro, 2016; Russian Sign Language (RSL) by Dushkina, 2019; LSF by Hauser, 2020; ASL by Wilbur, 2016). In these studies, different strategies are claimed to be used to express temporal clauses within a complex clause and relativization is one of them. Below is an example from ASL:

(27) br
M-A-R-Y EXERCISE WHEN, TUESDAY, THURSDAY NIGHTS
'It's ON TUESDAY AND THURSDAY NIGHT when/that Mary exercises.'
(Wilbur, 1994, p. 654)

LIS, on the other hand, is claimed to use adjunct subordination in temporal adverbial clauses, which is supported by asymmetric extraction tests as shown below (Aristodemo, 2017, p. 88):

(28) a. BOSS STOCK SELL NOT-YET BEFORE ___ STAMP BUY WHO?
'Who bought the stamps before the boss sold the stocks?'
b. * ___ STOCK SELL NOT-YET BEFORE SECRETARY STAMP BUY WHO?
Intended meaning: 'Who is s.t. before selling the stocks the secretary bought the stamp?'

Apart from extraction tests, they also use the following as tests to examine the structural relationship in LIS: resumptive pronouns, wh-clefts, word order, stand-alone test and parasitic gaps. In the end, they conclude that the relation between the temporal clause and the matrix clause is subordination.

Based on the same syntactic tests used for temporal clauses in LIS, Hauser (2020) claims that temporal clauses in LSF are not subordinated to the main clause but the clauses expressing time are coordinated. In the following example, Hauser shows that the temporal clause can stand alone in LSF, which is ungrammatical in LIS (left/right in the bottom-left corner of the square brackets indicate the left/right body turns of the signer):

(29) a. [$_{\text{left}}$ JEAN BUY FLOWER] BEFORE [$_{\text{right}}$ MARIE BUY VASE]
'Jean bought flowers and before Marie bought a vase.'

b. BEFORE [$_{\text{left}}$ MARIE BUY VASE]
'Before (now), Marie bought a vase.'

The following example shows that the inversion of clauses in such a sentence in LIS is impossible whereas it is possible with a change in the meaning in LSF:

(30) a. [$_{\text{left}}$ JEAN BUY FLOWER] BEFORE [$_{\text{right}}$ MARIE BUY VASE.]
'Jean bought flowers and before Marie bought a vase.'

b. BEFORE [$_{\text{left}}$ MARIE BUY VASE][$_{\text{right}}$ JEAN BUY FLOWER]
'Before (now), Marie bought a vase and Jean bought flowers.'

In addition to the stand alone test in (29) and inversion test in (30), Hauser argues that the results of resumptive pronoun tests indicate that the complex temporal constructions in LIS are coordinated. The findings from two sign languages (LIS &

LSF) point out that whereas some subordination strategies are used across sign languages, languages may have different structural relationships in expressing the same temporal meanings or temporal relationship.

It has also been argued that adverbial clauses including temporal clauses are not truly independent from the main clause, yet they are not complemented to the main clause, either (Wilbur, 2016, p. 36). This in-betweenness of the adverbial clauses has given rise to several analyses which shows that they display different characteristics regarding their structural relationships with the main clauses. Haegeman (2012), for instance, classifies adverbial clauses as central and peripheral based on their internal syntax. She argues that central adverbial clauses adjoin to the main clause at the vP (little v Phrase) level or at the TP (Tense Phrase) level whereas peripheral adverbial clauses adjoin to the main clause at the CP level. To illustrate, a temporal adverbial clause is of central type when it has an event time reading whereas it is of peripheral type when it has a concession reading. Central-peripheral distinction is not crucial for this dissertation since all the temporal clauses I analyze belong to the central clause category in Haegeman's cartographic analysis. However, Wilbur (2016) argues that this distinction plays a role in the clausal order preferences of complex constructions with adverbial clauses in ASL. Considering the ordering preferences of temporal clauses in TİD (see Chapter 5 for details of clause ordering), this dissertation may have implications for the Haegeman's analysis which predicts that all temporal clauses should show similar characteristics regarding their structural properties.

Finally, temporal clauses have also been shown to be marked by NMMs. A number of sign languages (ASL, Israeli Sign Language (IsL) and LIS) have been reported to have brow raise accompany temporal clauses. Janzen (1999),

Dachkovsky (2008), Dachkovsky and Sandler (2009) and Aristodemo (2017) suggest for ASL, IsL and LIS respectively that temporal clauses may be functioning as topics (just like yes/no questions and conditional clauses) since all these different types of constituents are accompanied by brow raise.

Göksel and Kelepir (2016) suggest that head thrust, an instantaneous non-manual marker, may be marking the right boundary of adverbial clauses indicating incompleteness, similar to rising intonation in some spoken languages. In the literature, it has been also discussed in detail for spoken languages that the syntactic structure plays a role on placing intonational boundaries (Cooper & Paccia-Cooper, 1980; Ferreira, 1988; Watson & Gibson, 2004). I show in Chapter 5 that this non-manual marker also occurs in temporal clauses I study in this thesis and it may be marking the clausal boundary as discussed in Göksel and Kelepir (2016).

In all the examples above, the different clauses are signed linearly. However, sign language modality also allows using more than one articulator, usually both of the hands, to express two different temporal expressions simultaneously. I call this here "simultaneous expression of temporal relations". This phenomenon is another understudied area in sign language research and there are controversial observations and analyses. To begin with, Emmorey (2002a) argues that two hands as articulators do not sign different propositions. Either they need to be identical to each other or two hands must form one predication together, which can be an extended version of Battison's (1978) Symmetry Condition on phonology. However, Napoli and Sutton-Spence (2010) show that four simultaneous propositions can be expressed at the same time. See Figure 4 in which four propositions are expressed by a signer simultaneously and these are interpreted as 'a hand shows a person walking toward a

tree; the other hand shows a tree falling toward the person; eyes move to show a person is looking around; mouth shows a cat meowing.'

Figure 4. Four simultaneous propositions expressed at the same time
Source: Napoli and Sutton-Spence, 2010, p. 653

Napoli and Sutton-Spence (2010) do not investigate the temporal relations between these propositions and do not make a claim regarding the syntactic status of this complex clause but they only focus on the limitations on the simultaneous expressions. They conclude that the upper limit is four propositions because of the perceptive factors such as cognition and memory and not because of the lack of productivity of the articulators of a signer.

In this dissertation, I focus on the simultaneous propositions articulated by two hands that might have a temporal relation. The functions of simultaneity expressed through two manual articulators in sign languages are listed as the following by Miller (1994, p. 99): (i) expressing foregrounded and backgrounded information, (ii) establishing contrast, and (iii) expressing a direct conditional relationship between the two propositions in two hands. (i) is the most relevant function here in terms of establishing temporal relations between two simultaneous propositions (see Section 6.1 and 6.2 for a detailed analysis on foregrounded (Figure) and backgrounded (Ground) information in time denoting complex constructions).

The type of simultaneity in which two hands express two different events at the same time has been observed in other sign languages before (Finnish Sign Language (FinSL) in Jantunen, 2013; HKSL in Tang & Lau, 2012; and Catalan Sign Language (LSC) in Zorzi, 2018). Kimmelman (2017) investigates simultaneous structures in general and proposes a syntactic analysis. He proposes that structures in which the weak hand is involved in simultaneous signing are coordination structures. In his examples, the weak hand hold is usually in the form of a buoy and it is interpreted to express a proposition as shown in Figure 5.

CL:CARRY2+CL:CARRY1 CL:CARRY2+NEED.NOT CL:CARRY2+THROW
H1: CL:CARRY1. SUITCASE NEED_NOT THROW
H2: CL:CARRY2----------
Figure 5. 'He carries [the suitcase and the cage]. He does not need the suitcase. He throws it away.'
Source: Kimmelman, 2017, p. 52

Kimmelman argues that weak hand holds in list buoys are in a coordination relationship with the utterances on the dominant hand and he analyzes them as coordinate constituents of a multidominant structure (de Vries, 2009). He sees the presence of the weak hand hold as evidence for coordination since there is no specific coordination marker. He also states that the weak hand hold ends at the same time with the signing on the dominant hand, and this synchronization is an indication of coordination.

Zorzi (2018) extends Kimmelman's analysis to tense phrases (TPs) in LSC. She claims that the clausal constituents signed by each hand are in a coordination relation. She proposes that these conjuncts are semantically symmetric and it is

possible to swap the propositions on each hand without any difference in the meaning. Thus, and following Kimmelman's arguments, she claims that these constructions are examples of symmetric coordination in LSC.

central left ht+bl right ht+bl
(31) JORDI BOOK RECIPE READ GIORGIA COOK
'Jordi was reading a recipe and Giorgia was cooking.' (p. 19)

However, Navarrete-González and Zorzi (2019) highlight that there are actually no specific subordination or coordination markers that clearly indicate the structural relationship between two clauses in LSC. Therefore, they discuss that the same utterance may have at least two different interpretations in LSC, and thus, may have different syntactic relations. So, for instance, (32) below can be a coordination or a subordination structure.

(32) JORDI BOOK RECIPE READ GIORGIA COOK
1st interpretation: 'Jordi was reading a recipe and Giorgia was cooking.' (p. 29)
2nd interpretation: 'Jordi was reading a recipe while Giorgia was cooking. (p. 35)

There is another preliminary study which focuses on the temporality of the simultaneous expressions in a sign language. Dushkina (2019) investigates the expression of the simultaneous temporal clauses and she states that there are four ways of marking simultaneity in RSL, which are hold, doubling, fully simultaneous production and non-manual markers, or combination of these strategies. She outlines the strategies, provides phonological considerations but does not present a syntactic analysis on the structural relationship between these propositions.

Thus, a detailed analysis of temporal clauses in general and a detailed analysis of the simultaneously expressed temporal clauses in specific is needed to be conducted in sign languages. This present study aims to fulfill these gaps in addition to uncovering the syntactic and semantic properties of temporal clauses in TİD.

It should also be noted that temporal clauses have also been analyzed as topics in some previous studies (Dachkovsky, 2008; Dachkovsky & Sandler, 2009) due to the presence of the same non-manual markers in both topic constituents and temporal clauses as well as the fact that both types of constituents tend to occur sentence-initially in the languages studied[5]. I come back to this issue in 5.1 when I discuss the word order restrictions on temporal clauses in TİD.

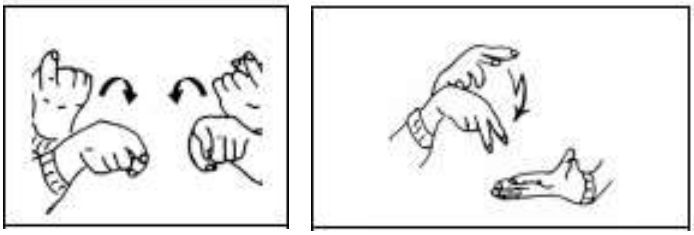
2.3 Visibility of abstract linguistic notions in sign languages

Even though sign languages constitute a challenge for researchers in identifying the presence/absence of subordination, they provide visible evidence for certain abstract notions that have been proposed before for spoken languages. There are several studies which show that the meaning of a sign is iconically represented in its phonological form for different semantic notions across several languages.

Wilbur's Event Visibility Hypothesis (EVH) (2003, 2008, 2010) is one of the prominent proposals on visibility of meaning and it focuses on form-meaning mapping in the event structure of predicates. Wilbur proposes that the internal structure (telicity) of an event is reflected onto its phonological form across sign languages. According to this hypothesis, the telicity of an event is expressed through its phonology by an abrupt stop in signing indicating the presence of an endpoint of the event whereas atelic events, which do not have natural end points, have a path movement indicating the duration of the event. In other words, Wilbur argues that the meaning of event structure is mapped onto form in sign languages. Figure 6 provides examples from ASL: HAPPEN is a telic verb which has an end state and is articulated

[5] See also Haiman (1978), Coulter (1979) and Janzen (1999) which argue that conditional clauses are topic constructions.

with an abrupt stop while READ is an atelic verb and is articulated with a path movement which Wilbur claims indicates that the event is durative.



a. HAPPEN b. READ

Figure 6. HAPPEN as a telic verb and READ as an atelic verb
Source: Wilbur, 2008, pp. 232, 235

According to Wilbur, telic events like HAPPEN which have natural end points are marked by an affix 'EndState' overtly in sign languages whereas this affix is not present in atelic events like READ. She also argues that the spatial paths in atelic events correspond to the temporal duration of these events. Similarly, I discuss in Section 6.3 that durational and non-durational meanings of temporal expressions in TİD are encoded in their phonological forms.

While Wilbur's observations show how the form (i.e. phonology) of signs can iconically represent their semantic features such as telic and atelic, a large body of research focuses on the interaction between parts of signing space and meaning. Since Lillo-Martin and Klima (1990) it has been commonly assumed that any location in signing space can in principle be used referentially. When a location is used referentially in signing space, it is called a "locus" (loci, for plural). A locus is established when the signer treats a location in the signing space as referring to an entity. This can be done by signing the referent in a certain location in the signing space in order to later point back to it to establish an anaphoric relation. It can also be done by simply pointing to that location. Lillo-Martin and Klima (1990) categorize these loci as pronouns (first vs. non-first) and referential indices. They argue that

referential indices in sign languages make indexing in anaphoric relations visible, which is something not possible in spoken languages.

Based on Lillo-Martin and Klima's observation on the visibility of indexing in sign languages, Schlenker (2017) argues that being able to establish several anaphoric relations through multiple loci simultaneously is possible in sign languages and any locus in the signing space can be the 'overt realization of a formal index' (cf. Lillo-Martin & Klima, 1990; Sandler & Lillo-Martin, 2006). That is, even though binding is an abstract notion for spoken languages, loci prove to be the visible evidence for the relation between an antecedent and a variable in sign languages. Thus, creating referential indices visibly enables the signers to establish and follow anaphoric relations unambiguously. Schlenker (2017, p. 8) explains this with the following: the use of a pronoun can be deictic/indexical or anaphoric as shown in the following example:

(33) [A representative]$_i$ told [a senator]$_k$ that he$_{i/k/m}$ would be re-elected.

In the English example above, the pronoun *he* in the embedded clause can be coindexed with 'a representative', 'a senator' anaphorically or it could be a deictic 'he', referring to an individual not mentioned in the sentence. In sign languages as well, a pointing sign can have an anaphoric or deictic function (Meier, 2012; Schlenker, 2017). However, thanks to the visibility of the "formal indices", the ambiguity illustrated in the English example in (34) disappears. See the following sentence:

(34) DEPUTY$_b$ SENATOR$_a$ CL$_b$-CL$_a$ IX-b a-TELL-b IX-a / IX-b WIN ELECTION (LSF)
'An MP$_b$ told a senator$_a$ that he$_a$/he$_b$ (= the deputy) would win the election.'
(Schlenker, 2017, p. 9)

In the example above the antecedent DEPUTY is signed in locus ‘b’ and SENATOR is signed in locus ‘a’. Later when the pointing sign/index sign IX-a is pointed to the locus ‘a’, it is understood to refer to SENATOR unambiguously. The same holds for IX-b and DEPUTY. Thus, even though both index signs have the same form (i.e. index finger pointing), which antecedent they refer to is understood from the locus they point at. They function as if the speaker is pronouncing the referential indices of each pronoun.

The discussion on the use of anaphoric use of loci is not limited to personal pronominal use, however. Studies have shown that anaphoric constructions are used in temporal domains as well as personal pronominal domains for spoken languages (Partee, 1973; Stone, 1997; Kratzer, 1998). Additionally, Schlenker (2013) argues that both temporal and modal anaphora besides personal pronominal anaphora are available in sign languages. He states that there are a limitless number of possible loci to be assigned to personal pronominal, modal or temporal reference in the signing space. He argues that each locus in the signing space could be a pronominal, modal or temporal variable. He calls this property of sign languages as ‘Variable Visibility’. The logic behind this notion is that sign languages provide visible evidence for anaphora which is abstractly built in spoken languages by establishing a locus and referring back to this locus through pointing to indicate anaphora. The following is an ASL example which shows that a locus can function as a modal variable:

(35) a. Context: The speaker is playing in a lottery. (ASL)
NOW IX-1 $_a$[POSSIBLE RICH]. $_b$[POSSIBLE SAME POOR]. IX-$_a$ IX-1 LUCKY.
'Now I might be rich. I might also still be poor. Then [= if I am rich] I am lucky.'

b. Context: The speaker is playing in a lottery, and he believes he has won.
NOW IX-1 POSSIBLE $_a$[VERY RICH]. POSSIBLE $_b$[LITTLE-BIT RICH]. NO-MATTER THE-TWO-$_{a, b}$ IX-1 LUCKY.
'Now I might be rich, and I might be a little rich. In both cases I am lucky.'

(Schlenker, 2013, p. 215)

In the example above, the modal force is possibility and the modal POSSIBLE/CAN is an existential quantifier which quantifies over possible worlds (Schlenker, 2013). More importantly, each of these possible worlds can be referenced back through the use of loci. In (35a), each proposition is assigned a locus, and then, one possible world is referred to anaphorically in which the speaker is rich. On the other hand, after assigning one locus to each proposition in (35b), both possible worlds are referred to by pointing back to these loci with the sign THE-TWO. This example shows that modal anaphora is available in sign languages just like personal pronominal anaphora.

Schlenker (2013) argues that temporal anaphora are also realized in sign languages just in the same way as pronominal (and modal) anaphora. In other words, loci function as temporal variables like pronominal anaphora and modal anaphora as shown in above examples (34-35). Temporal anaphora, which are abstractly built between the temporal variable and its antecedent in spoken languages are built through the use of loci in a visible manner, i.e. pointing to the same locus to build the anaphoric relationship. The following is another example from ASL and it shows that a locus can function as a temporal variable:

(36) a. Context: Every week I play in a lottery.
IX-1 $_a$[SOMETIMES WIN]. IX-1 $_b$[SOMETIMES LOSE]. IX-a IX-1 HAPPY.
'Sometimes I win. Sometimes I lose. Then [= when I win] I am happy.'

b. $_a$[WHILE RAIN] TEND WARM. $_b$[WHILE SNOW] TEND COLD. IX-b IX-1 HAPPY. IX-a IX-1 NOT HAPPY.
'When it rains it is warm but when it snows it is cold. Then [= when it snows] I am happy but then [= when it rains] I am not happy.
(Schlenker, 2013, pp. 214-215)

In each example above, two different temporal propositions are assigned to different loci, 'a' and 'b'. Namely, they are signed in these different locations in the signing space. In (36a) there is one temporal pronoun, IX-a. Since this pointing sign points to locus 'a', it is understood to refer to [SOMETIMES WIN] unambiguously. Note that, in the English translation, the temporal pronoun *then* would be ambiguous. (36b) provides an example with two temporal pronouns, IX-a and IX-b. Their referents are also understood unambiguously. Note that in the English counterpart (in the translation line) with two *then*s the referents would not be clear. In conclusion, Schlenker in his work provides another phenomenon in which what is considered an abstract anaphoric relation, the relation between modal, temporal, and personal pronouns and their antecedents can be expressed in a visible manner in sign languages. In other words, what has been considered a theoretical notion, the formal indices between pronouns and their antecedents receive empirical evidence from sign languages. I take up this issue in Chapter 6.4 and argue that a temporal clause type in TİD that I have identified in this study contains morphologically complex temporal expressions that contain temporal pronouns/variables.

The last study to be mentioned here is Aristodemo (2017). She argues that the temporal markers BEFORE and AFTER function like degree scales in LIS in that BEFORE and AFTER are similar to iconic-MORE in terms of their semantic properties.

She analyzes BEFORE and AFTER as temporal scales which make the temporal ordering of events visible in the signing space, i.e. AFTER and BEFORE make the temporal precedence and subsequence visible. She considers the time line on which AFTER and BEFORE occur as the temporal scale and the temporal reference to the points on this timeline is maintained through AFTER and BEFORE. According to her account, the use of space reflects the gradability in temporal constructions as well as comparative constructions in LIS.

CHAPTER 3

METHODOLOGY

This chapter explains the methodology employed in this study to investigate temporal clauses in TİD. It presents the characteristics of the participants, the data, and data collection procedures. The findings described in the following chapters are the results of a comprehensive methodology: different types of data (naturalistic or elicited) were used and different tasks were designed to elicit and test the relevant linguistic structures.

3.1 Participants

The data were collected from a total of 57 informants. These can be categorized into three groups: (i) 55 participants from the previously collected BÜ-TİD corpus data, (ii) three TİD consultants, and (iii) eight deaf signers who participated in the grammaticality judgment tasks and picture description tasks. The members of these groups sometimes overlap (i.e. three signers both provided data for the corpus and also provided data for this study as consultants and six out of eight signers who participated in the grammaticality judgment tasks also had joined the corpus work).

The first group, who contributed data to the BÜ-TİD corpus, consists of 36 female and 19 male participants. The mean age is 33 whereas the age range is 18-60 at the time of data collection. Seventeen of these participants acquired TİD through their parents or other family members before the age of 7. Thirty-eight participants, on the other hand, acquired TİD starting from the age of 7, which means they were exposed to sign language during their primary school years or after.

Even though there is a number of confounding factors (such as the age of becoming deaf, the age of being exposed to the sign language, the presence or absence of family members who sign actively or who are native signers themselves, and the level of education) to determine the degree of nativeness of a signer (Lillo-Martin & Henner, 2020; Mayberry & Fischer, 1989; Meier, 2016), I consider a signer as "native" if s/he was exposed to the sign language before the age of seven and s/he had deaf family members in the family. On the other hand, I consider a signer as (non-native but) fluent if s/he didn't not have deaf family members in the family, s/he was exposed to the sign language after the age of 7 (i.e. at schools or deaf organizations) but has been using TİD as his/her primary language in the TİD-signing community. According to these criteria, there are 19 native signers and 38 fluent signers who participated in this study.

With respect to their level of education, six participants graduated from primary schools; 16 graduated from middle schools; 27 participants graduated from high schools and six participants graduated from higher education institutions. Two informants reported that they did not receive any institutional education.

Three consultants, all of whom previously had provided data for the BU-TİD Corpus, participated in this study during the pilot studies and produced data to be used as stimuli in the grammaticality judgment tasks. Two of them are female and one is male. All of them are teachers of TİD. Their average age was 35 at the time of data collection.

Eight informants joined the tasks designed for the purposes of this study (six of whom previously had provided data for the BU-TİD Corpus). Four of them are native and four of them are non-native but fluent. One of them is male whereas seven are

females. Their average age was 32 at the time of the data collection. The tasks they participated in are picture description task and grammaticality judgment task.

At this point, I should also point to a methodological challenge I faced. One of the fluent signers who provided data for this study was not sure about her responses during the grammaticality judgment tasks. She responded to the test items as 'I understood' or 'I did not understand' instead of 'Yes', 'No' or 'Not sure'. Her responses were noted down as 'Yes' or 'No' during the elicitation. She might have replied as 'no' to a question which she could normally consider grammatical. Similarly, she might have said 'yes' for an ungrammatical item because she could understand the string of signs. The signer also reported many times that she was bored during the tasks and she kept asking whether there are many items left or not. Thus, I compared her answers to the other seven informant's answers. Regarding her responses, she became an outlier ten times. In other words, ten times out of 178 times she gave an answer which was the opposite of the answer that I elicited from the other seven informants. For instance, she reported that item no. 78 was ungrammatical whereas seven other informants found it grammatical. Other informants became an outlier 4.8 times on average. Because her answers might not be reliable, her responses were cancelled and another informant was recruited to replace her.

In the next subsection I explain the characteristics of the data used in this study.

3.2 Data

As mentioned in Chapter 1, the main purpose of this thesis is to identify and analyze temporal clauses in TİD. In order to achieve this purpose, a number of different types

of data have been analyzed. In addition to analyzing the BÜ-TİD corpus data which were collected by means of natural conversations, structured and semi-structured elicitation tasks, I elicited utterances and grammaticality judgments via the use of a questionnaire, picture descriptions and grammaticality judgment tasks. These will be described in the following subsections in more detail and in the order they were administered.

3.2.1 Corpus data

The naturalistic part of elicited data investigated in this study was obtained from the BU-TİD Corpus[6]. Currently, there are 227 files that were written with a word processing software (Microsoft Word) and contain sign-gloss translations of the utterances in the corresponding video files by a TİD-Turkish bilingual hard-of-hearing signer. There are also 161 files that were transcribed with EUDICO Linguistic Annotator (ELAN) program (Wittenburg, Brugman, Russel, Klassmann, & Sloetjes, 2006) by a non-native fluent signer. Around 23 hours of overall video footage of the corpus were annotated in ELAN program (Taşçı, in press-b). The data in this corpus have been elicited through structured and semi-structured elicitation tasks and free conversations. This corpus also offers a database file where one can find information about the date of the elicitation, the related research topic, sub-research topics, whether the transcription of the videos are available or not, and the type of the transcription (Word or ELAN). Furthermore, Word transcriptions of free conversation files in the corpus had

[6]This corpus is construed based on the data collected during different projects from 2012 to 2019 at Bogaziçi University, Istanbul. Two of the projects were supported by TÜBİTAK (The Scientific and Technological Council of Turkey) with Project numbers 111K314 (2012-2015) and 114E263 (2014-2016). Two of the projects were supported by the European Commission within COST Action IS1006 (2012-2015) and within Horizon 2020 Project no. 69334 (2016-2020).

been skimmed by a researcher and potential grammatical constructions (e.g. conditionals, relative clauses, questions, etc.) were noted in the database file, as well.

After working out the keywords that could guide me in identifying the temporal clauses used in naturalistic and elicited data with our deaf consultant, I searched for the following words both in ELAN files and word transcription files available in the BU-TİD corpus: ZAMAN 'time', ÖNCE 'before', SONRA 'after', and BERI 'since'. See Table 2. The numbers in the ELAN column represents the number of tokens found in the ELAN files. However, the numbers in the right-hand column represents the number of word processing files that have the keyword at least once.

Table 2. Number of Occurrences of the Keywords in Transcribed (ELAN and Word) Files

	ELAN (161 files)	Word (227 files)
ZAMAN 'time'	17 tokens	48 files
ÖNCE 'before'	104 tokens	88 files
SONRA 'after'	323 tokens	97 files
BERI 'since'	3 tokens	121 files

I went through all transcribed files in Word (227) and ELAN (161). I (i) looked at all the transcriptions and marked a file whenever there is a hint for temporal adverbial clauses (i.e. keywords), (ii) watched some of the videos which corresponded to the utterances I marked in Word or ELAN files, and (iii) analyzed these utterances.

The following illustrate the utterances chosen from transcriptions that I marked as highly likely to include temporal clauses:

(37) a. ELEKTRIK KESMEK $GI_{1Ç}$ NE YAPMAK
ELECTIRICITY CUT IX_{1PL} WHAT DO
'What are we going to do when there is a power cut?'

b. GI PIŞIR YUMUŞAK PIRINÇ BARDAK KOY
IX COOK SOFT RICE CUP PUT
'When it becomes soft, put a cup of rice.'

c. GI_1 KÜÇÜK SÜRE HIÇ GÜLMEK^NEG
IX_1 SMALL DURATION NEVER LAUGH^NOT
'I have not laughed since I was young.'

d. YORGUN ZAMAN EV DINLENMEK
TIRED TIME HOME REST
'When I am tired, I rest at home.'

e. ANNE GITMEK KAPI KAPATMAK
MOTHER GO DOOR CLOSE
'My mother closed the door while she was leaving.'

f. GI_1 EVLENMEK^NEG GI_1 ÖNCE 17 SENE GI_3 AILE BU
IX_1 MARRY^NOT IX_1 BEFORE 17 YEAR IX_3 FAMILY THIS
'Before I got married, I was with this family for 17 years.'

The corpus data is invaluable in terms of having provided many examples of the ways of expressing different types of temporal expressions, showing how non-manuals accompany manual markers, and providing a foundation for constructing tasks to elicit further data. The following subsections provide how further data are elicited for this study, which are mostly based on the inferences, observations and conclusions obtained from the corpus data.

3.2.2 Data elicited for this study

I elicited further data (i) to obtain certain structures which were not available in the naturalistic data and (ii) to understand the properties of the structures through grammaticality judgment tasks. Elicited data include the responses to a questionnaire (Hengeveld, 1991) designed to elicit different types of adverbial clauses as well as picture description tasks, and grammaticality judgment tasks.

3.2.2.1 Questionnaire

As a starting point for data collection, some parts of the questionnaire in Hengeveld (1991) were used to elicit different types of adverbial clauses. This questionnaire was originally designed to distinguish languages typologically with regard to the strategies they make use of while producing adverbial clauses. The purpose of using this large-scale questionnaire in this study was to identify what is possible/present and what is not possible/present in the adverbial temporal clauses of TİD.

The Hengeveld questionnaire has sentences in English which contain three types of temporal clauses that denote the following temporal relations: simultaneity, anteriority, and posteriority. The methodology suggested is to ask speakers of a given language to translate these sentences to their language.

One of the main aspects emphasized in the questionnaire is the possibility of co-referentiality of the subjects in the matrix and the adverbial clauses. For almost each type of adverbial clause, there are two examples. In one of the examples the subject of the matrix and the subject of the adverbial clause refer to different entities whereas in the other example they are co-referential. This is due to the observation that some languages make a distinction between these two types of clauses in terms of the structural properties of the subordinate clause such as finiteness.

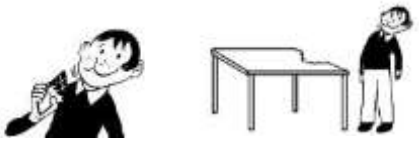
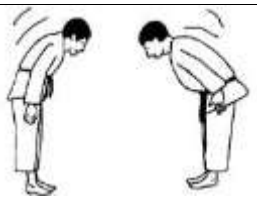
I applied this questionnaire to three deaf consultants and asked them to translate Turkish sentences into TİD to see how these temporal relations are expressed in TİD, and if they are expressed in the form of temporal clauses or by other grammatical means. I recorded their signed translations with a camera. There was no deaf-deaf interaction. They translated and signed the sentences in TİD directly to the camera after they read them in Turkish.

As a result of this initial study, I elicited 18 utterances which were targeted to elicit temporal clauses of simultaneity, anteriority and posteriority. Consultants produced 9 utterances in which the clauses have the same subjects and 9 utterances in which the clauses have different subjects. Since the utterances elicited from this task are translations of Turkish sentences, I did not include them in the analysis of the data. However, I benefited from the findings of this questionnaire in developing further elicitation tasks. In the next subsection, I describe the picture description tasks which are partly based on this questionnaire.

3.2.2.2 Picture description tasks

Picture description tasks used in this study aim to elicit how TİD signers express sequential (expressing anteriority and posteriority) and simultaneous events. There are different sets of pictures in this task, as described in Table 3.

Table 3. Design of the Picture Description Task for Sequentiality and Simultaneity

Group	Set	Aim	Parameters	Pictures
A	1	BEFORE	same subject	 (Zwitserlood, 2003)
	2		different subjects	 (Zwitserlood, 2003)
	3	AFTER	same subject	same as set 1
	4		different subjects	same as set 2
B	5	WHEN/ WHILE	two subjects, same action (at the same time)	 (Zwitserlood, 2003)
	6		one subject, two different actions (at the same time)	 (internet sources)
	7		two subjects, two different actions (at the same time)	 (Skopeteas et al., 2006)

There are two groups of stimuli in this data set. Group A targets the utterances of sequentiality whereas Group B aims to elicit utterances that denote simultaneity. In Group A, there are four sets of stimuli (i.e. sets 1-4) and each set consist of five pairs of pictures from Zwitserlood's study (2003), which was originally designed to elicit data for the use of classifiers. There are 146 visuals in this work and pictures which could trigger the production of temporal clauses which denote sequentiality or simultaneity were chosen from among them. In this task, two informants sat facing each other and they were asked to describe the actions on the pairs of pictures. Before the real task started, the deaf consultants who conducted the tasks described two pairs of pictures to clarify what was expected in the task. After an informant looked at the pair of pictures that depicted sequentiality, s/he was expected to produce an utterance using 'after' or 'before', as in the following: "The boy ate the chocolate before/after he ate the table". If, for instance, the first informant produced an utterance with 'before', the second informant was asked to reverse the sentence using 'after' without looking at the picture. Then, the target production was "He ate the table after he ate the chocolate.", and vice versa. They each had five turns like this. When they had difficulty in understanding the task, our consultant practiced several examples with them.

The picture description tasks are designed to answer questions about how each type of temporal clause is expressed. To begin with, one question about BEFORE-clauses is how TİD signers express an event that happened before another event. With this question, the strategies employed by the signers while they are talking about events that happened before another event are targeted to be elicited.

Similarly, a question about AFTER-clauses looks for answers to how TİD signers express an event that happened after another event. This question aims to investigate the possible ways of talking about an event that happened after another event.

In Group B (Sets 5-7), informants were sitting facing each other again. Each signer was given three different lists of 32 pictures in total and s/he was asked to describe the picture to the other signer. They were instructed to express the simultaneity of events through the example utterances produced by the consultant. With this task, the strategies used in TİD while the signers were talking about events that happened simultaneously were targeted to be elicited.

In addition, I paid attention to the same-subject and different-subjects distinction while preparing the pictures in all sets (1-7) of two groups as Hengeveld (1991) proposes. In both Group A and B, all sets have stimuli which have same-subjects and different subjects. In Group B, I added another criterion to understand whether the subjects are doing the same action or different actions makes a difference in expressing the simultaneity of the events. Therefore, pictures used in Group B both aim at (i) same subject – different subjects distinction and (ii) same event – different events distinction for the elicitation of simultaneous structures.

3.2.2.3 Grammaticality judgment tasks

Analysis of corpus data and discussions with the consultants led me to conclude that the signs BEFORE, AFTER, DURATION and GÖRE form temporal expressions in TİD. However, a fundamental question regarding all types of temporal clauses is whether they form subordinated clauses. As mentioned in Section 2.1, not all diagnostic tests

that have been proposed in the literature are applicable to all sign languages and most of these tests are limited to complement clauses. Therefore, new tests were developed during the current study to investigate the subordination relation of temporal clauses. These tests were designed with the following questions in mind:

- Do BEFORE/AFTER/DURATION/GÖRE form constituents with the strings of signs that potentially form a temporal clause or do they belong to a different clause in the utterance?

- Can non-manual markers help identify these strings of signs as clauses? These non-manuals may be domain markers, spreading (only) over the potential clause or they can be boundary markers, marking the end of the clause.

Apart from these two general questions, there are questions to be answered in this study with respect to each type of temporal clauses. As mentioned in 3.2.2.2, strategies used to express sequentiality and simultaneity were aimed to be elicited with picture description tasks. Analysis of corpus data, discussion with the consultants and the elicited utterances showed that at least in some cases BEFORE-clauses contain manual and/or non-manual negation. I tested whether negation is obligatory in BEFORE-clauses or not.

The next question about BEFORE-clauses is whether it is possible to regard a BEFORE-clause without negation grammatical. The reason for asking this question is that the two consultants reported in the beginning of the data collection procedure that BEFORE-clauses must involve a manual and/or non-manual negation marker.

DURATION is one of the manual markers that denotes temporality and is used in temporal clauses as well. Since it has several forms, there are more questions to ask for this type of temporal marker to understand the nature of this

sign. First of all, one question about DURATION is how duration is encoded in TİD. This question aims to find out the ways of expressing duration, their phonological realizations, and the environments in which these forms are realized. A related question asks what the similarities and differences among the phonological realizations of DURATION (DURATION_1A, DURATION _1B, DURATION_1C, DURATION_2, DURATION_3 and DURATION_4) are. Another question investigates whether DURATION can be used with an NP as well as a clause. The reason for asking this question is to see whether some forms of DURATION are compatible with phrases and other forms are compatible with clauses, or whether or not there is such a distinction. The last question about DURATION is whether it could be used with both telic and atelic predicates. The aim of this question is to understand whether DURATION needs an end point to be able to encode the duration or it could encode the duration of an activity-denoting predicate without an end point. The answer to this question would also help to understand the characteristics of DURATION.

Another temporality marker that has been identified in this study is GÖRE. This sign is actually a multifunctional sign and temporality marking is only one of its functions, as understood from discussions with TİD consultants. Since it does not directly correspond to any of the temporality markers in the surrounding spoken language, Turkish, the first question about this sign was what kind of temporality GÖRE denotes (i.e. sequence, duration, frequency etc.). Then, the structural properties of temporal clauses with GÖRE would be investigated accordingly. To test GÖRE-clauses, question-answer pairs were formed and informants were asked about the grammaticality of the utterances in TİD. How GÖRE-clauses are tested in this study is described in detail in Section 3.2.2.2.6.

There are two more temporal clauses in TİD that have been identified during the current study: (i) clauses that denote simultaneity but are expressed sequentially (ii) clauses that denote simultaneity and are expressed simultaneously. The questions for these two types of temporal clauses are the following:

- Is the structural relationship between simultaneity expressing temporal clauses and the main clauses coordination or subordination?

- Are temporal/dependent clauses signed on the non-dominant hand and held as classifiers/buoys?

The first question above aims to find out whether the way of expression of two simultaneous events (i.e. sequential vs. simultaneous expression) depends on the co-referentiality of the subjects. The second question tries to answer what the structural relationship (i.e. coordination or subordination) is between the two clauses when the clauses are simultaneously expressed. It also aims to find out whether there are markings of subordination in simultaneous structures. The last question is about the status of the non-dominant hand when the two hands are active in a simultaneous expression of two clauses. Whether the non-dominant could be considered a weak hand hold, buoy or classifier construction is the subject of investigation here.

In the following sub-sections, I describe the grammaticality judgment tests that I have conducted with native and non-native signers. These tests are based on the discussions with and elicitations from two of the deaf consultants as well as on the findings from the corpus.

The test items consist of single utterances (e.g. IX_1 MARRY NOT BEFORE IZMIR LIVE 'I lived in İzmir before I got married.') or question-answer pairs (e.g. -

IX$_2$ WHEN IZMIR LIVE? +MARRY NOT BEFORE ‘When did you live in İzmir? Before I got married.’) which are signed by one or two consultants. These utterances were video-recorded to be shown to the signers. In order to prepare them for the tasks, the signers were told that some of the utterances were ungrammatical and the ungrammaticality might be due to the use of non-manual markers, the choice of the sign, or the word order. Participants sometimes report that an utterance is ungrammatical because they do not like a lexical item in the utterance and they prefer another lexical item even though the construction is grammatical. If they reported an utterance as ungrammatical, then they were asked to sign the corrected version of the utterance. Thus, I aimed to see whether the ungrammaticality stems from the factors that are expected (i.e. the absence of a non-manual marker in the utterance) or unexpected (i.e. the change of a lexical item). In the following subsection, I describe the test items used in these grammaticality judgment tasks.

3.2.2.3.1 Common testing items across different temporal clauses

The main purpose of the testing items given in this section through grammaticality judgment task is to understand the structural properties of temporal clauses in TİD, as mentioned at the beginning of Section 3.2.2.3.

A sequence of signs such as the one in (38a) below might have the structure in (38b) or the one in (38c):

(38) a. HOMEWORK FINISH AFTER IX$_2$ PARK GO

b. subordination: [[HOMEWORK FINISH AFTER] IX$_2$ PARK GO]
‘After you finish your homework, you go to the park.’

c. juxtaposition: [HOMEWORK FINISH] [AFTER IX$_2$ PARK GO]
‘You finish your homework. Afterwards you go to park.’

Whether these strings of signs form a constituent or not is crucial because their constituency would make them a candidate of a structural unit and be a dependent clause of a complex clause.

Similarly, if one or a set of non-manual markers can be identified to mark the constituency of a string of signs, then this would support the proposal that they function as a subordinated clause.

The crucial question here is where the sign AFTER belongs to: Is it part of the first constituent or the second one? If AFTER forms a constituent with the preceding signs, then the string HOMEWORK FINISH AFTER can be a subordinated temporal clause. If, on the other hand, this string cannot be shown to form a constituent, then the structure is more likely to be the one in (38c) where the two clauses are coordinated via juxtaposition and AFTER functions as a connective rather than a (postpositional) subjunctor. Thus, I designed tests to find whether sequences such as HOMEWORK FINISH AFTER can stand alone, and thus form a constituent. If the informants confirmed that this sequence could stand alone, then there would be a strong supporting evidence for subordination.

This stand-alone test has been applied to four types of temporal clauses. In this test, there are question answer pairs as exemplified below:

(39) a. GI_2 NE_ZAMAN KAHVALTI YEMEK?
IX_2 WHEN BREAKFAST EAT?
'When did you have breakfast?'

- IŞ GELMEK DEĞIL ÖNCE
- WORK COME NOT BEFORE
- 'Before I came to work'

b. GI_2 NE_ZAMAN PARK GITMEK?
IX_2 WHEN PARK GO?
'When did you go to the park?'

- ÖDEV BITMEK SONRA
- HOMEWORK FINISH AFTER
-'After I finished homework.'

c. GI_2 NE_ZAMAN HASTA?
IX_2 WHEN SICK?
'How long have you been sick?'

- ANKARA GELMEK SÜRE
-ANKARA COME DURATION
- 'Since I came from Ankara'

d. GI_2 NE_ZAMAN KOCA KIZMAK? - GI_3 ÖZÜR_DILEMEK SÜRE
IX_2 WHEN HUSBAND ANGRY? - IX_3 APOLOGIZE DURATION
'How long will you be angry with your husband? - 'Until he apologizes'

e. GI_2 NE_ZAMAN MARKET GITMEK? - OTOBÜS INMEK
IX_2 WHEN MARKET GO? - BUS GET_OFF
'When did you go to the market?' - 'When I got off the bus'

(39e) is different from the other testing items (39a-d) in that it does not include a subordinator such as AFTER or BEFORE. I show in Chapter 4 that *when*-clauses in TİD are expressed without an overt subjunctor. So, with testing items such as in (39e), I aimed at finding out whether a fragment answer such as "BUS GET_OFF" can be an answer to a question such as "When did you go to the market?".

Having described the general research questions in this subsection, I elaborate on how each type of temporal clauses was tested in this study in the next subsections. I also provide test items and procedures regarding how test items were presented to the signers.

3.2.2.3.2 Testing BEFORE-clauses

Besides testing BEFORE-clauses with question answer pairs as mentioned above, I used negation as a test for identifying BEFORE-clauses. Both the corpus data and the elicitations from consultants have revealed that negation is required in BEFORE-clauses. The negation in BEFORE-clauses can be expressed both manually (i.e. with NOT) and non-manually as in (40a) or only non-manually (i.e. without a manual negation marker) as in (40b). 're' stands for raised eyebrows and is one of the markers of negation in TİD (Dikyuva et al., 2017; Gökgöz, 2009, 2011; Zeshan, 2003).

Therefore, signers were given three sets of BEFORE-clauses in the grammaticality judgment tests: (i) with manual negation marker NOT + non-

manual marking for negation (40a), (ii) with only non-manual marking for negation on the verb and BEFORE (40b), and (iii) without manual or non-manual negation (40c).

(40) a. GI$_1$ EVLENMEK DEĞIL ÖNCE IZMIR YAŞAMAK
re
IX$_1$ MARRY NOT BEFORE IZMIR LIVE

b. GI$_1$ EVLENMEK ÖNCE IZMIR YAŞAMAK
re
IX$_1$ MARRY BEFORE IZMIR LIVE

c. GI$_1$ EVLENMEK ÖNCE IZMIR YAŞAMAK
IX$_1$ MARRY BEFORE IZMIR LIVE
'I lived in İzmir before I got married.'

3.2.2.3.3 Testing AFTER-clauses

What is commonly observed in the corpus data with AFTER-clauses is that AFTER cooccurs frequently with the aspect marker FINISH in TİD (Zeshan, 2003; Dikyuva, 2011; Karabüklü, 2016)[7]. While Zeshan (2003) does not report a certain function for FINISH, Dikyuva (2011) focuses on the mouth gestures as aspect markers and regards 'bn' as a completive marker. Karabüklü (2016), on the other hand, argues that it is actually FINISH which is the completive marker. She also presents examples in which FINISH helps order events chronologically as shown in Figure 7.

ÇALIŞMA BIT $_2$HABER_VER$_1$
STUDY FINISH $_2$LET_KNOW$_1$

Figure 7. 'After/When you have studied it, let me know.'
Source: Karabüklü, 2016, p. 124

[7] See Karabüklü (2016) for a discussion why FINISH is an aspectual marker and not a lexical verb.

Even though the example above does not include the temporal marker AFTER, the presence of BIT ‘finish’ (together with the head thrust) implies that the second event (letting know) happens after the first event (studying) is realized. Therefore, my first hypothesis was that BIT could be a marker of anteriority in AFTER-clauses, which means the events with BIT in the temporal clause take place earlier than the events in the matrix clause. I asked the two consultants whether AFTER-clauses without FINISH are grammatical or not and to understand whether AFTER-clauses can be also formed without FINISH. Their responses showed that AFTER-clauses are still grammatical without FINISH. Then, I decided to not to test the presence of FINISH specifically in AFTER-clauses.

3.2.2.3.4 Testing DURATION-clauses

As mentioned in the research questions in Section 2.2.2.2, DURATION has several phonological realizations in TİD. This finding was obtained through the corpus data analysis and discussions with consultants. Even though the findings related to DURATION are presented separately with respect to different realizations in Chapter 4, I present the testing items below referring to the underlying form DURATION.

One of the questions regarding the sign DURATION is whether this sign could be used with NP complements as well as with CP complements. To understand this, I formed minimal pairs as given below and asked the signers whether these are grammatical in TİD:

(41) a. DÜĞÜN SÜRE MISAFIR ÇOK GELMEK-GI$_{1ÇL}$
WEDDING DURATION GUEST MANY COME-IX$_{1PL}$
'We have had many guests since the wedding.'

b. GI$_{1ÇL}$ EVLENMEK SÜRE MISAFIR ÇOK GELMEK-GI$_{1ÇL}$
IX$_{1PL}$ MARRY DURATION GUEST MANY COME-IX$_{1PL}$
'We have had many guests since we got married.'

In (41a) above, DURATION takes an NP complement, WEDDING. In (41b), it takes a CP complement, [IX$_{1PL}$ MARRY].

Next, the feedback I gathered from consultants indicated that some phonological realizations of DURATION as a temporal subjunctor have some restrictions in their use. Therefore, I prepared utterances with DURATION based on different contexts and asked the signers whether DURATION is grammatical in these contexts. The utterance in (42) is reproduced based on a consultant's example utterance and it was presented to the participants as in Figure 8.

(42) IY$_1$ KIZ ÜNIVERSITE STAJ IŞ SÜRE IZMIR KALMAK
POSS$_1$ DAUGHTER UNIVERSITY INTERNSHIP WORK DURATION IZMIR STAY
'My daughter will stay in İzmir until she finishes the internship for the university.'

Figure 8. DURATION (DURATION_3)

Another question related to DURATION is whether it is compatible with both telic and atelic verbs. I tried to understand whether DURATION requires a predicate which has a natural end point or not in its CP complement. Therefore, I asked them minimal pairs of utterances in which the complement CP has a telic or atelic

predicate as shown in (43). In (43a) the verb is telic (ENTER) and, in (43b) the verb is an atelic verb (WORK):

(43) a. GI_1 OKUL GIRMEK SÜRE IY_1 BABA $_3$PARA_VERMEK$_1$
IX_1 SCHOOL ENTER DURATION $POSS_1$ FATHER $_3$MONEY_GIVE$_1$
'My father has been giving me money since I entered the school.'

b. ÇALIŞMAK SÜRE IY_1 $BABA_{3a}$ $_1$PARA_VERMEK$_{3a}$
WORK DURATION $POSS_1$ $FATHER_{3a}$ $_1$MONEY_GIVE$_{3a}$
'I give money to my father during (the time) I work.'

3.2.2.2.5 Testing *when(/while)*-clauses

The results of the questionnaire and the discussions with consultants have revealed that there is no overt marker for *when*-clauses in TİD, which makes it more challenging to test this type of temporal clauses. I have applied three tests on *when (/while)*-WHEN/WHILE-clauses. The first one is question answer pairs as mentioned in Section 3.2.2.2.1. But, it turned out that the fragment answers in that test are ungrammatical which means I cannot argue, yet, that a *when(/while)*-clause is a constituent and not coordinated with or juxtaposed to the matrix clause.

Initial observations on TİD had shown that a temporal clause always precedes the matrix clause. It is a peripheral construction. Without an overt matrix subject, it is not possible to determine the structure of the utterance "HOLIDAY BEGIN BODRUM GO". It could be either (44a) or (44b):

(44) a. juxtaposition: [HOLIDAY BEGIN][BODRUM GO]
'Holiday begins. I will go to Bodrum.'

b. subordination: [[HOLIDAY BEGIN] BODRUM GO]
'When the holiday begins, I will go to Bodrum.'

Therefore, I formed utterances in which the subjects of both clauses are overt, and the subject of the matrix clause precedes the temporal clause, as in example (45):

(45) ELVAN HOLIDAY BEGIN BODRUM GO
'When the holiday begins, Elvan will go to Bodrum.'

In (45) above, the matrix subject is ELVAN and the subject of the potential temporal clause is HOLIDAY. Notice that the structure of (45) cannot be coordination/ juxtaposition. The only possible analysis for a structure like this is subordination because the subject of the matrix verb (GO) is ELVAN and it precedes another clause which consists of a subject and a verb (HOLIDAY BEGIN). Following from this reasoning, I designed test items to determine whether structures in which a potential temporal clause can occur between the subject of the matrix clause and the matrix predicate. If these structures are possible, then the structure of (45) would be analyzed as in (46):

(46) [ELVAN [HOLIDAY BEGIN] BODRUM GO]

The last test applied on *when(/while)*-clauses is the *wh*-extraction test, which is based on assumptions similar to those for the previous test. The testing items in this type of test have a question word, 'who', in the position of the subject of the matrix clause:

(47) a.[[HOLIDAY BEGIN] WHO BODRUM GO]
'Who went to Bodrum when the holiday began?'

b.[WHO [HOLIDAY BEGIN] BODRUM GO]
'Who went to Bodrum when the holiday began?'

In both (47a) and (47b), the wh-item asks for information in which the answer refers to the subject of the matrix clause. Whereas the wh-item is in-situ in (47a), it appears to the left of the (potential) temporal clause in (47b). If structures such as (47b) are possible, then they can be analyzed as involving subordination, as

well. Whereas the string of signs in (47a) might yield a coordination relationship as in (48) below, the relationship could only be subordination in (47b) since the wh-extraction out of one conjunct is not possible except for across-the-board constructions (Ross, 1967).

(48) [HOLIDAY BEGIN][WHO BODRUM GO]
Coordination reading: 'The holiday began. Who went to Bodrum?'

3.2.2.2.6 Testing GÖRE-clauses

GÖRE[8] is a frequent but an understudied sign in TİD. It seems to have many functions and I suspected that denoting temporality is one of them. Therefore, I asked the two consultants to produce sentences in which GÖRE is a marker of temporality. I also asked them whether some of the utterances that I had collected from the corpus have temporal interpretations. Finally, I decided to ask the participants whether a GÖRE-clause could be an answer to a *when*-question. Then, I chose four utterances with GÖRE among the ones consultants produced during the discussion on GÖRE and asked one consultant to sign the *when*-questions whose answers could be the constituents with GÖRE and another consultant to sign the answers. The following is one of these question-answer pairs. See Appendix for further sample test items.

(49) a. Question:
BEBEK NE_ZAMAN BANYO_YAPMAK?
BABY WHEN HAVE_A_SHOWER?
'When will the baby have a shower?'

b. Answer:
GÖBEK DÜŞMEK GÖRE BANYO_YAPMAK SERBEST
UMBILICAL_CORD FALL_OFF GÖRE HAVE_A_SHOWER ALLOWED
'When the umbilical cord falls off, having a shower is allowed.

[8] *Göre* is a Turkish word. See Section 4.2.3 for the reasons why I choose to represent the meaning of this sign with a Turkish gloss instead of an English one.

Later, signers were asked whether these answers are compatible with the paired questions. If the answers are “yes”, then it points out that GÖRE has temporality marking function.

3.2.2.2.7 Testing the syntactic positions of non-clausal temporal phrases and temporal clauses

Discussions with consultants had shown that syntactic positions of temporal clauses are more restricted than those of non-clausal temporal phrases. According to the consultants, non-clausal temporal phrases are allowed post-verbally but temporal clauses are not. In order to verify this observation, I designed tests to be conducted with the other participants. The test items consist of a pair of similar utterances: one containing a simplex temporal phrase and one containing a potential temporal clause. These utterances were not presented as pairs but were randomly distributed. An example of such a minimal pair is the following:

(50) [[GI$_3$ DÜNYA GEZMEK] [ÖLMEK DEĞIL ÖNCE]] *TEMPORAL CLAUSE*
[[IX$_3$ WORLD TRAVEL] [DIE NOT BEFORE]]
‘He travelled around the world before he died.’

(51) [[GI$_1$ HASTANE GITMEK] IKI GÜN ÖNCE] *TEMPORAL PHRASE*
[[IX$_1$ HOSPITAL GO] TWO DAY BEFORE]
‘I went to hospital two days ago.’

In the light of the initial findings, I expected utterances like (50) to be ungrammatical and utterances like (51) to be grammatical.

3.3 Data collection procedures

During the tasks where both corpus data and elicited data were produced, a deaf signer sat across from another deaf addressee and each signer was video-recorded at

least from two angles: front and side as shown in Figure 9. Depending on the task, there was a picture file or a laptop in front of the signer.

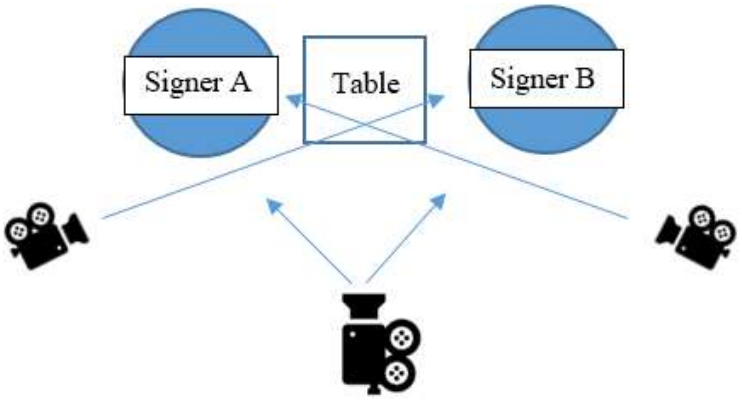


Figure 9. The set-up for data collection

In picture description tasks, signers were given sets of picture files and they were asked to describe each picture to the addressee. Each signer described the pictures in turn.

In grammaticality judgment tasks, signers watched videos of 178 testing items (utterances or question-answer pairs) which had been signed by the consultants in advance. They watched these videos in two sessions (morning and afternoon). They were accompanied by a Deaf consultant in case they needed help. Their responses were noted down by the author of this dissertation or by a hearing lab assistant.

All the elicited data are stored in BU-TİD Corpus archive at Boğaziçi University Sign Language Laboratory. The picture descriptions were annotated in ELAN by a non-native, fluent signer and translated into Turkish by another non-native, fluent signer.

CHAPTER 4

WAYS OF EXPRESSING (CLAUSAL) TEMPORAL RELATIONS IN TİD

In this chapter I present the findings of my study regarding the ways of expressing clausal temporal relations in TİD. These temporal relations are duration, sequentiality, simultaneity and frequency. These are expressed through temporal markers such as DURATION, BEFORE, AFTER, and GÖRE. Additionally, temporal clauses with no manual temporal markers denoting sequentiality and simultaneity are also described. This chapter describes these constructions whereas Section 5 focuses on the structural analysis of some of the clause types described here.

4.1 Adverbial clauses of duration

Temporal clauses denoting duration are expressed in several ways in TİD as the analysis of the BÜ-TİD Corpus data and elicited data show. In all the examples that are analyzed below, the sign that I gloss as DURATION is present. Clauses with DURATION may have a number of temporal meanings which can be translated into English with 'since X', 'until X', 'from X to Y', and 'for X'.

In terms of form, there are six variants of DURATION signs, and they differ from each other to a great extent in terms of both their phonological environments and their phonological properties. I first describe them phonologically, and then, morphologically in the following sub-sections. Lastly, I provide the findings regarding DURATION clauses from both corpus and elicited data.

4.1.1 Phonological description of different variants of DURATION

In this subsection I present the phonological properties of DURATION signs in terms of location, movement, and handshape.

We will see below that the articulation of the DURATION signs involve movement between two locations in space. These locations are given in Figure 10.

Figure 10. Locations used in DURATION signs

The locations shown above are the approximate values of pointing signs used in the set of signs that express duration in TİD. Full forms of the abbreviations are given below. *Ipsilateral* refers to the area on the side of the dominant hand and *contralateral* refers to the area on the opposite side of the dominant hand.

ipsi_back: ipsilateral back

ipsi_side: ipsilateral side

center: center

center distal: center and forward

contra_side: contralateral side

ipsi_up: ipsilateral up

ipsi_down: ipsilateral down

In terms of their handshapes, the signs that express duration that I have identified can be grouped into two: those with 1-handshape (☝) and those with flat handshape (🖐).The signs DURATION_1A, DURATION_1B and DURATION_1C are all articulated with 1-handshape (☝) whereas DURATION_2, DURATION_3 and DURATION_4 are articulated with flat handshape (🖐). They can also be grouped into two other sets in terms of the number of hands involved in the articulation of the signs, as one-handed and two-handed. DURATION_1A, DURATION_1B, DURATION_1C and DURATION_2 are two-handed signs whereas DURATION_3 and DURATION_4 are one-handed. The variants of DURATION are provided in Table 4.

Table 4. Variants of DURATION

Gloss	Visual
DURATION_1A	
DURATION_1B	
DURATION_1C	
DURATION_2	
DURATION_3	
DURATION_4	

Regarding movement, the variants of DURATION can have straight or arc-shaped movement from one location to another. The signs DURATION_1A, DURATION_1B and DURATION_1C are signed with an arc movement whereas DURATION_2, DURATION_3 and DURATION_4 have straight movements.

In the Hold-Movement-Hold (HMH) Model by Liddell (1984) and Liddell and Johnson (1989), simplex signs have sequential phonological structures and they consist of the sequence of hold-movement-hold. In this section, the phonological structure of DURATION signs will be presented within the HMH Model. In Figure 11, the first frame illustrates the first hold, the second frame illustrates the movement between holds, and the third frame illustrates the second hold in a one-handed variant of DURATION:

hold movement hold

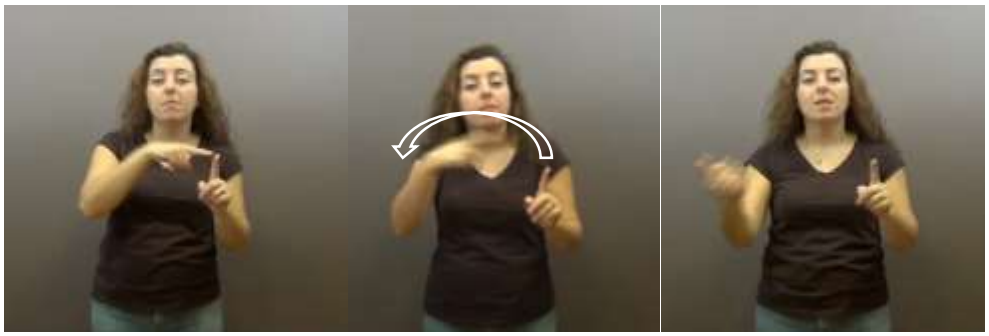
Figure 11. Hold-Movement-Hold sequence in a DURATION sign

When a DURATION sign is two-handed, it is more complex. All two-handed DURATION signs are asymmetrical, i.e. while one of the hands is active, the other one is inactive. If the sign is a two-handed sign, one of the hands (H1) moves whereas the other hand (H2) might stay still or might move towards H1. Hands point to the same location and have contact in one of these holds in some variants whereas hands point to different locations in other variants. To understand these phonological aspects of different variants of DURATION, I will demonstrate how two hands are involved in

these signs through holds and movements in the relevant tables below describing different forms of DURATION.

The reason why the first three variants are named DURATION_1A/B/C is that 1_B and 1_C are actually variants of 1_A that occur only under specific certain circumstances, which are explained later in the section. They are all two-handed and have the same handshape and movement. DURATION_1B is the mirror image of DURATION_1A. The aspect where DURATION_1C differs from DURATION_1A and DURATION_1B is that the first hold of DURATION_1C is anchored at the back of the ipsilateral shoulder. Below, I explain the phonological properties of each sign and the reasons for the multiple variants in detail.

Recall that DURATION_1A is a two-handed sign with 1-handshape (☝) as shown in Figure 12. The dominant hand moves from contralateral location to ipsilateral location with an arc movement whereas the non-dominant hand is kept still at contralateral location from the beginning. At the beginning of the sign, the tip of H1 (dominant hand) makes contact with the tip of H2 (non-dominant hand) and then moves to an ipsilateral location. Whereas H1 points to H2 at the first hold, they both point upwards at the second hold of the sign. This is the most common realization of DURATION.



hold movement hold

Figure 12. DURATION_1A

Table 5 represents the phonological features of the hands in DURATION_1A in which both hands point to the same location at the first hold of the sign. It also demonstrates that the inactive hand remains in the hold position while the active hand moves from one location to another.

Table 5. Phonological Representation of DURATION_1A

		Hold	Movement	Hold
DURATION_1A	H1 (☝)	Contralateral (pointing to H2)	Arc	Ipsilateral (pointing upw)
	H2 (☝)	Contralateral (pointing upw)	-- (hold)	-- (hold) Contralateral (pointing upw)

As I mentioned above, DURATION_1B is the mirror image of DURATION_1A[9]. The difference is that during the articulation of this sign, the signer uses her typical non-dominant hand as the active hand. Consider Figure 13.

hold movement hold

Figure 13. DURATION_1B

The signer in the visuals is a right-handed signer, and typically uses her right hand as her dominant/active hand. However, I have observed that in a number of cases she has uttered DURATION_1B, her left hand was active, i.e. articulated the movement while her right hand remained inactive, and thus, was in the hold position. This may appear as unexpected at first sight since in asymmetrical signs, the dominant hand of

[9] It is also possible to analyze DURATION_1A and DURATION_1B as the same sign since they are mirror images of each other. I list DURATION_1B here separately to show that whatever the shape of the DURATION sign is, the phonological and morphological components of the sign remain the same.

the signer is the active articulator whereas the non-dominant hand is the passive articulator according to the dominance condition which was originally proposed for phonological well-formedness in ASL (Battison, 1978) and which has also been argued to apply in TİD (Kubuş, 2008).

Reversing of the dominance from one hand to the other within one signer is not uncommon though. In sign language linguistics, this phenomenon is called "dominance reversal" (Frishberg, 1985). In the examples where DURATION_1B is used, the time denoting sign, for instance MARCH 2016, is signed on the dominant hand and thus, the temporal locus is established on the ipsilateral side instead of the contralateral side. Since the hand that signs the time denoting sign is held, the non-dominant hand becomes active and articulates the movement. Therefore, DURATION_1B is the form of DURATION in which dominance reversal has been applied to DURATION_1A. Crasborn (2011) explains that this phenomenon may occur when it is practical to use the non-dominant hand (when the dominant hand is busy holding something) or it may occur based on a linguistic purpose such as discourse cohesion as claimed by Friesberg (1985). Crasborn adds that whatever the reason is, when dominance reversal occurs, signers report that they have no problem in the perception of the signs on the reversed hands and addressees do not remember the hand choice of the signer later on. Thus, one might also argue that DURATION_1B is the same sign as DURATION_1A and they are in free variation in TİD. As shown in Table 6, the phonological representation of DURATION_1B is as the same as DURATION_1A, except for the laterality of the hands, i.e. the holds.

Table 6. Phonological Representation of DURATION_1B

		Hold	Movement	Hold
DURATION_1B	H1 (☝)	Ipsilateral (pointing upw)	-- (hold)	Ipsilateral -- (hold)
	H2 (☝)	Ipsilateral (pointing to H2)	Arc	Contralateral (pointing to contralateral side)

As for DURATION_1C, the dominant hand moves from ipsilateral back location to center location with an arc movement and the non-dominant hand moves from contralateral location to center location with a straight movement. At the end of the sign, the tip of H2 makes contact with the tip of H1 at a contralateral location. Differently from DURATION_1A and DURATION_1B, DURATION_1C ends with a contact of the hands whereas the others start with a contact. At the beginning of the sign, the orientation of H1 is towards the back of the body whereas H2 is pointing upwards[10]. H1 points to H2 at the second hold as displayed in Figure 14. See the phonological representation of the sign in Table 7.

hold movement hold

Figure 14. DURATION_1C

Table 7. Phonological Representation of DURATION_1C

		Hold	Movement	Hold
DURATION_1C	H1 (☝)	Ipsilateral back	Arc	Central
	H2 (☝)	Contralateral	Straight	Central

[10] In the first frame, H2 is observed to be pointing downwards. While H2 is approaching H1 and having its final location, it is going through a transition. Therefore, the downward pointing of H2 is not taken into consideration as a different location in this study.

I explain later that this variant is used only when the temporal expression which denotes the starting point of the duration is signed in the back of the signer's shoulder.

Among the two-handed signs of DURATION, the last one is DURATION_2. It has flat-handshape ( ). In this sign, the dominant hand moves from ipsilateral location to distal center location with a straight movement and the non-dominant hand moves from contralateral location to distal center location. At the end of the sign, H1 and H2 make contact as shown in Figure 15. See Table 8 for its phonological representation.

hold movement hold

Figure 15. DURATION_2

Table 8. Phonological Representation of DURATION_2

		Hold	Movement	Hold
DURATION_2	H1 ( )	Ipsilateral shoulder	Straight	Distal Center
	H2 ( )	Contralateral	Straight	Distal Center

Like DURATION_1C, DURATION_2 ends with a contact of the hands whereas the other two-handed signs (DURATION_1A and DURATION_1B) start with a contact. Another similarity between DURATION_1C and DURATION_2 is that H2 moves towards H1 and there is a contact at the second hold in both signs.

As mentioned above, there are two more signs indicating duration. They are one-handed and have flat handshape ( ). The first one of these signs is DURATION_3 as displayed in Figure 16. In this sign, the dominant hand moves from center location

to ipsilateral location with an arc movement. The orientation of the hand is vertical as represented in Table 9.

hold movement hold

Figure 16. DURATION_3

Table 9. Phonological Representation of DURATION_3

		Hold	Movement	Hold
DURATION_3	H1( )	Central	Arc	Ipsilateral

Another one-handed sign is DURATION_4 which is shown in Figure 17. In this sign, the dominant hand moves from location down to location up with a straight movement. H1 has a flat handshape ( ). In terms of the orientation of the hand, the palm of H1 faces downwards as represented in Table 10.

Figure 17. DURATION_4

Table 10. Phonological Representation of DURATION_4

		Hold	Movement	Hold
DURATION_4	H1 ( )	Down	Straight	Up

Similar to DURATION_1C, this sign is also used in very specific phonological environments, which I explain later in the section.

The phonological representation of different variants of DURATION has been given through HMH Model (Liddell, 1984; Liddell & Johnson, 1989) so far in this section. Table 11 summarizes how (all variants of) DURATION is represented phonologically based on this model. As shown in the table, holds correspond to the locations of DURATION and the movement corresponds to the movement between these two locations. What this table says is "H1 moves from $Location_x$ to $Location_y$ whereas H2 stays still" across different variants of DURATION.

Table 11. Phonological Representation of DURATION

		Hold	Movement	Hold
DURATION	H1	$Location_x$	Arc or straight	$Location_y$
	H2	$Location_z$	NA	$Location_z$

There are three points to be clarified about the specifications of H2 as given in this table. Firstly, whereas this table assumes that H2 does not move in any variants of DURATION, H2 moves towards its location ($Location_z$) in some variants of DURATION (DURATION_1C and DURATION_2). I consider these movements of H2 as arbitrary preparatory movements for the sign. Secondly, H2 moves whereas H1 stays still in DURATION_1B. I analyze the phenomenon as the dominance reversal and DURATION_1B as the mirror image of DURATION_1A. The last point to be clarified is that $Location_z$ is equal to $Location_x$ and $Location_z$ is equal to $Location_y$ when there is contact.

Having outlined the phonological characteristics of different variants of DURATION, I will describe the morphological properties of these signs in the next subsection.

4.1.2 Morphological make-up of the sign DURATION

In this section, I explain the morphological structure of the signs that denote duration based on the phonological analysis given in the previous subsection. Even though HMH Model was developed to explain the phonological sequential structure of simplex signs, it is also used to explain the sequence of structures in complex signs such as agreement verbs. In the previous section, I showed through the HMH Model that all signs of DURATION consist of holds and movements.

As for the morphological make-up of the signs, I assume that the hands with 1- (☝) or flat (🤚) handshapes articulate pointing signs (=index signs), functioning as temporal pronouns (see also 2.3 and 6.5). I propose that the variants of DURATION consist of three separate morphemes: two temporal pronouns and a root with the meaning {duration}. Index signs which constitute the holds of the signs (in the HMH model), point to temporal loci which indicate the beginning or the ending point of the duration of the event or state. The movement of the sign is the realization of a separate morpheme which corresponds to the duration between two temporal anchors. Regarding their morphological forms, I propose that all these are bound morphemes: the index signs in the active and inactive hands are clitics which cliticize to a bound root {duration}, which is phonologically realized as movement. See Table 12.

Table 12. Phonological and Morphological Representation of the Variants of DURATION

Phonological components:	Hold	Movement	Hold
Semantic components:	Temporal pronoun	{duration}	Temporal pronoun
Morphological forms:	Clitic	Bound root	Clitic

As shown in Table 13, all holds (temporal pronouns) are indices. Regardless of whether the handshape is flat () or 1-handshape (), I take them as index signs since (personal) pronouns in TİD may have either form (Dikyuva et al., 2017).

Table 13. Phonological Realizations of Each Morpheme in Each Variant of DURATION

	{temporal pronoun}	{duration}	{temporal pronoun}
DURATION_1A	IX ()	arc movement	IX ()
DURATION_1B	IX ()	arc movement	IX ()
DURATION_1C	IX ()	arc movement	IX ()
DURATION_2	IX ()	straight horizontal movement	IX ()
DURATION_3	IX ()	arc movement	IX ()
DURATION_4	IX ()	straight vertical movement	IX ()

Based on the distinctions between clitics and affixes proposed for spoken languages in Zwicky and Pullum (1983) and for sign languages in Quer at al. (2017, p. 225), I would like to argue that the index signs in DURATION signs should be analyzed as clitics and not as affixes.

First of all, clitics are less selective than affixes. In other words, clitics can attach to different parts of speech (e.g. auxiliary and/or noun) whereas affixes choose the category that they can attach to (e.g. nominalizer -er suffix in English can only be attached to verbs). Across sign languages, pointing signs have several functions and they could be used as pronouns, determiners, demonstratives, locative adverbials, and agreement markers (Quer, et al., 2017, p. 85). In addition to pronominal use, their uses for modal and temporal anaphora have also been observed in sign languages as mentioned in Section 2.3 (Lillo-Martin & Klima, 1990; Schlenker 2013, 2017, 2018). In some of these studies, pointing signs which are morphologically simplex correspond to temporal pronouns. Differently from what was proposed before, this study shows that pointing signs can also establish temporal anaphoric relations

within complex signs such as DURATION. In other words, I analyze the index signs (functioning as temporal pronouns) as morphemes of a complex structure (see Section 6. 5 for a detailed analysis). Moreover, these morphemes attach to the root {duration} as clitics and form the sign DURATION, which is a postposition in terms of its part of speech (see the discussion in Section 5.3).

Secondly, clitics usually have free forms, but it is not easy to trace back whether an affix is derived from a free form. Indices are commonly used as free forms across sign languages including TİD. The use of pointing signs for pronouns, determiners, demonstratives, and locative adverbials are in their free forms. The use of indices with bound forms are analyzed as clitics first by Fischer (1975) in agreement verbs though later works refer to this phenomenon mainly as agreement. Later, Nevins (2011) argues that the pronouns in agreement verbs in sign languages are indeed cliticized.

Due to the reasons given above I argue that DURATION is a morphologically complex sign, indices are in the form of clitics, and the movement is a bound root indicating the duration. The morphological analysis given above based on the phonological structure of the sign predicts that movement is a bound root in the variants of DURATION because each sign contains at least two holds if there is a movement according to HMH Model. A sign with movement does not necessarily have meaningful holds. But, this is the case at least for the variants of DURATION: The bound root {duration} has two {temporal pronoun}s even if these pronouns are not overtly assigned temporal specifications.

In the light of discussion above, the morphological representation of DURATION_1A, for instance, could be expressed with the following notation. In this

notation, ∫ represents the simultaneity of the pointing expressions and ^ represents the morpheme boundaries:

(52) IX_k(h2) ∫IX_i(h1)^$duration_{arc}$^ IX_k(h2) ∫IX_k(h1)

Having outlined the morphological properties of variants of DURATION in this section, I continue with the presentation of the findings in the next subsection.

4.1.3 Clausal and non-clausal expressions with DURATION

The first and the most common variant of DURATION clauses is the one with DURATION_1A. Analysis of corpus data and the findings of my study indicates that it can be used to express a number of durational relations. Figure 18 and examples in (53a-c) illustrate these uses.

Figure 18. DURATION_1A

(53) a. EVLENMEK SÜRE_1A MISAFIR ÇOK $_{3Ç}$GELMEK$_{1Ç}$
MARRY DURATION_1A GUEST MANY $_{3pl}$COME$_{1pl}$
'A lot of guests have come (to us) since we got married.'

b. YIL BIR SÜRE_1A GI_1 IŞSIZ
YEAR ONE DURATION_1A IX_1 UNEMPLOYED
'I have been unemployed for a year.'

c. 2020 GI_a 2025 SÜRE_1A PROJE ÇALIŞMAK
2020 IX_a 2025 DURATION_1A PROJECT WORK
'The project will continue from 2020 till 2025.'

These examples above show that DURATION_1A is compatible with the temporal references such as the start of an event as in (53a), a durational period without certain start and end points as in (53b), and a durational period with certain start and end points as in (53c).

DURATION_1B, which is the mirror image version of DURATION_1A, has the same usages as DURATION_1A. See Figure 19 and example (54):

THOUSAND NINE FORTY DURATION

Figure 19. DURATION_1B

(54) 1940 SÜRE_1 B
1940 DURATION_1B
'Since 1940'

Even though DURATION_1A seems to be the default form of expressing duration in TİD as observed from the corpus data and elicitations, DURATION_1B is optionally signed from the ipsilateral side to the contralateral side. I mentioned in the previous section that the reason for the dominance reversal in this example seems to be that the signer signs the first temporal expression 1940 with her dominant hand and as she holds that hand, the other hand becomes active (triggering dominance reversal). The signer may be choosing to sign 1940 here on her dominant hand even though this will cause dominance reversal because her addressee is on her ipsilateral side. Thus, signers might prefer DURATION_1B to make the sign DURATION_1 more visible to the addressee.

Figure 20 displays DURATION_1C and example (55) presents a sample utterance with DURATION_1C.

Figure 20. DURATION_1C

(55) DÜN SÜRE_1C GI$_1$ HASTA
YESTERDAY DURATION_1C IX$_1$ SICK
'I have been sick since yesterday.'

This variant of DURATION in Figure 20 is not a coincidental one. It seems to occur with only signs denoting time such as 'yesterday', 'past' or 'old times' which are all signed above the right shoulder. This is a phonological factor which determines where this sign starts, thus yields DURATION_1C.

The following is an instance of DURATION_2 shown in Figure 21and example (56) provides a sample utterance with this sign.

Figure 21. DURATION_2

(56) IY$_1$ YEŞIL PASAPORT VAR. GI$_1$ ÖLMEK SÜRE_2 GEÇERLI
POSS$_1$GREEN PASSPORT I_HAVE. IX$_1$ DIE DURATION_2 VALID
'I have a green passport. It is valid until I die.'

This variant of DURATION is used with temporal references which encode a termination. Figure 22 illustrates another variant of DURATION, DURATION_3, which is used with events denoting termination as exemplified in (57).

Figure 22. DURATION_3

(57) IY$_1$ KIZ STAJ IŞ SÜRE_3 IZMIR KALMAK
POSS$_1$ DAUGHTER INTERNSHIP WORK DURATION_3 IZMIR STAY
'My daughter will stay in İzmir until she finishes the internship.'

Like DURATION_1C, DURATION_4 has a restricted use and is used following such signs as 'little (child)', 'young' or 'birth' which are all signed in the lower area in front of the body. Thus, the occurrence of this sign is also based on phonological factors, namely the location of the previously signed temporal expression, like DURATION_1C. See Figure 23 and example (58).

Figure 23. DURATION_4

(58) GI$_1$ KÜÇÜK SÜRE_4 HIÇ GÜLMEK
IX$_1$ LITTLE DURATION_4 NEVER LAUGH
'I haven't laughed since I was little.'

Besides identifying the variants of DURATION, the findings of my study have shown that DURATION is compatible with both noun phrases and clauses. The example below is one of the minimal pairs used in the study. In (59a) the complement of DURATION_1A is a noun (phrase), WEDDING, whereas in (59b) it is a clause, IX$_{1pl}$ MARRY. Acceptance rates are given next to the relevant examples:

(59) a. DÜĞÜN SÜRE_1A MISAFIR ÇOK $_{3Ç}$GELMEK$_{1Ç}$ (7/8)
WEDDING DURATION_1A GUEST MANY $_{3PL}$COME$_{1PL}$
'We have had many guests since the wedding.'

b. GI$_{1Ç}$ EVLENMEK SÜRE_1A MISAFIR ÇOK $_{3Ç}$GELMEK$_{1Ç}$ (7/8)
IX$_{1PL}$ MARRY DURATION_1A GUEST MANY $_{3PL}$COME$_{1PL}$
'We have had many guests since we got married.'

Note that in these utterances, WEDDING and MARRY are different lexical items and they are phonologically distinct signs, belonging to different parts of speech. Whereas WEDDING is used in a context like 'I went to the wedding yesterday', MARRY is used in a context like 'I married two times' in TİD. Furthermore, they cannot be used interchangeably. The grammaticality of pairs like (59a) and (59b) shows that both noun phrases and clauses can be complements of DURATION.

Another finding regarding DURATION is that it is compatible with both telic and atelic predicates. When it is used with a telic verb, the verb specifies the starting point of duration whereas when it is used with an atelic verb, the verb specifies the interval of duration. The following pair exemplifies such pairs used in the study. (60a) has a telic verb ENTER and (60b) has an atelic verb WORK. The acceptance rates are given next to sentences.

(60) a. GI_1 OKUL GIRMEK SÜRE_1A IY_1 $BABA_{3a}$ $_{3a}$PARA_VERMEK$_1$ (7/8)
IX_1 SCHOOL ENTER DURATION_1A $POSS_1$ $FATHER_{3a}$ $_{3a}$MONEY_GIVE$_1$
'My father has been giving me pocket money since I entered the school.'

b. ÇALIŞMAK SÜRE_1A IY_1 $BABA_{3a}$ $_1$PARA_VERMEK$_{3a}$ (8/8)
WORK DURATION_1A $POSS_1$ $FATHER_{3a}$ $_1$MONEY_GIVE$_{3a}$
'I give money to my father during (the time) I work.'

Having presented the findings related to DURATION clauses in TİD in this sub-section, I continue in the next sub-section with the findings regarding the sequence-denoting temporal clauses in TİD.

4.2 Adverbial clauses of sequence

In this section, I present the findings regarding the temporal clauses of sequentiality in TİD which contain the temporal subordinators BEFORE, AFTER and GÖRE as well as those clauses which have no manual temporal markers.

BEFORE and AFTER are frequent signs in the BÜ-TİD corpus. They can function either as connectives or subordinators. GÖRE is the temporal subordinator which indicates that the event expressed in the matrix clause takes/took place when/after the event expressed in the subordinate clause. There is also a type of sequentiality denoting temporal clause that has no manual head but it shares similar properties with other temporal clauses in TİD such as being accompanied by the boundary marker head thrust and preceding the matrix clause.

4.2.1 BEFORE-clauses

One way of expressing sequentiality in TİD is using BEFORE either as a connective or as a subordinator. Though corpus data have provided a large number of instances with BEFORE as a connective whereas fewer examples of BEFORE as a subordinator, elicited data have shown that complex clauses containing a temporal clause with BEFORE as the subordinator are possible.

In this section, I first provide examples of constructions with BEFORE as a connective, and then I move to subordinated BEFORE-clauses.

In the corpus and elicited data, I have identified three constructions where BEFORE functions as a connective. Consider the following:

(61) a. [ÖNCE BAK EZBERLE] [SONRA GI_1 $_2BAK_1$ $_2ANLAT_1$]
[BEFORE LOOK MEMORIZE][THEN IX_1 $_2LOOK_1$ $_2TELL_1$]
'First, look and memorize (the picture). Then, look at and tell me.'

b. [GI_2 EKMEK_KES]$_k$ [GI_k ÖNCE EL_YIKA]
[IX_2 BREAD_CUT]$_k$ [IX_k BEFORE WASH_HANDS]
'You cut the bread. Before that, you washed (your) hands.'

c. [EKMEK_KES DEĞIL] [ÖNCE EL_YIKA]
[BREAD_CUT NOT] [BEFORE WASH_HANDS]
'Do not cut the bread. First, wash your hands.'

In (61a), BEFORE introduces the first event in a sequence of events. In (61b) and (61c), the first event is introduced after the second event. The index sign IX_k in (61b) functions as a propositional pronoun, and refers to the second event introduced in the first clause (i.e. cutting the bread). I analyze the constructions illustrated in (61) as juxtaposition of two independent clauses.

As for subordinated BEFORE-clauses, I have identified three possible constructions. Two of these constructions contain BEFORE-clauses with negation where negation does not negate the event. One of them contains both manual and

non-manual negation, whereas the other one contains only non-manual negation. These are illustrated below in (62) and (63) respectively, which were accepted by most of the informants as grammatical. The acceptance rates are provided next to the examples. Following Zeshan (2004) and Gökgöz (2009), I consider the non-manual markers raised eyebrows and backward head tilt as non-manual markers of negation. I refer to them as 'neg' when they occur together in the examples given in this study. The spreading domain of the non-manual 'neg' seems to change depending on the presence or absence of a manual negation marker across these examples.

(62) a. neg hth (3/3)
EKMEK KESMEK DEĞIL ÖNCE GI$_2$ EL_YIKAMAK
BREAD CUT NOT BEFORE IX$_2$ WASH_HAND
'Wash your hands before you cut the bread.'

b. neg hth (8/8)
ILAÇ_IÇMEK DEĞIL ÖNCE GI$_1$ YEMEK_YEMEK
PILL_TAKE NOT BEFORE IX$_1$ EAT
'I ate before I took the pills.'

c. neg hth (5/5)
GI$_1$ EVLENMEK DEĞIL ÖNCE IZMIR$_i$ GI$_i$ YAŞAMAK
IX$_1$ MARRY NOT BEFORE IZMIR$_i$ IX$_i$ LIVE
'I lived in İzmir before I got married.'

d. neg hth (5/5)
KOŞMAK DEĞIL ÖNCE SPOR AYAKKABI_GIYMEK
RUN NOT BEFORE SPORTS SHOE_WEAR
'Wear sports shoes before (you) run.'

(63) a. neg (7/8)
EKMEK KESMEK ÖNCE GI$_2$ EL_YIKAMAK
BREAD CUT BEFORE IX$_2$ WASH_HAND
'Wash your hands before you cut the bread.'

b. neg (8/8)
ILAÇ_IÇ ÖNCE GI$_1$ YEMEK YEMEK
PILL_TAKE BEFORE IX$_1$ EAT
'I ate before I took the pills.'

c. neg (8/8)
EVLENMEK ÖNCE GI$_1$ IZMIR YAŞAMAK
MARRY BEFORE IX$_1$ IZMIR LIVE
'I lived in İzmir before I got married.'

d. neg (8/8)
KOŞMAK ÖNCE SPOR AYAKKABI_GIYMEK
RUN BEFORE SPORTS SHOE_WEAR
'Wear sports shoes before (you) run.'

The third type of these constructions with BEFORE is exemplified in (64). In these examples no manual or non-manual negation is attested in BEFORE-clauses. The only indicator of the clausehood in (64a-d) is the head thrust accompanying BEFORE.

(64) a. hth (8/8)
EKMEK KESMEK ÖNCE GI$_2$ EL_YIKAMAK
BREAD CUT BEFORE IX$_2$ WASH_HAND
'Wash your hands before you cut the bread.'

b. hth (4/8)
ILAÇ_IÇ ÖNCE GI$_1$ YEMEK YEMEK
PILL_TAKE BEFORE IX$_1$ EAT
'I ate before I took the pills.'

c. hth (7/8)
EVLENMEK ÖNCE GI$_1$ IZMIR YAŞAMAK
MARRY BEFORE IX$_1$ IZMIR LIVE
'I lived in İzmir before I got married.'

d. hth (7/8)
KOŞMAK ÖNCE SPOR AYAKKABI_GIYMEK
RUN BEFORE SPORTS SHOE_WEAR
'Wear sports shoes before (you) run.'

The examples in (62), (63) and (64) have shown that there are several ways of marking BEFORE-clauses and these are manual negation, non-manual negation and head thrust. They can co-occur but it is not necessary. Hth is prevalent across different types of temporal clauses in TİD, but it may be absent in some constructions. Across the examples in (62-64), hth is absent only in the

constructions with BEFORE where non-manual negation is present. Following Göksel and Kelepir (2016), I consider 'hth' as a marker of subordinated clause boundary marker not only for temporal clauses but possibly for all types of dependent clauses in TİD. I will discuss the structural properties of such complex clauses in Chapter 5.

4.2.2 AFTER-clauses

AFTER, the most frequent sign among time denoting signs in BÜ-TİD Corpus, can also be used as a connective or a subordinator. Even though the majority of the instances are the uses of AFTER as connectives in the corpus, there are occurrences of AFTER as a subordinator, as well. Elicited data have also shown that AFTER is used both as a connective and a subordinator, instances of which were all regarded grammatical by the informants. Consider the following examples:

(65) hth
[[VIDEO IZLE SONRA] $_2$ANLAT$_1$] (8/8)
[[VIDEO WATCH AFTER] $_2$TELL$_1$]
'After you watch the video, tell me (about it).'

(66) a. hth
[VIDEO IZLE] [SONRA $_2$ANLAT$_1$] (8/8)
[VIDEO WATCH] [AFTER $_2$TELL$_1$]
'(First) you watch the video. Afterwards, tell me (about it).'

b. hth
[VIDEO IZLE]$_i$ [GI$_i$ SONRA $_2$ANLAT$_1$] (8/8)
[VIDEO WATCH]$_i$ [IX$_i$ AFTER $_2$TELL$_1$]
'(First) you watch the video. After that, tell me (about it).'

AFTER introduces the first event in all the three examples above (65), (66a), and (66b). In all these examples, the first event is watching the video and the second event is telling someone about the video. However, note that the translations provided for each example and the bracketing of the glosses indicate that whereas

AFTER in (65) is analyzed as a subordinator, AFTER in (66a) and (66b) is analyzed as a connective. Namely, the structural relations between two clauses in (65) and in (66) are different. AFTER belongs to the first clause in (65) whereas it belongs to the second clause in (66a) and (66b).

The most straightforward evidence for the syntactic position and function of AFTER comes from the distribution of the non-manual marker head thrust ('hth'). Recall from 2.2.4 that in Göksel and Kelepir (2016) it was suggested that head thrust might be marking the clausal boundary of subordinated adverbial clauses. In the previous section I showed that this prediction was borne out. Namely, my data also show that head thrust systematically occurs at the right edge of BEFORE-clauses.

Thus, I propose that head thrust marks the clausal boundary in each example in (65) and (66) above. Its co-articulation with AFTER in (65) indicates that AFTER is the last sign of its clausal constituent, thus, it functions as a subordinator. Its co-articulation with the sign preceding AFTER in (66a) and (66b) indicates that AFTER belongs to the second clausal constituent and functions as a connective. In Chapter 5, I provide further evidence for AFTER as a subordinator.

4.2.3 GÖRE-clauses

The sign GÖRE, which is illustrated in Figure 24, has several functions in TİD.

Figure 24. GÖRE

In its most common function, it has the meaning ‘according to’. This is illustrated in (67) below:

(67) OY FAZLA GÖRE BIR KIZ AD G-Ü-L GI_3 1.SINIF
VOTE MANY GÖRE ONE GIRL NAME G-Ü-L IX_3 1.GRADE
BAŞKAN OLDU
CLASS_PRESIDENT BECOME.PST
‘According to the majority of the votes, a girl named Gül became the class president.’

Signers of TİD label this sign as GÖRE after the Turkish word *göre* ‘according to’[11]. What is perhaps surprising is that the same sign (or its homonym) is also used in temporal clauses and there it does not have the meaning ‘according to’. Its meaning can be translated as ‘once’ or ‘when’[12]:

(68) INSAN YAŞLANMAK GÖRE AILE YUVA DÜŞKÜN GI FAZLA
HUMAN_BEING GET_OLD GÖRE FAMILY HOME KEEN_ON IX MUCH
‘Once/when a person gets old, s/he becomes keener on the family.’

TİD signers label this sign as GÖRE as well. In this thesis I use this (Turkish) gloss, following the convention of the TİD signers and to refrain from translating it into an English gloss until its meaning and functions are fully understood. I analyze it in this dissertation as a temporal clause subjunctor since even though the data are limited, indicate that GÖRE–clauses in TİD show similar characteristics to those of a *when*-clause in other languages and they have “immediate temporal vicinity” interpretation. To propose a stronger generalization, more data and analysis on GÖRE–clauses is needed, but I leave this possibility here for further research.

[11]Note that GÖRE is signed with the index finger touching the area below the eye on the ipsilateral side. This is identical to the articulation of the sign SEE. I would like to speculate that the homonymy between the two signs is due to the phonological similarity between the Turkish counterparts of these signs: the Turkish words for ‘see’ is *gör-* and for ‘according to’ is *göre*.
[12]The question how the temporal subordinator meaning has been grammaticalized from the meaning of ‘according to’, I leave for further research.

One may wonder why a sign, which is homophonous with the sign meaning 'according to', can function as a temporal marker. To make sure a clause with GÖRE can have a temporal meaning, I have designed a grammaticality judgment task where the informants were presented a number of question-answer pairs (see also Section 3.2.2.2.6). The questions ask about the time of an event and the answers are fragment answers containing GÖRE. (69) below illustrates these test items.

(69) Q: CAR STOP WHEN GO?
ARABA DURMAK NE_ZAMAN GITMEK?
'The car has stopped. When will it go?'

A: RED LIGHT STOP GREEN LIGHT GÖRE GO
KIRMIZI IŞIK DUR YEŞIL IŞIK GÖRE GEÇ
'It stops at the red lights. When the green light is on, it goes.'

The acceptability of these question pair items is quite high according to the results of the grammaticality judgment tasks. The informants found these items as grammatical 93.75% of the time on average. See Table 14 for some of these pairs.

Table 14. Question-Answer Pairs with GÖRE in the Elicited Data and Their Acceptability Rates

	Question-Answer Pairs	Rates
1	Q: ARABA DURMAK NE_ZAMAN GITMEK CAR STOP WHEN GO? 'The car has stopped. When will it go?' A: KIRMIZI IŞIK DURMAK YEŞIL IŞIK GÖRE GEÇMEK RED LIGHT STOP GREEN LIGHT GÖRE GO 'It stops at the red lights. When the green light is on, it goes.'	8/8
2	Q: TATLI PUDING NE_ZAMAN BITMEK DESSERT PUDDING WHEN FINISH 'When will the pudding be ready?' A: PUDING YAPMAK PIŞMEK GÖRE KAPATMAK PUDDING MAKE COOK GÖRE TURN_OFF 'Make a pudding, when it is cooked, turn of the cooker.'	8/8
3	Q: BEBEK NE_ZAMAN BANYO_YAPMAK BABY WHEN HAVE_A_SHOWER 'When will the baby have a shower?' A: GÖBEK DÜŞMEK GÖRE BANYO_YAPMAK SERBEST UMBILICAL_CORD FALL_OFF GÖRE HAVE_A_SHOWER ALLOWED 'When the umbilical cord falls off, having a shower is allowed.'	8/8

Due to the high acceptability rates given above, I conclude that GÖRE has a function that is connecting clauses temporally. The structural properties of GÖRE-clauses will be discussed in detail in Chapter 5.

The findings of the elicited data also indicated that GÖRE, as a temporal subordinator, is accompanied with the nonmanual marker hth, like AFTER and BEFORE, which again shows the subordination marking function of hth:

(70) hth
RED LIGHT STOP [GREEN LIGHT GÖRE] GO
KIRMIZI IŞIK DUR [YEŞIL IŞIK GÖRE] GEÇ
'When it is red, stop. When it is green, go.'

Having presented the findings with respect to the manual temporal clause markers in TİD in this section, I continue in the next sub-section with the discussion of the sequential temporal clauses whose temporality is not marked by a subordination marker such as AFTER, BEFORE, and GÖRE.

4.2.4 Sequential temporal clauses without manual subordination markers

There is a sequential temporal relation denoting clause type in TİD, yet it does not have a manual sign like BEFORE, AFTER, or GÖRE. The non-manual marker hth observed in this construction helps detecting the dependency between the clauses and analyzing the constituency of this type of complex clause since hth has been observed to function as the boundary marker both in the previous studies (Göksel & Kelepir, 2016) and in the present study with temporal markers with overt subordinators such as like BEFORE, AFTER, and GÖRE. Regarding the interpretation of this type of temporal clauses, I analyze them as sequential based on the interpretations of these clauses by TİD signers. Consider the example (71) and see Figure 25.

(71) GI_1 BEKLEMEK ELEKTIRIK AÇMAK BEKLEMEK.
IX_1 WAIT ELECTRICITY SWITCH_ON WAIT.

hth
AÇMAK GI_1 FIRINA_KOYMAK PIŞIRMEK
SWITCH_ON IX_1 PUT_IN_THE_OVEN COOK
'I waited for the power to come back on. When/once it is on, I put (the food) in the oven and cooked it.'

WAIT OPEN IX1 PUT_IN_THE_OVEN COOK
Figure 25. 'I waited. When/once it is on, I put it in the oven and cooked it.'

In this example, the structural relation between the two clauses is marked by a non-manual marker and I conclude that there is a dependency relation between these clauses. In terms of the timing of the events, the temporal relationship is a sequential one because the first event precedes the second event meaning 'once the power comes back on, she puts the food in the oven'.

Head thrust is the only indicator for subordination in this type of clauses and this non-manual marker seems to have a broader function, i.e. marking the clause boundary. One may wonder how the temporal interpretation is obtained here. One possibility is that the lack of a manual temporal marker may trigger a default interpretation that the clauses have a sequential temporal relation. In other words, there might be a covert head functioning as WHEN or TIME in these clauses. The structural properties of temporal clauses without a manual marker will be discussed in Chapter 5, based on the findings presented in this section.

In this section, I have reported my findings regarding the temporal clauses which denote sequentiality in TİD. In Section 4.3, I continue reporting the results with the temporal clauses of simultaneity whether expressed simultaneously or sequentially.

4.3 Adverbial clauses of simultaneity

Sign languages have the capacity to express two (or more) propositions at the same time using more than one articulator: the hands, the face, and the body (Napoli & Sutton-Spence, 2010; Vermeerbergen, Leeson, & Crasborn, 2007). When they are expressing two simultaneous events, they may use more than one articulator at a time and express the simultaneity in a simultaneous way. Or, they may use one articulator (the dominant hand) as the only active articulator, sign the events sequentially, and express manually or non-manually that the events are simultaneous. Based on this variety in the expression of simultaneity denoting clauses, I will describe the simultaneous events expressed simultaneously and simultaneous events expressed sequentially in TİD in the following subsections.

4.3.1 Simultaneous events expressed simultaneously

Use of buoys and classifiers are the main ways of expressing simultaneity of two propositions across sign languages (Liddell, 2003; Vermeerbergen et al., 2007). Buoys are the signs held still on H2 while H1 continues signing (Liddell, 2003). A buoy can be in the form of a lexical sign or a classifier sign. When it is a classifier, the handshape of H2 can represent an entity and/or its action, handling of an entity, or the size and the shape of the entity. Consider (72) and Figure 26. Here, the signer was asked to describe a picture which depicted similar actions (i.e. looking) by two

different agents. While expressing the simultaneity of the events, the signer makes use of classifiers in the following example. Hands represent a person's eyes in the form of an entity classifier:

(72) KIZ$_a$ ÇIÇEK$_i$ BAKMAK ERKEK$_b$ GI ÇEKIÇ$_j$ AYNI ZAMAN
GIRL$_a$ FLOWER$_i$ LOOK BOY$_b$ IX HAMMER$_j$ SAME TIME
$_a$BAKMAK$_i$-$_b$BAKMAK$_j$
$_a$LOOK$_i$-$_b$LOOK$_j$
'The girl is looking at the flower. The boy is looking at the hammer at the same time. She is looking at this. He is looking at that.'

$_a$BAKMAK$_i$
H1: $_a$LOOK$_i$ (CL-entity)
$_b$BAKMAK$_j$
H2: $_b$LOOK$_j$ (CL-entity)
Figure 26. 'She is looking at this. He is looking at that.'

In example (73), the signer is describing two different activities performed by two different agents simultaneously. One of the agents is riding a horse and the other is riding a bike as shown in Figure 27:

(73) BIRLIKTE AT AT_BINMEK BISIKLET AT_BINMEK BISIKLET_BINMEK
TOGETHER HORSE HORSE_RIDE BICYCLE HORSE_RIDE BICYCLE_RIDE
'They are riding together. While one is riding the horse, the other one is riding the bike.'

Figure 27. While one is riding the horse, the other one is riding the bike.'

a.	b.	c.
Signer's H1: waiting	Signer's H1: BICYCLE_RIDE	Signer's H1: BICYCLE_RIDE
Signer's H2: HORSE_RIDE (CL-entity)	Signer's H2: kept as a buoy	Signer' H2: HORSE_RIDE (CL-entity)

What is different from the previous simultaneous expression in (72) is that the signings of the events in (73) are not initiated at the same time. First, HORSE_RIDE is signed and left as a buoy in the form of a classifier on the non-dominant hand and then BICYCLE_RIDE is introduced on the dominant hand. Then, they are signed together on both hands, as shown in the stills of Figure 27.

The last type of simultaneity expressing temporal clauses is the expression of one agent involved in two different actions at the same time. See (74) and Figure 28.

(74) KIZ SANDALYE TAŞIMAK KOŞMAK
GIRL CHAIR CARRY RUN
'The girl is running while she is carrying the chair.'

Signer's H1: CARRY_A_CHAIR (CL-handling)
Signer's H2: hold

Signer's H1: CARRY_A_CHAIR (CL-handling)
Signer's H2: RUN

Figure 28. 'The girl is running while she is carrying the chair.'

In (74), the signer introduces one of the events first on the dominant hand, and then introduces the second event on the non-dominant hand. In the last frame, she signs the events together. Similar to (73), the proposition 'she is carrying a chair' is introduced earlier than the other proposition 'she is running'. These two propositions are signed together later for some time and the proposition 'she is carrying a chair' is in the form of a handling classifier in (74) even though the events are being realized at the same time. In other words, although the signer describes two events happening simultaneously, she signs one of them first, and then, she signs the other event while holding the first event as a buoy.

Differently from the example given in (73), the formerly signed event in (74) is not on the non-dominant hand but it is on the dominant hand. Moreover, the non-dominant hand starts signing a new sign (RUN) while the dominant hand is holding the sign CARRY_A_CHAIR. In other words, in (74), the non-dominant hand moves whereas the dominant hand is kept as a buoy. Employing the dominant hand for holding a buoy is not commonly observed (Liddell, 2003). Thus, this example (74) might be considered as another example of dominance reversal (Crasborn, 2011; Frishberg, 1985) considering that the majority of simultaneity expressing propositions are similar to (73). As in DURATION_1B

which is the dominance reversal version of DURATION_1A (see Section 4.1), we see here that simultaneity denoting temporal clauses also make use of dominance reversal.

In chapters 5 and 6, I discuss the structural relationship between the simultaneity denoting clauses expressed in a simultaneous way in more detail again and present the evidence for subordination in such constructions.

4.3.2 Simultaneous events expressed sequentially

One of the ways of expressing simultaneity of the events in TİD is by signing the events sequentially and ending the utterance with the sign SAME. This construction expresses that the events are coextensive. Consider the following example in (75) and Figure 29. 'bl-f' stands for forward body lean and 'bl-left/right' stands for left/right body lean.

(75) bl-f & bl-left

[RÜZGAR BELKI] [KADIN ŞEMSIYE ŞEMSIYE_UÇMAK_RÜZGARDA]
[WIND POSSIBLY] [WOMAN UMBRELLA UMBRELLA_FLY_IN_THE_WIND]
bl-f bl-f & bl-right
[GI$_3$ TOP TOP_UÇMAK_RÜZGARDA] [AYNI, ERKEK KADIN AYNI]
[IX$_3$ BALL BALL_FLY_IN_THE_WIND] [SAME, MAN WOMAN SAME]

'It may be the wind. Woman's umbrella flies in the wind. Man's ball flies in the wind. Same time, man and woman at the same time.'

UMBRELLA_FLY_IN_THE_WIND BALL_FLY_IN_THE_WIND SAME

Figure 29. 'Woman's umbrella flies in the wind and man's ball flies in the wind. Same.'

Whether these clauses can be analyzed as having a subordination relationship or not is discussed in Section 5.2.3 and 6.1.

So far, I have displayed the results of the study with respect to the clauses of duration, sequentiality and simultaneity in TİD. In the next section, I will present the results of another type of temporal clause which is adverbial clauses of frequency.

4.4 Adverbial clauses of frequency

Like adverbs of frequency such as *sometimes, always* and *never,* there are clausal elements which modify the verb in the matrix clause to express the frequency of the event/state denoted by the main verb. The following sentence from English exemplifies such modification:

(76) 'Whenever Meltem goes to the bookstore, she buys a book.'

Reports of the consultants indicated that such structures are available in TİD, as well. The wh-word WHEN is used in these clauses and the temporal clause boundary is marked by a head thrust (hth):

(77) hth
[GI$_1$ NE_ZAMAN GITMEK] [DAIMA UYUMAK]
[IX$_1$ WHEN GO] [ALWAYS SLEEP]
'Whenever I go (to his room), (my roommate) sleeps.'

My study shows that constructions illustrated in (78) and (79) are also possible and the acceptance rates are given next to the relevant examples:

(78) hth
[GI$_1$ NE_ZAMAN ODA GIRMEK BAKMAK] [HEP UYUMAK UYUMAK] (5/5)
[IX$_1$ WHEN ROOM ENTER LOOK] [ALWAYS SLEEP SLEEP]
'Whenever I enter (my housemate's room), she always sleeps.'

(79) IY_1 EV ARKADAŞ VAR. GI_3 HASTA GI_3.
$POSS_1$ HOUSE FRIEND THERE_IS. IX_3 SICK IX_3.

hth
[GI_3 NE_ZAMAN DONDURMA YEMEK] [HEMEN BOĞAZ HASTA OLMAK] (5/5)
[IX_3 WHEN ICE-CREAM EAT] [IMMEDIATELY THROAT SICK BECOME]
'I have a housemate. She is sick. Whenever she eats ice-cream, she becomes sick immediately.'

The structure of temporal clauses of frequency is distinct from other types of temporal clauses I have identified in TİD so far. Differently from previous types of temporal clauses, this temporal clause is marked by the question word WHEN meaning 'whenever' when used in a temporal clause as in (77), (78) and (79). Moreover, whereas DURATION, AFTER, BEFORE, and GÖRE are clause final elements which mark the temporal clauses manually, WHEN is a wh-phrase and it is not a clause final element unlike other manual temporal markers. The right edge of the temporal clause is marked by a non-manual marker hth whose function has been shown to be marking clausal boundaries throughout this thesis. Thus, I refer to this type of temporal clause as 'temporal clauses of frequency'.

This chapter has outlined the results of the study conducted in this thesis with respect to four different types of adverbial clauses namely, temporal clauses of duration, temporal clauses of sequentiality, temporal clauses of simultaneity and temporal clauses of frequency. In the next two chapters, discussion on the structural properties of temporal clauses in TİD (in Chapter 5) and visible expression of temporal relations (in Chapter 6) will be presented based on the findings given in this chapter.

CHAPTER 5

STRUCTURAL PROPERTIES OF TEMPORAL CLAUSES IN TİD

This chapter summarizes and interprets the findings of the study presented in Chapter 4 in terms of structural properties of time denoting expressions (clausal and non-clausal temporal phrases) in TİD. It also raises further questions on the constructions that are under investigation. In Section 5.1, I present and discuss the findings regarding the syntactic position of temporal clauses, contrasting it with the position of simplex temporal phrases. In Section 5.2, I present evidence that the relationship between the temporal clauses I investigate and the matrix clause is subordination. In Section 5.3, I argue that DURATION, BEFORE, AFTER and GÖRE are postpositions based on the properties of their complements and their head directionality.

5.1 Temporal clauses in TİD must occur preverbally

Wilbur (2016, p. 46) shows that there is a strong preference in ASL for temporal clauses to be on the left side of the utterances, namely, before the main clause. In LIS, similar to ASL, temporal clauses must precede the main clause (Aristodemo, 2017).

(80) hn++
BELL RING [ ], MARY LEAVE
'Mary left when the bell rang.' (Wilbur, 2016, p. 46)

(81) a. BOSS STOCK SELL NOT-YET BEFORE, SECRETARY STAMP BUY
b. BOSS STOCK SELL MOMENT PI, SECRETARY STAMP BUY
c. BOSS STOCK SELL AFTER, SECRETARY STAMP BUY
d. *SECRETARY STAMP BUY BOSS STOCK SELL NOT-YET BEFORE
e. *SECRETARY STAMP BUY BOSS STOCK SELL MOMENT PI
f. *SECRETARY STAMP BUY BOSS STOCK SELL AFTER
'The secretary bought the stamps {before/when/after} the boss sold the stocks.' (Aristodemo, 2017, pp. 80-86)

The findings of the current study have shown that temporal adverbial clauses (TACs) in TİD must also occur in the preverbal area, i.e. before the matrix verb. This finding is the summary of three observations: (i) TACs cannot occur postverbally as exemplified in (82a), (ii) TACs can precede the matrix clause as in (82b), and (iii) TACs can also be center-embedded, i.e. can occur in an area between the matrix subject and the rest of the matrix clause as in (82c). Consider the corresponding examples below which are given with their acceptance rates.

(82) a. hth
* [SOĞAN KAVURMAK] [YAĞ KOYMAK SONRA] (1/8)
[ONION FRY] [OIL ADD AFTER]
'Fry the onion after putting the oil.'

b. hth
[YAĞ KOYMAK SONRA] [SOĞAN KAVURMAK] (8/8)
[OIL ADD AFTER] [ONION FRY]
'After putting the oil, fry the onion.'

c. neg hth
[ÇOCUK [HAVA KARARMAK ÖNCE] EV ERKEN GELMEK]
[CHILD [WEATHER DARKEN BEFORE] HOME EARLY COME]
'The child came home early before it got dark.' (8/8)

Considering (82 a-b-c), TİD can be said to have a strong "left-preference" in the case of TACs. The common property of these three examples is that TAC precedes the predicate of the matrix clause in all examples. Note that the requirement for the structural position in which a TAC can be found is not necessarily the left of the matrix clause but the left of the verb of the matrix clause, as (82c) shows. There are two possibilities regarding the base position of the TAC in a complex construction in TİD. The first possibility is that it is base generated in a higher position than the matrix clause, which yields the clause order observed in (82b). According to this possibility, TAC precedes the matrix clause because it is in a higher position in their structural relationship. Based on this assumption, to explain the word order in (82c), I

can further speculate that the subject of the matrix clause, ÇOCUK 'child', moves to a higher position than the TAC due to information structural motivations such as topicalization. The second possibility is that TAC is base generated at a lower position where it can modify the verb of the matrix clause, which results in the word order seen in (82c). In that case, TAC may move to a higher position than the subject of the matrix clause to yield the word order given in (82b) again for topicalization purposes. Both possible analyses show that there may be a Topic Phrase position that needs to be filled in TİD, and this position can be filled either by the temporal clause as in (82b) or the subject of the matrix clause as in (82c).

One might wonder whether the word order restriction explained above is a general restriction on the position of (temporal) adverbials in general and not specific to temporal clauses. A comparison of temporal clauses with simplex temporal phrases shows that that is not the case. Results of the grammaticality judgment tasks described in Chapter 3 (3.2.2.2.1) show that simplex temporal *phrases* are actually acceptable postverbally, in contrast with temporal *clauses*. Consider the following examples. (83) illustrates the possible positions of simplex temporal phrases, in this case [TWO_DAY_BEFORE], whereas (84) illustrates the possible positions of temporal clauses, in this case […DIE NOT BEFORE].

(83)	a. IX_1 [TWO_DAY_BEFORE] HOSPITAL GO	(preverbal)	(8/8)
	b. IX_1 HOSPITAL GO [TWO_DAY_BEFORE]	(postverbal)	(13/16)
	'I went to the hospital two days ago.'		
(84)	a. [IX_3 DIE NOT BEFORE] [WORLD TRAVEL][13]	(preverbal)	(8/8)
	b. *[IX_3 WORLD TRAVEL] [DIE NOT BEFORE]	(postverbal)	(0/8)
	'He travelled around the world before he died.'		

[13] Here I assume for ease of exposition that IX_3 in (84a) is in the subject position of the temporal clause whereas IX_3 in (84b) is in the subject position of the matrix clause. Note that IX_3 in (84a) could also be the matrix subject. However, even if that were the case, it wouldn't change the fact that (84b) shows that the temporal clause cannot follow the matrix clause/verb.

As shown in (83) and (84), temporal phrases such as TWO_DAY_BEFORE are acceptable both preverbally and postverbally in TİD. However, preverbal position is the preferable position for TACs. Table 15 shows the acceptance rates which compare the preverbal and postverbal usages of temporal phrases. Even though the acceptance rates for the postverbal usage of temporal phrases are lower than the preverbal position, they are still considerably high.

Table 15. Percentages and Rates of the Acceptability of the Simplex Temporal Phrases in Preverbal and Postverbal Positions

	pre-verbal	post-verbal
AFTER	100% (16/16)	93.75% (15/16)
BEFORE	100% (16/16)	75% (12/16)
DURATION	87.5% (28/32)	71.9% (23/32)

TACs, on the other hand, are not considered grammatical postverbally whereas their preverbal counterparts are considered grammatical. See Table 16.

Table 16. Percentages and Rates of the Acceptability of TACs in Preverbal and Postverbal Positions

	pre-verbal	post-verbal
AFTER	100% (16/16)	6.25% (1/16)
BEFORE	100% (16/16)	12.5% (2/16)
DURATION	90.7% (29/32)	12.5% (4/32)

One could raise the question whether the restriction observed here may be due to the fact that temporal clauses are topics and topics cannot occur postverbally (Coulter, 1979; Haiman, 1978; Janzen, 1999; Pfau, 2008; Wilbur & Pathschke, 1999). However, an explanation with reference to information structure would not explain why a simplex temporal phrase is grammatical postverbally whereas a temporal clause is ungrammatical in the same position. If it were due to the properties of information structure in TİD, both the clausal temporal element and the temporal phrase would be grammatical postverbally (or neither of them would

be). The reason why clausal temporal elements are ungrammatical postverbally might be because of the restrictions that the postverbal domain has in TİD. The postverbal domain might have restrictions against the heavy elements like clauses for the reasons we do not know yet.

Wilbur (2016) concludes that adverbial clauses in ASL have a left-side preference if they are central, and they have a right-side preference if they are peripheral in the sense of Haegeman (2012) (see Section 2.1.1). She discusses the left side and right side preferences of adverbial clauses and she argues that neither topicality nor the restrictions on focus bearing elements explains the dual behavior of different types of adverbial clauses in ASL. It might be also a possible explanation for the restriction of TACs in TİD for not occurring post-verbally. Temporal clauses are central clauses according to Haegeman's classification, and TİD may be differentiating between central clauses and peripheral clauses like ASL does, which is a claim that requires an in-depth analysis of all adverbial clauses in TİD.

Due to the fact that the structural properties of topic constructions and the postverbal domain in TİD are among underinvestigated issues, I leave this question here as a topic of further research.

To sum up this subsection, TACs are selective in terms of their syntactic position in a complex clause. They can either precede the matrix clause or follow the subject of the matrix clause, which means TACs must precede the verb of the matrix clause in either case. This finding will be crucial for the discussion of subordination in simultaneity-denoting clauses in 5.2.3 and 6.1.

Having discussed the word order preferences of TACs in TİD in this subsection, in the next sub-section I turn to the evidence showing that TACs in TİD are subordinated clauses.

5.2 Temporal clauses in TİD are instances of subordination

One of the aims of this thesis is to find out whether the structural relationship between a temporal clause and a matrix clause in TİD is subordination or not. In order to answer this question, several tests have been designed (see Chapter 3). The findings of these tests were presented in Chapter 4. In this section, I discuss how these findings help with understanding the structure of temporal clauses in TİD. First, in Section 5.2.1, I present common properties that indicate subordination across several types of temporal clauses. In Section 5.2.2, I discuss a unique property of BEFORE-clauses and argue that that property is further evidence for subordination in this type of temporal clause. In Section 5.2.3, I focus on (some) types of temporal clauses that do not contain manual subjunctors and discuss whether properties specific to these types of temporal clauses can point to subordination.

5.2.1 Evidence for subordination of temporal clauses

In this section I discuss three different types of evidence for subordination of temporal clauses: The first one is related to the identification of constituents that include the manual subjunctors. The second piece of evidence comes from the presence of a non-manual marker, head thrust, which I argue functions as a boundary marker, and signals the right edge of temporal clauses usually together with the manual subjunctors, and the third piece of evidence comes from the position of the matrix subject in relation to the temporal clause.

Consider the string of signs in (85a) below. Structurally, it may be subordination or coordination. These possibilities are represented in (85b) and (85c), respectively. The main difference between the two structures is that the temporal expression,

AFTER, would belong to the first constituent in subordination, as in (85b), whereas it would belong to the second constituent in coordination/juxtaposition, as in (85c).

(85) a. WORK COME AFTER IX_1 EAT BREAKFAST

b. subordination: [[WORK COME AFTER] IX_1 EAT BREAKFAST]
'After I came to work, I ate breakfast.'

c. juxtaposition: [WORK COME]. [AFTER IX_1 EAT BREAKFAST]
'I came to work. Afterwards, I had breakfast.'

So, one way of identifying the presence of subordination is to look for evidence that shows that a temporal expression such as AFTER belongs to the constituent that would potentially be the temporal clause, as in (85b). One type of test that I have conducted for this aim is "the stand-alone test". This test aims at finding out whether strings of signs such as [WORK COME AFTER] can stand-alone, i.e. can be constituents. One syntactic context where this can be tested is question-answer pairs where the answer is an elliptical answer, with only the target constituent, [WORK COME AFTER]. (86) below illustrates the test question-answer pair:

(86) GI_2 KAHVALTI NE_ZAMAN YEMEK GI_2? - IŞ GELMEK SONRA
IX_2 BREAKFAST WHEN EAT IX_2? - WORK COME AFTER
'When did you have your breakfast? - 'After I came to work.'

This test has been applied to four types of temporal clause that I have investigated: BEFORE-, AFTER-, DURATION-clauses[14] and one type with no manual temporal expression. For each temporal clause type, 4 tokens of question answer pairs were presented to the signers and they were asked to judge them for acceptability (See Appendix for more Q-A pairs).

[14] During this stage of research, BEFORE, AFTER and DURATION were the three known manual subjunctors of TACs in TİD and GÖRE was being tested only as a potential temporal manual subjunctor. Therefore, it was not included in this test.

The overall acceptance rate for the temporal clauses with manual temporal expressions BEFORE, AFTER and DURATION is 79%. See Table 17 for individual results.

Table 17. Results of the Stand-alone Test with TACs with AFTER, BEFORE and DURATION in TİD

Clause Type	Acceptance Rate	Acceptance Percentage
AFTER	28/32	87.5%
BEFORE	32/32	100%
DURATION	16/32	50%

The acceptance rates for AFTER-clauses and BEFORE-clauses as elliptical answers are quite high. I argue that these results show that the signs AFTER and BEFORE can form subordinated temporal clauses and that they can function as subjunctors.

In contrast, the acceptance rates are lower for potential constituents with DURATION (specifically with DURATION_1A). However, I would like to argue that this does not necessarily show that DURATION cannot form subordinated clauses. DURATION-clauses, in fact, differ from the other types in that even within full complex clauses (i.e. with no ellipsis), the acceptance rate for this type of clauses is 50%, much lower than the acceptance rates for the other types. The main reason for this difference is most probably the variation among signers, for only some of whom, DURATION-clauses are common.

The last type of clause that was tested this way is the temporal clauses with no overt manual temporal expressions. One sub-type denotes simultaneity of events, as represented in (87a-b), and the other sub-type denotes sequentiality of events, as represented in (87c). These are hypothetical question answer pairs and they were formed just to get tested with the informants. Some of the elliptical answers, for instance (87a), included a head thrust at the end of the utterance, which I have already shown is a common boundary marker across temporal clauses in TİD. (87b)

has a head nod instead of a head thrust. Whether or not head nod also functions as a clausal-boundary marker requires further research (see Gökgöz & Arık, 2011). The non-manual marker tongue protruding (bn) in (87c) is probably not a clausal boundary marker but a perfective marker (Dikyuva, 2011, Karabüklü, 2016):

(87) a.

	hth
GI_2 NE_ZAMAN TEMIZLIK YAPMAK?	- GI_2 BEKLEMEK
IX_2 WHEN CLEANING MAKE?	- IX_2 WAIT_FOR
'When did you do the cleaning?	- 'While waiting for you.'

b.

	hn
GI_2 NE_ZAMAN KAHVALTI YAPMAK?	- SABAH HABER IZLEMEK
IX_2 WHEN BREAKFAST MAKE?	- MORNING NEWS WATCH
'When did you have breakfast?	- 'While watching the news.'

c.

	bn
GI_2 NE_ZAMAN PARK GITMEK?	- ÖDEV BITMEK
IX_2 WHEN PARK GO?	- HOMEWORK FINISH
'When did you go to the park?	-'When the homework finished.'

The results differ radically from the results of the previous three types of TACs as shown in Table 18.

Table 18. Results of the Stand-alone Test with TACs without Overt Manual Subjunctors

Type	Percent	Acceptance Rate
Simultaneity denoting temporal clauses	0%	0/32
Sequentiality denoting temporal clauses	18.75%	6/32

These results indicate that TACs without overt manual subjunctors are not acceptable as elliptical answers. The unacceptability of these elliptical answers might be caused by the absence of an overt manual subjunctor. It may be the case that an overt manual subjunctor is required in elliptical environments for TACs to be able to stand alone. The data also shows that head thrust, which has been observed to be a boundary marker so far, does not affect the acceptability rates of elliptical answers with or without manual temporal markers. Regardless of the presence or absence of

head thrust, elliptical answers with manual temporal markers are acceptable whereas elliptical answers without manual temporal markers are considered ungrammatical in TİD. To be able to understand this difference, a detailed analysis of elliptical environments in TİD is needed, which is beyond the scope of this study.

To summarize, the stand-alone test shows that AFTER, BEFORE can form constituents with preceding signs in such a way that these constituents can be analyzed as temporal clauses. The tests with DURATION show that the acceptability rate is low, however, below I provide other support for the subordinated property of this type of clause. The results of this test with constituents without manual temporal expressions do not support a claim for constituency.

The second piece of evidence for the subordinated nature of TACs comes from the observation that head thrust frequently occurs at the right edge of the constituents that I argue are temporal clauses, namely, TACs with BEFORE, AFTER, DURATION, GÖRE, and those without an overt manual subordinator, both in the corpus and the elicited data. In the TACs with a manual subjunctor, the articulation of head thrust either coincides with the end of the articulation of the subjunctor or occurs right after it. In the TACs without a manual subjunctor, head thrust coincides with the end of the articulation of the last sign in the TAC, which is usually the verb. In the following examples head thrust follows the subjunctor BEFORE (see Section 4.2.1 for more examples and acceptability rates):

(88) a. neg hth (3/3)
EKMEK KESMEK DEĞIL ÖNCE GI_2 EL_YIKAMAK
BREAD CUT NOT BEFORE IX_2 WASH_HAND
'Wash your hands before you cut the bread.'

b. neg hth (8/8)
EVLENMEK ÖNCE GI_1 IZMIR YAŞAMAK
MARRY BEFORE IX_1 IZMIR LIVE
'I lived in İzmir before I got married.'

I would like to argue that the presence of this non-manual marker, head thrust, marks the end of the preceding clause, forcing BEFORE to belong to that clause. As a consequence, the string EVLENMEK ÖNCE / MARRY BEFORE, cannot be analyzed as an independent clause but must be subordinated to the main clause.

I propose that head thrust also marks the end of the first clausal element in AFTER-and GÖRE-clauses. The fact that head thrust accompanies AFTER in (89a) and marks the clause boundary together with AFTER, indicates that AFTER belongs to the first clause, and the relationship is subordination. On the other hand, AFTER in (89b) and (89c) is not a structural element of the first clause but it belongs to the second clause, which makes AFTER a connective and shows that the structural relationship is juxtaposition.

(89) hth
a. [[VIDEO WATCH AFTER] $_2$TELL$_1$]
'After you watch the video, tell me (about it).'

hth
b. [VIDEO WATCH] [AFTER $_2$TELL$_1$]
'(First) you watch the video. Afterwards, tell me (about it).'

hth
c. [VIDEO WATCH]$_i$ [IX$_i$ AFTER $_2$TELL$_1$]
'(First) you watch the video. After that, then tell me (about it).'

(90) below provides an example with head thrust in GÖRE-clauses.

(90) hth
[RED LIGHT STOP GREEN LIGHT GÖRE] [GO]
[KIRMIZI IŞIK DUR YEŞIL IŞIK GÖRE] [GEÇ]
'When it is red, stop. When it is green, go.'

Finally, we observe head thrust at the right edge of TACs without overt temporal subjunctors, as well, as illustrated in (91) below. The clause marked by head thrust is interpreted as a temporal clause.

(91) hth
[AÇMAK] GI$_1$ FIRINA_KOYMAK PIŞIRMEK
[SWITCH_ON] IX$_1$ PUT_IN_THE_OVEN COOK
'When/once it (the power) was on, I put (the food) in the oven and cooked it.'

The third piece of evidence showing that TACs are subordinated clauses comes from constructions in which the potential temporal clause is sandwiched between the matrix subject (different from the subject of the temporal clause) and the rest of the matrix clause, as in the examples in (92) below. (92a), (92b) and (92c) illustrate test items with manual subjunctors BEFORE, AFTER and DURATION, respectively, whereas (92d) illustrates test items with no manual subjunctor.

(92) a. [ÇOCUK [HAVA KARARMAK DEĞIL ÖNCE] EV ERKEN GELMEK]
[CHILD [WEATHER GET_DARK NOT BEFORE] HOUSE EARLY COME]
'The child came home early before it got dark.'

b. [IY$_1$ KARDEŞ [SINAV AÇIKLAMAK SONRA] ANKARA GITMEK]
[POSS$_1$ BROTHER [EXAM ANNOUNCE AFTER] ANKARA GO]
'My brother went to Ankara after the exam results were announced.'

c. [GI$_1$ [YENI METRO AÇILMAK SÜRE_1] BOĞAZIÇI ÜNI. HIÇ GITMEK DEĞIL GI$_1$]
[IX$_1$ [NEW SUBWAY OPEN DURATION_1] BOĞAZIÇI UNI. NEVER GO NOT IX$_1$]
'I have never gone to Boğaziçi University since the subway opened.'

d. [IY$_1$ ANNE [KAR ERIMEK] MEMLEKET GITMEK]
[POSS$_1$ MOTHER [SNOW MELT] HOMETOWN GO]
'My mother went to (her) hometown when/once the snow melted.'

Similarly, the *wh*-extraction test shows that the question word, 'who' can be in the position of the subject of the matrix clause while the temporal clause is center embedded:

(93) [WHO [HOLIDAY BEGIN] BODRUM GO]
'Who went to Bodrum when the holiday began?'

As I discussed in Section 5.1, there are two possibilities for the base position of the TACs in TİD. The first possibility is that TACs are generated at a higher position

than the matrix clauses, and thus, they always precede the matrix clause unless they are between the matrix clause subject and its verb. According to the second possibility, TACs in (92a-d) are in their base generated positions, and in that case, they follow the subject of the matrix clause and they precede the verb of the matrix clause.

Regardless of the question whether TACs are in their base generated positions or not in (92a-d) and (93), the grammaticality/availability of these examples indicates that center embedding of an adjunct-clause is possible in TİD. In the sign language literature, it has been shown that center-embedding for complement clauses is possible under certain circumstances in sign languages. Quer (2012) shows that center-embedding is possible in LSC through role-shift. Center-embedding of complement clauses in LIS is allowed with certain structures such as control constructions and through the use of some strategies such as role-shift and use of space in LIS (Geraci & Aristodemo, 2016). Similarly, Göksel, Hakgüder, and Kelepir (2016) also show that center-embedding of complement clauses, especially with control verbs, is possible in TİD. However, no mention of the center-embedding of an adjunct clause has been noted for any sign language in the literature. Thus, this study shows that TİD, as an SOV language, allows center-embedding of an adjunct clause.

Going back to the application of center-embedding test for subordination in TİD, as with the first test, this test was also developed for three TACs with manual temporal expressions and for the types with no such expressions. The results of these tests are given in Table 19.

Table 19. Results of the Center Embedding with Four Types of TACs[15]

Type	Acceptance rates	Acceptance percentages
AFTER	14/16	87.5%
BEFORE	16/16	100%
DURATION	20/29	69%
TACs without overt manual subjunctor	18/20	90%

The results show that at least three types of TACs are accepted with high rates when they are sandwiched between the matrix subject and the rest of the matrix clause. This is true even for the TACs without overt manual subjunctors.

According to Table 19, the TACs with DURATION again differs from the rest of the TACs with lower overall acceptance rates. This can, however, be related to the different acceptance rates of individual signs glossed as DURATION. Contrast the acceptance rates for items with DURATION_1A, repeated below as (94a), and those for items with DURATION_4, represented in (94b).

hth

(94) a. [GI_1 [YENI METRO AÇILMAK SÜRE_1] BOĞAZIÇI ÜNI. HIÇ GITMEK DEĞIL GI_1]
[IX_1 [NEW SUBWAY OPEN DURATION_1] BOĞAZIÇI UNI. NEVER GO NOT IX_1]
'I have never gone to Boğaziçi University since the subway opened.' (8/8)

b. [IY_1 DEDE [GI_1 KÜÇÜK SÜRE_4] HASTA]
[$POSS_1$ GRANDFATHER [IX_1 SMALL DURATION_4] SICK]
'My grandfather has been sick since I was little.' (3/5)

The lower acceptability rates for constructions like (94b) might stem from the fact that there are two possible candidates for the subjecthood and both of them are animate which makes the processing of the utterance more difficult. Therefore, signers might prefer the subject of the matrix clause not to precede the subject of the temporal clause when both the subjects are animate or inanimate.

[15] The number of the tokens for each group is different because different properties of these TACs were investigated in different stages of the study.

Center-embedded structures like (94) above have higher acceptability rates when the subjects of the clauses are different from each other in terms of their animacy. In other words, when the subjects of the matrix clause and the subordinate clause are both animate (/inanimate), signers prefer the order in which the adverbial clause precedes the matrix clause. This preference is more obvious with clauses with no manual subjunctor. To illustrate, whereas (95a) below is considered ungrammatical, (95b) is accepted as grammatical:

(95)

hth
a.*[ÖĞRENCI GI [ÖĞRETMEN GELMEK] BAYILMAK] (1/8)
[STUDENT IX [TEACHER COME] FAINT]
'The student fainted, when the teacher came (in).'

hth
b. [ÖĞRETMEN GELMEK] [ÖĞRENCI BAYILMAK] (7/8)
[TEACHER COME] [STUDENT FAINT]
'The student fainted, when the teacher came (in).'

Assuming that TİD is an SOV language (Açan, 2007; Gökgöz, 2009; Kubuş, 2008; Sevinç, 2006; Zeshan, 2003), it is expected that TİD allows center embedding of complement and adjunct clauses. As mentioned above, TİD allows center-embedding of temporal clauses (see examples (92a-d) and (93) above). Thus, the ungrammaticality of (95a) is not because TİD does not allow center-embedding. The contrast between (95a) and (95b) shows that there are some restrictions for center-embedding. One restriction attested in this study is that when the subjects of both clauses share the same property in terms of their animacy, as in (95) above, the subject of the matrix clause is not preferred to precede the subject of the temporal clause. On the other hand, all examples in (92) are considered grammatical because the subjects of each clause differ in terms of their animacy feature. This finding supports the work of Sevinç (2006) which argues that one of the factors that determine word order in TİD is animacy. According to Sevinç, animacy plays a role

in word order of TİD and if the two arguments are animate the Agent (A) must precede the Patient (P), which yields the word order APV. If the arguments are not both animate, then, the word order PAV is also acceptable. There is no morphological inflection indicating that they are the subjects of a TAC or a matrix clause, and thus, both animate arguments compete for the subjecthood of the TAC, which yields in unacceptability. Therefore, when the two subjects are similar in terms of their animacy, the subject of the matrix clause may be hard to identify, thus, TİD signers favor the cases in which the temporal clauses precede the main clause instead of the cases in which the temporal clauses are center-embedded. Geraci, Cecchetto, and Zucchi (2008) claim that such constraints on center-embedded clauses in LIS are not only syntactic but they are also dependent on processing factors due to short-term memory load. Similarly, the unacceptability of (95a) may stem from the difficulty in processing the sentence when there are two animate subjects.

In this subsection, I have shown that there are three types of evidence which indicate that TACs in TİD are subordinated clauses. In the following subsection, I discuss the presence of negation as evidence for subordination in BEFORE-clauses which are usually marked by negation.

5.2.2 Further evidence for subordination of BEFORE-clauses

BEFORE-clauses in TİD can contain manual (negative particle NOT) and/or non-manual markers of negation (raised eyebrows and backward head tilt) but these markers do not negate the event expressed in the BEFORE-clause. Consider the following examples where ‘neg’ stands for the bundle of non-manual markers of negation which are raised eyebrows and backward head-tilt in these examples:

(96) a. neg hth (3/3)
EKMEK KESMEK DEĞIL ÖNCE GI$_2$ EL_YIKAMAK
BREAD CUT NOT BEFORE IX$_2$ WASH_HAND
'Wash your hands before you cut the bread.'

b. neg hth (8/8)
EVLENMEK ÖNCE GI$_1$ IZMIR YAŞAMAK
MARRY BEFORE IX$_1$ IZMIR LIVE
'I lived in İzmir before I got married.'

(96a) has both the manual negation particle NOT and the non-manual markers of negation, whereas (96b) only has the latter. What is crucial here is that in neither of these examples, the event expressed in the temporal clause, namely, the event of cutting the bread in (96a) and the event of getting married in (96b), is interpreted as negated. I would like to argue that this property of BEFORE-clauses is further evidence that they are subordinated. If the sentences in (96) were two independent clauses connected with *before*, we would expect negation to induce sentential negation and have a meaning roughly as "(You) don't cut the bread." or "I didn't get married."

Obligatory negation in subordinated clauses which do not induce sentential negation has been observed before in other languages such as Turkish (Göksel & Kerslake, 2005; Kornfilt, 1997):

(97) Ekmeğ-i kes-me-den önce el-ler-in-i yıka
bread-acc cut-neg-abl before hand-pl-2poss-acc wash
'Wash your hands before cutting the bread.'

Aristodemo (2017) have similar outcomes in their study on temporal clauses in LIS with respect to the requirement of negation in BEFORE clauses. Even though the surrounding spoken language, Italian does not require negation marker in BEFORE clauses, LIS does[16]. Moreover, it does not allow the standard negation

[16] In LIS, a BEFORE clause without negation is acceptable only if there is the modal marker MUST.

NEG but only allows NOT-YET. Regarding the non-manual markers, raised eyebrow, which marks clausal adjuncts in LIS in general, is also observed in BEFORE clauses. There are three non-manual markers, namely wide eye opening, further raising of the eyebrows and a nod, which accompany the manual marker BEFORE as represented by NMM in Aristodemo (2017):

(98) _____re _NMM
BOSS STOCK SELL NOT-YET BEFORE, SECRETARY STAMP BUY
'The secretary bought the stamp before the boss sold the stocks.'
(p. 88)

This type of negation has been discussed in the literature as expletive negation which does not change the truth value of a sentence and this phenomenon is observed in different types of clauses across languages (Horn, 1989; van der Wouden, 1994). For instance, expletive negation is observed in BEFORE-clauses in Italian (Donati, 2000) like in Turkish and TİD. A cross-linguistic study by Makri (2013) shows that the licensing conditions of negation and negation licensing lexical items differ from language to language. It seems that both negation manual marker NOT and non-manual negation markers license negation in BEFORE-clauses in TİD, which requires further detailed analysis.

In all examples through (96-98), as evident from the translations, the negative particle does not contribute sentential negation to the temporal clause. When BEFORE functions as a connective, however, negation is obligatorily interpreted as having sentential scope. The following is an example from Turkish:

(99) Ekmeğ-i kes-ti-m. (ondan) önce el-ler-im-i yıka-ma-dı-m.
bread-acc cut-pst-1sg. (that) before hand-pl-1poss-acc wash-neg-pst-1sg
'I cut the bread. Before (that) I did not wash my hands.'

Thus, I take the presence of a negative marker without the sentential negation as an indication that the BEFORE-clause is subordinated to the main clause.

5.2.3 Subordination in simultaneity denoting temporal clauses

As explained in Chapter 4, there are two types of simultaneity denoting temporal clauses: (i) those which are signed simultaneously and (ii) those which are signed sequentially. Figure 30 is an example of the former type whereas Figure 31 exemplifies the latter type.

H1: $_{a}$LOOK$_{i}$ ‘A looks at I’
H2: $_{b}$LOOK$_{j}$ ‘B looks at J’
Figure 30. ‘A is looking at I (and) B is looking at J.’

bl-f & bl-left
H1: UMBRELLA_FLY_IN_THE_WIND SAME

bl-f & bl-right
H2: BALL_FLY_IN_THE_WIND SAME
Figure 31. ‘Umbrella flies in the wind. Ball flies in the wind. Same time.’

While expressing the simultaneity of events (A is looking at I, B is looking at J), as in Figure 30, H1 and H2 start and finish the sign at the same time. In such an example, I assume that the relationship between two propositions (i.e. $_{a}$LOOK$_{i}$ and $_{b}$LOOK$_{j}$) could be coordination rather than subordination due to the absence of any indication of subordination.

The question arises whether such constructions as in Figure 31 can be analyzed as having a subordination relationship: as an adverbial clause and a main clause. There is no evidence for such an analysis. There is no head thrust or any other NMM that marks the subordinate temporal clause, which is usually the case when there is no overt lexical head such as AFTER or BEFORE. This may as well be a case of juxtaposition. In other words, the clauses here may be two independent clauses. The forward body lean which is either towards the left side or right side might be an indication of another semantic relationship such as comparison. The signer may be placing the events in the signing space contrastively to show that these events are realized by different agents. The signer signs the first clause while leaning towards the contralateral side and signs the second clause while leaning towards the ipsilateral side. This may be a case of use of different parts of signing space for contrastive purposes (Mather & Winston, 1998; Perniss, 2012; Winston, 1991, 1995) and such constructions are analyzed as instances of coordination in the literature (Navarrete-González & Zorzi , 2019; Zorzi, 2018) (see Section 6.1 for a discussion).

Another explanation is that the NMMs observed in these utterances might be marking the real locations of the agents in the picture. Rightward and leftward body leans might correspond to the relative positions of the agents. But, there is no indication pointing that the clauses given in Figure 31 are structurally dependent on each other.

To summarize, we have seen that determining the structural relationship between clauses denoting simultaneity is less straightforward. I discuss the structural status of simultaneously expressed clauses, as the ones in Figure 30 in more detail in 6.1, and argue that they may be displaying a sign language

modality specific indicator of subordination. However, for the ones that are sequentially expressed, as the one in Figure 31, in the absence of head thrust and overt subordinators, I conclude that there is no evidence for subordination.

As I showed previously in Chapter 4, there are some other constructions which also denote simultaneity and are signed sequentially. However, they have non-manual markers that spread over both (part of) the subordinated and the matrix clause, which, I would like to propose, points to subordination. Figure 32 and example (100) exemplify such constructions:

ONE MAN BREAD_CUT HAPPY

Figure 32. 'A man is happy while he is cutting the bread.'

(100) fbl

BIR ADAM EKMEK_KES MUTLU

ONE MAN BREAD_CUT HAPPY

'A man is happy while he is cutting the bread.'

In the example above, both predicates [BREAD_CUT] and [HAPPY] are marked by the same spreading non-manual marker: forward body lean and facial expression of HAPPY in the third and the fourth frames. The spreading of the non-manual marker over the temporal clause and the main predicate might be an indication of subordination because the non-manual marker may prosodically indicate that the temporal clause is a constituent of the matrix clause. Another finding which is consistent with the previous findings is that since the temporal clauses have shown a unified pattern in preceding the matrix clause, or at least preceding the

verb of the matrix clause, in TİD so far (see also Section 5.2), I assume that [[ONE MAN]$_i$ BREAD_CUT] is the temporal clause and [e$_i$ HAPPY] is the matrix clause of this simultaneity denoting complex clause.

Another construction I have observed is signed simultaneously with both hands but the signing of the two clauses is not initiated at the same time. Consider Figure 33:

a.	b.	c.
H1: (in preparation)	H1: BICYCLE_RIDE	H1: BICYCLE_RIDE
H2: HORSE_RIDE	H2: HORSE_RIDE	H2: HORSE_RIDE

Figure 33. 'She is riding a horse while he is riding a bike.'

In this figure, the signer introduces the first clause on H2 and introduces the second clause on H1. Considering the sequential expression of temporal relations in TİD in which the temporal clauses always precede the verb of the main clauses, I suggest that the first introduced proposition is the subordinate temporal clause of the complex clause. Furthermore, I propose that subordinate clauses are held as buoys in simultaneously expressed complex clauses and they are signed on the non-dominant hand (see Chapter 6 for a discussion of the function of dominant and non-dominant hands, and the semantic and pragmatic status of the clauses)[17].

[17] This finding might be extended to other types of complex clauses in TİD in which the non-dominant hand is involved, which necessitates further investigation of other complex clauses in TİD.

There are also cases in which dominance reversal applies and the temporal clause is introduced on H1 and kept as a buoy there, instead. See Figure 34.

a.
H1: CARRY_A_CHAIR
H2: (hold)

b.
H1: CARRY_A_CHAIR
H2: RUN

Figure 34. ‘She is carrying a chair while she is running.

In the example above, the signer introduces the first event on the dominant hand, and then introduces the second event on the non-dominant hand. In the second frame, she signs the events together. My explanation for Figure 33 also applies here (Figure 34) except that the hands are reversed. Regardless of the hand usage, CARRY_A_CHAIR might be the temporal clause since it is introduced earlier and RUN is the matrix clause as it is introduced later.

Conversely, the fact that the two clauses are signed simultaneously for some time may be claimed to indicate that the relationship can also be coordination (and not necessarily subordination). I elaborate on this issue again in Chapter 6 in detail with supporting evidence based on the semantic and pragmatic use of space and discuss the structural relation between the two clauses in similar constructions.

The examples given so far have shown that simultaneously expressed propositions in TİD might have a coordination relationship, as in Figure 30 as well as a subordination relationship, as in the examples in Figure 33 and Figure

34. I have proposed that if one of the propositions is introduced earlier (as in Figure 33 & 34), then the relationship is subordination, based on the ordering restriction in TACs in TİD. If they are simultaneously introduced as in Figure 30, then the relationship is coordination regardless of the hand used. However, there might be other factors which determine the structural properties such as dominance reversal exemplified in Figure 34 or the spreading domain of the non-manual markers, if any. I elaborate further on this issue again in Section 6.1.

Having presented the evidence showing that TACs in TİD are subordinated clauses in this section, I present the analysis of the syntactic category of the subjunctors in the temporal clauses in TİD in the next section.

5.3 DURATION, BEFORE, AFTER and GÖRE are postpositions

In this section, I discuss the syntactic category of the temporality denoting markers in TİD, and argue that DURATION, BEFORE, AFTER and GÖRE are postpositions in examples like (101a) and (101b) and they are postpositional subjunctors as in (102).

The observation of the data in this study has revealed that DURATION, BEFORE, AFTER and GÖRE can have two different types of complements in TİD, namely, nominal as shown in (101) and clausal as shown in (102). In (101a), the complement of AFTER is a noun phrase, ONE MONTH, whereas in (101b) it is a pronoun.

(101) a. [BIR AY SONRA] OKUL TATIL
[ONE MONTH AFTER] SCHOOL HAVE_A_BREAK
'The school has a break one month later.'

b. [GI SONRA] GI_2 GÜVENMEK DEĞIL
[IX AFTER] IX_2 TRUST NOT
'After that, I do not trust you.'

(102) [IŞ GELMEK SONRA] KAHVALTI YEMEK GI_1
[WORK COME AFTER] BREAKFAST EAT IX_1
'I had breakfast after I came to work.'

Having nominal complements is one of the cross-linguistic characteristics of postpositions (Genetti, 2008). Furthermore, using (nominalized) clausal elements as the complements of postpositional conjunctors/subjunctors is a strategy used in languages (Comrie & Thompson, 1985). Thus, given that DURATION, BEFORE, AFTER and GÖRE take nominal complements, I conclude that they are postpositions. See further examples below:

(103) a. [DÜN SÜRE_3] BURUN_AKMAK
[YESTERDAY DURATION_3] NOSE_RUN
'My nose has been running since yesterday.'

b. [BAYRAM ÖNCE] TEMIZLIK YAPMAK
[EID BEFORE] CLEANING DO
'Before the eid, I did the cleaning.'

c. [SINAV SONRA] YEMEK
[EXAM AFTER] EAT
'I ate after the exam.'

d. [OY FAZLA GÖRE] BIR KIZ AD G-Ü-L GI_3 1.SINIF BAŞKAN
[VOTE MANY GÖRE] ONE GIRL NAME G-Ü-L IX_3 1.GRADE PRESIDENT OLDU
BECOME.PST
'According to the majority of the votes, a girl named Aslı became the class president.'

Since they can also take clausal complements, as in (103), I analyze them as postpositional subjunctors. The post-complement position of the postpositions is consistent with the generalization that TİD is a head-final language (Açan, 2007; Sevinç, 2006; Zeshan, 2003; Kubuş, 2008; Gökgöz, 2009). The following examples show that DURATION, BEFORE, AFTER and GÖRE cannot follow their complements, nominal or clausal.

(104) a. *[DURATION_3 YESTERDAY] NOSE_RUN
b. *[BEFORE EID] CLEANING DO
c. *[AFTER EXAM] EAT
d. *[GÖRE VOTE MANY] ONE GIRL NAME A-S-L-I IX_3 1.GRADE CLASS_PRESIDENT BECOME.PST

In typological studies, the close relation between postpositions and subordinating conjuncts is a frequently observed phenomenon and researchers argue that there is a grammatical extension of adpositions to being conjunctors (Genetti, 1986, 2008) or subjunctors based on the relationship between two clauses. Complements of adpositions are nominal elements as stated above in this subsection. However, when a postposition is complemented by a clausal unit, but not a simple noun phrase, there might be clausal nominalization (Comrie & Thompson, 1985). According to Comrie and Thompson, these nominalized clauses do not have a derived noun as the head and they usually carry their verbal characteristics (i.e. number, person marking on the verb). In TİD, there is no morphological inflection in the temporal clause or any change in the syntactic structure of the complemented elements. However, I stipulate that the type of clausal complements of postpositional subjunctors in TİD may also be nominalized based on cross-linguistic typological information.

After discussing the syntactic properties of DURATION, BEFORE, AFTER and GÖRE as postpositions and the characteristics of their complements in this subsection, I conclude that DURATION, BEFORE, AFTER and GÖRE are postpositional subjunctors derived from postpositions and they form subordinated temporal clauses.

In this chapter, I have presented my analyses on structural properties of temporal clauses, clausal ordering in complex clauses with TACs, and temporal postpostional subjunctors. In the next chapter, I will discuss the visible expression of temporal relations in TİD both from semantic and syntactic points of view.

CHAPTER 6

VISIBLE EXPRESSION OF TEMPORAL RELATIONS

This chapter focuses on the visibility of temporal relations in TİD. It presents the semantic aspects of the expression of time and how temporal relations in TİD are expressed through the use of space, use of loci, figure-ground relations, and the visibility of inner structure of time denoting elements.

I discuss my findings on the expressions of temporal relations in TİD with respect to the proposals made in Demirdache and Uribe-Extaberria's (1997, 2000, 2004, 2007) for temporal relations, in Schlenker's work (2013, 2017, 2018) regarding the interpretation of the use of loci for temporal reference, and with respect to Wilbur's (2003) Event Visibility Hypothesis to show how phonological form maps onto meaning in expressing temporal relations.

6.1 Figure and Ground in temporal clauses

Figure and Ground are semantic notions which are used to express the events of motion and location (Talmy, 1975). The relationship between them may be containment, movement, or temporal, as mentioned before in Section 2.1.3. In all of these relations, Figure is analyzed as the focused element and the Ground is analyzed as the backgrounded element. In temporal relation denoting complex clauses, the temporal clause is analyzed as the Ground and the matrix clause is analyzed as the Figure (D&UE, 2002, 2007; Talmy 1975). Consider the following example:

(105) After Burcu finished her project, she applied for a job.

In this construction which contains a temporal clause, the event of 'finishing her project' is the Ground (backgrounded) event of the construction whereas the event of

‘applying for a job’ is the Figure (focused) event of the construction. According to D&UE (1997 and later works), the temporal adverbial “after” here functions as a spatiotemporal predicate whose temporal arguments are realized as Figure and Ground (see Section 6.2 for the discussion of spatiotemporal predicates in detail).

I argue in this section that TİD provides “visible” evidence for the Figure-Ground relation proposed for clausal temporal constructions in Talmy (1975) and D&UE (2002, 2007).

The Figure-Ground relation in the expression of relations of location and/or motion in sign languages has been studied extensively (Emmorey, 2002b; Meier, 2002, Özyürek et al., 2010; Talmy, 2003, i.a). Figure 35 is an example from TİD:

H1	----------	MAN	MAN_WALKING
H2	TREE	TREE	TREE_STANDING

Figure 35. ‘The man is walking towards the tree.’
Source: Dikyuva et al., 2017, p.160

In this example, we see that the signer first introduces the Ground (tree) and the Figure (man), on the non-dominant (H2) and the dominant hands (H1), respectively. It is crucial to note that as can be seen in the second frame, when the signer introduces the Figure (man) on H1, H2 is still holding the Ground (tree). Only after the introduction of these two entities, the proposition ‘The man is walking towards the tree.’ is signed, as can be seen in the third frame.

What is crucial in this example for our purposes in this section is that it illustrates the fact that in locational/motional Figure-Ground constructions in sign

languages, it is usually the case that the non-dominant hand represents the Ground and the dominant hand represents the Figure, and the Ground is usually held (on H2) while H1 signs the rest of the utterance.

The type of temporal construction I analyze here is the one where simultaneous events are expressed simultaneously, that is, with the use of both of the hands. Consider Figure 36 and notice the parallelism between this utterance and the one in Figure 35.

H1	----------	CYCLE
H2	HORSE_RIDE	HORSE_RIDE

Figure 36. ‘While he is riding a horse, she is riding a bicycle.’

In the utterance above, the signer first introduces ‘he is riding a horse’ on H2 and then ‘she is riding a bicycle’ on H1 while holding the sign for ‘riding a horse’ on H2 (in the second still photo). Thus, she ends up signing the two events simultaneously.

Now, when we analyze this example with respect to Talmy’s (1975) and D&UE’s (2002, 2007) proposals, we observe that this temporal construction provides visual evidence for them (see Section 2.3.). Recall that they analyze temporal clauses as Ground and main clauses as Figure. In the utterance in Figure 36, the temporal clause ‘he is riding a horse’ is expressed on H2, which usually represents the Ground in sign languages, as we saw above in Figure 1, and the main clause ‘she is riding a bicycle’ is expressed on H1, which usually represents the Figure. I suggest that the TİD data analyzed here is the visible evidence for the correspondence between

temporal clause and Ground (non-dominant hand) and the one between main clause and Figure (dominant hand).

There are utterances in our data, however, that may complicate this picture at first sight. Note that the signer in these examples are right-handed, thus, her dominant and active hand is her right hand. However, as mentioned in Chapter 4 and 5 in the discussion of DURATION-clauses, signers can frequently reverse the dominance of their hands. In other words, due to various reasons mentioned in Section 4.1.1, in a single utterance or discourse, a right-handed signer may use her right hand as the non-dominant hand (likewise, a left-handed signer may use her left hand as her non-dominant hand). Figure 37 is another example of such dominance reversal.

H1	PULL_CHAIR	PULL_CHAIR
H2	----------	RUN

Figure 37. 'She is pulling the chair while she is running.'

Here, even though this signer's right hand is her dominant hand, in this utterance she uses that hand as the non-dominant hand. I assume this is the case because this is the hand she keeps "on hold" thus as her passive hand after signing PULL_CHAIR while the left hand actively signs the rest of the utterance. In terms of the Figure-Ground mapping, her right hand represents the Ground while her left hand represents the Figure. This is another instance of dominance reversal. Due to the reversal of the hands, the temporal clause is signed on the right hand as the Ground of the complex

clause, and the matrix clause is signed on the left hand as the Figure of the complex clause. Thus, I argue that the Figure-Ground relation between the simultaneously articulated temporal clauses are maintained even when there is a change of dominance preference in the use of hands.

Going back to the question of subordination, raised previously in Section 5.2.3, in these complex clauses in which the clauses are simultaneously expressed, it is difficult to detect which clause is the main clause and which one is the temporal clause (see Chapter 5 for the discussions on subordination). At first sight, either of them seems to be a possible candidate for the temporal clause because there is no clear evidence for subordination.

However, I would like to propose two possible indications of subordination specific to sign language modality, which are related to each other. The first one is the ordering of the onset of articulation of the clauses. Recall that in Section 5.1 for sequentially/linearly expressed complex clauses, I argued that the temporal clause must precede the main predicate[18]. I also suggested that this may be showing that the signers treat temporal clauses as both the Topic and the Ground of the complex sentence as there are various studies that argue that in many sign languages both topics and grounds are expressed utterance-initially. For instance, Kimmelman, Pfau, and Aboh (2016) argue that the first part of the utterance signed as the weak hand hold is the topic whereas the rest of the utterance on the dominant hand is the focus. De Weerdt (2016) states that Ground always precedes the Figure both in Flemish Sign Language (VGT) and FinSL. In a similar fashion, Özyürek et al. (2010) reports that Ground precedes the Figure in 93% of the locative constructions in TİD (see also

[18] I stated in Section 5.1 that center embedding of the temporal clause is also possible in TID, thus, I use the term "precede the main predicate" here. But this property does not affect the argument of ordering discussed here.

Aarons, 1994; Branchini, 2007; Sze, 2013; Tang & Lau, 2012, i.a.). In conclusion, (i) Topic occurs sentence-initially and precedes Focus, (ii) Ground occurs sentence initially and it precedes Figure, and (iii) Ground tends to be also Topic, and Figure tends to be also Focus in sign languages.

The "ordering" is less obvious with the so-called simultaneously (i.e. non-linearly) expressed clauses but note that even in these constructions the hands do not start to articulate the two clauses simultaneously. In all the cases in our data, the non-dominant hand starts first, then stays in "hold" while the dominant hand continues with the rest of the utterance. This may not be a coincidence. Since we know that the "holds" have the function of representing the Ground or the Discourse Topic, by articulating a clause with the non-dominant hand first, the signer may again be signaling that the first initiated clause is the Ground/Topic, establishing the temporality of the event expressed by the main clause, hence, functioning as the temporal clause.

The second but related property is the mapping between the dominant vs. non-dominant hands, Figure vs. Ground relation and the main vs. temporal clause relation, as described above. The suggestion that these mappings point to a subordination relation is a theoretical stipulation based on D&UE (2002, 2007)'s proposal that temporal clauses are the Ground and main clauses are the Figure in simultaneous temporal relation denoting constructions in spoken languages. For the TİD data, it follows then that if the non-dominant hand is always used to represent the Ground, then the proposition that is expressed by that hand must be the temporal clause. Similarly, if the dominant hand always represents the Figure, then the proposition that is expressed by that hand must be the main clause. This is of course

based on the assumption that if two (clausal) constituents are interpreted as Figure vs. Ground, then they are in a subordination relation.

One might raise the question whether the two clauses can be in a coordination relation rather than a subordination relation. As mentioned in Section 2.2.4, Kimmelman (2017) and Zorzi (2018) analyze the relationship between the constituents which are realized by different hands as coordination. However, I claim that the relationship between these simultaneous clauses in TİD is subordination since I observed more properties that support subordination in these constructions. Recall from the related section that even though Kimmelman (2017) does not specify the category of the weak hand hold in terms of complexity, Zorzi (2018) extends his analysis to TPs in LSC and argues that the structural relationship between the constituents is coordination. They both see the presence of weak hand hold as the evidence for coordination. Kimmelman also highlights the synchronization of the hands at the end of the utterance and he sees this synchronization as an indication of clause dependency and another evidence for coordination. Nevertheless, he states that the presence of the weak hand hold shows that there is a structural relationship between the two constituents on each hand, either coordination or subordination.

Recall also from Section 2.2.4 that Navarrete-González and Zorzi (2019) highlight the ambiguity of the following sequential construction for which both coordination and temporal subordination interpretations are available.

(106) JORDI BOOK RECIPE READ GIORGIA COOK
1st interpretation: 'Jordi was reading a recipe and Giorgia was cooking.' (p. 29)
2nd interpretation: 'Jordi was reading a recipe while Giorgia was cooking. (p.35)'

Since there are no specific subordination or coordination markers that point to the structural relationship between two clauses in (106), the same utterance may have at

least two different interpretations in LSC, and thus, may have different syntactic relations.

These studies have shown that simultaneously and bimanually articulated propositions constitute complex clauses and they chose to analyze them as instances of coordination. However, I claim in this thesis that such constructions are instances of subordination in TİD, based on not only the simultaneous articulation but also on other factors such as the onset of each utterance on different hands and the dominant vs. non-dominant hand use for the Ground event and the Figure event, respectively (and other arguments presented in Section 5.2).

To summarize, the analysis of the properties of the simultaneously expressed temporal clauses in this section sheds more light on the syntactic status of these clauses which I started discussing in Chapter 5. The three properties of the clause articulated with H2 that I argue is subordinated are summarized again below:

(i) It is introduced first[19];

(ii) It is held throughout the utterance - thus it cannot be syntactically independent from the matrix clause;

(iii) It is articulated with H2, which usually represents the Ground in Figure-Ground constructions in TİD, and within the framework of Talmy (1975) and D&UE (2002, 2007), the subordinate clause is the Ground.

The evaluation of such manifestation of clausal features like the ones listed above leads to the proposal that these properties may be the sign language counterparts of subordination markers expressing simultaneous events, obviating the need for overt lexical subjunctors such as WHILE.

[19] Recall from Section 5.1 that I proposed that the onset of the articulation is also an indication that the temporal clause is signed before the main clause.

If the analysis here is on the right track, then we have identified a property of subordination that is specific to sign language modality: in simultaneously expressed complex clauses, the clause that is articulated by the non-dominant hand is the subordinate clause.

In the next section, I elaborate more on the spatiotemporality of the temporal expressions in TİD.

6.2 Visibility of spatiotemporality

The second issue to be covered in this chapter is the visibility of spatiotemporality in sign languages. Spatiotemporality is the representation of temporal arguments through Figure and Ground elements, which was discussed in the previous section. This section elaborates on how visible the spatiotemporality is in temporal expressions of TİD, based on the dyadic spatiotemporal predicate analysis of D&UE (1997, 2000, 2004, 2007). In other words, I present and discuss how this Figure-Ground relation extends to temporal expressions in the sense of Talmy (1975) and how spatiotemporal predicate analysis is applied to TİD in the sense of D&UE.

According to some analyses, tense is a two place predicate which orders two temporal elements (Klein, 1995; Stowell, 1993; Zagona, 1990). In such analyses, temporal arguments that the tense predicate can take are the event time (ET), the assertion time (AST-T)/(or speech time (ST)), and the utterance time (UT)/(or reference time (REF-T)). These are the basic syntactic and semantic arguments on which the temporal relations are defined.

Demirdache and Uribe-Extebarria (2000, 2004, 2007) argue that temporal adverbials are just like tenses which are two-place predicates in the sense that they

have temporal elements as their arguments (see section 2.1.3 for details). See the following example:

(107) Franny left before Christmas. (D&UE, 2012, p. 2)

In this sentence, *before* is analyzed as a temporal adverbial which is semantically a two-place predicate and its time denoting arguments are “Franny left" and "Christmas".

Recall from section 2.1.3 that D&UE propose that temporal relations can be explained with three semantic primitives and these are WITHIN, AFTER, or BEFORE. They classify the topological temporal relations between the temporal arguments as inclusion, subsequence, and precedence respectively.

The spatiotemporal predicates have two time-denoting arguments, and the relationship between the arguments is defined based on the location of the Figure with respect to the Ground, applying Hale’s (1984) use of the semantic opposition : +/- central coincidence to temporal structures. The following examples, which are reproduced based on Hale’s examples on Warlpiri (p. 240) show how +/- central coincidence is relevant for Figure and Ground elements:

(108) a. + central coincidence: The ball is on the table.
b. - central coincidence: The ball is near the table.

Table 20 shows how the feature +/- central coincidence is applied to the expression of temporal relations within D&UE’s framework:

Table 20. Semantic Opposition: +/- Central coincidence in Temporal Relations

	-central coincidence AFTER (subsequence)	+central coincidence WITHIN (inclusion)	-central coincidence BEFORE (precedence)
Locating temporal markers	*after* DP/CP	*at, in, during* DP, *when* CP	*before* DP/CP
Durational temporal markers	*from* DP, *since* DP/CP	*for* DP, *while* CP	*until* DP/CP

Source: Adapted from D&UE, 2012, p. 1

As shown in Table 20, the feature [+central coincidence] represents the inclusion relationship in which the two temporal arguments overlap temporally. Regarding temporal adverbial clauses, *when* and *while* are the two heads that take CPs as arguments and induce the [+central coincidence] meaning. [- central coincidence], on the other hand, represents the subsequence and precedence in which the two temporal arguments do not overlap temporally. In this type of relationship, one temporal argument follows or precedes the other one. *After, since, before* and *until* are among the temporal adverbial heads that take CPs as their arguments and induce [- central coincidence] meaning.

Thus, according to the +/- central coincidence analysis, there are three possibilities: (i) two arguments can overlap temporally, or (ii) can precede or (iii) follow one another temporally. Considering the types of temporal clauses observed in TİD data, sequentiality denoting temporal clauses in TİD are semantically [– central coincidence] whereas simultaneity and frequency denoting temporal clauses in TİD are [+ central coincidence], which is the common case for all languages. Duration denoting temporal clauses in TİD, however, can be semantically both [– central coincidence] or [+ central coincidence]. What I claim for TİD differently at least

from spoken languages is that TİD provides visual evidence for this abstract semantic correspondence, at least partially.

Following up on the proposal in the previous paragraph, if TİD expresses certain semantic notions visually via simultaneous articulation, then one might predict that the different values of the semantic feature +/- central coincidence can also be expressed visually. Specifically, the prediction would be that temporal relations with [+ central coincidence] should be expressed with simultaneous articulation of the events whereas those with [- central coincidence] should be expressed with sequential articulation of the events in TİD. In other words, the semantic overlap that is analyzed through -/+ coincidence for spoken languages can be represented through the overlap of signs articulated by the two hands in TID because there are multiple articulators in sign languages which makes simultaneous expression possible.

Note, however, that this is true if only sequentiality and some duration denoting temporal clauses which are [– central coincidence] are expressed sequentially but not simultaneously. There is no example in the corpus and elicited data that I have analyzed where a sequential event is articulated simultaneously. That is, all complex clauses where the temporal relation is precedence, subsequence or duration are articulated sequentially/linearly. The utterance in Figure 38 which is an example with AFTER is articulated sequentially:

OIL_PUT AFTER STIR

Figure 38. ‘Stir after putting the oil.’

In the example above, the event of ‘putting the oil’ precedes the event of ‘stirring’. Similarly, even though some examples with DURATION are [+central coincidence], most of them are [-central coincidence] and none of the examples with DURATION overlap visually. See Figure 39.

MARRY$_i$ DURATION_1A GUEST MANY COME

Figure 39. ‘Many guests have come since I got married.’

The events of ‘guests’ coming’ follows the event of ‘getting married’. As these events in both Figure 38 and Figure 39 do not overlap temporally, they do not overlap visually, either. My observation is that if two events are temporally [-central coincidence], then, they cannot be signed simultaneously in TİD.

On the same grounds, another prediction is that if two events are temporally [+ central coincidence], then, they can be expressed simultaneously. The prediction holds. Consider Figure 40.

IX MAN IX WOMAN H1: RIDE_BYCYCLE
H2: RIDE_HORSE

Figure 40. ‘While the man is riding a horse, the woman is riding a bike.’

This utterance exemplifies a construction in which two events are expressed simultaneously. In the last frame, the H1 signs one clause whereas H2 signs another clause. The event on H1 is the ‘woman’s riding a bike’ whereas the event on H2 is ‘man’s riding a horse’. These events are temporally [+ central coincidence], that is, they are happening at the same time and this is reflected in the construction in which signing of the clauses overlap visually, as well.

However, this correspondence is not obligatory. Simultaneity of events can be expressed sequentially, as well as shown in Figure 41.

ONE MAN ONION ONION_CUT CRY

Figure 41. ‘One man is crying while he is chopping the onions.’

In this example, even though the events of ‘crying’ and ‘chopping the onion’ are temporally [+ central coincidence], they are signed sequentially. Figure 42 provides another example with a frequency denoting temporal clause:

IX$_1$ WHEN ROOM ENTER SEE ALWAYS SLEEP

Figure 42. ‘Whenever I enter her room, she always sleeps.’

In summary, regarding the temporal relations that denote precedence or subsequence, TİD is similar to spoken languages in the ordering of the events and establishing the relations accordingly. However, for the temporal relationships that denote inclusion (+ central coincidence), sign languages have a tool that can show that the two events overlap temporally through the use of multiple articulators. Thanks to the presence of multiple articulators in sign languages, [+ central coincidence] can be expressed visually. However, this is not obligatory and there are cases where simultaneous (+central coincidence) events can also be expressed sequentially. Thus, I can conclude that visible event semantics is available in sign languages, but since there are other options of expressing a temporal relation, some phonological form-meaning overlaps do not manifest themselves in the sign modality (in TİD).

We have seen that sequential events [- central coincidence] are only possible to be expressed sequentially in contrast with simultaneous [+ central coincidence] events, which can be expressed both simultaneously and sequentially. So, there is an asymmetry. This asymmetry implies that, by default, languages express dependent clauses sequentially regardless of the semantic relation between the clauses (i.e. temporal). However, sign languages have the physical potential with its multiple articulators to express two phrases simultaneously, so it creates an optionality. When this optionality is employed, the semantics of [+ central coincidence] events translates into the modality of TİD and is manifested with the related signs.

To conclude, sign languages provide visible evidence for the notions that have been abstractly proposed for spoken languages (Lillo-Martin & Klima, 1990; Sandler & Lillo-Martin, 2006; Schlenker, 2017, p. 4). Schlenker (2017) and Wilbur (2003, 2008) show, for instance, that abstract semantic notions related to anaphora, variables and event structure are visible in sign languages (see Section 2.3). In a similar vein, I have argued in this section that my analysis of temporal clauses in TİD provides visible evidence for another abstract notion, namely [+/- central coincidence] feature that has previously been proposed for temporal relations based on spoken language data.

6.3 Visibility of locating and durational expressions in temporal clauses

Visibility of the meaning in the form in sign languages has been suggested in the literature for different semantic notions and one of them is telicity. As mentioned in Section 2.3, Wilbur (2003, 2008, 2010) proposes that the internal structure (telicity) of an event is reflected onto its phonological form and she formalizes this common property of sign languages as the Event Visibility Hypothesis (EVH).

Similarly, I argue that the semantic content of a temporal expression is reflected on its form in TİD. I showed in Chapter 4 that the temporal expressions that denote duration have a path movement between two locations in the signing space whereas other temporal expressions do not have such property.

I base my argument on the distinction between durational and locating temporal markers. D&UE (2000, 2005) classify time adverbials (both simple temporal markers and adverbial clauses) in spoken languages as locating and durational temporal markers based on their semantic content. Locating temporal markers such as *after* are semantically two-place predicates as mentioned in Section

6.2. They “serve to locate a time span by relating or ordering it with respect to the time represented by their internal arguments”, which are time denoting arguments (2005, p. 200). Durational temporal markers such as *during*, on the other hand, “specify either the duration/temporal size or the boundaries of the event by relating this time span to the time span denoted by their internal argument” (2005, p. 201). In the rest of this section, I argue that locating temporal markers in TİD locate a temporal point in the signing space (like AFTER in TİD) whereas durational temporal markers (like DURATION in TİD) mark the duration of the event and/or the event boundaries.

The adverbial elements to be analyzed in this section are BEFORE, AFTER, GÖRE, and variants of DURATION. I argue that BEFORE, AFTER, and GÖRE carry the properties of *locating* temporal markers whereas all variants of DURATION carry the properties of *durational* temporal markers and these temporal markers depict these properties visually.

To begin with, BEFORE is a locating temporal marker, and it marks the precedence of the event by anchoring it to the back of the signer’s body. The starting point of the sign is somewhere in front of the signer’s ipsilateral shoulder. See Figure 43.

Figure 43. BEFORE

The locating adverb BEFORE in Figure 43 is from the utterance in (109):

(109) ILAÇ İÇMEK DEĞIL ÖNCE YEMEK YEMEK LAZIM
PILL TAKE NOT BEFORE FOOD EAT NECESSARY
'You need to eat (food) before taking the medicine.'

The event of 'eating food' is anchored to a time before the event of 'taking the pill' in this example. Semantically, the anchoring is expressed with the adverb BEFORE. Phonologically, the anchoring is represented by the end point of the sign BEFORE which is signed at the back of the body which usually represents times or events anterior to the speech time or a reference time (see Section 2.2.2) (Arık, 2012; Dikyuva et al., 2017) or precedence on Timeline 1 (see Section 6.4 for details) similar to other sign languages (Pfau et al., 2012; Sinte, 2013). I would like to propose that the anchoring of the event by the sign BEFORE to a locus in the signing space is the visible manifestation of the locating function of locating temporal markers proposed in D&UE (2000, 2005).

The second temporal marker which shows the properties of a locating adverb is AFTER. It marks subsequence by anchoring the event to a locus which is away from and in front of the body whereas the starting point is closer to the signer's body and in the central signing space. The locating adverb AFTER in Figure 44 is from the utterance in (110):

Figure 44. AFTER

(110) VIDEO IZLEMEK SONRA $_2$ANLATMAK$_1$
VIDEO WATCH AFTER $_2$TELL$_1$
'After you watch the video tell me.'

The event of ‘telling’ is anchored to a time after the event of ‘watching the video’ in this example. In terms of meaning, the anchoring is expressed with the adverb AFTER. In terms of form, the anchoring is expressed through the end point of the sign AFTER which is signed away from the body which is usually used to mark times or events posterior to the speech time or a reference time (Arık, 2012; Dikyuva et al., 2017) or subsequence on Timeline 1 (see Section 6.4 for details). Again, AFTER anchors the event of ‘telling’ to a locus in the signing space and this shows its locating function as a locating temporal marker in the sense of D&UE (2000, 2005).

The last of locating temporal markers to be discussed here is GÖRE. As described in 4.2.3 before, one of its functions is to establish a temporal relation between two clauses. This sign is signed as in Figure 45.

Figure 45. GÖRE

The locating temporal marker GÖRE in Figure 45, is from the utterance in (111):

(111) INSAN YAŞLANMAK GÖRE AILE YUVA DÜŞKÜN GI FAZLA
HUMAN-BEING GET_OLD GÖRE FAMILY HOME KEEN_ON IX MUCH
‘Once/when a person gets old, s/he becomes keener on the family.’

GÖRE is a sign that establishes a sequence relationship between the temporal elements. The event of ‘becoming keen on the family’ is anchored to a time close to the event of ‘getting old’, and the meaning it yields is ‘Once/when a person gets old, s/he becomes keener on the family’. This sign is less iconic than BEFORE and AFTER since there is no specified use of space that is specific to temporal sequence. It does

not denote duration and it is analyzed as a locating temporal marker even though it does not anchor any temporal reference in the signing space. Thus, GÖRE cannot be not interpreted as visually transparent as other temporal markers. Yet, it still functions as an anchor for the event of 'getting old' and this shows its locating function as a locating temporal marker in the sense of D&UE (2000, 2005).

According to D&UE (2000, 2005), the second type of temporal markers are durational ones. Based on the observations from the TİD data, all variants of DURATION belong to this category. Depending on the specifications attained to this sign, it can convey the temporal relation with respect to the starting point of the event (as in Figure 46), end point of the event (as in Figure 47), or the duration itself (as in Figure 48).

2005 DURATION_1A

Figure 46. 'Since 2005'

YEAR ENTERTAINMENT DURATION_2

Figure 47. 'Until New Year's Eve'

YEAR ONE DURATION_1A

Figure 48. ‘For a year’

In these Figures (46-48), all temporal adverbial elements are durational. All of the duration signs have a starting point, a movement, and an ending point. Starting and ending points in the articulation represent the starting and the ending points of the events/states, and the movement represents the duration. In other words, here, as well, the meaning of a temporal expression is represented visibly.

Note that starting and ending points of the events/states do not always have to be expressed/specified with an overt lexical expression. To illustrate, the ending point is unspecified in the utterance in Figure 46 whereas it is the starting point which is unspecified in the utterance in Figure 47. In Figure 48, neither of the points are specified. Still, the form (phonology) of the sign inherently contains starting and ending points and I interpret that these represent the starting/ending points of the events/states even when they are not expressed overtly in the case of DURATION.

Rather than locating an event to a point in time, these temporal markers express the duration between two events. And thus, the difference between a locating and a durational temporal marker is made visible in TİD.

In this section I have presented locating and durational temporal markers in TİD and how they represent the visibility of time based on D&UE’s classification of temporal markers and showed that TİD represents the semantics of a temporal notion

through its phonology, which is a finding that has not been noted for other sign languages so far.

In the next section, I discuss the timelines available in TİD and demonstrate the specified and underspecified areas in the signing space for temporal information in TİD, and discuss how these areas serve to convey the meaning and visibility of time.

6.4 Timelines in TİD

Timelines are frequently used in sign languages for time reference as mentioned in Section 2.2.2. TİD also makes use of timelines while giving time references or expressing temporal relations. Line 1 (Arık, 2012; Dikyuva et al., 2017, Karabüklü, 2016) and the combination of Line 2 and Line 6 (Karabüklü, 2016) are the two timelines that are observed in TİD based on the classification of timelines by Sinte (2013) (see Section 2.2.2). Consider Figure 49.

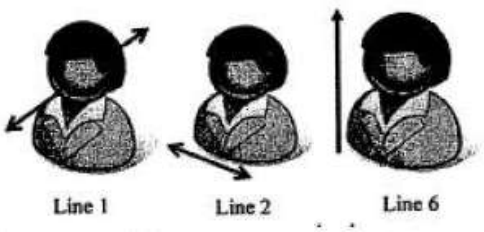


Figure 49. Some of Sinte's timelines used in TİD
Source: Sinte, 2013, p. 207

In addition to previous observations on the use of timelines in TİD, I will present examples in which TİD makes use of not only Line 1 and the combination of Line 2 and Line 6, as Karabüklü suggested, but also their individual uses as well as Line 3 and Line 4 through temporal expressions in TİD. I will also discuss the meanings of these timelines in this subsection. At the end of this section, I will provide data

showing that TİD makes use of a timeline which has not been mentioned in the literature before.

To begin with, Line 1 is an abstract invisible line that goes over the dominant shoulder. In addition to its use to mark past and future time references as outlined in previous studies (see Section 2.2.2.), it is also observed in TİD in the expressions with BEFORE. In these expressions, BEFORE uses the Line 1 as shown in Figure 50. However, here, the back of the body marks antecedence, not necessarily the past tense. It does not mark the temporal reference of the events but their temporal order. When there are two events whose temporal relation is represented with BEFORE, the event which happens first is anchored somewhere at the back of the body through BEFORE. See Figure 50.

MARRY BEFORE IZMIR LIVE

Figure 50. BEFORE on Line 1

(112) EVLENMEK ÖNCE IZMIR YAŞAMAK
MARRY BEFORE IZMIR LIVE
'I lived in İzmir before I got married.'

In the example (112) above, the first event is 'living in İzmir' and it precedes the event of 'marrying'. As shown in Figure 50, both the first event and the second event are signed in the neutral signing space in front of the body of the signer. However, what makes the event of 'living in İzmir' the preceding event is anchoring it to a previous point in time by using Line 1 in the articulation of BEFORE and the anchoring it at the back of the body.

Similarly, being another temporal postposition, AFTER orders events using Line 1 as displayed in Figure 51. Events are signed in the neutral signing space in front of the body as in BEFORE-clauses. However, the second event is anchored to a point which is away from the body, which indicates that the second event follows the first event in terms of their chronological ordering. See example (113).

VIDEO WATCH AFTER $_2$TELL$_1$

Figure 51. AFTER on Line 1

(113) VIDEO IZLEMEK SONRA $_2$ANLATMAK$_1$
VIDEO WATCH AFTER $_2$TELL$_1$
'After you watch the video tell me.'

In the example (113), the first event is 'watching the video' and it precedes the event of 'telling'. The second event is anchored to a subsequent point in time (away from the body) on Line 1 through the use of the temporal marker AFTER. Therefore, I conclude that Line 1 is not only used to mark past and future time references in TİD but also to express the chronological order of the events, regardless of their tenses. The preceding event is anchored at the back of the signer's body and the following event is anchored away from the signer's body on Line 1.

Another timeline used in TİD is Line 2 and it is commonly observed in clausal and non-clausal DURATION phrases. As Karabüklü (2016) points out, in temporal expressions with DURATION, there are two temporal references and there is a straight or arc movement between these two points to show the duration between them (Section 4.1.1). These points are assigned to loci in the signing space

arbitrarily. Both of the loci can be specified with certain temporal references (e.g. FROM MONDAY TILL WEDNESDAY as in Figure 52) or only one of them can be specified with a certain temporal reference (e.g. 'since I got married' as in Figure 53 or 'till I find a job' as in Figure 54). When only one is anchored to a specific time, the other is interpreted as 'present' or 'now'. See the examples (114-116).

MONDAY IX WEDNESDAY DURATION_1A COURSE THERE_IS

Figure 52. DURATION_1A on Line 2

(114) PAZARTESI GI ÇARŞAMBA SÜRE_1A KURS VAR
MONDAY IX WEDNESDAY DURATION_1A COURSE THERE_IS
'There is a (TİD) course from Monday till Wednesday.'

IX_1 EVLENMEK DURATION_1A GUEST MANY $_{3pl}COME_1$

Figure 53. DURATION_1A on Line 2

(115) GI_1 EVLENMEK SÜRE_1A MISAFIR ÇOK $_{3Ç}GELMEK_1$
IX_1 MARRY DURATION_1A GUEST MANY $_{3pl}COME_1$
'A lot of guests have come (to us) since I got married.'

JOB FIND DURATION_1A FATHER $_3MONEY\_GIVE_1$

Figure 54. DURATION on Line 2

(116) IŞ BULMAK SÜRE_1A BABA $_3$PARA_VERMEK$_1$
JOB FIND DURATION_1A FATHER $_3$MONEY_GIVE$_1$
'Until I find a job, (my) father will give me money.'

These examples (114-116) show that the loci used in the expressions with DURATION can refer to a point in the past, in the future or present.

This finding shows that the central signing space is underspecified in terms of temporal encoding. The examples (114-116) also show that the contralateral side is specified for anteriority and the ipsilateral side is specified for posteriority in the expressions with DURATION. Note also that findings of this study have displayed previously that there is a use of DURATION in which the locus on the right side of the signer marks the anterior temporal reference whereas the locus on the left side of the signer marks the posterior temporal reference (see also Section 4.1.3). See the example repeated in Figure 55 and (117):

THOUSAND NINE FORTY DURATION_1B
Figure 55. DURATION_1b

(117) 1940 SÜRE_1 B
1940 DURATION_1B
'Since 1940'

As discussed in 4.1.1, dominance reversal is observed in time denoting expressions in TİD and DURATION_1B is one of these examples. Since this is a case of dominance reversal, not only the hands but the notions of ipsilateral and contralateral are also reversed. Thus, it is still the ipsilateral side which is marked for anteriority and it is

the contralateral side which is marked for posteriority in Figure 55 just like the utterances in Figures 52-54. Looking at the examples represented through Figures 52-55 which are relevant to Line 2, I argue that the ipsilateral side is used for posterior temporal reference whereas the contralateral side is used for anterior temporal reference in TİD.

Line 3 is another timeline used to express temporal relations in TİD even though it has not been mentioned in previous studies. Here, the non-dominant arm represents the timeline, and the back of the arm marks anteriority. Like BEFORE (or BEFORE_1) which is signed on Line 1, BEFORE_2 is signed on Line 3 and it marks anteriority in TİD. See Figure 56 and example (118).

RUN BEFORE_2 SPORTS SHOE_WEAR

Figure 56. BEFORE_2 on Line 3

(118) KOŞMAK ÖNCE_2 SPOR AYAKKABI_GIYMEK
RUN BEFORE_2 SPORTS SHOE_WEAR
'(I) will wear sports shoes before (I) run.'

In this example, the first event is 'wearing shoes' and it precedes the event of 'running'. Both events are signed in the neutral signing space in front of the body of the signer. While signing the sign BEFORE, the event of 'wearing shoes' is placed at a point prior to the event of 'running' on Line 3. It is understood from the example that the back of the arm marks anteriority whereas the front side of the arm marks posteriority. The articulation of BEFORE is somehow iconic and its meaning is visible

in its form. Line 3 is similar to Line 1 in that the back is used to encode previous events whereas the front (ahead) is used to encode following events on both lines.

The temporal adverbials with DURATION_2 provide further evidence that a horizontal timeline on the sagittal plane in front of the signer's body, which is Sinte's Line 4, is also used in TİD. See Figure 57 and example (119).

BERK SCHOOL OPEN DURATION_2 MOTHER SLEEP

Figure 57. DURATION_2 on Line 4

(119) BERK OKUL AÇILMAK SÜRE_2 ANNE UYUMAK
BERK SCHOOL OPEN DURATION_2 MOTHER SLEEP
'Berk will stay at my mom's until school starts.'

On this timeline, the locus where the hands overlap shows the (future) time when the school will start whereas the starting point of H1 is interpreted as 'now' or 'present'.[20] Line 4 starts at around the dominant shoulder and the sign ends at a point which is in the central signing space and away/further from the signer's body. Thus, the movement in Line 4 is more like from back to front rather than side to side.

So far, the uses of Line 1, Line 3 and Line 4 in TİD have shown that a locus which is on the back of these lines represents anteriority whereas a locus in the front of these lines encodes posteriority. What reveals these timelines is that there are temporal subjunctors such as AFTER and BEFORE, and time expressions such as YESTERDAY, IN_THE_PAST and FUTURE signed on these timelines. Specific temporal

[20] The default interpretation of H1 in DURATION_2 is 'now' or 'present'. There is also a possibility that the temporal meaning of H1 like in this example can be dependent on the context and have another meaning other than 'now' or 'present'.

references are not realized by pointing at loci on any of these timelines (e.g. pointing at a locus behind the shoulder for anteriority).

This dichotomy is also observed in the expressions with DURATION_2 and expressions with DURATION_4 and, in which anteriority and posteriority are marked on Line 4 in the former type of signs whereas anteriority is marked with a lower locus and posteriority is marked with a higher locus on Line 6 in the latter type.

However, temporal references are placed in contralateral and ipsilateral sides with the expressions with DURATION_1A and DURATION_1B: posteriority is marked by the ipsilateral side and the anteriority is marked by the contralateral side of the signer on Line 2. Looking at the examples which are relevant to Line 2, I argue that the ipsilateral side marks posteriority whereas the contralateral side marks anteriority in TİD.

The last timeline used in TİD that I would like to discuss is Line 6. It is a vertical timeline. As explained in detail in Section 4.1., it indicates the temporal relation between two reference points: one of which is anchored at a time in the past and the other one represents the present time. This timeline can be argued to be more iconic than the previous timelines in that it represents a temporal duration related to 'growth', as shown in Figure 58 and glossed in (120).

Figure 58. DURATION_4 on Line 6

(120) KÜÇÜK SÜRE_4
SMALL DURATION_4
'since I was a child/small'

In Figure 58 above, the starting point of the time interval (the first reference point) is marked with the sign SMALL 'small' and the end point of the time interval (the second reference point) is at a higher location in the frontal plane. This higher location is above the forehead level which is interpreted as 'now’.

The meaning of this timeline is related to the growth of an individual in the contexts where DURATION_4 is used, which was also observed by Sinte (2013) across some sign languages in which this timeline is available. It is also important to note that the use of Line 6 is limited to some lexical items such as BIRTH and SMALL which are signed in the lower central signing space. The place of articulation of these signs might be triggering the use of Line 6 to express the duration with these signs because of their lexical semantics.

So far I have presented the timelines proposed by Sinte (2013) which are also observed in TİD. According to her classification, there are six abstract lines to express temporal meaning in sign languages and five of them have been attested in TİD. These timelines are exemplified and explained above. However, there is another timeline used by TİD signers to express duration in the future as shown in Figure 59 and example (121) (see Section 4.1.3 for details on DURATION_3).

Figure 59. DURATION_3

(121) IY$_1$ KIZ STAJ IŞ SÜRE_3 IZMIR KALMAK
POSS$_1$ DAUGHTER INTERNSHIP WORK DURATION_3 IZMIR STAY
'My daughter will stay in İzmir until she finishes the internship.'

This timeline consists of a flat handshape and an arc movement towards the ipsilateral side of the signer. It cooccurs with future denoting NPs such as 2050, or a clause with a future time reference. It could be represented as in Figure 60.

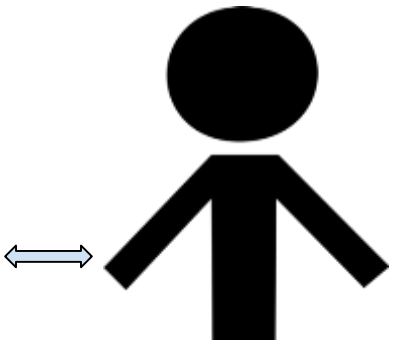


Figure 60. Additional timeline observed in TİD (Line 7)

This timeline shows that the future time reference in TİD is maintained not only distal-front as in Line 1, Line 3 and Line 4 but also through distal-ipsilateral side as in Line 7. What these two areas of signing space have in common is that they are both distant from the signer's body.

In this section, I have shown the timelines used in TİD according to Sinte's (2013) classification and I suggested a new timeline which was not mentioned in Sinte (2013). I have also examined the use of space in indicating the temporal relations in TİD and the meanings that are pertained to different parts of the signing space and I have proposed a timeline for the use of space in the expression of time and temporal relations in TİD, which might be also in use in other sign languages.

Besides proposing a new timeline for TİD, the findings presented in this chapter so far also have implications for the theoretical analyses that claim that the signing space is meaningful across sign languages. There are several studies that show that the interpretation of (indefinite) pronouns in sign languages may be determined by the location in the signing space where they are articulated and that there is an iconic relation between these locations and the interpretation they encode. Interestingly, some of these locations are beyond the central signing space.

For instance, in Davidson and Gagne (2014), lower central signing space corresponds to small domain of quantification but higher signing space corresponds to larger domain of quantification. Perhaps the degree of "familiarity of the set" is represented with the degree of proximity of the location of the signs to the central space/signer's body, which means the closer is the more familiar.

In another study, Barberà (2015) shows that lower ipsilateral signing space is marked for specificity, but the upper area (which is beyond the central signing space) is marked for non-specificity.

Kelepir et al. (2018) investigate another semantic aspect of indefinite pronouns in TİD which also provides evidence for the iconic representation of meaning. They show that indefinite pronouns are signed in different parts of the signing space depending on whether they are exclusive indefinite pronouns or inclusive indefinite

pronouns. While inclusive indefinite pronouns are signed in the central space, exclusive indefinite pronouns are signed outside the central space, namely, in the lateral signing space. This is consistent with how inclusive and exclusive personal pronouns are signed in sign languages (Cormier, 2012). Hence, the findings of this study illustrate iconic representation of another semantic contrast: the degree of clusivity correlates with the degree of proximity to the central signing space/signer's body.

Lastly, as mentioned in 2.3, Schlenker (2013, 2017, 2018) shows that sign languages provide visible evidence for pronominal, temporal, and modal anaphora through the use of loci. He argues that these anaphoric relations can be set and understood unambiguously through the use of referential indices created in the signing space.

This thesis provides a novel set of data from TİD to this growing evidence for the visible representation of semantic notions. I have shown that temporal information is encoded based on some specifications within the signing space and different areas of the signing space have different interpretations. For instance, future/posterior temporal expressions are signed away from the body (distal ipsilateral or distal center), thus, associating the degree of temporal closeness to the utterance time/reference time to the degree of spatial closeness to signer's body. In this respect, futurity/posteriority of an event patterns with exclusive pronouns (personal and indefinite) and quantifiers/indefinites with wider domains of quantification, all articulated away from the body. Conversely, temporal expressions that are related to the utterance time (present/"now") pattern with inclusive pronouns and quantifiers/indefinites with narrower domains of quantification, all articulated closer to the body. These findings indicate that the representation of temporal

concepts and the representation of pronouns are expressed in similar ways. The findings of this study are important in illuminating the discussion on the relationship between the components of the signing space and its semantic and pragmatic features.

In the next section, I turn to the relationship between the location of temporal pronouns and their interpretation, which provides visible evidence for the abstract notion of anaphoric relations in spoken languages.

6.5 Loci as temporal variables

The uses of loci in sign languages provide another set of evidence for the visibility of abstract semantic notions. As mentioned in Section 2.3, indexing is visible in sign languages (Lillo-Martin & Klima, 1990) and loci in sign languages are argued to be overt realizations of anaphoric relations that are abstract in spoken languages (Schlenker, 2013, 2017, 2018).

Schlenker (2013) shows that sign languages use loci for nominal, temporal and modal anaphora, as mentioned in 2.3. The following is an example of how loci are used for temporal anaphora in ASL:

(122) a. Context: Every week I play in a lottery.
IX-1 $_{a}$[SOMETIMES WIN]. IX-1 $_{b}$[SOMETIMES LOSE]. IX-a IX-1 HAPPY.
'Sometimes I win. Sometimes I lose. Then [= when I win] I am happy.'

b. $_{a}$[WHILE RAIN] TEND WARM. $_{b}$[WHILE SNOW] TEND COLD. IX-b IX-1 HAPPY. IX-a IX-1 NOT HAPPY.
'When it rains it is warm but when it snows it is cold. Then [= when it snows] I am happy but then [= when it rains] I am not happy.
(Schlenker, 2013, pp. 214-215)

In (122a), the signer signs SOMETIMES WIN in locus a and SOMETIMES LOSE in locus b. The gloss IX-a in the second sentence represents a pointing sign and

shows that the signer points to locus a. Schlenker (2013) analyzes this pointing (index) sign as a temporal pronoun, with a meaning similar to *then* as in the translation of the example above, and anaphorically referring to the proposition SOMETIMES WIN in the first sentence. What is crucial here is that even though we have a temporal pronoun here with two potential clausal antecedents (SOMETIMES WIN and SOMETIMES LOSE), thanks to the visual modality, namely, being able to point to the locus of the antecedent, the referent of the pronoun is understood *unambiguously*.

(122b) has two temporal pronouns and their antecedents are also understood unambiguously. WHILE RAIN is signed in locus a and WHILE SNOW is signed in locus b. In the following sentence, two different pointing signs, IX-b and IX-a, point to these two different loci in the signing space and thus, unambiguously refer to the corresponding antecedents[21].

The examples in (122a-b) show that sign languages differ from spoken languages in that the referent of the pronominal element in sign languages is understood unambiguously, due to the anaphoric use of loci.

Based on Schlenker's analysis of loci as variables in ASL and LSF, I argue that loci are used as temporal variables in TİD, as well, but within a morphologically complex structure differently from the set of data Schlenker used in his analysis. My findings with temporal expressions in TİD provide further and a different set of evidence for the existence of visible variables in sign languages. Based on Schlenker (2013) which concludes that loci are variables, based on the anaphoric reference to the previously established locus, I claim that a lexical item can also provide visible evidence for temporal anaphora. Examples with DURATION provide supporting

[21] See Schlenker's (2013:214) explanation on how clauses with 'sometimes' and 'when' function as the antecedents of these temporal pronouns.

evidence for this idea of loci as variables in the sense that: (i) any location in the signing space can in principle function as locus and thus as a temporal variable, (ii) the straight or arc movement between two temporal indices can be on the sagittal plane, transverse plane or coronal plane, which shows that assigning temporal reference in different planes is also possible, and (iii) multiple loci can be used in the same utterance for different temporal references.

In the rest of this section, based on my morphological analysis of holds as clitics in Section 4.1.2, I will argue that the two holds (phonological components in HMH Model (Liddell, 1984; Liddell & Johnson, 1989)) in the sign DURATION are not just arbitrary phonological components of the sign but that they are temporal loci. See Table 21 taken from Chapter 4:

Table 21. Phonological and Morphological Representation of the Variants of DURATION

Phonological components:	Hold	Movement	Hold
Semantic components:	Temporal pronoun	{duration}	Temporal pronoun
Morphological forms:	Clitic	Bound root	Clitic

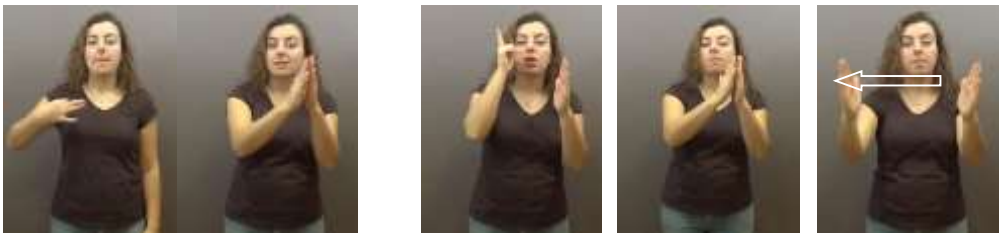
DURATION has six phonological variants as presented in detail in Section 4.1.1. However, the articulation of all of them contain two phonological holds which, I claim, correspond to two temporal loci (pronouns) morphologically. Thus, what makes DURATION signs special is that the locations of the holds correspond to loci whose temporal references are dynamically assigned and which function as temporal pronouns, as shown in Table 21.

In most of the data analyzed in this thesis, there are two temporal antecedents in the utterance referred to by the two loci in the sign (e.g. 'from 1980 to 2000'). In some of the examples, there may only be one overt antecedent

and the covert antecedent is usually interpreted as ‘now’ or ‘present’ when it is signed within the neutral signing space (e.g. ‘since 1980 (till now)’).

Based on the common characteristics of variants of DURATION, I argued in Section 4.1.2 that they are complex signs consisting of three morphemes: two cliticized index signs which function as temporal pronouns and a root with the meaning {duration} as represented in Table 21. I also claim there that flat handshape (🤚) and 1-handshape (☝) pointing signs in DURATION both function as temporal pronouns and they refer to the beginning or the ending time of the duration of an event or state. Thus, there are potentially two loci in each DURATION which can be assigned temporal reference.

In the following, I explain these with specific examples. Figure 61 and example (123) illustrate a case with two overt antecedents (and two loci):



H1: MONDAY (locus for MONDAY) WEDNESDAY (locus for MONDAY) (locus for WEDNESDAY)
H2: (locus for MONDAY)……(locus for MONDAY)
Figure 61. Two loci associated with temporal anaphora and used simultaneously

(123) PAZARTESI GI ÇARŞAMBA SÜRE_1A
MONDAY IX WEDNESDAY DURATION_1A
‘From Monday till Wednesday’

The example in (123) shows that there are two time denoting signs (MONDAY and WEDNESDAY) and they are associated with two different loci in the signing space. The signer first establishes the first temporal locus in the contralateral side, as seen in the second frame of Figure 61, after signing the lexical sign (MONDAY) in

the first frame. In the second frame, it is also seen that the signer points to the temporal locus with two hands in the form of flat handshapes (🤚). Here, H2 points to the actual temporal locus whereas H1 points to the starting point of the time interval which will be expressed by DURATION in the later frames. In the third frame, the antecedent (WEDNESDAY) for the second temporal locus is signed. The last frame is the basic realization of two temporal anaphora, in which H2 refers to the first established temporal locus and H1 refers to the second established temporal locus. When the signer wants to express the duration between these two temporal expressions, she refers to the loci she built beforehand. In the last frame, it is seen that the distance (created by movement of H1) between the two loci corresponds to the time interval between the two temporal expressions namely the morpheme {duration}.

Here, one issue that could be controversial is the form of the handshapes indicating temporal loci in Figure 61 and the form of pointing in the second frame. The index signs here are in the form of flat handshapes (🤚), not the more commonly used 1-handshape (☝) in index signs. I assume that time anchoring temporal indices can also have flat handshapes (🤚) in TİD since pointing or index signs can have different handshapes and orientations across sign languages even though the most common handshape is 1-handshape (☝) (Pfau, 2011; Quer at al., 2017). Moreover, as I mentioned in Section 4.1.2, personal pronouns can also have either 1-handshape (☝) or flat handshape (🤚)in TİD (Dikyuva, et al. 2017). Thus, I take both 1-handshape (☝) and flat-handshape (🤚) in the variants of DURATION as index signs, and thus, as temporal pronouns.

Regarding the touching of the palms, which is again not a common form of indexing in sign languages, I consider it as two hands pointing to the same

temporal locus (see the second and the fourth frame of the Figure 61). H2 establishes the temporal locus of the starting point of duration and is held there until the end of the temporal phrase and H1 points to the same locus to mark the starting of the time interval. Thus, I argue that touching of the palms is the same in terms of meaning and function with the touching of the tips of indexing fingers as in Figure 62, which is a common way of indexing in TİD and also in other sign languages:

Figure 62. Tips of the fingers anchoring the same temporal locus in DURATION_1A

Another potential question regarding the temporal anaphora in Figure 61 is why we see the established locus for WEDNESDAY in the fifth frame whereas the antecedent sign is signed in the third frame. It is unexpected for a sign and the index sign that establishes its locus to be intervened by the signing of another sign, but DURATION_1A continues to being signed still after the intervening sign (WEDNESDAY) is completed. When the meanings of these temporal loci are checked with the informants, they stated that H2 stands for MONDAY and H1 stands for WEDNESDAY in the fifth frame of Figure 61.

The following example from Karabüklü (2016) also shows that the second established locus is coindexed with the second signed antecedent. See Figure 63.

NOW DURATION ---------- MARCH----------DURATION

Figure 63. 'from now until March'
Source: Karabüklü, 2016, p. 92

Even though, this is a temporal relation denoting sign with DURATION as well, the signer signs the first antecedent, NOW (frame #1), with H2 she establishes the first locus which refers to NOW (frame #2), and holds it, with H1 she touches the index sign on H2 to refer to the same temporal locus (frame #2), signs the antecedent of the second locus, MARCH, (frame #4), and finally establishes the second temporal locus, locus of MARCH with H1 (frame #5). Note that throughout the utterance H2 holds the pointing sign that refers to NOW.

What is different and important in this example (Figure 63) is that the second antecedent, MARCH, is signed immediately before its temporal locus is set. This example supports my analysis that (i) the second locus anchors the meaning of the second signed antecedent in the signing space, and (ii) DURATION is a morphologically complex sign which consists of three morphemes. All in all, not establishing the locus right after the antecedent sign in expressions with DURATION does not yield a problem in terms of temporal anchoring. There is optionality as shown between Figure 61 and Figure 63 which show that the second antecedent does not necessarily immediately precede the established locus. This optionality might be available due to the morphologically complex internal structure of DURATION[22]. Since

[22]Notice here in Figure 63 that a syntactic phrase, the noun phrase [MARCH] 'March', is intercepting the root {duration}. The possibility of this may contribute to the controversy regarding the competing models of the architecture of grammar and the ordering of the syntactic and morphological operations.

this discussion is not part of the main issue this dissertation focuses on, I leave this issue to further research.

In the examples given in Figures 61 and 63, I have shown that simplex temporal expressions such as MONDAY, MARCH etc. can function as the antecedents of temporal variables. My analysis of DURATION clauses shows that clausal temporal expressions can also function as such antecedents. Consider the utterance in Figure 64 and example (124).

IX$_1$ MARRY DURATION_1A GUEST MANY $_{3pl}$COME$_1$
Figure 64. 'A lot of guests have come (to us) since I got married.'

(124) GI$_1$ EVLENMEK SÜRE_1A MISAFIR ÇOK $_{3Ç}$GELMEK$_1$
IX$_1$ MARRY DURATION_1A GUEST MANY $_{3pl}$COME$_1$
'A lot of guests have come (to us) since I got married.'

In the first two frames, there is a clausal constituent which is [IX$_1$ MARRY] 'I got married'. H2 in the third frame points to a locus in the signing space and anchors the clausal constituent. H1 in the third frame first points to this locus that H2 is pointing at (similar to the second frame in Figure 63), and then, ends the sign with another index sign on H1. Since the second locus in the ipsilateral side is unspecified, the interpretation for this locus is 'present' or 'now', as also mentioned in Section 6.4.

So far I have argued that there are two temporal indices in the variants of DURATION and that they function as temporal variables. I have presented evidence for

It may, for instance, indicate that syntax and morphology work in a parallel fashion as proposed by Jackendoff (2002) and Booij (2010), not sequentially as proposed in the models such as Distributed Morphology (Halle & Marantz, 1993; Harley & Noyer, 1999). Since this issue is beyond the scope of this dissertation, I leave it for further research.

how TİD builds temporal anaphoric relations and temporal pronouns can refer to simplex antecedents such as ‘wedding’ or complex antecedents such as ‘I got married’ as in the case of DURATION.

The second support for the claim that DURATION signs have temporal pronouns comes from the observation that any locus on any plane can function as a temporal variable in TİD in the expressions with DURATION. For instance, in Figure 65, the first locus is established at the back of the body and the second locus is in the central signing space. In Figure 65, H1 points to the back of the body which refers to an anterior time (Section 2.2.2. and 6.4.). This instance of DURATION also shows that the holds in this sign are not meaningless, yet they have temporal references. Similarly in Figure 66, whereas the first locus is in the center signing space, the second locus is established on a distal point on the ipsilateral side. In Figure 67, the sign starts at the low signing area where the first locus is established and it ends above the forehead level in front of the body where the second locus is established.

Figure 65. DURATION_1A

Figure 66. DURATION_3

Figure 67. DURATION_4

The Figures 65-67 show that the assignment of temporal reference to a locus is not limited to the central signing space in TİD. Back of the body, distal ipsilateral side and distal front, low or upper signing areas are among the parts of signing space that are used for temporal reference in TİD.

The Figures 65-67 also show that a temporal locus and the temporal relation between temporal loci can be assigned to any of the planes that sign languages make use of: sagittal plane, transverse plane or coronal plane, which also indicates that any locus in different planes can be a temporal variable. This finding points out that the temporal loci established in the signing space are not one dimensional but three dimensional, which supports the argument by Schlenker (2017) that there are limitless loci to be assigned pronominal, modal and temporal references in the signing space.

Many of the complex clauses analyzed in this study include two clauses whose structural relationship is established through the subordinators such as DURATION, BEFORE, and AFTER. Among these, DURATION is the one which provides visible evidence for the establishment of temporal anaphora since BEFORE and AFTER are simplex lexical signs, but the form and the meaning of DURATION is defined based on the established loci or loci with a default meaning (i.e. ‘present’ or ‘now’) within the signing space, which makes DURATION a complex sign. Thus, TİD shows that it is possible to assign a temporal reference which is propositional in terms of structure

(example (124)) to a locus as well as a temporal reference which is simplex in structure (example (123)) to temporal pronouns in the variants of DURATION.

This chapter demonstrated how the findings of the study can be analyzed in terms of the visibility of abstract notions in TİD. In the upcoming chapter, I summarize the major findings, reflect on the limitations, discuss the implications and suggest areas of further research.

CHAPTER 7

CONCLUSION

This dissertation investigated the syntactic and semantic properties of temporal clauses and the strategies used in temporal marking and subordination of temporal clauses in TİD. Through the examination of corpus data and elicited data, the presence of clausal temporal phrase was identified in TİD and these complex temporal phrases were classified according to the temporal relation between the temporal clause and the matrix clause. In this chapter, I provide a summary of my dissertation based on the findings and discussions. The rest of this chapter is organized as follows: I summarize findings of the study with regard to the typology of temporal clauses and syntactic and semantic analyses in Section 7.1, I reflect on the limitations of the study in Section 7.2, and finally I discuss the implications of this study and suggestions for further research.

7.1 Major findings of the study

The contributions of the study to the field of (sign) linguistics are three fold: typological, syntactic, and semantic. The typological findings about the temporal clauses in TİD are the following:

- There are four types of temporal relations observed in temporal clauses in TİD, namely, duration, sequentiality, simultaneity, and frequency.
- There are ways of marking temporal clauses both manually and non-manually. They can be marked by manual temporal markers such as DURATION, BEFORE, AFTER, and GÖRE, and by non-manual markers such as head thrust.

- Duration denoting temporal clauses are headed by the temporal marker DURATION. This sign has six phonological variants, but they have morphologically the same underlying structure: two clitics which function as temporal pronouns and a root with the meaning {duration}.
- BEFORE, AFTER, and GÖRE are the temporal subjunctors which are used to form temporal clauses of sequentiality. BEFORE and AFTER are frequent signs in the BU-TİD Corpus both as connectives and subjunctors. Even though GÖRE is an infrequent sign in the corpus, it was identified as a temporal subjunctor for the first time in this study. It orders the events of a complex structure such that the event expressed in the matrix clause takes/took place when/after the event expressed in the subordinate clause.
- In some temporal clauses, there is no manual temporal marker denoting sequentiality or simultaneity. However, these temporal clauses are marked by the same non-manual boundary marker, head thrust, which is observed in the temporal clauses with manual subordinators. I conclude that it is the non-manual marker which marks the subordinated clausehood, independent of the presence of the manual temporal subjunctors.
- Simultaneity denoting temporal clauses in TİD can be expressed with either simultaneous or sequential signing. Sequentiality denoting clauses can be expressed only with sequential signing.
- One way of expressing simultaneity of the events in TİD is by signing the events sequentially and ending the utterance with the sign SAME.
- The wh-word WHEN is used as the manual temporal marker for temporal clauses of frequency in TİD. Moreover, head thrust (hth) marks the temporal clause boundary in frequency denoting temporal clauses, as well.

The syntactic analysis of temporal clauses in TİD has revealed the following:

- Temporal clauses in TİD must occur preverbally. This finding follows from the fact that temporal *clauses* in TİD cannot occur postverbally whereas simplex temporal *phrases* can. Moreover, TİD allows center-embedding, i.e. a temporal clause in TİD can follow the matrix subject and precede the predicate of the matrix clause.
- The investigation of temporal clauses in TİD has shown that the structural relationship between the temporal clause and the matrix clause is subordination. The evidence for this conclusion comes from stand-alone tests, use of non-manual marker head thrust, presence of negation in BEFORE-clauses, center-embedding of temporal clauses, and simultaneous constructions.
- DURATION, BEFORE, AFTER, and GÖRE are temporal subjunctors which carry the properties of postpositions, and the supporting evidence comes from their complements and their head directionality.

The semantic analysis of the temporal clauses in TİD has revealed the following:

- The temporal clause in TİD is the Ground whereas the matrix clause is the Figure following Talmy's (1975) and D&UE's (1997) analysis.
- Semantic opposition [-/+ central coincidence] can be (partially) visible in the simultaneity denoting constructions in the sense of D&UE (1997 and other related works).
- Wilbur's Event Visibility Hypothesis (2003, 2008, 2010) applies to temporal expressions in TİD in that locating adverbs mark a temporal point in the signing space (like AFTER in TİD) whereas durational adverbs (like DURATION in TİD) encode the duration of the event and/or the event boundaries.

- TİD makes use of five of the timelines offered by Sinte (2012) and these are: Line 1, Line 2, Line 3, Line 4 and Line 6. Additionally, I found that there is one more timeline (Line 7) which extends on the distal ipsilateral side of the signer encoding time meaning 'from now to distant future'.
- The contralateral side is specified for anteriority and the ipsilateral side is specified for posteriority in TİD, as observed in the expressions with DURATION.
- Loci can function as temporal variables in TİD. The evidence for this comes from temporal expressions with DURATION. In the morphological make-up of this sign, there are two temporal pronouns functioning as temporal variables and a root with the meaning {duration}. Moreover, the features and the meaning of these temporal variables are defined based on their antecedents. In the absence of an antecedent, they are interpreted as 'present' or 'now'.

Having outlined the typological, syntactic and semantic properties of temporal clauses in TİD in this section, I focus on the limitations of the study in the next section.

7.2 Limitations

There are several limitations that affected the conducting of this study and also interpreting the findings of the study. These limitations are due to methodology, lack of prior data, literature, and the interpretation of the findings.

First of all, data used in this study comes from both corpus data and elicited data. I initiated my study by exploring the corpus data which are annotated in ELAN program or transcribed in word processing files. I scanned the corpus data with some keywords as I mentioned in Chapter 3. These keywords were ZAMAN 'time', ÖNCE

'before', SONRA 'after', and BERI 'since'. I listed 447 tokens in word processing files and 350 ELAN files that include at least one of these keywords. The limitation of the data provided here is that the keywords in the word processing files were not linked to the videos, therefore, it was sometimes difficult to track back to these examples in the videos and it was sometimes even impossible. Among those which I could track and analyze, only a few turned out to be complex structures. For instance, though there are 323 tokens of SONRA 'after' in the word processing files, the majority of these examples were connectives and not subjunctors.

On the other hand, ELAN files were more useful in tracking these keywords in the annotations. Moreover, literature on the complexity at the propositional level in TİD and sign languages in general is quite limited. Literature on adverbial or temporal clauses in sign languages is even scarcer. Thus, a meticulous data collection and analysis procedure was conducted and called for.

Another limitation with regard to the data is that, some further questions arose in the middle of the data collection procedure, so that the number of elicitation stimuli are not equal across types of temporal clauses. For instance, DURATION was an understudied sign, and thus, difficult to capture. That is why more items were included in the elicitation data to examine DURATION. Both descriptive and analytic examinations of DURATION were made based on a larger body of stimuli and data. Similarly, GÖRE was another understudied sign which I discovered as another temporal marker during the process of data collection. Thus, the stimuli designed to study GÖRE in this study turned out to be more at the level of description, less at the level of analysis. Despite the difficulties in analyzing the present data, collecting new data, and interpreting the whole data, I could accomplish analyzing them all under one topic which is temporal clauses in TİD.

The third limitation of the study is about the interpretation of the data. Before, during and after the data collection procedure, I worked with two consultants to be able to understand and interpret the data and the signers' productions and responses. There were times when these two consultants gave different opinions on a topic. Furthermore, the use of a sign language may differ from one region to another in terms of some aspects such as lexical choice. Some signers reported that DURATION is a common sign in TİD whereas some others reported that it is an infrequent sign (or some variants of the sign are infrequent) even though the participants are from the same region. Thus, more stimuli investigating DURATION were included in the study to understand the form and meaning of the constructions in which this sign is used.

In the same vein, the data elicited from one participant was excluded from this study because the responses she gave were usually 'I don't understand' and 'I understood' instead of 'yes' or 'no' while giving her responses in grammaticality judgment task. She also reported that 'there is no such sign' especially for DURATION. Her responses were replaced by another fluent signer.

The fourth limitation is that there were no test items in the study which investigate whether sequential events can be expressed simultaneously in TİD. The utterances from both the corpus data and the elicited data show that simultaneous events can be expressed both through simultaneous signing and sequential signing whereas sequentiality denoting temporal clauses can be expressed only in a sequential way. Negative evidence is needed to make sure that sequential events cannot be signed simultaneously in TİD, which will require further research.

The last limitation of this study is that I did not test whether the loci in DURATION signs can be used in an anaphoric relation, i.e. whether one can point to those loci later in the discourse in the sense of Schlenker (2013, 2017, 2018). I

showed in the study that DURATION is a complex sign and it has two temporal pronouns which realize as loci but further research is needed to show whether these pronouns can have anaphoric relations.

I have discussed the limitations of the study in this section in terms of methodology, and I continue with the implications of this study and suggestions for further research in the next section.

7.3 Implications and further research

The findings of the present study have implications both at the descriptive level and theoretical level. At the descriptive level, the findings of the study show that sign languages display the variety found among spoken languages with respect to the typology of the temporal clauses in terms of meaning and form. However, the visual-spatial modality in sign languages makes the expression of some types of temporal clauses such as simultaneity *visible in their form*. At the theoretical level, sign languages have the structural properties that spoken languages have, but they might not use the same strategies that spoken languages do. For instance, non-manual markers in sign languages play a role in boundary marking in terms of clausal structure and pointing signs play a role in encoding the temporal meaning. Below, I summarize the implications of the study together with the suggestions for further research.

This study has shown that there are restrictions for the clausal order of a temporal clause with respect to the matrix clause. This restriction is not observed when the temporal expression is simplex. Thus, this implies that TİD is not a truly scrambling language, but there are restrictions to the inner structural organization of clauses. As for the reason why clausal temporal expressions cannot be post-verbal, it

is not quite clear. Information structure related motivations are not expected to differentiate between simplex temporal expressions and clausal temporal expressions. This restriction might be due to the properties of post-verbal domain in TİD, about which there is no previous work. Therefore, information structure and the post-verbal domain are the two areas of research awaiting a comprehensive examination in TİD.

A previous study on adverbial clauses of a sign language, Wilbur (2016), based on Haegeman's (2012) cartographic approach to adverbial clauses, claims that adverbial clauses in ASL are central if they have left preference, they are peripheral if they have right preference . This dissertation concludes that temporal clauses in TİD can be only on the left side of the complex construction. Though the structural analysis of this study is not based on Haegeman (2012), the findings may indicate a similarity between TİD and ASL in terms of defining the central and peripheral adverbial clauses in a sign language. To elaborate on this issue and to investigate the structural typology of adverbial clauses, a thorough structural analysis of all types of adverbial clauses in TİD is needed.

This study has implications for the theoretical analysis on the use of space, the visibility of meaning in terms of semantics, and the morphological complexity of signs. To begin with, it is highlighted in this thesis that TİD makes use of space in a meaningful way while expressing the time and temporal relations. Along with previous findings for other sign languages, TİD also uses timelines to make anterior or posterior temporal reference. As a tenseless language (Dikyuva et al. 2015; Karabüklü, 2016), TİD anchors events according to their chronological order within the signing space. Moreover, this study has shown that TİD makes use of a timeline, Line 7, which was not identified in the sign language literature before. When all the

timelines and their meanings in TİD are considered and evaluated, it is concluded that some parts of the signing space in TİD have specific meanings for time reference similar to what is usually described in other sign languages via timelines (Sinte, 2013 and references therein). According to the findings discussed in Chapter 6, future/posterior temporal expressions are signed and/or anchored away from the body (distal ipsilateral/distal center) whereas the utterance time, 'present' or 'now' is expressed closer to the signer's body. Based on this, I suggest that there is a relationship between the degree of temporal closeness to the utterance time/reference time with the degree of spatial closeness to signer's body. This temporal specific meaning of space is in line with other semantic functions of signing space offered for TİD and other sign languages. In line with (Cormier, 2012), Davidson and Gagne (2014), Barberà (2015), and Kelepir et al. (2019)'s proposals which exemplify the representation of different semantic contrasts through the use of space in sign languages, the findings reported in this dissertation show that future temporal reference is expressed in a similar way with exclusive pronouns (personal and indefinite) and quantifiers with wider domains of quantification whereas temporal reference to 'present' or 'now' is expressed in a similar way with inclusive pronouns (personal and indefinite) and quantifiers with narrower domains of quantification. Thus, this study provides supporting evidence for the claim that temporal expressions show pronominal characteristics as proposed in Partee (1973) and in Kratzer (1988), and that the signing space has semantic and pragmatic functions in sign languages (Barberà, 2015; Kuhn & Aristodemo, 2017; Perniss, 2012; Schlenker, 2018). However, more research is needed to investigate the pronominal and temporal use of space in TİD.

The second important finding related to the semantics of the temporal clauses in TİD is that index signs which anchor temporal meaning function as variables. For spoken languages, it is argued that time denoting expressions have anaphoric properties similar to pronouns (Kratzer, 1988; Partee, 1973). Schlenker (2016) argues that sign languages provide visible evidence of these anaphoric relations based on his examples from LSF and ASL. He also points out that these variables are the concrete forms of the abstract notions proposed for spoken languages. This study provides supporting evidence for Schlenker's (2017) analysis of temporal variables with examples from the variants of DURATION in TİD. The evidence from DURATION is indirect because it is the morphological make-up of DURATION which allows such an analysis. However, a detailed analysis of pointing signs functioning as temporal variables in TİD should be conducted to be able to fully understand the semantic properties of index signs in TİD and whether they can directly function as temporal variables which display anaphoric relations.

The third important finding of this study is that it presents the puzzle that is observed in the sign DURATION with respect to its morphological make-up. As mentioned in 6.5, a noun phrase [MARCH], which is a syntactic phrase, intercepts the root {duration}. The presence of such possibility in a language, in which simultaneous expression is available, may indicate that the operations involving morphology and syntax realize in a parallel fashion indeed as proposed in the models such as construction morphology (Booij, 2010; Jackendoff, 2002). This is a phenomenon which cannot be explained by the models in which morphemes are linearized in a sequential manner as in Distributed Morphology (i.a. Halle & Marantz, 1993; Harley & Noyer, 1999). A detailed analysis on the variants of

DURATION (and similar signs) is needed to contribute to the discussion of the competing models on the architecture of grammar, which is left for further research.

The last important finding of this study is related to the morphological make-up of signs in sign languages. As previously mentioned in this section, DURATION has been analyzed as a complex sign in which there are two index signs functioning as temporal variables. I argue in 4.1 that these index signs attach to the bound morpheme {duration} as clitics. A similar analysis is proposed for agreement verbs in the literature by Fischer (1975) and Nevins (2011) which analyze the agreement markers in agreement verbs as cliticized pronouns. Thus, the morphologically complex status of DURATION extends this analysis to another part of speech which is not an agreement verb but a postposition. Moreover, these analyses indicate that the morphological complexity of signs can also realize sequentially, which is considered as rare in sign languages. More examples of the use of clitics from sign languages, including TİD, are needed to contribute to the understanding of how clitics are formed and how complex signs with clitics realize in sign languages.

APPENDIX

SAMPLES FROM THE GRAMMATICALITY JUDGMENT TASK

1. Sample test items with BEFORE

<table>
<tr><td colspan="2">1.1 Question-answer pairs</td></tr>
<tr><td>IX$_2$ WHEN BREAKFAST EAT?
‘When did you have breakfast?’</td><td>- WORK COME NOT BEFORE
- ‘Before I came to work’</td></tr>
<tr><td colspan="2">1.2 Items with manual negation</td></tr>
<tr><td colspan="2">a. BREAD CUT NOT BEFORE IX$_2$ WASH_HAND
‘Wash your hands before you cut the bread.’ a.

b. PILL_TAKE NOT BEFORE IX$_1$ EAT
‘I ate before I took the pills.’

c. IX$_1$ MARRY NOT BEFORE IZMIR$_i$ IX$_i$ LIVE
‘I lived in İzmir before I got married.’

d. RUN NOT BEFORE SPORTS SHOE_WEAR
‘Wear sports shoes before (you) run.’</td></tr>
<tr><td colspan="2">1.3 Items with non-manual negation only</td></tr>
<tr><td colspan="2">a. <u>neg</u>
BREAD CUT BEFORE IX$_2$ WASH_HAND
‘Wash your hands before you cut the bread.’

b. <u>neg</u>
PILL_TAKE BEFORE IX$_1$ EAT
‘I ate before I took the pills.’

c. <u>neg</u>
MARRY BEFORE IX$_1$ IZMIR LIVE
‘I lived in İzmir before I got married.’

d. <u>neg</u>
RUN BEFORE SPORTS SHOE_WEAR
‘Wear sports shoes before (you) run.’</td></tr>
</table>

1.4 Items without negation
a. BREAD CUT BEFORE IX_2 WASH_HAND 'Wash your hands before you cut the bread.' b. PILL_TAKE BEFORE IX_1 EAT 'I ate before I took the pills.' c. MARRY BEFORE IX_1 IZMIR LIVE 'I lived in İzmir before I got married.' d. RUN BEFORE SPORTS SHOE_WEAR 'Wear sports shoes before (you) run.'

2. Sample test items with AFTER

<table>
<tr><td colspan="2">2.1 Question-answer pairs</td></tr>
<tr><td>- IX$_2$ WHEN PARK GO?
- ‘When did you go to the park?’

- IX$_2$ BREAKFAST WHEN EAT IX$_2$?
- ‘When did you have your breakfast?</td><td>- HOMEWORK FINISH AFTER
-‘After I finished my homework.’

- WORK COME AFTER
- ‘After I came to work.’</td></tr>
<tr><td colspan="2">2.2 Subordinator-connective test</td></tr>
<tr><td colspan="2">[[VIDEO WATCH AFTER] $_2$TELL$_1$]
‘After you watch the video, tell me (about it).’

[VIDEO WATCH] [AFTER $_2$TELL$_1$]
‘(First) you watch the video. Afterwards, tell me (about it).’

[VIDEO WATCH]$_i$ [IX$_i$ AFTER $_2$TELL$_1$]
‘(First) you watch the video. After that, tell me (about it).’</td></tr>
</table>

3. Sample test items with DURATION

<table>
<tr><td colspan="2">2.1 Question-answer pairs</td></tr>
<tr><td>- IX$_2$ WHEN SICK?
- ‘How long have you been sick?’

- IX$_2$ WHEN HUSBAND ANGRY?
- ‘How long will you be angry with your husband?</td><td>- ANKARA COME DURATION
- ‘Since I came from Ankara’

- IX$_3$ APOLOGIZE DURATION
- ‘Until he apologizes’</td></tr>
<tr><td colspan="2">2.2 NP/CP complement test</td></tr>
<tr><td colspan="2">MARRY DURATION_1A GUEST MANY $_{3pl}$COME$_{1pl}$
‘A lot of guests have come (to us) since we got married.’

WEDDING DURATION_1A GUEST MANY $_{3PL}$COME$_{1PL}$
‘We have had many guests since the wedding.’</td></tr>
<tr><td colspan="2">2.3 Telicity in DURATION clauses test</td></tr>
<tr><td colspan="2">IX$_1$ SCHOOL ENTER DURATION_1A POSS$_1$ FATHER$_{3a}$ $_{3a}$MONEY_GIVE$_1$
‘My father has been giving me pocket money since I entered the school.’

WORK DURATION_1A POSS$_1$ FATHER$_{3a}$ $_1$MONEY_GIVE$_{3a}$
‘I give money to my father during (the time) I work.’</td></tr>
</table>

4. Sample test items with GÖRE

	Question- Answer Pairs	
1	CAR STOP WHEN GO? 'The car has stopped. When will it go?'	RED LIGHT STOP GREEN LIGHT GÖRE GO 'It stops at the red lights. When the green light is on, it goes.'
2	DESSERT PUDDING WHEN FINISH 'When will the pudding be ready?'	PUDDING MAKE COOK GÖRE TURN_OFF 'Make a pudding, when it is cooked, turn of the cooker.'
3	BABY WHEN HAVE_A_SHOWER 'When will the baby have a shower?' UMBILICAL_CORD FALL_OFF GÖRE HAVE_A_SHOWER ALLOWED	UMBILICAL_CORD FALL_OFF GÖRE HAVE_A_SHOWER ALLOWED 'When the umbilical cord falls off, having a shower is allowed.'
4	IX_2 WHEN WAIT IX_2 'When are you waiting for?'	PHONE BATTERY FINISH GÖRE MOTHER WAIT IX_1 'When the phone battery is off, I will wait for my mother.'

5. Sample test items for sequential temporal clauses without manual subordination markers

	Question- Answer Pairs	
1	IX$_2$ WHEN MARKET GO? 'When did you go to the market?'	- BUS GET_OFF - 'When I got off the bus'
2	IX$_2$ WHEN CLEANING MAKE? 'When did you do the cleaning?	- IX$_2$ WAIT_FOR - 'While waiting for you.'
3	IX$_2$ WHEN BREAKFAST MAKE? 'When did you have breakfast?	- MORNING NEWS WATCH - 'While watching the news.'
4	IX$_2$ WHEN PARK GO? 'When did you go to the park?	- HOMEWORK FINISH - 'When the homework was finished.'

6. Sample test items for temporal clauses vs. temporal phrases

a. IX$_1$ [TWO_DAY_BEFORE] HOSPITAL GO IX$_1$ HOSPITAL GO [TWO_DAY_BEFORE] 'I went to the hospital two days ago.'	(preverbal temporal phrase) (postverbal temporal phrase)
b. [[IX$_3$ WORLD TRAVEL] [DIE NOT BEFORE]] [IX$_3$ DIE NOT BEFORE] [WORLD TRAVEL] 'He travelled around the world before he died.	(preverbal temporal clause) (postverbal temporal clause)

7. Sample test items for center embedding of temporal clauses

a. CEM HOLIDAY BEGIN BODRUM GO 'When the holiday begins, Cem will go to Bodrum.'
b. [WHO [HOLIDAY BEGIN] BODRUM GO] 'Who went to Bodrum when the holiday began?'
c. [CHILD [WEATHER DARKEN BEFORE] HOME EARLY COME] 'The child came home early before it got dark.'
d. [POSS$_1$ BROTHER [EXAM ANNOUNCE AFTER] ANKARA GO] 'My brother went to Ankara after the exam results were announced.'
e. [IX$_1$ [NEW SUBWAY OPEN DURATION_1] BOĞAZIÇI UNI. NEVER GO NOT IX$_1$] 'I have never gone to Boğaziçi University since the subway opened.'
f. [POSS$_1$ MOTHER [SNOW MELT] HOMETOWN GO] 'My mother went to (her) hometown when/once the snow melted.'
g. [POSS$_1$ GRANDFATHER [IX$_1$ SMALL DURATION_4] SICK] 'My grandfather has been sick since I was little.'
h. [STUDENT IX [TEACHER COME] FAINT] 'The student fainted, when the teacher came (in).'
i. BERK SCHOOL OPEN DURATION_2 MOTHER SLEEP 'Berk will stay at my mom's until school starts.'

8. Sample test items with temporal clauses of frequency

a. [IX$_1$ WHEN GO] [ALWAYS SLEEP] 'Whenever I go (to his room), (my roommate) sleeps.'
b.POSS$_1$ HOUSE FRIEND THERE_IS. IX$_3$ SICK IX$_3$. [IX$_3$ WHEN ICE-CREAM EAT] [IMMEDIATELY THROAT SICK BECOME] 'I have a housemate. She is sick. Whenever she eats ice-cream, she becomes sick immediately.'

REFERENCES

Aarons, D. (1994). *Aspects of the syntax of American Sign Language* (Unpublished PhD thesis). Boston University, Boston, MA.

Aarons, D., Kegl, J., & Neidle, C. (1995). Lexical tense markers in American Sign Language. In K. Emmorey & J. Reilly, *Language, gesture, and space* (pp. 225-253). Hillsdale: Lawrence Erlbaum Associates.

Açan, Z. (2007). *A linguistic analysis on basic sentence types in Turkish Sign Language (TİD) with reference to non-manual activity* (Unpublished PhD thesis). Hacettepe University, Ankara, Turkey.

Arık, E. (2010). Describing motion events in sign languages. *Poznań Studies in Contemporary Linguistics*, *46*(4), 367-390.

Arık, E. (2012). Space, time, and iconicity in Turkish Sign Language (TİD). *A Journal of Humanities and Social Sciences*, *4*(16), 345-358.

Arik, E. (2013). Expressions of space in Turkish Sign Language. In E. Arık (Ed.), *Current directions in Turkish Sign Language research* (pp. 219-242). Newcastle upon Tyne, UK: Cambridge Scholars Publishing.

Aristodemo, V. (2017). *Gradable constructions in Italian Sign Language* (Unpublished PhD thesis). EHESS, Paris, France.

Aristodemo, V., Geraci C., & Santoro, M. (2016, September). Adjunct subordinate: The case of temporal clauses in LIS. Paper presented at *Formal and Experimental Advances in Sign Language Theory* (FEAST), University of Ca' Foscari, Venice, Italy.

Barberà, G. (2015). *The meaning of space in sign language. Reference, specificity and structure in Catalan Sign Language discourse*. Berlin/Boston: De Gruyter Mouton and Ishara Press.

Battison, R. (1978). *Lexical borrowing in American Sign Language*. Silver Spring, MD: Linstok.

Binnick, R. (1991). *Time and the verb: A guide to tense and aspect.* New York: Oxford University Press.

Booij, G. (2010). Construction morphology. *Language and Linguistics Compass*, *4*, 543-555.

Branchini, C. (2007). *On relativization and clefting in Italian Sign Language (LIS)* (Unpublished PhD thesis). Università degli Studi di Urbino, Italy.

Branchini, C. & Kelepir, M. (2017). Subordination. In J. Quer, C. Cecchetto, C. Donati, C. Geraci, M. Kelepir, R. Pfau & M. Steinbach (Eds.), *SignGram blueprint: A guide to sign language grammar writing*. Berlin: Mouton de Gruyter.

Cabeza Pereiro, C., & Fernandez Soneira, A. (2004). The expression of time in Spanish Sign Language (LSE). *Sign Language & Linguistics, 7*(1), 63-82.

Cecchetto, C., Geraci C., & Zucchi, S. (2006). Strategies of relativization in Italian Sign Language. *Natural Language and Linguistic Theory, 24*, 945–975.

Cogen, C. (1977). On three aspects of time expression in American Sign Language. In L. A. Friedman (Ed.), *On the other hand: New perspectives on American Sign Language* (pp. 197-214). New York: Academic Press.

Comrie, B. (1985). *Tense.* New York: Cambridge University Press.

Comrie, B., & Thompson, S. A. (1985). Lexical nominalization. In T. Shopen (Ed.), *Language typology and syntactic description, 3,* (pp. 349-398). Cambridge: Cambridge University Press.

Cooper, W. E., & Paccia-Cooper, J. (1980). *Syntax and speech*. Cambridge, MA: Harvard University Press.

Cormier, K. (2012). Pronouns. In R. Pfau, M. Steinbach & B. Woll (Eds.), *Sign language: An international handbook* (pp. 227-244). Berlin: Mouton de Gruyter.

Coulter, G. (1979). *American Sign Language typology* (Unpublished PhD dissertation). University of California San Diego, CA.

Crasborn, O. (2011). The other hand in sign language phonology. In M. van Oostendorp, C. Ewen, E. Hume & K. Rice (Eds.), *The Blackwell companion to phonology* (pp. 223–240). UK: Blackwell Publishing.

Dachkovsky, S. (2008). Facial expression as intonation in Israeli Sign Language: The case of neutral and counterfactual conditionals. In J. Quer (Ed.), *Signs of the time. Selected papers from TISLR 2004* (pp. 61-82). Hamburg: Signum. Cambridge, MA.

Dachkovsky, S., & Sandler, W. (2009). Visual intonation in the prosody of a sign language. *Language and speech, 52*(2-3), 287-314.

Davidson, K., & Gagne, D. (2014, October). Context made visible: On the structure of quantified noun phrases. Talk presented at *North East Linguistic Society conference*, Boston, MA.

de Swart, H. (1991). *Adverbs of quantification: A generalized quantifier approach*. (PhD thesis). University of Groningen, the Netherlands.

de Weerdt, D. (2016). Existential sentences in Flemish Sign Language and Finnish Sign Language. *SKY Journal of Linguistics, 29*, 7-38.

Demirdache, H., & Uribe-Extaberria, M. (1997). The syntax of temporal relations: A uniform approach to tense and aspect. In E. Curtis, J. Lyle & G. Webster (Eds.), *Proceedings of the West Coast Conference on Formal Linguistics XVI* (pp. 145-159). Stanford Linguistics Association: CSLI Publications.

Demirdache, H., & Uribe-Extaberria, M. (2000).The primitives of temporal relations. In R. Martin, D. Michaels & J. Uriagerreka (Eds.), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik* (pp. 157-186). Cambridge, MA: MIT Press.

Demirdache, H., & Uribe-Extaberria, M. (2004). The syntax of time adverbs. In J. Guéron & J. Lecarme (Eds.), *The syntax of time* (pp. 143-179). Cambridge, MA: The MIT Press.

Demirdache, H., & Uribe-Extaberria, M. (2005). Aspect and temporal modification. In P. Kempchinsky & R. Slabakova (Eds.), *Aspectual inquiries* (pp. 191-221). Dordrecht, the Netherlands: Springer.

Demirdache, H., & Uribe-Extaberria, M. (2007). The syntax of time arguments. *Lingua: International Review of General Linguistics, (117)*2, 330-366.

Demirdache, H., & Uribe-Extaberria, M. (2012, March). Relativizing time arguments. *Workshop*: *Generalizing relative strategies.* Ghent.

Deringil, S. (2002). *İktidarın sembolleri ve ideoloji.* İstanbul: Yapı Kredi Yayınları.

Dikyuva, H. (2011). *Grammatical nonmanual expressions in Turkish Sign Language (TİD)* (Unpublished master's thesis). University of Central Lancashire, Preston, England.

Dikyuva, H., Makaroğlu, B., & Arık, E. (2015). *Türk İşaret Dili dilbilgisi kitabı* [Turkish Sign Language Grammar Book]. Ankara: TC Aile ve Sosyal Politikalar Bakanlığı.

Dikyuva, H., Makaroğlu, B., & Arık, E. (2017). *Turkish Sign Language grammar*. Ankara: Ministry of Family and Social Policies Press.

Dixon, R. M. W., & Aikhenvald, A. I. U. (2009). *The semantics of clause linking: A cross-linguistic typology*. Oxford: Oxford University Press.

Donati, C. (2000). A note on negation in comparison. *Quaderni del Dipartimento di Linguistica, 10,* 55-68.

Dushkina, V. (2019). *Strategies marking simultaneity in Russian Sign Language.* Retrieved from:Https://Www.Hse.Ru/Data/2019/12/06/1520814752/85LNG2019%20%E2%80%94%20%D0%BA%D0%BE%D0%BF%D0%B8%D1%8F.Pdf

Emmorey, K. (2002a). *Language, cognition, and the brain: Insights from sign language research.* Hove, UK: Psychology Press.

Emmorey, K. (2002b). The effects of modality on spatial language: How signers and speakers talk about space. In R. P. Meier, K. Cormier & D. Qunito-Pozos (Eds.), *Modality and structure in signed and spoken languages* (pp. 405-421). Cambridge: Cambridge University Press.

Ferreira, F. (1988). *Planning and timing in sentence production: The syntax-to-phonology conversion* (Unpublished PhD thesis). University of Massachusetts, Amherst.

Fischer, S. (1975). Influences on word order change in American Sign Language. In L. Charles (Ed.), *Word order and word order change* (pp. 1–25). Austin: University of Texas Press.

Friedman, L. A. (1975). Space, time, and person reference in American Sign Language. *Language*, *51*(4), 940-961.

Frishberg, N. (1985). Dominance relations and discourse structures. In W. C. Stokoe & V. Volterra (Eds.), *SLR '83: Proceedings of the 3rd international symposium on sign language research* (pp. 79–90). Rome: Consiglio Nazionale delle Ricerche.

Geis, L. M. (1970). *Adverbial subordinate clauses in English* (PhD thesis). MIT, Cambridge, MA.

Genetti, C. (1986). The grammaticalization of the Newari verb tol. *Linguistics of the Tibeto-Burman Area, 9*(2), 53-70.

Genetti, C. (2008). Syntactic aspects of nominalization in five Tibeto-Burman languages of the Himalayan area. *Linguistics of the Tibeto-Burman Area, 31*(2), 97-144.

Geraci, C., & Aristodemo, V. (2016). An in-depth tour into sentential complementation in Italian Sign Language. In A. Herrmann, M. Steinbach & R. Pfau (Eds.), *A matter of complexity: Subordination in sign languages* (pp. 95-150). Berlin: Mouton de Gruyter.

Geraci, C., Cecchetto, C., & Zucchi, S. (2008). Sentential complementation in Italian Sign Language. In M. Grosvald & D. Soares, (Eds.), *Proceedings of the thirty-eighth Western Conference on Linguistics, WECOL* (pp. 46-58).

Gökgöz, K. (2009). *Topics in Turkish Sign Language (Türk İşaret Dili) syntax: Verb movement, negation and clausal architecture* (Unpublished master's thesis). Boğaziçi University, İstanbul, Turkey.

Gökgöz, K. (2011). Negation in Turkish Sign Language: The syntax of nonmanual markers. *Sign Language & Linguistics, 14*(1), 49-75.

Gökgöz, K., & Arık, E. (2011). Distributional and syntactic characteristics of nonmanual markers in Turkish Sign Language (Türk İşaret Dili, TİD). *MIT Working Papers in Linguistics 62: Proceedings of the 7th Workshop on Altaic Formal Linguistics,* 63-78.

Göksel, A., Hakgüder, E., & Kelepir, M. (2016). İşaret dillerinde karmaşık tümceleri belirlemek: Türk İşaret Dili (TİD) üzerine bir yöntem ve betimleme çalışması. In B. Savaş, D. Yüksel, D. Fidan, B. Öztürk & B. İ. Karagül (Eds.), *29. Ulusal Dilbilim Kurultayı bildirileri* (pp. 163-170). Kocaeli Üniversitesi, Kocaeli, Turkey.

Göksel, A., & Kelepir, M. (2013). The phonological and semantic bifurcation of the functions of an articulator: HEAD in questions in Turkish Sign Language. *Sign Language and Linguistics*, *16*(1), 1-30.

Göksel, A., & Kelepir, M. (2016). Observations on clausal complementation in Turkish Sign Language. In A. Herrmann, R. Pfau & M. Steinbach (Eds.), *A matter of complexity: Subordination in sign languages* (pp. 65-94). Berlin: De Gruyter Mouton.

Göksel, A., & Kerslake, C. (2005). Turkish: A comprehensive grammar. New York: Routledge.

Haegeman, L. (2012). *Adverbial clauses, main clause phenomena, and the composition of the left periphery.* Oxford: Oxford University.

Haiman, J. (1978). Conditionals are topics. *Language, 54*, 564-589.

Hale, K. (1986). Notes on world view and semantic categories: some Warlpiri examples. In P. Muysken & H. van Riemsdijk (Eds.), *Features and projections* (pp. 233-254). Dordrecht: Foris.

Halle, M., & Marantz, A. (1993). Distributed morphology and the pieces of inflection. In K. Hale & S. J. Keyser (Eds.), *The view from building 20* (pp. 111-176). Cambridge, MA: MIT Press.

Harley, H., & Noyer, R. (1999). Distributed morphology. *Glot International, 4*, 3-9.

Haspelmath, M. (1993). *A grammar of Lezgian.* (Mouton Grammar Library, 9). Berlin - New York: Mouton de Gruyter.

Hauser, C. (2020). *Subordination in French Sign Language: Nominal and sentential embedding* (Unpublished PhD thesis). Paris Diderot University, Paris, France.

Heinämäki, O. (1978). *Semantics of English temporal connectives*. Bloomington, IN: Indiana University Linguistics Club.

Hengeveld, K. (1991). *Questionnaire: The internal structure of adverbial clauses. Eurotyp Theme Group on adverbial relations, operators, and connectives*. University of Amsterdam. Available at http://Tulquest.Humanum.fr/sites/default/files/questionnaires/43/Hengeveld_adverbial%20clauses.pdf

Horn, L. (1989). *A natural history of negation*. Chicago: University of Chicago Press.

Jackendoff, R. (2002). *Foundations of language*. Oxford: Oxford University Press.

Janzen, T. (1999). The grammaticization of topics in ASL. *Studies in Language, 23*, 271-306.

Johnson, K. (1988). Clausal gerunds, the ECP, and government. *Linguistic Inquiry, 19*(4), 583-609.

Johnston, M. (1994). *The syntax and semantics of adverbial adjuncts* (Unpublished PhD thesis). University of California, Santa Cruz.

Johnston, T., & Schembri, A. (2007). *Australian Sign Language: An introduction to sign language linguistics*. Cambridge: Cambridge University Press.

Karabüklü, S. (2016). *Time and aspect in Turkish Sign Language (TİD): Manual and nonmanual realizations of 'Finish'* (Unpublished master's thesis). Boğaziçi University, İstanbul, Turkey.

Karabüklü, S. (2018). Strategies to express time in a tenseless language: Turkish Sign Language (TİD). *Dilbilim Araştırmaları Dergisi, 29*(1), 87-118.

Kelepir, M. (Ed). (in press). *A grammar of Turkish Sign Language (TİD)* (SIGN-HUB Sign Language Grammar Series) (pp. 230-237). (http:// www.sign-hub.eu/grammardetail/UUID-GRMM-ce6c68d4-9b41-402b-8e0e-0511a88eb832) (Accessed 30-06-2020).

Kelepir, M., & Göksel, A. (2013) Aspects of reported utterances in Turkish Sign Language. In E. Arık (Ed.), *Current directions in Turkish Sign Language research* (pp. 186-213). Newcastle-upon-Tyne: Cambridge Scholars Publishing.

Kelepir, M., Özkul, A., & Tamyürek Özparlak, E. (2018). Agent-backgrounding in Turkish Sign Language (TİD). *Sign Language and Linguistics, 21*(2), 258-284.

Kemaloğlu, Y., & Kemaloğlu, P. Y. (2012). The history of sign language and deaf education in Turkey. *Kulak Burun Boğaz İhtisas Dergisi, 22*(2), 65-76.

Kimmelman, V. (2017). Linearization of weak hand holds in Russian Sign Language. *Linguistics in Amsterdam, 10*(1), 28-59.

Kimmelman, V., Pfau, R., & Aboh, E. O. (2016, September). Word-internal coordination in handling classifier predicates. Talk presented at *Formal and Experimental Advances in Sign Language Theory* (*FEAST)*. Ca 'Foscari University, Venice, Italy.

Klein, W. (1995). A time relational analysis of Russian aspect. *Language, 68*, 525-552.

Kornfilt, J. (1997). *Turkish*. London: Routledge.

Kratzer, A. (1998). More structural analogies between pronouns and tenses. In D. Strolovitch & A. Lawson (Eds.), *Proceedings of SALT VIII* (pp. 92-110). Cornell University, Ithaca, NY.

Kubuş, O. (2008). *An analysis of Turkish Sign Language (TİD) phonology and morphology* (Unpublished master's thesis). Middle East Technical University, Ankara, Turkey.

Kuhn, J., & Aristodemo, V. (2017). Pluractionality, iconicity, and scope in French Sign Language. *Semantics and Pragmatics, 10*(6), 1-49.

Jantunen, T. (2013). Ellipsis in Finnish Sign Language. *Nordic Journal of Linguistics 36*(3), 303–332.

Larson, R. (1990). Extraction and multiple selection in PP. *The Linguistic Review, 7,* 169-182.

Levinson, S., & Wilkins, D. (2006). The background to the study of the language of space. *Bilingualism-language and cognition* - BILING-LANG COGN. 10.1017/CBO9780511486753.002.

Liddell, S. (1980). *American Sign Language syntax.* The Hague: Mouton Publishers.

Liddell, S. (1984). THINK and BELIEVE: Sequentiality in American Sign Language signs. *Language, 60,* 372-399.

Liddell, S. (2003). *Grammar, gesture, and meaning in American Sign Language*. Cambridge: Cambridge University Press.

Liddell, S., & Johnson, R. (1989). American Sign Language: The phonological base. *Sign Language Studies, 64,* 197-277.

Lillo-Martin, D., & Henner, J. (2020). Acquisition of sign languages. *Annual Review of Linguistics 7.*

Lillo-Martin, D., & Klima, E. S. (1990). Pointing out differences: ASL pronouns in syntactic theory. In S. D. Fischer & P. Siple (Eds.), *Theoretical issues in sign language research, Volume 1: Linguistics* (pp. 191-210). Chicago: The University of Chicago Press.

Lyons, J. (1977). *Semantics.* New York: Cambridge University Press.

Makaroğlu, B. (2012). *Türk İşaret Dilinde soru: Kaş hareketlerinin dilsel çözümlemesi* (Unpublished Master's thesis). Ankara University, Ankara, Turkey.

Makaroğlu, B. (2013). Interrogatives in Turkish Sign Language (TİD): The role of eyebrows. In E. Arık (Ed.), *Current directions in Turkish Sign Language research* (pp. 143-165). Newcastle upon Tyne, UK: Cambridge Scholars Publishing.

Makaroğlu, B. (2018). *Türk İşaret Dilinde uyum: Şablon biçimbilim açısından bir inceleme.* (Unpublished Master's thesis). Ankara University, Ankara, Turkey.

Makri, M. (2013). *Expletive negation beyond Romance. Clausal complementation and epistemic modality* (Unpublished master's thesis). University of York, York, UK.

Marsaja, I. (2008). *Desa Kolok - A deaf village and its sign language in Bali, Indonesia.* Nijmegen: Ishara Press.

Mather, S., & Winston, E. A. (1998). Spatial mapping and involvement in ASL storytelling. In C. Lucas (Ed.), *Pinky extension and eye gaze: Language use in deaf communities* (pp. 183-210). Washington, DC: Gallaudet University Press.

Mayberry, R. I., & Fischer, S. D. (1989). Looking through phonological shape to lexical meaning: The bottleneck of nonnative sign language processing. *Memory and Cognition, 17*, 740-754.

Meier, R. P. (2002). Why different, why the same? Explaining effects and non-effects of modality upon linguistic structure in sign and speech. In R. Meier, K. Cormier & D. Quinto-Pozos (Eds.), *Modality and structure in signed and spoken languages* (pp. 1-26). Cambridge: Cambridge University Press.

Meier, R. P. (2016). Sign language acquisition. *Oxford Handbooks Online*. Oxford University Press.

Miles, M. (2000). Signing in the Seraglio: Mutes, dwarfs and gestures at the Ottoman Court 1500-1700. *Disability & Society, 15*(1), 115-134.

Miller, C. (1994). Simultaneous constructions in Quebec Sign Language. Word order issues in sign language. In M. Brennan & G. H. Turner (Eds.), *Working papers* (pp. 89-112). Durham: International Sign Linguistics Association.

Napoli, D., & Sutton-Spence, R. (2010). Short report: Limitations on simultaneity in sign language. *Language, 86*, 647-662.

Navarrete-González, A. & Zorzi, G. (2019, May). The role of contrast in coordination and subordination in Catalan Sign Language. Talk presented at *Euskal Herriko Unibertsitatea*. University of the Basque Country, Vitoria-Gasteiz, Spain.

Neidle, C., Kegl, J., MacLaughlin, D., Bahan, B., & Lee, R. G. (2000). *The syntax of American Sign Language: Functional categories and hierarchical structure.* Cambridge, MA: MIT Press.

Nevins, A. (2011). Prospects and challenges for a clitic analysis of (a)sl agreement. *Theoretical Linguistics, 37*(3-4), 173–187.

Özkul, A. (2013). *A phonological and morphological analysis of instrumental noun-verb pairs in Turkish Sign Language* (Unpublished master's thesis). Boğaziçi University, Istanbul, Turkey.

Özsoy, A. S., Arık, E., Göksel, A., Kelepir, M., & Nuhbalaoğlu, D. (2013). Documenting Turkish Sign Language (TİD): A report on a research project. In E. Arık (Ed.), *Current directions in Turkish Sign Language research* (pp. 55-69). Newcastle upon Tyne, UK: Cambridge Scholars Publishing.

Özyürek, A., Zwitserlood, I., & Perniss, P. (2010). Locative expressions in signed languages: A view from Turkish Sign Language (TİD). *Linguistics, 48*(5), 1111-1145.

Padden, C. (1988). *Interaction of morphology and syntax in American Sign Language.* New York: Garland.

Partee, B. H. (1973). Some structural anologies between tenses and pronouns in English. *Journal of Philosophy, 70*(18), 601-609.

Perniss, P. (2012). Use of sign space. In R. Pfau, M. Steinbach & B. Woll (Eds.), *Sign language. An international handbook* (*HSK - Handbooks of linguistics and communication science*) (pp. 412-431). Berlin: De Gruyter Mouton.

Petronio, K., & Lillo-Martin, D. (1997). Wh-movement and the position of spec-CP: Evidence from American Sign Language. *Language, 73*, 18-57.

Pfau, R. (2008). Complex sentences. In A. Baker, B. van den Bogaerde, R. Pfau & T. Schermer (Eds.), *Sign language science - An introduction* (pp. 145- 166). Deventer: Van Tricht.

Pfau, R. (2011). A point well taken: On the typology and diachrony of pointing. In D. J. Napoli & G. Mathur (Eds.), *Deaf around the world*. *The impact of language* (pp. 144-163). Oxford: Oxford University Press.

Pfau, R., Steinbach, M., & Woll, B. (2012). Tense, aspect and modality. In R. Pfau, M. Steinbach & B. Woll (Eds.), *Sign language. An international handbook* (HSK - Handbooks of linguistics and communication science) (pp. 186-204). Berlin: Mouton de Gruyter.

Quer, J. (2012). A modality-free account of the position of clausal arguments. Paper presented at *Formal and Experimental Advances in Sign Language Theory (FEAST)* 2012-SignGram COST Action. University of Warsaw, Poland.

Quer, J., Cecchetto, C., Pfau, R., Donati, C., Steinbach, M., Geraci, C., & Kelepir, M. (Eds.). (2017). *SignGram blueprint. A guide to sign language grammar writing.* Berlin: De Gruyter Mouton.

Quirk, R., Greenbaum, S., Leech, G., & Svartvik, J. (1985). *Comprehensive grammar of the English language.* London: Longman.

Sæbø, K. J. (2011). Adverbial clauses. In K. von Heusinger, C. Maienborn & P. Portner (Eds.), *Semantics* (*Handbücher zur Sprach- und Kommunikationswissenschaft / Handbooks of Linguistics and Communication Science* 33.2) (pp. 1420-1441). Berlin: Mouton de Gruyter.

Sandler, W. (1999). The medium and the message: Prosodic interpretation of linguistic content in Israeli Sign Language. *Sign Language & Linguistics, 2*(2), 187-216.

Sandler, W. & Lillo-Martin, D. (2006). *Sign language and linguistic universals.* Cambridge: Cambridge University Press.

Saral, B. (2019). *The universal quantifier 'all' in Turkish Sin Language* (Unpublished master's thesis). Boğaziçi University, Istanbul, Turkey.

Schlenker, P. (2013). Temporal and modal anaphora in sign language (ASL). *Natural Language and Linguistic Theory, 31*(1), 207-234.

Schlenker, P. (2017) Sign language and the foundations of anaphora [Survey Article]. *Annual Review of Linguistics, 3*, 149-77.

Schlenker, P. (2018). Visible meaning: Sign language and the foundations of semantics. *Theoretical Linguistics*, *44*(3-4), 123-208.

Sevgi, H. (2019). *Effects of age of acquisition on morphosyntactic structures in Turkish Sign Language: Evidence from classifiers* (Unpublished master's thesis). Boğaziçi University, Istanbul, Turkey.

Sevinç, A. (2006). *Grammatical relations and word order in Turkish Sign Language (TİD)* (Unpublished master's thesis). Middle East Technical University, Ankara, Turkey.

Sinte, A. (2013). Expressions of time in French Belgian Sign Language (LSFB). In L. Meurant (Ed.), *Sign language research, uses and practices* (pp. 205-235). Berlin: Mouton de Gruyter.

Skopeteas, S., Fiedler, I., Hellmuth, S., Schwarz, A., Stoel, R., Fanselow, G., Féry, C., & Krifka, M. (2006) *Questionnaire on information structure (QUIS): reference manual*. *Interdisciplinary Studies on Information Structure, 4*. Universitätsverlag Potsdam, Potsdam, Germany.

State Institute of Statistics. (2002). *Turkey disability survey*. Ankara, Turkey.

Stone, M. (1997). The anaphoric parallel between modality and tense. Technical report MS-CIS-97-09 IRCS 97-06. University of Pennsylvania.

Stowell, T. (1993). *The syntax of tense*. Unpublished manuscript, Linguistics Department, UCLA.

Sumer, B. (2015). *Acquisition of spatial language by signing and speaking children: A comparison of Turkish Sign Language (TID) and Turkish*. (Unpublished doctoral dissertation). Radboud University Nijmegen, Nijmegen.

Sumer, B., Zwitserlood, I., Perniss, P. M., & Ozyurek, A. (2013). Acquisition of locative expressions in children learning Turkish Sign Language (TİD) and Turkish. In E. Arık (Ed.), *Current directions in Turkish Sign Language research* (pp. 243-272). Newcastle upon Tyne: Cambridge Scholars Publishing.

Sze, F. (2011). Non-manual markings for topic constructions in Hong Kong Sign Language. *Sign Language & Linguistics*, *14*(1), 115-147.

Talmy, L. (1975). Semantics and syntax of motion. In J. Kimball (Ed.), *Syntax and semantics 4* (pp. 181–238). New York: Academic Press.

Talmy, L. (2003). The representation of spatial structure in spoken and signed language. In K. Emmorey (Ed.), *Perspectives on classifier constructions in sign languages* (pp. 169-196). Mahwah, NJ: Lawrence Erlbaum.

Tang, G., & Prudence L. (2012). Coordination and subordination. In R. Pfau, M. Steinbach & B. Woll (Eds.), *Sign language: An international handbook* (pp. 340-364). München: Walter de Gruyter.

Taşçı, S. S. (2012). *Phonological and morphological aspects of lexicalized fingerspelling in Turkish Sign Language (TİD)* (Unpublished master's thesis). Boğaziçi University, Istanbul, Turkey.

Taşçı, S. S., & Göksel, A. (in press). Socio-historical background: 1. History. In M. Kelepir (Ed.), *A grammar of Turkish Sign Language (TİD).* (SIGN-HUB Sign Language Grammar Series) (pp. 230-237). (http:// www.sign-hub.eu/grammardetail/UUID-GRMM-ce6c68d4-9b41-402b-8e0e-0511a88eb832) (Accessed 30-06-2020).

Taşçı, S. S. (in press-a). Socio-historical background: 2. The sign language community. In M. Kelepir (Ed.), *A grammar of Turkish Sign Language (TİD).* (SIGNHUB Sign Language Grammar Series). ((http:// www.sign-hub.eu/grammardetail/UUID-GRMM-ce6c68d4-9b41-402b-8e0e-0511a88eb832) (Accessed 30-06-2020).

Taşçı, S. S. (in press-b). Socio-historical background: 4. Linguistic study. In M. Kelepir (Ed.), *A grammar of Turkish Sign Language (TİD).* (SIGNHUB Sign Language Grammar Series). (http:// www.sign-hub.eu/grammardetail/UUID-GRMM-ce6c68d4-9b41-402b-8e0e-0511a88eb832). (Accessed 06-09-2020).

Thompson, H. (1977). The lack of subordination in American Sign Language. In L. Friedman (Ed.), *On the other hand* (pp. 181-195). New York: Academic Press.

van der Wouden, T (1994). *Negative Contexts.* (Unpublished PhD dissertation). University of Groningen, Groningen, the Netherlands.

van Gelderen, E. (2010). *An introduction to the grammar of English*. Amsterdam: John Benjamins.

van Gijn, I. (2004). *The quest for syntactic dependency: Sentential complementation in Sign Language of the Netherlands*. Utrecht: LOT dissertation.

Vermeerbergen, M., Leeson, L., & Crasborn, O. (Eds.). (2007). *Simultaneity in sign language: Form and function*. Amsterdam: John Benjamins.

Vries, M. de. (2009). On multidominance and linearization. *Biolinguistics, 3*(4), 344–403.

Watson, D., & Gibson, E. (2004). The relationship between intonational phrasing and syntactic structure in language production. *Language and Cognitive Processes, 19*, 713–755.

Wilbur, R. (1994). Eyeblinks and ASL phrase structure. *Sign Language Studies, 84*, 221-240.

Wilbur, R. B. (2003). Representations of telicity in ASL. *Proceedings of the 39th annual meeting of the Chicago Linguistic Society* (pp. 354-368).Chicago, IL: Chicago Linguistic Society.

Wilbur, R. B. (2008). Complex predicates involving events, time and aspect: Is this why sign languages look so similar? In J. Quer (Ed.), *Signs of the time: Selected papers from TISLR 2004* (pp. 217-250). Hamburg: Signum Press.

Wilbur, R. B. (2010). The semantics-phonology interface. In D. Brentari (Ed.), *Sign languages* (pp. 357-382). Cambridge: Cambridge University Press.

Wilbur, R. B. (2016). Preference for clause order in complex sentences with adverbial clauses in American Sign Language. In: Pfau, R., M. Steinbach & A. Herrmann (Eds.), *A matter of complexity: Subordination in sign languages* (pp. 36-64). Berlin: De Gruyter Mouton.

Wilbur, R. B., & Patschke, C. (1999). Syntactic correlates of brow raise in ASL. *Sign Language & Linguistics, 2,* 3-41.

Winston, E. A. (1991). Spatial referencing and cohesion in an American Sign Language text. *Sign Language Studies, 73,* 397-410.

Winston, E. A. (1995). Spatial mapping in comparative discourse frames. In K. Emmorey & J. S. Reilly (Eds.), *Language, gesture, and space* (pp. 87-114). Hillsdale, NJ: Lawrence Erlbaum.

Wittenburg, P., Brugman, H., Russel, A., Klassmann, A., & Sloetjes, H. (2006). ELAN: A professional framework for multimodality research. *Proceedings of the Fifth International Conference on Language Resources and Evaluation.*

Zagona, K. (1990, March). Times as temporal argument structure. Paper presented at *Time in Language Conference*, Cambridge, Massachusetts.

Zeshan, U. (2002). Sign language in Turkey: The story of a hidden language. *Turkic Languages, 6*(2), 229-274.

Zeshan, U. (2003). Aspects of Türk İşaret Dili (Turkish Sign Language). *Sign Language and Linguistics, 6*(1), 43-75.

Zeshan, U. (2004). Hand, head and face – Negative constructions in sign languages. *Linguistic Typology, 8*(1), 1-58.

Zorzi, G. (2018). *Coordination and gapping in Catalan Sign Language (LSC)* (Unpublished Phd thesis). Universitat Pompeu Fabra (UPF), Barcelona.

Zucchi, S. (2009). Along the time line: tense and time adverbs in Italian Sign Language. *Natural Language Semantics, 17*(2), 99–139.

Zwicky, A., & Pullum, G. (1983). Cliticization vs. inflection: English N'T. *Language, 59*(3), 502-513.

Zwitserlood, I. (2003). *Classifying hand configurations in Nederlandse Gebarentaal (Sign Language of the Netherlands)*. Utrecht: LOT Dissertation Series.