THE CAUSATIVE-INCHOATIVE ALTERNATION IN TURKISH SIGN LANGUAGE AND THE AGE-OF-ACQUISITION EFFECTS ON COMPLEX CLAUSES

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BOĞAZİÇİ UNIVERSITY

2020

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A thesis submitted to the

Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Master of Arts

in

Linguistics

by

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Boğaziçi University

2020

The Causative-Inchoative Alternation in Turkish Sign Language

and the Age-of-Acquisition Effects on Complex Clauses

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June 2020

DECLARATION OF ORIGINALITY

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ABSTRACT

The Causative-Inchoative Alternation in Turkish Sign Language

and the Age-of-Acquisition Effects on Complex Clauses

This study aims to describe the causatives-inchoative alternation in Turkish Sign Language and to discuss the age-of-acquisition effects on multi-predicative constructions observed as both causative and inchoative clauses. The discussion extends itself to remarks on the structure of alternating verbs and serial verb constructions. I present and discuss the results of three tasks: a picture-description task, a picture matching task, and an acceptability judgment task. The results obtained from these tasks reveal that (i) the causative-inchoative alternation in Turkish Sign Language is attested both as labile alternation and classifier alternation, which is mostly compatible with previous accounts on this phenomenon in sign languages; however, Turkish Sign Language provides data that cannot be accounted for by Benedicto & Brentari's (2004) account that directly links classifier handshapes and transitivity; (ii) both causative and inchoative clauses seem to have complex event structures; (iii) the structure of serial verb constructions seem to be of a mono-clausal nature; (iv) there seems to be no significant age of acquisition effects on preferring labile alternation or classifier alternation to mark the causative-inchoative alternation; yet (v) producing more complex clauses, i.e. serial verb constructions, appear to be an early acquisition group tendency.

ÖZET

Türk İşaret Dilinde Edicili Geçişli-Edicisiz Geçişsiz Değişimi ve Karmaşık Tümcelerde Dil Edinim Yaşının Etkileri

Bu çalışmanın amacı Türk İşaret Dili'nde geçişli-geçişsiz değişkenliğinin biçimsözdizimsel olarak nasıl ifade edildiğini betimlemek ve hem edicili geçişli hem edicisiz geçişsiz tümcelerde gözlemlenen sıralı eylem yapılarının üretimi üzerinden olası edinim yaşı etkilerini tartışmaktır. Tartışmanın kapsamı geçişli-geçişsiz değişkenliği sergileyen eylemlerin ve bu eylemlerle sıklıkla gözlemlenen edicili geçişli ve edicisiz geçişsiz sıralı eylem yapılarının tümce(cik) yapılarının belirlenmesini de içermektedir. Bulgular, bir resim anlatma görevi, bir resim ve tümce eşleştirme görevi ve bir dilbilgisel-kabuledilebilirlik puanlama görevinden elde edilmiştir. Elde edilen bulgulara göre (i) Türk İşaret Dilinde geçişli-geçişsiz değişkenliği hem biçimbilimsel olarak örtük hem de farklı sınıflayıcı el şekilleriyle biçimbilimsel olarak açık bir şekilde işaretlenebilmektedir. Bu durum aynı görüngünün sergilendiği işaret ve konuşma dillerindeki örüntülerle benzerlik taşır, ancak; Türk İşaret Dilinden elde edilen bulgular Benedicto ve Brentari'nin (2004) sınıflayıcı el şekilleri ve geçişlilik arasında doğrudan bağlantı kuran açıklamasına karşıt veri niteliği taşımaktadır. Ek olarak, elde edilen bulgular (ii) hem edicili geçişli hem de edicisiz geçişsiz tümcelerin olay yapısı bakımından karmaşık olduğunu, (iii) sıralı eylem yapılarının aynı tümce sınırları içinde olduğunu, (iv) geçişli-geçişsiz değişkenliğinin biçimbilimsel olarak işaretlenme yolları konusunda dil edinim yaşının bir etkisinin olmadığını, ancak (v) erken dil edinim grubunun sıralı eylem yapıları üretmeye daha eğilimi olduğunu göstermiştir.

ACKNOWLEDGMENTS

My three years in this department have given me everything that I can expect and want from an M.A. program. It pushed me out of my comfort zone to constantly learn and grow. It allowed me to explore what I am really interested in and provided me with the essential tools to plan a future to achieve my goals. Moreover, it has become my home, my safe haven, my *alma mater* in the sincerest sense. Therefore, I would like to use this space to pay gratitude to everyone who has been involved in my progress, whether in the academic or personal sense and bid farewell to this department I so dearly love.

First and foremost, I would like to express my heartfelt gratitude to my advisor Dr. Kadir Gökgöz for his constant support and patience. During the two years we worked together, I have had the chance to acquire countless new skills and learn a lot out of my academic comfort zone. I cannot thank him enough for believing in me and encouraging me to do the best I can under any circumstances. He has always been there for me to help better my understanding of linguistic and academic matters. I find his excitement and interest in difficult questions, new data, and uncharted matters in TİD truly inspiring. I really appreciate how much time and energy he put into advising me through this process. I am looking forward to collaborating with him in the future.

Next, I would like to thank my committee members Dr. Nihan Ketrez Sözmen and Dr. Ömer Demirok for their insightful comments and suggestions. Their input not only bettered my initial work but also gave me a lot of inspiration regarding my plans for future studies.

Speaking of the betterment of my work, I am forever grateful to Elvan Tamyürek Özparlak for introducing me to TİD and Deaf culture, as well as working with me during my whole data collection process. This thesis wouldn't have been possible without her support. She has been the best of friends, teachers, and co-workers. She has answered all my questions with her endless patience, and never judged me for what I did not know or understand. Working with her made me look forward to coming to the lab every day. Hereby, I would also like to express my deep gratitude to all of my participants and to the Deaf community in Turkey. I truly appreciate their kindness, understanding, and support. I will always try my best to give back to this community and cherish Deaf culture.

Moreover, I am ineffably indebted to Dr. Pavel Logačev and my dear friend Furkan Atmaca for their aid in data visualization and statistics. If it wasn't for their help, I probably would have thrown my project-issued laptop out of the window in frustration while trying to make sense of R plots and get sued by the BAP office. ☺ Furkan has spent a lot of time making sure my results were visualized properly and Dr. Pavel Logačev has always been remarkably patient with (and maybe sometimes amused by) my naive questions in my attempts to interpret my results. I will also absolutely miss his unique sense of humor. He certainly made my day on multiple occasions.

I cannot go without mentioning how much I owe to Prof. Dr. Meltem Kelepir for introducing me to the study of visual grammars. I came into this department with no interest or plan to work on TİD. However, learning from her during my very first semester eventually changed my mind, and I felt less intimidated and more excited to dive into doing research on a language and a modality that I had no background on. I have always been astonished by her on-point questions, child-like curiosity, and her

ability to make the complicated look so simple. Speaking of my introduction to this field, I must also mention Prof. Dr. Josep Quer along with Prof. Dr. Meltem Kelepir, since my first ever introduction to sign language linguistics was his class in CreteLing2017 in the summer before I started my M.A. Had I not been so intrigued by his lecture I probably wouldn't have taken Prof. Dr. Meltem Kelepir's class(es) in the first place.

I am also greatly thankful to Prof. Dr. Sumru Özsoy for her guidance. Our readings and discussions filled a lot of gaps in my theoretical knowledge and my understanding of syntax. I wholeheartedly appreciate her eagerness to provide feedback whenever asked for, and I will always feel very lucky to have had the opportunity to learn from her.

In thanking the faculty with whom I had the good fortune to learn from, I cannot overlook Prof. Dr. Aslı Göksel's part. Her attitude towards academia and her invaluable insights concerning linguistic phenomena are truly unique. Her comments and encouragement have always made me eager to explore more, and not feel despair when facing difficult questions or data that is seemingly impossible to account for.

I also need to thank Prof. Dr. Balkız Öztürk Başaran and Dr. Elena Guerzoni for setting a foundation in syntax and semantics (respectively) in their classes. The last pat on the back for me to be convinced to work on TİD came from Prof. Dr. Balkız Öztürk Başaran and I really needed that approval at the time. Even a brief conversation with her makes otherwise very complicated linguistic phenomena seem so easy and fun to think about. Dr. Elena Guerzoni has always asked great questions that totally shift my perspective on my work, and I will never forget how supportive she has been about my future plans.

In addition, I would like to thank Prof. Dr. Ronnie Wilbur, Prof. Dr. Diane Lillo-Martin, and Dr. Natasha Abner. The conversations I had with Prof. Dr. Ronnie Wilbur and Prof. Dr. Diane Lillo-Martin in the initial stages of my thesis helped me sketch out my thoughts and plans for this work, and I hope I will cross paths with them again in the future. As for Dr. Natasha Abner, I am deeply grateful for her comments and suggestions on my thesis, as well as her suggestions for potential future work. I am absolutely looking forward to working together very soon.

In addition, I would like to thank Dr. Özge Can and Dr. Murat Özgen, mentors and friends from my undergrad, who prepared me for this M.A. program in the first place. Knowing that I am making them proud never fails to fuel me to work as hard as I can.

A very important aspect of my time here in Boğaziçi has been *my office, my TİD school, my second home in İstanbul:* JF316, which I have shared with the greatest company I could have. Time totally flew working alongside Noyan Dokudan, Burcu Saral, and Buket Ela Demirel. Life and work in JF316 were always joyful, there was always good music (sometimes even live & acapella!), good food, and good conversation. We have never missed a single opportunity to celebrate and party. I would be the luckiest person alive if I feel half the joy I felt there while working elsewhere. They have been nothing but supportive and uplifting all along.

In expressing gratitude towards my friends & co-workers, I must especially thank Hande Sevgi. Things worked out in a strange way that she paved the way for me, in a sense. I have learned a lot from her merely by observing what she went through during her thesis writing process and her Ph.D. applications. She has always been there to encourage me, answer my questions, and ease my worries. In a similar sentiment, I would also like to thank Serpil Karabüklü and Lauren Rose “Nik”

Nikolai for “adopting” me during TISLR13 and helping me out by sharing their valuable experiences in the field of sign language linguistics and in grad life in general with me.

I would also like to thank Noyan Dokudan (yup, once more!), Furkan Atmaca (again!), Utku Türk, Semra Özdemir, Assem Amirzhanova, Muhammed İleri, and Aslı Kuzgun for putting up with my constant ranting, nagging, and awkwardness on various virtual platforms as well as in real life.

Speaking of putting up with me, there must be a special place where friends come from, for *De Kussers*: Elif *liflie* Sarmış, Ege *baransie* Dalmaz, and Jules *juliboi* Tackaert. They have always been there to lift my mood and attempt to keep my mental health mostly intact. They have made me feel like I have my own cheer-leading team. I am grateful to have known these brilliant *cutesies*.

As if this much love and support wasn’t enough, I have always had Işınsu Doğan, the one and only, by my side (virtually nowadays). We have known each other since dinosaurs walked the earth, and she never once stopped supporting me, even if I usually fail to explain what it is exactly that I’m doing in this strange realm called linguistics. Knowing that she is proud of my every little achievement has always provided me with much-needed hope and strength even in my hardest days, when I often questioned whether I have what it takes to be here, doing what I love the most.

I, of course, owe the most heartfelt of gratitude to my family: Mustafa *babiş* Kayabaşı, Ferdane Kayabaşı, Damla Kayabaşı, Deniz Kayabaşı, and Defne *ponçik* Kayabaşı for being the joy of my life, for believing in me, for loving and supporting me unconditionally. Within this bundle of joy, I must especially thank my dad for kindling my curiosity for as long as I can remember, and always reminding me that

he is proud of me. I truly appreciate how much interest he has shown in my work and how patiently he has listened to my sometimes failed attempts to explain linguistic phenomena that I find astonishing. Our conversations on linguistics always leave me in marvel with respect to how unique of a perspective a curious outsider to the field can provide. None of this would be possible without *babiş.*

Lastly, if there is anyone reading this in the future, a good part of this thesis has been written during the SARS-CoV-2 pandemic, under self-isolation. As a person who loathes working from home, I would like to give myself a self-high-five for adapting to this unpleasant situation fairly quickly and finishing this thesis in time.

This thesis has been funded and supported by "Supporting Sign Language Development of Deaf Children with Hearing Parents through Linguistically Informed Preschool Stories" project by Boğaziçi University Research Fund Grant Number 14458.

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ABBREVIATIONS

1P	1st person plural
2SG	2nd person singular
3SG	3rd person singular
ACC	accusative
ASL	American Sign Language
bht	backward head tilt
BPCL	body part classifier
CAUS	causativizier
CHDLC	contact-handling classifier
CL	classifier
DEM	demonstrative
DSL	Danish Sign Language
EXTCL	extension classifier
fht	forward head tilt
GHDCL	grabbing-handling classifier
H	hand
HDCL	handling classifier
HKSL	Hong Kong Sign Language
hs	headshake
INTR	intransitive
IX	index
le	lowered eyebrows
NEG	negation

NOM	nominative
O	object
PASS	passive
PAST	past tense
pc	puffed cheeks
PL	plural
POSS	possessive
re	raised eyebrows
RSL	Russian Sign Language
RT	reaction time
S	subject
SASS	size and shape classifier
SVC	serial verb construction
TENSE	tense
TİD	Turkish Sign Language *(Türk İşaret Dili)*
TR	transitive
V	verb
VAL_d	valency decreasing
VAL_i	valency increasing
WECL	whole entity classifier

CHAPTER 1

INTRODUCTION

The causative-inchoative alternation refers to the phenomena where one can use some verbs both transitively and intransitively (e.g. breaking a vase vs. a vase breaking on its own). The transitive alternate has a causer and a theme, whereas the intransitive alternate has a single theme argument (Kegl, 1990; Levin, 1993; Engberg-Pedersen, 2010). This alternation is one of the many valency alternations observed in the world's languages. Researchers investigated valency and valency changing operations through both spoken and signed languages on morpho-syntactic and semantic grounds to understand the mapping mechanisms between event structure and argument structure (Kegl, 1990; Levin, 1993; Piñón, 2002; Benedicto & Brentari, 2004; Benedicto et al., 2007; Engberg-Pedersen, 2010). Valency changing operations can manifest themselves in morpho-phonology, morpho-syntax, lexicon, and word order in different languages and language typologies. Regardless of how these operations are marked in the grammar of a particular language, they always affect the number of required arguments of a given predicate and the theta roles that those arguments bear, which creates a discussion on whether these operations are syntactically or semantically motivated (Parsons, 1990; Haspelmath & Müller-Bardey, 2001; Haspelmath, 2002; Piñón, 2002). Since signed and spoken languages are conveyed in different modalities(i.e., aural-oral vs. visual-gestural), investigating the mapping between event structure and argument structure in languages of the visual-gestural modality undoubtedly contributes to this discussion, given that most signed languages can still be considered understudied regarding argument and event structure.

Moreover, studies on the interaction of age of acquisition and linguistic performance in morpho-syntactically complex structures indicate that early and late acquisition groups of signers may display differences in the production as well as comprehension (Schick, 1990; Slobin et al., 2003). Therefore, one of the hypotheses of this thesis is that a morpho-syntactic alternation that can be marked in potentially multiple ways and complexities may reveal differences in the production of such constructions based on age-of-acquisition groupings. Finding out more about whether there are indeed differences concerning the linguistic ability to produce morpho-syntactically complex structures among different acquisition groups would not only help us raise awareness on the issue of undesirable effects of late exposure to linguistic input (Mayberry & Eichen, 1991; Newport, 1990; Mayberry, 1994; Newport at al., 2001; Mayberry et al., 2002; Mayberry, 2007; Morford & Hänel-Faulhaber, 2011, Mayberry et al., 2011 *inter alia*) but also help us develop better educational materials to increase the access to resources for early linguistic exposure in the visual modality, especially for deaf individuals born into hearing families, a group which approximately constitute the 95% of the deaf population around the globe (Moores, 2001; Marschark & Albertini, 2002).

As for Turkish Sign Language *(henceforth,* TİD), Zeshan's (2002) observations on several topics such as pronominals, tense, aspect, sentence structure, non-manuals, and numerals are considered the first linguistic work done on TİD, as reported in Taşçı (in press). Taşçı (in press) provides a good overview on the first linguistic studies done on several aspects of TİD; reporting that many studies on the morphology and phonology (Kubuş, 2008; Taşçı, 2012; Özkul, 2013; Sevinç, 2015; Gökgöz, 2018; Makaroğlu & İşsever, 2018; Taşçı & Göksel, 2018 *inter alia*), word order, syntax and clause structure (Sevinç, 2006; Gökgöz, 2009; Göksel & Kelepir,

2016), on semantics and pragmatics (Kelepir et al., 2018; Karabüklü, 2018; Makaroğlu et al., 2018; Özkul, 2019; Nuhbalaoğlu, 2019; Saral, 2019 *inter alia*) and the acquisition of TİD (Sümer and Özyürek, 2016; Sümer, 2015a, 2015b; Sümer et al., 2017; Sevgi, 2019 *inter alia*) have flourished rather quickly afterward. Today, theoretical and experimental research on TİD continues, following its many predecessors, some of which are mentioned above.

Taşçı (in press) reports that there are 187.500 to 337.500 TİD signers in Turkey, although he suggests that the number of Deaf and Hard of Hearing people, and the number of total people who use TİD as their main mean of communication are difficult to pinpoint because the nature of such a question depends on many other variables. In the same report, he notes that the oralist tradition in education has prevailed since the 1950s, and TİD only found a place in the state curriculum in 2005. Given that the scientific and linguistic studies on TİD began around the early 2000s, one should not overlook how much impact researchers might have had on such developments.

The aims of this thesis are (i) to describe the lexical and morpho-syntactic expressions of the causative-inchoative alternation in TİD, (ii) to discuss its implications on the relation between argument and event structure, and (iii) to compare how the age-of-acquisition affects the production of such structures in early and late acquisition group adults.[1] To the best of my knowledge, there is no literature focused on the causative-inchoative alternation in TİD so far. Therefore, this thesis may be considered preliminary work for a subject that can be studied in many aspects and from different perspectives of different sub-fields in the future.

[1] The participants in the early acquisition group have reported that they were first exposed to TİD between the ages of 0-3, while the participants in the late acquisition group have reported that they were first exposed to TİD after the age of 4. *See* Chapter 4 for a detailed overview of participants.

Moreover, this thesis follows the steps of its predecessor Sevgi (2019), in that it compares the age-of-acquisition effects on morpho-syntactic structures between adults of different age-of-acquisition groups. Given the urgent need for broader access to sign language exposure and more accessible education for Deaf children, these studies provide a scientific base for health and education institutions to take the importance of sign language access and exposure in consideration when arranging their policies towards the Deaf community.

Here is the layout of the thesis. First, Chapter 2 will provide a summary of the literature on the causative-inchoative alternation, serial verb constructions (*henceforth*, SVCs), and the event structure of these constructions in signed and spoken languages. Later, Chapter 3 will give background information on the age-of-acquisition effects observed with sign language acquisition, and specifically, on morpho-syntactic structures. In Chapter 4, I will describe the data collection and analysis process. This chapter will include detailed information about the participants of this study and the designs of the production and comprehension tasks, stimuli materials, and how the descriptive statistics were run for comprehension tasks. In Chapter 5, I will describe the structure of the causative-inchoative alternation in TİD based on the utterances observed in the production tasks. I will also discuss how the data obtained for this study compares to those already presented in the literature for other sign languages. Moreover, in this chapter, I will provide a discussion on the mono- or bi-clausalness of SVCs in TİD and age-of-acquisition effects on the causative-inchoative alternations in the production of early and late acquisition signers of TİD, based on the data obtained from comprehension tasks. Lastly, in Chapter 6, I will summarize and conclude the findings of this thesis and raise potential future research questions.

CHAPTER 2

THEORETICAL BACKGROUND: THE CAUSATIVE-INCHOATIVE ALTERNATION AND SERIAL VERB CONSTRUCTIONS

This chapter will outline the relevant literature on the causative-inchoative alternation in both signed and spoken languages with regards to syntax and event structure. Moreover, it will include background information on serial verb constructions as well, for TİD data acquired for this thesis display such structures too. Section 2.1.1 will provide an overview of how the causative-inchoative alternation manifests itself in spoken languages. Then, Section 2.1.2. will explore the literature on causatives and the causative-inchoative alternation in sign languages. Moreover, Section 2.2.1, and Section 2.2.2 examine SVCs in spoken and signed languages, respectively, given that the causative-inchoative data in this study include such structures. Lastly, Section 2.3 will provide a quick overview of the event structure of causatives, inchoatives, and SVCs.

2.1 The causative-inchoative alternation

The causative-inchoative alternation refers to verbs that one can use both transitively and intransitively. The transitive alternate has a causer and a theme, and the intransitive alternate has a single theme argument (Kegl, 1990; Levin, 1993; Engberg-Pedersen, 2010). This alternation is one of the many valency alternations observed in the world's languages. Researchers investigated valency and valency changing operations through both spoken and signed languages on morpho-syntactic and semantic grounds to understand the mapping mechanisms between event

structure and argument structure (Kegl, 1990; Levin, 1993; Piñón, 2002; Benedicto & Brentari, 2004; Benedicto et al., 2007; Engberg-Pedersen, 2010). Valency changing operations can manifest themselves in morpho-phonology, morpho-syntax, lexicon, and word order in different languages and language typologies. Regardless of how a language marks these operations, they affect the number of arguments a given predicate requires. This interaction creates a discussion on whether these operations are syntactically or semantically motivated (Parsons, 1990; Haspelmath & Müller-Bardey, 2001; Haspelmath, 2002; Piñón, 2002).

Sign languages and spoken languages exploit different modalities. Therefore, investigating the mapping between event structure and argument structure in languages of the visual modality contributes to this discussion as most signed languages are still understudied regarding descriptions of argument structure and event structure.

2.1.1 The causative-inchoative alternation in spoken languages

Valency refers to a predicate's ability to govern a certain number of arguments of a particular type (Haspelmath & Müller-Bardey, 2001; Haspelmath, 2002). Whether this relation between a predicate and its required arguments is driven by semantics, syntax, or both has been a matter of debate. Valency alternations play a crucial role in this debate. Moreover, valency is related to the relation between argument structure and event structure. Therefore, valency changing operations may give us clues as to how a given language encodes parts of events within its argument structure (Haspelmath & Müller-Bardey, 2001; Piñón, 2002). In this sub-section, I will focus on the basics of causative-inchoative alternation, and then in Section 2.1.2, I will describe how these valency changes are encoded in some sign languages.

We observe the causative-inchoative alternation in verbs that can alternate between a causative-transitive meaning that requires a theme and a causer argument and an intransitive meaning that requires a single theme argument. The intransitive alternate of the pair denotes a change of state, and its transitive counterpart indicates the initiation of that particular change of state:

(1) a. I broke the window.
b. The window broke.

Schäfer (2009, p. 641)

In (1), there is no morphological marking on the predicate to indicate the valency change. Such verbs that undergo a valency change without any overt morpho-syntactic marking are called labile verbs (Kulikov, 2001). However, this is not the only way the alternation phenomenon manifests itself. It is also the case that some languages mark verbs morphologically either to indicate a valency increasing operation or to indicate a valency decreasing operation (Kulikov, 2001; Schäfer, 2009). Turkish morphologically marks both of these valency changing operations as in (2):

(2) a. Kalem düş-tü-Ø
pen(cil).$_{NOM}$ fall.$_{PAST\text{-}3SG}$
"The pen(cil) fell down."

b. Çocuk kalem-i düş-ür-dü-Ø.
child.$_{NOM}$ pen(cil)-$_{ACC}$ fall.$_{VALi\text{-}PAST\text{-}3SG}$
"The child dropped the pencil."

(3) a. Kadın kapıy-ı aç-tı- Ø.
woman.$_{NOM}$ door-$_{ACC}$ open-$_{PAST\text{-}3SG}$
"The woman opened the door."

b. Kapı aç-ıl-dı-Ø.
door.$_{NOM}$ open-VAL$_{d\text{-}PAST\text{-}3SG}$
"The door opened."

The verb düş- (“to fall”) in (2a) has a single theme argument, but in (2b), it hosts a causative suffix that marks the valency increase so that the predicate requires a causer along with the theme argument. In contrast, the verb aç- (“to open”) in (3a) has no morphological marking that marks it as a causative; it is what is called a lexical causative (Schäfer, 2009), meaning that its event structure includes causation even although its morphological structure does not overtly mark it. In (3b), however, the middle morpheme {-ıl} marks a valency decrease in the predicate, allowing it to license only a theme argument. The intransitive-inchoative alternates in these cases are usually unaccusatives (Schäfer, 2009). However, in some languages including Turkish, unergative verbs (as well as transitive verbs) can also have a causative alternate as in (4) (*see* Göksel & Kerslake, 2004; Kornfilt, 2013; Erguvanlı-Taylan, 2015 for more Turkish examples):

(4) a. Çocuk gül-dü-Ø.
child.$_{NOM}$ laugh-$_{PAST\text{-}3SG}$
“The child laughed.”

b. Kadın çocuğ-u gül-dür-dü-Ø.
woman.$_{NOM}$ child-$_{ACC}$ laugh-VAL$_{i\text{-}PAST\text{-}3SG}$
“The woman made the child laugh.”

In addition to lexical causatives which I have exemplified so far, there are also cases where the causative structure is bi-clausal, i.e., periphrastic or analytical causatives:

(5) a. John caused Bill to die on Sunday by stabbing him on Saturday
b. John killed Bill on Sunday by stabbing him (*on Saturday).
Schäfer (2009, p. 643)

As the temporal modification shows, analytical causatives such as (5a) may denote both direct and indirect causation, whereas lexical causatives such as (5b) only denote direct causation. Analytical causatives can also be constructed via an auxiliary that is usually grammaticalized from a lexical verb. In the case of English, that is “make” (6):

(6) He made her cry. Haspelmath (2016, p. 305)

Sapountzaki (2007) notes that Mandarin also has a causative auxiliary that is grammaticalized from the verb "give". We will not go into a detailed survey of languages that display this phenomenon, except for seeing whether this is attested for the analytical causatives in signed languages in the next section.

2.1.2 The causative-inchoative alternation in sign languages

In the introduction section, I have mentioned that sign languages may convey a different typology than spoken languages; therefore, I will describe how sign languages manifest causative-inchoative structures.

First, we observe that labile verbs that can be used both transitively and intransitively also exist in sign languages (7):[2]

(7) a. DADDY / MAN /PENCIL / BREAK
"Daddy got so mad that he broke the pencil."

b. $\underset{\text{INDEX}_{\text{WRIST.}}}{\underline{\qquad\qquad}}$ BREAK/
BREAK
"...His shin was broken, and his ankle in two places."
Enberg-Pedersen (2010, p. 49-50)

Engberg-Pedersen (2010) provides the following Figure 1 for the handshape of BREAK in Danish Sign Language (*henceforth,* DSL) for both (7a) and (7b):



Figure 1. The initial and final position of the verb "BREAK" in DSL taken from Danish Sign Language Dictionary (2008)
Engberg-Pedersen (2010, p. 50, with permission from the author)

[2] Some labile verbs in sign languages might have lexicalized from handling classifier handshapes, a process that neutralizes the handling component (which otherwise marks a transitive clause) and allows the given handshape to be used in intransitive contexts as well.

Labile verbs are also attested in Russian Sign Language (*henceforth*, RSL) as suggested by Kimmelman (2018) (8):

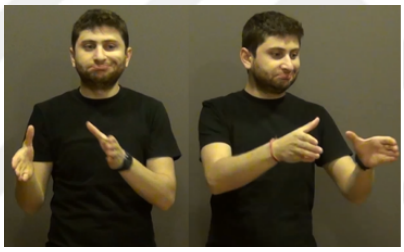
(8) a. IX-1 COMPUTER DAMAGE
"I damaged the computer".

b. SWING TREE DAMAGE
"The swings on the tree broke."

Kimmelman (2018, p. 13)

In addition to labile verbs, we also observe that the inchoative variant of an inchoative-causative pair is expressed with a change of state verb and its causative counterpart with a handling classifier (*henceforth*, HDCL) predicate (Kegl, 1990). A HDCL is a verbal predicate the handshape of which cross-references the manipulated object and the manipulating agent such as (9):

(9)

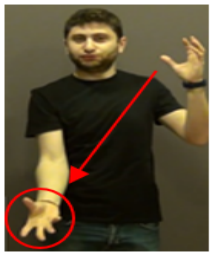


ELDERLY.WOMAN MAN CARRY.HCL(CURVED-B):BULKY.ENTITY
"A man carries an elderly woman."

TİD:Gökgöz (2020, p. 4)

The morphologically marked inchoative counterpart of HDCLs is observed to surface as whole entity classifier (*henceforth*, WECL) handshapes in Benedicto & Brentari (2004). A WECL refers to a verbal predicate the handshape of which cross-references the manipulated entity only such as (10):

(10)



TREE APPLE FALL.OFF.WECL(CURVED-5)ROUND.OBJECT
"An apple falls off a tree."

TİD:Gökgöz (2020, p. 3)

Starting with the finding that causative/transitive clauses and inchoative clauses can be morphologically marked via different classifier handshapes, Benedicto & Brentari (2004) further argued that classifiers are functional heads to which verbal roots attach, which then determines whether the root conveys a transitive or an intransitive alternate (Figure 2):

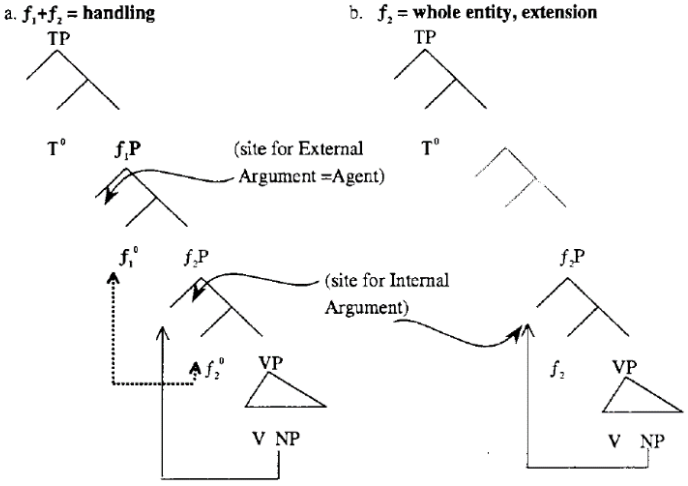


Figure 2. Benedicto & Brentari's (2004) account for the transitive-intransitive alternation

Benedicto & Brentari (2004, p. 769)

According to Benedicto & Brentari's (2004) account based on American Sign Language (*henceforth,* ASL), a WECL handshape introduces a lower functional head (f_2) so that it licenses a single internal argument. On the other hand, a HDCL handshape introduces a higher functional head above the lower one (f_1) which licenses a causer argument as well (*see also* Benedicto et al., 2007). Benedicto & Brentari (2004) also argue that f_1 specifically introduces an agent, not merely a causer. This will become relevant as Section 5.1 will briefly mention non-agentive causers, and agentive causers which surface as WECLs. Since both Kegl (1990) and Benedicto & Brentari (2004) argue that these constructions share the same verbal

root, one might draw a parallel with the HDCL & WECL alternation and the affixal marking of transitivity (11):[3]

(11) a. INDEX BOOK C+MOVE
s/he book obj_grab$_{hdln}$+move_vertical-to-horizontal
"S/he took the (standing) book and laid it down on its side."

b. BOOK B+MOVE
book 2D_flat_obj$_{w/e}$+move_vertical-to-horizontal
"The (standing) book fell down on its side."

Benedicto & Brentari (2004, p. 769)

Benedicto & Brentari (2004) extends their account to unergatives as well, comparing them to unaccusatives for both types of clauses are intransitive, but their single argument is of different thematic roles (Figure 3):

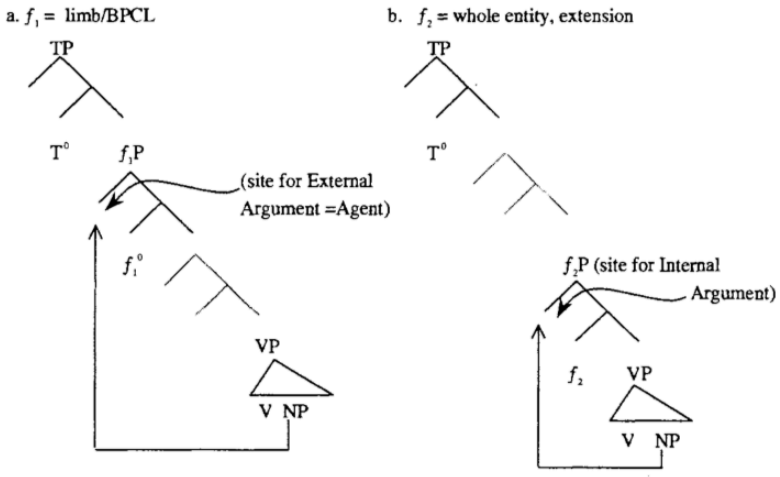


Figure 3. Benedicto & Brentari's (2004) account for unergatives and unaccusatives

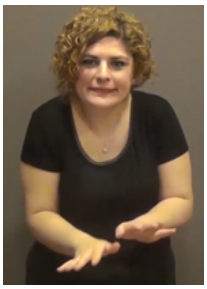
Benedicto & Brentari (2004, p. 767, 781)

As Figure 3 displays, Benedicto & Brentari (2004) argue that an unergative clause only has the *f1* projection, which hosts a body part classifier handshape (*henceforth,* BPCL) which in turn licenses a single/external argument, whereas an unaccusative clause only has the *f2* which hosts a WECL handshape which in turn licenses a

[3] I cite the examples with the glosses as they are in the original source.

single/internal argument. A BPCL is a verbal predicate the handshape of which cross-references a body part of the given animate entity as such (12):

(12)



BABY CRAWL.BPCL(5-5)HUMAN.FEET
"The baby is crawling."

TİD:Gökgöz (2020, p. 3)

Contra Benedicto & Brentari (2004), Kimmelman (2018) observes WECLs in transitive clauses in RSL (13):

(13) IX-1 CHAIR CL_{WECL}-MOVE+WALL WALL CL_{WECL}-MOVE+WALL
"I pushed the chair to the wall."

Kimmelman (2018, p. 24)

However, one must note that the WECL in (13) does not reference the causer or the agent of the clause, but it references the theme. Kimmelman (2018) also adds hat WECLs in transitive clauses are not always grammatical (14a) and finding out the reason why would require further research on this matter:

(14) a. *BOY POSS-A BOAT PLAY CL_{WECL}-GO.DOWN.

b. BOY POSS-A BOAT PLAY CL_{HDCL}-GO.DOWN.
"The boy drowned his toy boat."

Kimmelman (2018, p. 24)

In Section 5.1, I will discuss whether WECLs are attested in TİD and whether it is in the same fashion as Kimmelman (2018) observes or not.

Moreover, Tang & Yang observe a WECL in causation without an animate/agentive causer (15), contra Benedicto & Brentari (2004):

(15) PAPER CL:a_flat_object_be_located_at_i, WIND CL:blow_flat_object_away
"A piece of paper is located here; the wind blows the paper away."

Tang & Yang (2007, p. 1247-1251)

Tang & Yang (2007) argues that (15) can be a transitive or even a causative clause. Even though one would expect to see HDCLs in causative and transitive clauses, Hong Kong Sign Language (*henceforth,* HKSL) displays that a WECL can also reference the external argument of a given causative event.

So far, we have covered labile verbs for morpho-syntactically unmarked causative-inchoative alternations and different classifier handshapes for morpho-syntactically marked causative-inchoative alternations in sign languages. Engberg-Pedersen (2010) also makes a note of analytical causatives in DSL (16):

(16) a. CHAOS$_f$ / ARBEJDE 1.p LEAVE /
"The disturbance made me leave."

b. DEAF / INDEX CHANGE HEAR / DUMB / CHANGE SPEAK
"He maketh both the deaf to hear, and the dumb to speak"

Engberg-Pedersen (2010, p. 56-57)

Engberg-Pedersen (2010) states that analytical causatives in DSL can be constructed either by the verb "ARBEJDE" (to make) or "FORANDRE" (to change), "ARBEJDE" being followed by stative predicates or adjectives, and "FORANDRE" being followed by dynamic predicates. She also states that there are other sign languages that are reported to have causative auxiliaries such as Greek Sign Language (Sapountzaki, 2007; Steinbach & Pfau, 2007), and The Catalan Sign Language (Quer & Frigola, 2006; Steinbach & Pfau, 2007).

2.2. Serial verb constructions

In this section, we will explore serial verb constructions (*henceforth*, SVCs) in sign languages and spoken languages. Multi-predicate constructions are vastly observed, especially in causation events in sign languages. (Aikhenvald, 2006; Tang & Yang, 2007; Haspelmath, 2016; Loos, 2017) and there is yet no strict consensus on how

these structures should be analyzed. We observe similar structures in TİD for both causative and inchoative clauses, and these clauses convey morpho-syntactically complex structures due to their multi-predicative nature (*see* Section 5.1, 5.2). This complexity is both relevant to the event structure of causatives and the causative-inchoative alternation, and to the potential age-of-acquisition effects observed on complex structures (*see* Chapter 3). Many researchers (Aikhenvald, 2006; Benedicto et al. 2008; Haspelmath, 2016 inter alia) employ different criteria for what is considered an SVC. Still, the consensus in the literature is that they are multi-predicative, although the clause itself denotes one event. [4] They are mono-clausal since all the predicates convey one tense, and the predicates share one argument (Benedicto et al. 2008: 111-112). Sections 2.2.1 and 2.2.2 will elaborate on what type of tests are available.

SVCs may often be categorized together with resultatives or proposed as a larger class that covers resultatives as a subtype (Aikhenvald, 2006, p. 19). The SVCs featured in this study, unlike resultatives, display a result-denoting, argument sharing predicate of a verbal nature rather than an adjectival quality (17):

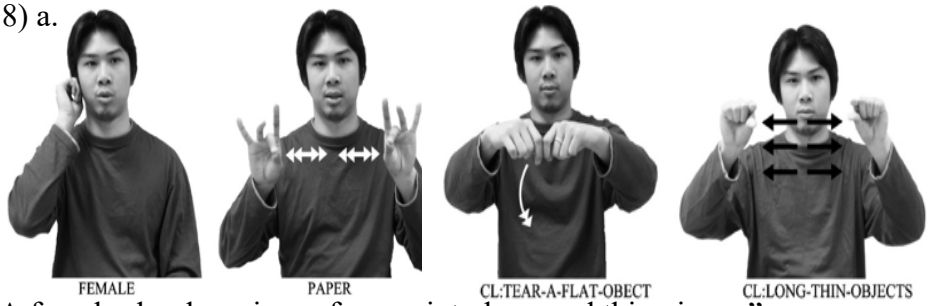
(17) a. Bruce licked the plate clean. Loos (2017, p. 1)

b. n=babas welik n=mot do Taba: Bowden (2001, p. 297)
3SG-bite pig 3SG-die real
"It bit the pig dead."

Note that the result related lexical item in (17a) "clean" is an adjective(al predicate), but the result-related lexical item in (17b) "mot" (to die) is a verb. We can exemplify this distinction in signed languages as well. Below (18) is two examples from HKSL, that showcase what I consider structural equavalents of the sentences in (17):

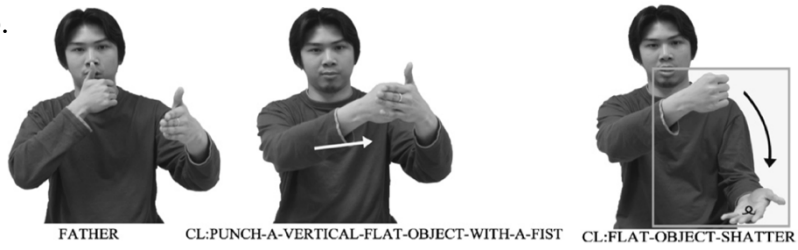
[4] I remain agnostic to the discussion of whether there is embedding in these structures within this chapter. For such a discussion in TİD, *see* Section 5.2.

(18) a.

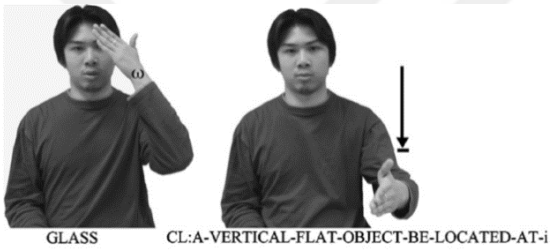


"A female shreds a piece of paper into long and thin pieces."

b.



.



"Father shatters a glass panel by punching it with his fist."

Tang & Yang (2007, p. 1246-1249,with permission from the authors)

(18a) from HKSL has what Tang & Yang (2007) considers a SASS (size and shape specifier) expressing the resultant state of the causation event, whereas (18b) has two verbal lexical items, resembling the structure in (17b) above. Because the SVCs in the TİD clauses that we will discuss in Chapter 5 shows the properties of (17b) and (18b), the following sections will be focused on SVCs and not on resultatives of the traditional sense (17a).

Another limitation of the following sections will be focusing on what is categorized as symmetrical SVCs in which the serialized verbs constitute an action sequence expressing cause-effect or cause-manner (19a), whereas asymmetrical SVCs tend to express aspect, valency increase (19b) or direction (19c) in the matrix verb by adding a "minor verb" to the structure Aikhenvald (2006):

(19) a. ó tì-wà-rà étéré a Igbo:Aikhenvald (2006, p. 2)
he hit-split.open$_{TENSE}$ plate the
"He shattered the plate."

b. lei lo di saam lai Cantonese:Aikhenvald (2006, p. 21)
you take $_{PL}$ clothing come
"Bring some clothes."

c. PERSON CL:limp CL:move-in-circle ASL:adpt. from Supalla (1990, p. 134)[5]
"A person limping in circle."

In (19a), the two predicates "tì" (hit, transitive) and "wà" (split-open, intransitive) get serialized together while preserving their own semantic content and expressing a causative event of a person shattering a plate by marking the relevant sub-events. Aikhenvald (2006) emphasizes that both of these predicates can stand alone in other structures. However, in (19b), the two predicates "lo" (take) and "lai" (come) get serialized to form a new meaning "bring," by the second predicate increasing the matrix predicate's valency and losing its own semantic content. (19c) is an example of direction denoting asymmetrical SVCs in which the first classifier predicate "limp" expresses the manner of the movement and the second classifier predicate "move in circles" express the direction of the movement. This SVC type is commonly observed in signed languages (Costello, 2016). The TİD data we will discuss further in Chapter 5 show properties resembling (19a). Therefore, we will focus on symmetrical SVCs in spoken and signed languages in the following sub-sections 2.2.1 and 2.2.2.

2.2.1 Serial verb constructions in spoken languages

SVCs are commonly observed in creole languages, languages of West Africa, Oceania, Amazonia, Southeastern Asia, and New Guinea (Aikhenvald, 2006;

[5] Cited from Costello's (2016) commentary on Boss (1996).

Haspelmath, 2016). In observing the SVCs in spoken languages of these language families, researches have proposed certain common features that different multi-predicate-structures may share to qualify as an SVC. While some researchers aimed to propose universal tests for SVCs (Aikhenvald, 2006; Haspelmath, 2016 *inter alia*), others suggested that different diagnostics may work for different languages depending on the morphosyntactic properties of that particular language (van Staden & Reesink, 2008, p. 23). In order not to over-complicate the discussion beyond the scope of this study, I will only include the main tests employed by most of these researchers and cite the relevant sources for further information.

The most commonly suggested properties are the lack of an overt coordination or subordination item (Aikhenvald, 2006; Haspelmath, 2016) and denoting a single event (Aikhenvald, 2006; Bisang, 2009; Comrie, 1995; van Staden & Reesink, 2008 *inter alia*). Haspelmath (2016) argues that whether a multi-predicate clause denotes a single event with the separate predicates corresponding to sub-events or not can be a subjective matter depending on the researchers' stance on events and semantic features. However, he agrees that the lack of a coordinating item is a useful test to determine whether a multi-predicative structure is mono-clausal and thus qualifies as an SVC.

Haspelmath (2016) offers negation as another test to determine the number of clauses, following Bohnemeyer et al. (2007, p. 501), who suggest that there must be only one way to negate an SVC that typically scopes over the whole SVC, indicating that it is a mono-clausal construction. Haspelmath (2016) cites an example (20) from (Baule: Larson, 2010, p. 205-206):

(20) a. Ɔ fa man agba man man Yao.
3SG.SUBJ take NEG cassava give NEG Yao.
"He doesn't give any cassava to Yao."

b. *Ɔ kɛɛ man ngatɛ di.
3SG.SUBJ grill NEG peanuts eat
"She doesn't roast peanuts and eats them."

c. *Ɔ kɛɛn ngatɛ di man.
3SG.SUBJ grill peanuts eat NEG
"She roasts peanuts and doesn't eat them."

Baule: Larson (2010, p. 205-206)

Even though Larson (2010) has not made any implications about SVCs, Haspelmath (2016) uses (20) to show that structures like (20a) are mono-clausal and thus SVCs as the component verbs cannot be negated independently (20b-c). Haspelmath (2016) also argues that structures like (21) below, which Foley (2010, p. 102) consider to be SVCs, do not qualify, since the negated meaning might change based on where the negation is and the negation can be in different positions in the same structure:

(21) a. namot i yor i aŋgi-r pika-r ba-irik-tap
man a egg a get-R throw-R NEG-go.down-NEG
"A man didn't get an egg and throw it down."

b. namot i yor i aŋgi-r ba-pika-r ba-irik-tap
man a egg a get-R NEG-throw-R NEG-go.down-NEG
"A man got an egg but didn't throw it down."

Foley (2010, p. 102)

Another test that is proposed for SVCs is extractability (Haspelmath, 2016; Jansen et al.,1978). Haspelmath (2016) argues that the SVC structure in Sranan language (22) qualifies as mono-clausal because both objects in the structure can be fronted:

(22) a. San$_i$ Kofi teki a nefi koti?
what Kofi take the knife cut
"What did Kofi cut with the knife?"

b. San$_i$ Kofi teki koti a brede?
what Kofi take cut the bread
"What did Kofi cut the bread with?"

adapted from Jansen et al. (1978, p. 147)

Haspelmath (2016) also excludes structures that have a predicate-argument

relation (23) from SVCs, whereas Aikhenvald (2006) considers them a sub-type of symmetrical SVCs:

(23) man hêt kèèw tèèk
3SG make glass break
"He broke the glass." Lao: Enfield (2008, p. 161)

The reason why Haspelmath (2016) excludes predicate-argument relation structures from SVCs is that if this sub-type is allowed, then structures such as (24) in English that are not mono-clausal per se would also classify as SVCs:

(24) a. She helped me solve the problem.
b. He made her cry.
Haspelmath (2016, p. 305)

Aikhenvald (2006) also notes that the second predicate in SVCs is always intransitive, which is observed in TİD data as well (*see* Chapter 5, Section 5.1).

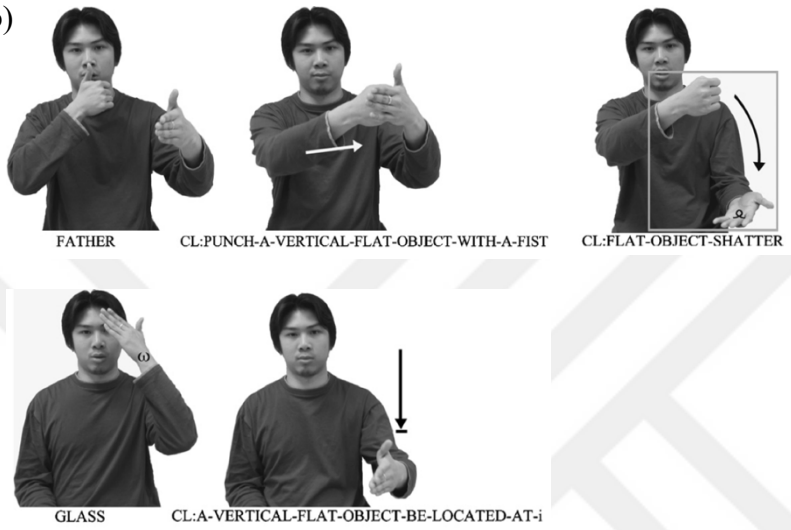
2.2.2 Serial verb constructions in sign languages

In the previous section, I summarized some proposals and tests for SVCs based on data from spoken languages. In this section, we will see whether these tests can apply within the typology of signed languages. That SVCs are a part of sign languages that have been known since Supalla (1986, 1990). Ever since, many researchers have worked on SVCs to propose different analyses and accounts on these structures (Slobin & Hoiting, 1994; Hong, 2003; Tang, 2003; Benedicto, Cvejanov & Quer, 2008; Tang & Yang, 2006; Bos, 2016; Costello, 2016; Benedicto, 2019). As stated in the previous sections, I will focus on symmetrical SVCs as the TİD data discussed in this study (Chapter 5) resembles the properties of those.

SVCs in signed languages are observed with both lexical and classifier predicates (Supalla, 1986, 1990; Costello, 2016; Tang & Yang, 2006; Benedicto, Cvejanov & Quer, 2008; Benedicto, 2019 *inter alia*). Costello (2016) suggests that

most examples that fall within the lines of cause-effect SVCs include classifiers (18b repeated below). Still, he also implies that this situation may be caused by how sign languages employ classifiers to express manner and not necessarily a restriction on how these languages have to construct SVCs (*see* Chapter 5 for SVCs in TİD with lexical verbs):

(18b)



"Father shatters a glass panel by punching it with his fist."

Tang & Yang (2007, p. 1246-1249, with permission from the authors)

As for tests that can determine whether an SVC in a given sign language is mono-clausal or not, typological differences between sign languages and spoken languages, and the fact that most sign languages are understudied may limit our options. Based on Bos' (1996) observations on SVCs in NGT, Costello (2016) suggests that the no-linking-element condition might be tricky, given that the verbal elements might be linked by non-manual markers even though there is no overt coordination marker. He also suggests that we generally do not know enough on the argument structure of signed languages to say anything definitive on the predicate-argument relations, even though he assumes that NGT SVCs abide by the generalization that coordination is not overt, based on Bos (1996). NGT examples from Bos (1996), which Costello

(2016) compares with Haspelmath's (2016) and Aikhenvald's (2006) accounts, do not include any cause-effect pairs. Therefore, he does not elaborate much on the condition of denoting a single event. As for negation, Costello (2016, p. 12) notes that the spreading domain of non-manual negation may make it challenging to test whether the given construction can only be negatable in one way, especially because sign languages may employ non-manual negation along with manual negation. However, he also adds that non-manual spreading of negation along with manual negation might be considered similar to the phonological phenomena of spoken languages such as vowel harmony and would not undermine this test. Extractability is not discussed in Bos (1996) or Costello (2016). Lastly, Costello (2016) notes that prosodic cues of clause boundaries in signed languages are still under investigation, and therefore determining whether SVCs are completely separate predicates or mono-clausal SVC structures is not as trivial in general.

2.3. On the event structure of causatives, inchoatives, and serial verb constructions

Sign languages provide syntax-semantics interface related studies with tremendously interesting evidence, as the argument structure, event structure, and the relation between the participants and sub-events are clearly visible (Wilbur, 2003, 2005, 2008). Therefore, sign languages might have a lot to bring to the table, for they present evidence that is usually covert in sign languages (Davidson et al., 2019).

Causative events consist of a causal frame or initiation followed by a change of state. The latter may or may not surface in the structure via a serial verb construction. On the other hand, inchoative events consist of a change of state which entails a covert initiation in the event itself (Schäfer, 2009; Tang & Yang, 2007;

Loos, 2017 *inter alia*). Researches have proposed several accounts to model for the way the argument structure is built or the way valency works, including the causative-inchoative alternation. While the lexicalist approaches hypothesize that such valency alternations take place at the lexicon level before syntax, more generative accounts have suggested that such valency changing operations have to do with syntactic projections interacting with verbal items. The vast majority of the discussion has been about which morphosyntactic operations take place in order for the verbs to alternate between transitivity and intransitivity. This derivation-oriented approach created two opposing accounts; one that argues that the causative is the base form and its inchoative counterpart gets derived through an operation of detransitivization and vice versa (Piñón, 2001; Schäfer, 2009 *inter alia*). An alternative to this binary discussion has been proposed by researches who argue that both forms get derived by a common root (Marantz, 2007; Davis & Demirdache, 1997; Pustejovsky, 1995, 2008; Doron, 2003; Embick, 2004; Alexiadou et al., 2006 *inter alia*). All these different accounts have one thing in common, i.e. they inevitably make implications on the event structure of such predicates. Especially, accounts in which the syntactic configurations determine the semantic interpretation of the given event imply that the construction of the argument structure is closely tied to the syntax-semantics interface (Marantz, 2013).

While certain accounts suggest that causatives and inchoatives have the same event decomposition but they differ in how much of that event structure surfaces (McCawley, 1968; Dowty, 1979; von Stechow, 1995), others argue that the event structure is built just as the syntactic structure (Larson, 1988; Harley, 1995; Pesetsky, 1995; Chomsky, 1995; Folli, 2003; Folli & Harley, 2005; Ramchand,

2008), and causatives and inchoatives can be divided into different levels of projections based on their argument requirements.

(25) a. [BECOME [Y <STATE>]]
b. [X CAUSE [BECOME [Y <STATE>]]]

adapted from Schäfer (2009, p. 652)

A representation such as (25) can be employed regardless of which direction one thinks the valency changing operation happens. Causative-to-inchoative accounts would argue that the inchoative is derived by the deletion of the CAUSE subevent, while inchoative-to-causative accounts would argue that the causative is derived by adding a CAUSE layer to the event/syntactic structure of the inchoative base (Schäfer, 2009). The existence of the CAUSE in the event structure dates back to as early as Lakoff (1970) and Jackendoff (1972).

A more complex event-decomposition-oriented account comes from Ramchand (2008) who hypothesizes functional projections Init(iation)P, Proc(ess)P, and Res(ult)P that correspond to the CAUSE, BECOME, and STATE layers in the terminology employed by previous event structure-based accounts (25). Her event structure model for the relevant sub-events assumes that the direction of alternation is from inchoative to causative since, derivation-wise, it presents a simpler picture. The derivation from inchoative to causative takes place if an initiator is added to the event structure (Figure 4):[6]

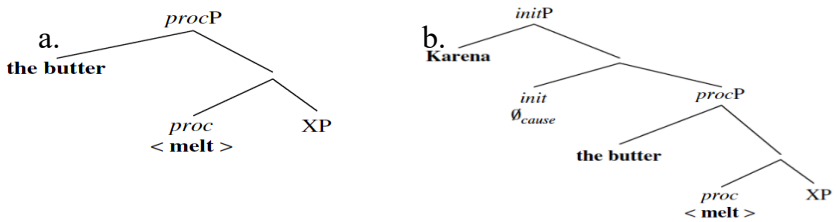


Figure 4. Ramchand's (2008) representation for causative-inchoative alternation
Ramchand (2008, p. 86-87)

[6] I would like to note that I prefer to remain agnostic as to which direction the causative-inchoative alternation takes place or whether it is a directional alternation at all.

In both (25a) and (25b), the predicate projects to a ProcP and introduces the undergoer of the given process sub-event. In the case of inchoative/intransitive events, that is what the event structure consists of. If the event includes an initiator participant, a higher functional projection to host that sub-event is present.

Furthermore, Ramchand (2008) assumes that the alternating predicates such as “break” or “melt” must have a null-headed InitP available at all times, so that these predicates can alternate between a transitive and an intransitive meaning. However, predicates that do not alternate do not have a null headed InitP readily available in their structure. She asserts that, for a causative structure to be built, an agentive causer is not necessary, but the existence of a causing sub-event is. Therefore, the existence of an initiator of any description, be it a volitional agent or an instrumental or an abstract causer, is required. Another account that resembles Ramchand (2008) in suggesting that the addition of a causal sub-event is necessary to build a causative is Pylkkänen (2008). She argues that there are separate functional heads for introducing a causing event (CauseP) that merges with a verbal root, and a causer/agent (VoiceP) dominating the former (Figure 5):

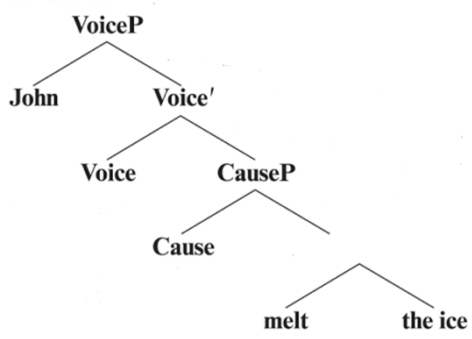


Figure 5. Pylkkänen’s (2008) representation of causative events
adapted from Pylkkänen (2008, p. 88)

The claim that there is a separate functional head that introduces the external argument is also in line with the general assumption that external arguments are

introduced to syntax by a separate head other than the verbal root/lexical verb that selects the internal argument (Kratzer, 1996).

Pylkkänen (2008) argues that an inchoative sentence like (26a) does not only lack an agent/causer but also lacks the interpretation of a caused event that is related to the end state of being melted, as opposed to (26b):

(26) a. The ice melted.
b. John melted the ice.

Pylkkänen (2008, p. 1, 88)

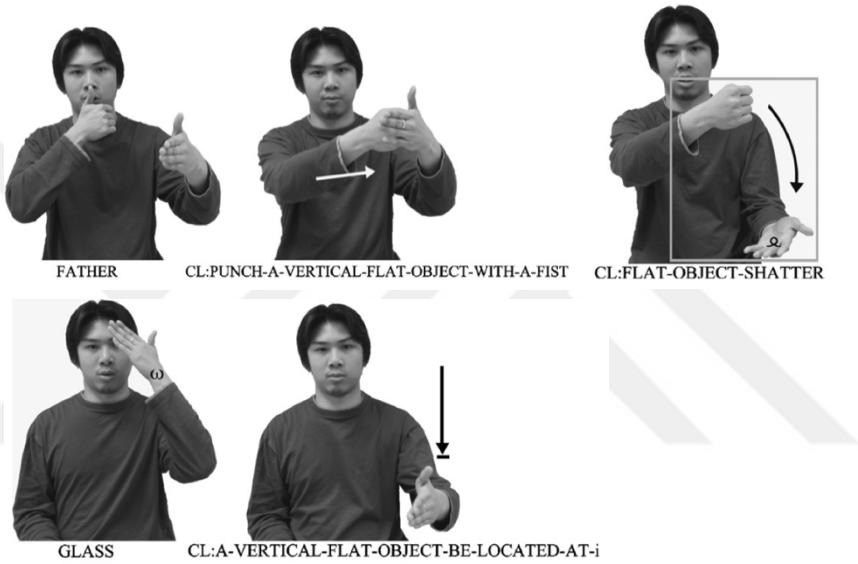
Following Kratzer (1996) and in line with Pylkkänen (2008), Alexiadou et al. (2006) also argue that a causative is built by a VoiceP introducing a causer/agent external argument. Furthermore, like Ramchand (2008), Alexiadou et al. (2006) suggest that inchoatives have a Cause head that is empty too.

The idea that CAUSE is only found in the transitive alternate of an alternating verb is widely common among semantics-driven accounts (Lakoff, 1965; Pesetsky, 1995; Piñón, 2001; Härtl, 2003; Levinson, 2012 *inter alia*), while several syntax-driven accounts suggest that CAUSE is or can be present in the intransitive alternate of an alternating verb (Levin & Rappaport-Hovav, 1995; Chierchia, 2004; Kallulli, 2006; Alexiadou et al., 2006; Koontz-Garboden, 2009). The presence of a CAUSE event in an intransitive alternate has also been suggested in sign language research. Causative events consist of a causal frame or initiation followed by a change of state. The latter may or may not surface in the structure via a serial verb construction. On the other hand, inchoative events consist of a change of state which entails a covert initiation in the event itself (Tang & Yang, 2007; Loos, 2017). Therefore, Tang & Yang (2007) consider inchoative events as internal causation events, whereas they consider causatives as external causation events. In this sense, based on their observations on HKSL, they hypothesize that both causatives and inchoatives are

equally complex in the event structure whether it is morphologically marked on the structure or not.

Tang & Yang (2007) also observe that some causation events are expressed via verb pairs that they refer to as serial verb constructions in which the first predicate marks the causal event/initiation with an HDCL/BPCL and the second predicate denotes the result of the change of state with a whole-entity classifier (18b repeated below) :

(18b)



"Father shatters a glass panel by punching it with his fist."

Tang & Yang (2007, p. 1246-1249, with permission from the author)

According to Loos (2017), these structures do not necessarily fall in the same category as lexical causatives with regards to denoting an inherent causal meaning. Nonetheless, she argues that they fall under the umbrella of causative structures because they describe events of causation by specifying the manner with which causal event takes place and its result/end state without stating the causal relation overtly. Therefore, both Loos (2017) and Tang & Yang (2007) seem to consider these structures as causatives with serial verb constructions, even though they refer to them as resultatives or serial verb constructions (*see* Section 2.2.) due to their second predicate denoting the result of the causal event.

After this background on the morphosyntax and event structure of causatives, inchoatives, and SVCs, I will provide a brief overview of the age-of-acquisition effects in the context of exposure to a sign language as a first language in Chapter 3.

CHAPTER 3

AN OVERVIEW OF AGE-OF-ACQUISITION EFFECTS ON MORPHOSYNTACTIC STRUCTURES

The relation between age-of-exposure to linguistic input and language performance and competence have been studied since the 50s. These studies and discussions initially arose from the question of how children acquire language in a certain time frame solely with exposure, yet this ability seems to diminish in adulthood. This period in early childhood is often named "the critical" period (Chomsky, 1965, 1979, 1981; Birdsong & Molis, 2001; Hakuta et al., 2003; Johnson & Newport, 1989; McDonald, 2000; Sebastián-Gallés et al., 2005; Vanhove, 2014 *inter alia*). Following Patkowski (1980), Hartshorne et al. (2018) note that there are in fact two aspects of this critical period that researchers are curious about. One is to find out how and why the language acquiring/learning ability change over time, and the other is how late exposure to language affects the language acquirement process.

Until rather recently, the latter was thought to be not possible to observe except for very rare cases like Genie (Curtiss,1977; Skuse, 1988). However, many researchers have shown less than 10% of Deaf people are born and raised in households in which at least one member of the household is a signer (Mitchell & Karchmer, 2004), which means that exposure to language for the vast majority of the Deaf population is delayed, usually until they reach school age (Aranoff et al., 2003; Cormier et al., 2012). Further studies also concluded that inadequate and late exposure, namely after the critical age period, to linguistic input affects one's linguistic performance and competence in adulthood even in the case that such

exposure to linguistic input may have continued consistently for the rest of the adolescence of the individual (Mayberry & Eichen, 1991; Newport, 1990; Mayberry, 1994; Newport at al., 2001; Mayberry et al., 2002; Mayberry, 2007; Morford & Hänel-Faulhaber, 2011; Mayberry et al., 2011 *inter alia*). Therefore, research regarding production and comprehension proficiencies of Deaf individuals coming from different age-of-acquisition groups hold great importance for discussions of critical age and age-of-acquisition effects.

This chapter provides an overview of the relevant literature on the age-of-acquisition effects and the critical period, with a focus on sign language acquisition as one's first functional language. Section 3.1 summarizes some basic observations made on the language acquisition process of Deaf children and studies on what happens when exposure to a sign language is delayed. Section 3.2 provides a summary of observations regarding the acquisition of complex morphosyntactic structures in sign languages in general.

3.1 Sign language acquisition

Previous research on how Deaf children acquire the sign language that they are exposed to while growing up revelated that the developmental stages they go through are the same as hearing children who acquire spoken languages. Their acquisition process takes around the same duration, and they produce the same types of errors during their developmental stages (Bellugi, 1988; Lillo-Martin, 1999; Meier, 1991; Newport & Meier, 1985). This shows that the linguistic and cognitive mechanisms underlying language acquisition are the same regardless of whether the input is auditory or visual. Given the visual nature of the linguistic input, one curious point is whether the iconicity and gestures accelerate the acquisition of a visual language.

Petitto (1987, 2013) showed early on, that, Deaf toddlers can distinguish between gesture and language at 18 months of age, and otherwise gestural items like pointing, accordingly as lexical signs in proper contexts. Therefore, previous studies clearly report that the language acquisition milestones of a visual language are not different from that of an auditory one. What makes the language acquisition period of a vast majority of Deaf children different is that their exposure to a first functional language is often delayed or significantly more impoverished than that of hearing children.

Many researchers show evidence that native-like proficiency in adulthood is not generally attested in cases where the age-of-exposure to one's first language is past puberty (Coppieters, 1987; Eubank & Gregg, 1999; Johnson & Newport, 1989; Weber-Fox & Neville, 1999). Early acquisition group signers perform better at sentence recalling, and sentence shadowing tasks (Mayberry & Eichen, 1991; Mayberry & Fischer, 1989). The performance difference between early and late acquisition groups is also present at lexical decision, morphological repetition priming, sign monitoring, and probe recognition tasks (Emmorey, 1991; Emmorey et al., 1995; Emmorey et al., 1995). Newport (1990) observes that early acquisition group ASL signers out-score their late acquisition group peers in both comprehension and production tasks in morphology and syntax. Mayberry (1993) tested the effects of L1 acquisition on L2 acquisition between early and late acquisition groups of ASL signers by comparing their English as a second language skills. She reports that signers who got exposed to ASL from birth on performed the best, while relatively early acquisition signers who got exposed to ASL between the ages of 5-8 scored below this group. The early acquisition group which was exposed to ASL between the ages 5-8 outperformed the late acquisition group who

were exposed to ASL between the ages 9-13 for the first time. Her results clearly show that the earlier the exposure of L1, the better it is for L2 learning as well. Mayberry (1998) reports that Deaf individuals who got exposed to ASL at school age for the first time performed significantly poorly on grammaticality judgment and processing tasks in their L2 English, compared to English learning individuals who got exposed to their L1 (ASL or a spoken language other than English) from infancy on. Mayberry & Lock (2003) worked on grammaticality judgment tasks and picture matching tasks with 54 participants from different linguistic backgrounds (i.e. hearing children from a spoken L1 background, Deaf children from a signed L1 background, and Deaf children with no signed L1 background) to see whether late exposure affects the acquisition of L1 and L2 in the same way. Their results revealed that both hearing and Deaf individuals who got exposed to an L1 from infancy on in a modality that fits their needs may reach native-like proficiency in an L2 that they got exposed to in a later age, while Deaf individuals, who got exposed to their L1 at a later age as a result of being born to hearing parents who do not sign, experience linguistic deficits in their adulthood regardless of modality. Cormier et al. (2012) reported that early acquisition group signers gave more accurate answers in identifying grammatical and ungrammatical utterances in BLS, compared to the late acquisition group signers. Furthermore, early acquisition group also had shorter reaction times on average.

Apart from linguistic performance and competence tasks, research on neural activity show that there are differences in which language-related brain areas get activated in early and late acquisition group signers. The left inferior frontal gyrus is activated more in early acquisition group signers than in late acquisition group signers during a phonological judgment task (MacSweeney et al., 2008).

3.2. Acquisition of complex morphosyntactic structures in deaf children and the age-of-acquisition effects

The literature summarized in the previous section makes it clear that the age-of-acquisition continues to affect L1 proficiency even in adulthood in various domains of language such as phonology, morphology, and syntax. Depending on the age and degree of exposure, differences among early and late acquisition groups could become more prominent in more specific structures, like classifier constructions, which are known to be morphologically more complex than lexical verbs (Supalla, 1982; Zwitserlood, 2003; Benedicto & Brentari, 2004 *inter alia*). These structures are acquired around the age of 7-8 even when the individual has access to sign language input from birth (Schick, 1990; Slobin et al., 2003). The fact that even children who are exposed to the input of such structures from birth develop them later in childhood (around the age of 7-8) (Schick, 1990; Slobin et al., 2003) may make the developmental difference in the late acquisition group even more adamant. Cormier et al. (2012) compared early and late acquisition group signers with a grammaticality test that includes simplex sentences, negated sentences, agreeing predicates, plain verb predicates, relative clauses, and wh-clauses in BSL. They found that the early acquisition signers were more accurate at identifying grammatical and ungrammatical clauses for sentences with the given structures.

In addition to the proficiency difference between adult signers from early and late acquisition groups, Newport (1990) observes that the errors Deaf children with hearing parents, and Deaf children with Deaf parents differ in the acquisition process. Children who are exposed to a sign language from birth start out with producing complex signs partially, with one or a few morphemes, and then add more morphemes as they proceed in their developmental process, whereas children who

get exposed to a sign language later in life tend to hold onto the holistic forms they sign for morphologically complex signs, and they tend to overgeneralize the patterns they observe in complex structures, unlike their peers who are born to Deaf parents.

Given that causative-inchoative alternating pairs are often morpho-syntactically realized through classifier constructions as well as being complex[7] with regards to their event structure, i.e. consisting of multiple sub-events, I hypothesize that production of alternating verbs and SVCs might differ among early and late acquisition groups.

[7] Morphological complexity and syntactic complexity as referred here are two different types of complexities, in that, a classifier predicate is a morphologically complex structure but a mono-predicative clause whose predicate surfaces with a classifier predicate would be a syntactically simplex clause or a clause consisting of multiple morphologically simplex lexical predicates would be syntactically complex due to displaying a serial verb construction, i.e. multiple predicates.

CHAPTER 4

METHODOLOGY

This chapter presents information about the tasks employed to answer the research questions given in Chapter 1, explaining how they were designed and run. Moreover, it also contains information on the participants who performed these tasks. Lastly, the methods which were used to analyze the results are described. Section 4.1 includes background information about the participants' proficiency in TİD as well as information on which participants performed which tasks. A production task was designed in order to collect the initial data, and two comprehension tasks (a picture selection task and an acceptability task) were designed in order to test out the hypotheses which were made based on the production data. Each task and how their results were analyzed are described separately under Section 4.2.

4.1 Participants

The data for this thesis came from 36 participants between the ages of 20-47, 19 of which are in the early acquisition group who had deaf parents and got exposed to TİD between the ages of 0-3, and the remaining 17 are in the late acquisition group who had hearing parents and got exposed to TİD after the age of 4, typically when they started school. The late acquisition group was not further divided into sub-groups based on the age-of-first-exposure (e.g. 4-7, 7-10) since accessing enough participants for each sub-group was not possible. Further studies with a wider pool of delayed exposure individuals who got exposed to TİD as their L1 at different ages may reveal more fine-grained findings. 10 participants from the late acquisition

group reported using homesign (accompanied with Turkish or not) at home growing up, whereas the remaining 7 reported using only Turkish (sometimes accompanied with some TİD later in their life) at home growing up. The background information summarized above is laid out for each participant in Table 1 below:

Table 1. Socio-personal Background of the Participants

Part.	Age at Task Sessions	Gender	Age of Exp. to TİD	Hearing Status of Parents	Primary Language Used at Home Growing Up	Estimated # of years TİD used	Education
P1	43	F	0_3	both deaf	TİD	40-43	high school
P2	43	F	0_3	both deaf	TİD	40-43	high school
P3	35	M	0_3	both deaf	TİD	32-35	high school
P4	34	M	0_3	both deaf	TİD	21-34	college
P5	33	M	0_3	both deaf	TİD, homesign	30-33	high school
P6	30	F	0_3	both deaf	TİD	27-30	high school
P7	29	M	0_3	both deaf	TİD, homesign	26-29	high school
P8	28	M	0_3	both deaf	TİD	25-28	high school
P9	28	F	0_3	both deaf	TİD, homesign	25-28	secondary sc.
P10	27	F	0_3	both deaf	homesign	24-27	secondary sc.
P11	27	F	0_3	both deaf	TİD, homesign	24-27	high school
P12	26	M	0_3	both deaf	TİD, homesign	23-26	secondary sc.
P13	26	M	0_3	both deaf	TİD	23-26	high school
P14	25	F	0_3	both deaf	TİD	22-25	high school
P15	25	F	0_3	both deaf	TİD	22-25	university
P16	23	F	0_3	both deaf	TİD	20-23	high school
P17	21	F	0_3	both deaf	TİD	17-21	high school
P18	19	M	0_3	both deaf	TİD	16-19	high school
P19	50	M	13_17	both hearing	Turkish, homesign	37-33	university
P20	49	F	8_12	both hearing	Turkish, homesign	37-41	high school
P21	46	F	8_12	both hearing	Turkish, homesign, TİD	34-38	high school
P22	46	F	4_7	both hearing	Turkish	39-42	high school
P23	43	M	8_12	both hearing	Turkish	31-35	university
P24	41	F	8_12	both hearing	homesign	29-33	high school
P25	36	M	4_7	both hearing	Turkish, homesign	29-32	high school
P26	35	F	4_7	both hearing	homesign, Turkish	28-31	high school
P27	34	F	13_17	both hearing	Turkish, TİD	17-21	high school
P28	33	M	4_7	both hearing	Turkish	26-29	high school
P29	33	M	8_12	both hearing	homesign	21-25	college
P30	33	F	4_7	both hearing	Turkish, homesign	26-29	high school
P31[8]	32	M	4_7	deaf father, hearing mother	Turkish, TİD	25-28	high school dropout
P32	31	F	4_7	both hearing	homesign	24-27	high school
P33	31	M	13_17	both hearing	Turkish	14-18	university (enrolled)
P34	28	M	8_12	both hearing	Turkish	16-21	university (enrolled)
P35	24	F	8_12	both hearing	Turkish, TİD	12-16	college
P36	24	F	8_12	both hearing	homesign	12-16	high school

Moreover, the majority of the participants (24) were high school graduates, 2 of them were secondary school graduates, 4 of them were 2-year-college graduates, 3 of them

[8] It is possible that P31's father lost his hearing during P31's adulthood, due to aging related gradual hear loss, because our Deaf consultant who contacted the participants through her personal network has invited P31 as a part of the late acquisition group. Our survey of personal information did not include age of hearing loss details for the parents of the participants.

were university graduates, and 2 of them were enrolled in the university as the tasks took place.

The tasks that are explained in detail in Section 4.2. were performed by a different number of participants out of this participant pool, enabling us to reach an equal number of participants from each acquisition group for each task as can be seen in Table 2 below:

Table 2. Task Count by the Participants

Early Acq. Participant	Production Task	Picture Selection Task	Acceptability Judgment Task	Late Acq. Participant	Production Task	Picture Selection Task	Acceptability Judgment Task
P1	x	-	-	P19	x	x	x
P2	x	-	-	P20	x	x	x
P3	-	x	x	P21	x	x	x
P4	x	x	x	P22	x	x	x
P5	x	x	x	P23	x	x	x
P6	-	x	x	P24	x	-	-
P7	x	x	x	P25	x	x	x
P8	x	x	x	P26	x	x	x
P9	x	-	-	P27	x	-	-
P10	x	x	x	P28	x	x	x
P11	x	x	x	P29	-	x	x
P12	x	-	-	P30	-	x	x
P13	-	x	x	P31	x	x	x
P14	-	x	x	P32	-	x	x
P15	-	x	x	P33	x	x	x
P16	x	x	x	P34	x	x	x
P17	-	x	x	P35	-	x	x
P18	-	x	x	P36	-	x	x

Twenty-four participants performed the production task (Section 4.2.1), half of them being from the early acquisition group and the other half from the late acquisition group. Thirty participants performed the comprehension tasks (Sections 4.2.2 and 4.2.3), half of them being from the early acquisition group and the other half from the late acquisition group.

Each participant filled out an informed consent form as well as a personal background form, from which we collected the information in Table 1. The content of both forms was explained to each participant in TİD by a Deaf assistant. The conditions to which they are asked to give consent to were also explained to each

participant by the Deaf assistant, and each participant was informed that they have the right to request their data to be erased at any given time if their consent status has changed. Each task was also explained in TİD by the same Deaf assistant before the task session started, and she remained either in the same room or a connected room, depending on the task to be able to answer any potential questions.

4.2 Tasks

Three tasks were designed and run for the data collection process. A production task was used in order to collect the initial data, and two comprehension tasks (a picture selection task and an acceptability task) were employed in order to test the hypotheses made based on the production data.

4.2.1 Production task

A pilot task was prepared before the actual production task in order to be able to determine the best stimuli to prepare to elicit the target structures. Section 4.2.1.1 lays out the pilot task, and 4.2.1.2 lays out the details of the production task.

4.2.1.1 Pilot

To obtain causative and inchoative clauses, verbs that may be expected to display the transitivity alternation were listed as can be seen in Table 3:

Table 3. Preliminary List of Predicates Expected to Display Valency Alternation

break	burn	spill
break off	put-off	crumble
shatter	bounce	squish
cut	roll	open
bend	swing	close

The verbs in Table 3 were chosen based on both our preliminary observations on TİD and the alternating verbs listed in the ValPal corpus (Hartmann, Haspelmath &

Taylor Eds., 2013). Then, 51 copy-right free images showing situations that one can describe with the listed verbs were obtained via a google image search. Later these pictures were shown to the Deaf assistant in a randomized order, and she was requested to describe what she saw to another person who didn't see the images. This process was recorded via an HD camera. The camera captured both the consultant who described the pictures and the addressee to see any potential question & answer interaction between the addressee and the consultant. This pilot was repeated twice with the same consultant and two different addressees. Afterward, the pilot recordings were examined with the Deaf assistant, and possible structures that can be elicited via a picture description task were listed. This list revealed that some inchoatives and causatives surface as SVCs (*see* Section 5.1 and 5.2), extending the main discussion of this thesis to the structure of SVCs in TİD along with the causative-inchoative alternation.

4.2.1.2 Stimuli

The production task consisted of 4 sets of stimuli: causatives, inchoatives, unintentional/accidental causatives, and supernatural causatives. The stimuli in these four sets and the sources that they were taken from can be found in Appendix A. First of all, two sets of visual stimuli, one consisting of causative events and the other consisting of the inchoative (causer-less) counterparts of such events were prepared to elicit structures that display the causative-inchoative alternation. Moreover, two more sets of stimuli were prepared in order to elicit instances of different types of causatives for descriptive purposes as well as theoretical discussions.

The causative stimuli set had 17 items in total, all of which were in .gif format. Nine of these stimuli were cut or modified from publicly accessible online materials found on YouTube[9] and through a Google Image search.[10] 8 of these stimuli were made on Adobe Illustrator 2019 and Adobe Photoshop 2019 using template images taken from the publicly available copy-right free content on FreePik.[11]

An example of a causative stimulus can be seen in Figure 6 below:[12]



Figure 6. Causative stimulus sample to elicit "to break something off"

The inchoative stimuli set included 13 stimuli in total, all of which were in .gif format. Seven of these stimuli were cut or modified from publicly accessible online materials found on YouTube and through a Google Image search. Six of these stimuli were made on Adobe Illustrator 2019 and Adobe Photoshop 2019 using template images taken from the publicly available copy-right free content on FreePik. Two of the 13 stimuli were repeated twice, and one of the 13 stimuli was repeated three times in total as the event that they match in the causative set had the same event shown in 4 different manners incorporated to it for descriptive purposes. Namely, there were 2 stimuli for " to open" in the causative task, one performed by

[9] www.youtube.com
[10] https://www.google.com.tr/imghp?hl=tr&tab=wi&authuser=0&ogbl
[11] https://www.freepik.com
[12] Note that I am only able to provide the still frames of this stimulus as well as the following stimuli samples since the original format of the majority of the stimuli is in .gif format.

a human causer and the other by an animal causer. However, there could only be 1 inchoative counterpart to both of these causative stimuli, since we cannot modify a non-existent causer in the inchoative stimuli set. Similarly, there were three stimuli for “to rock (a cradle)” in the causative task, two of which are performed by animal agents, but with different body parts, and the remaining one by a human agent. There could also only be one inchoative counterpart of these three stimuli. Therefore, in total, the inchoative set also had 17 instances of production and annotation, each of which matches an item from the causative set. An example inchoative stimulus can be seen in Figure 7 below:



Figure 7. Inchoative stimulus sample to elicit “to break (intr)”

The unintentional/accidental production stimuli set aimed to elicit causative utterances in which the causer is not performing a strictly agentive act but causes the given act without intending to do so. This set consisted of 14 stimuli, 13 of which were in .gif format and the remaining one in .png format. Six of the stimuli in .gif format and one in .png were cut or modified from publicly accessible online materials found on YouTube and Google Image search. The remaining seven stimuli in .gif format were made on Adobe Illustrator 2019 and Adobe Photoshop 2019 using template images taken from the publicly available copy-right free content on FreePik. An example unintentional/accidental causative stimulus can be seen in Figure 8 below:



Figure 8. Unintentional/accidental causative stimulus sample to elicit “to cause/make something fall by mistake

The supernatural causation stimuli set aimed towards eliciting causatives in which the causation is strictly indirect. The set consisted of 10 visuals in .gif format, all of which were made on Adobe Illustrator 2019 and Adobe Photoshop 2019 using template images taken from the publicly available copy-right free content on FreePik. An example of a supernatural causation stimulus can be seen in Figure 9 below:



Figure 9. Supernatural causation stimulus sample to elicit “to turn something from blue to red”

4.2.1.3 The procedure

The participants sat in front of a laptop computer with a Deaf assistant sitting across. The stimuli were shown to them in a randomized order within each set. The participants were requested to describe to the Deaf assistant what they see in each stimulus. This process was recorded by 3 HD cameras. One camera recorded with the participant in focus, the second camera recorded the stimuli on the screen, and

the third camera recorded both the participant and the Deaf assistant at a wide-angle to be able to capture any potential interaction. All the participants saw each stimulus once and proceeded at their own pace, which means they had to click on the right arrow button on the keyboard to move on to the next stimulus. The participants were allowed to take short breaks at any point they needed. The hearing assistant who co-ran the tasks with the Deaf assistant was not present in the room during the recording in order not to distract the participants, but she was observing the task from the connected room, keeping eye contact with the Deaf assistant in case they might need help to resolve a potential technical issue or other issues.

4.2.1.4 Analysis

All four sets of the production data for each participant were annotated in MS Excel for the name of the event and the grammatical type (lexical verb or classifier) of the predicate of the target utterance. Classifier predicates were also annotated for sub-types. Up to three sequential predicates in the same clause were annotated to be able to capture serial verb constructions as well. Each hand was annotated separately to be able to represent utterances where the two hands are signing different signs at the same time. One-predicate clauses were marked as simplex clauses, and bi- or multi-predicate utterances were marked as complex clauses. The annotation rubric is exemplified in Table 4 below:

Table 4. Sample Annotation Rubric

Stimulus	Core Predicate	Predicate 1		Predicate 2		Predicate 3		Clause Type
		Hand1	Hand2	Hand1	Hand2	Hand1	Hand2	
x-01	lexical	break	break	-	-	-	-	simplex
x-02	classifier	push.HDCL	push.HDCL	fall.WECL	fall.WECL	fall	fall	complex
x-03	classifier	melt.WECL	-	spread	spread			complex

As an addition to the information in Figure 12, the adverb "SELF" (by itself) that we expected to see in the inchoative stimuli was also annotated 1 if it was observed and 0 if not.

Then, for the causative and inchoative sets, the core predicate of each utterance was chosen to determine what kind of causative-inchoative alternation method has been employed by that particular participant for that stimulus. What we consider the "core predicate" is the predicate that expresses the initiation in causative events, and the predicate that expresses the process in inchoative events. In cases of serial predication, these predicates were the first predicates in the serial verb construction.

Afterward, the annotated information on causative and inchoative sets was organized in a separate excel file in a format that can be used as a data frame in RStudio as exemplified in Table 5 below:

Table 5. Representative RStudio Data Frame for the Causative and Inchoative Sets

participant	acquisition group	stimuli	structure	clause type	predicate type	adverb SELF
1	late	1	causative	complex	classifier	0
1	late	2	causative	simplex	lexical	0
2	early	1	inchoative	complex	classifier	0
2	early	2	inchoative	simplex	lexical	1

The data frame was then transferred to RStudio (R Core Team , 2013). First of all, the N/A responses, which are instances of stimuli that the signer accidentally skipped during the task, were cleared.[13] Then, the alternation types explained in Table 6 were calculated:

Table 6. Determining the Alternation Types

Stimulus Tag	Core Predicate	Stimulus Tag	Core Predicate	Alternation Type
CAUS-01	classifier	INCH-01	classifier	classifier alternation
CAUS-02	lexical verb	INCH-02	lexical verb	labile alternation
CAUS-03	lexical verb	INCH-03	classifier	mixed alternation
CAUS-04	classifier	INCH-04	lexical verb	mixed alternation

[13] The N/A responses lead to the loss of 10 data points in total, 2 data points in the early acquisition group for the inchoatives tasks, and 8 data points in total in the late acquisition group, 5 of which for the inchoatives task and the remaining 3 for the intentional causatives task.

Then, the ratio of complex and simplex clauses produced by structure and age-of-acquisition grouping were calculated and plotted as a bar graph. In addition to this, the causative-inchoative responses were taken in corresponding pairs to calculate whether the response pairs were consistent with regards to complexity as laid out in Table 7:

Table 7. Determining the Complexity Types

Stimulus Tag	Complexity	Stimulus Tag	Complexity	Complexity Type
CAUS-01	simplex	INCH-01	simplex	simplistic
CAUS-02	complex	INCH-02	complex	exhaustive
CAUS-03	simplex	INCH-03	complex	medium
CAUS-04	complex	INCH-04	simplex	medium

If both responses to corresponding causative-inchoative stimuli were multi-predicate structures, these instances were marked “exhaustive”. If both responses to corresponding causative-inchoative stimuli were mono-predicate structures, these instances were marked “simplistic”, and in the case that one response in a corresponding pair was a mono-predicate clause and the other one was a multi-predicate clause, then such instances were marked “medium”. Moreover, the ratio of classifier and lexical predicates produced by structure and age-of-acquisition grouping was calculated and plotted as a bar graph. Afterward, the distribution of alternation types by age-of-acquisition grouping were plotted as a bar graph as well. The instances of the adverb ‘SELF’ in inchoative clauses were also plotted by age-of-acquisition grouping. Following these initial descriptive graphs, the average tendency of the early acquisition group to produce complex or simplex clauses, the average complexity of the response pairs, the adverb ‘SELF’ in inchoatives, and the three alternation types (Table 6) were also calculated and plotted as bar graphs with standard error bars. All the plots were made using the ggplot2 (Wickham, 2016) package. In addition to the plots, the clause complexity data was also fitted into a Bernoulli model using the brms (Bürkner, 2017, 2018) package, in order to layout

the probability of a signer being from the early acquisition group based on the ratio of the complex clauses that s/he produced.

Lastly, the annotations of all four sets were used for the purpose of describing the causative-inchoative structures in TİD as well as the theoretical discussion of this thesis.

4.2.2 Picture selection task

The picture selection task was prepared in order to determine whether negation in serial verb constructions is interpreted as negating all the verbs involved in the serial verb construction or just the matrix/core verb. This was designed to help determine whether result-related serial verb constructions that were observed in both causatives and inchoatives were mono-clausal or bi-clausal.

4.2.2.1 Stimuli

There were six target test sentences to be tested and 30 filler sentences that consisted of similar lexical items but unrelated structures.

Table 8. Test Sentences for The Picture Selection Test

Test Sentences	Potential Interpretations
1. MAN HIT VASE BREAK NOT	a. Neither the man hit the vase, nor the vase broke.
	b. The man hit the vase but the it didn't break.
2.SOLDIER SHOOT MAN DIE NOT	a. Neither the soldier shot the man nor did the man died.
	b. The soldier shot the man but he didn't die.
3.MAN KICK BALL ROLL NOT	a. Neither the man kick the ball, nor the ball rolled.
	b. The man kicked the ball but it didn't roll.
4.MAN POUR WATER FIRE DIE.DOWN NOT	a. Neither the man poured water onto the fire, nor the fire died down.
	b. The man poured water onto the fire but it didn't die down.
5.MAN HEAT ALUMINUM MELT NOT	a. Neither the man heated the aluminum, nor the aluminum melted.
	b. The man heated the aluminum but it didn't melt.
6.MAN PUSH CHILD FALL NOT	a. Neither the man pushed the child, nor the child fell.
	b. The man pushed the child but he didn't fall.

For each stimulus sentence, two pictures corresponding to two potential interpretations were prepared on Adobe Illustrator 2019 and Adobe Photoshop 2019

using template images taken from the publicly available copy-right free content on FreePik (Figure 10):

a.Visual for Interpretation



The man didn't hit the vase (for it to) break

b.Visual for Interpretation



The man hit the vase but the it didn't break.

Figure 10. Sample visuals for the two potential interpretations of the negated SVCs

All the stimuli sentences were constructed and recorded on video by the Deaf assistant. The glosses of the sentences in the videos can be found in Appendix B.

4.2.2.2 The procedure

The participants sat in front of a laptop computer with OpenSesame (Mathôt, Schreij & Theeuwes, 2012) task open in front of them and they were requested to select the picture that fits the interpretation of the test sentence using the keyboard arrows left and right. Each stimulus video was played twice and two pictures for them to select from appeared on the screen afterward. The participants did not have a time limit to choose a picture, but they were also not allowed to go back to re-watch the stimulus or re-choose a picture. Each participant saw the videos/sentences in random order. All the participants were allowed to pause the task and take a break at any given time. Neither the Deaf assistant nor the hearing assistant who co-ran the task was present in the room during the task in order not to distract the participants, but they were observing the task from outside the room, in case the participant might need help or pause the task to take a break.

4.2.2.3 Analysis

The OpenSesame (Mathôt, Schreij & Theeuwes, 2012) logs for each participant were transferred to RStudio (R Core Team, 2013) for the analysis. First of all, the randomized order of the responses was normalized. Secondly, the responses were separated by structure type in order to separate the test items from the fillers. Then the average response and the average response time for the target structure was plotted into a bar graph by age-of-acquisition grouping using the ggplot2 package (Wickham, 2016).

4.2.3 Acceptability judgment task

The acceptability judgment task was prepared to further test the structure of serial verb constructions that we observed in both causative and inchoative clauses in order to find out whether they are mono-clausal or bi-clausal.

4.2.3.1 Stimuli

39 sentences in total were constructed and recorded on video by a Deaf assistant. Table 9 below shows an example from each structure category and the number of items per category:

Table 9. The Outline of the Sentences in the Acceptability Judgement Task

Category	# of Stimuli	Example Gloss
a. SOVV	x6	MAN VASE HIT BREAK
b. SVS/OV	x6	MAN HIT VASE BREAK
c. Cleft	x6	MAN HIT BREAK *WHAT* IX VASE
d. Topicalization	x6	$\text{VASE}_{\text{TOPIC}}$, MAN HIT BREAK
e. Wh-extraposed	x3	MAN HIT BREAK IX *WHAT*
f. Wh preceding 2nd predicate	x3	MAN HIT *WHAT* BREAK
g. Wh-double	x3	MAN *WHAT* HIT *WHAT* BREAK
h. Wh-in situ	x3	MAN *WHAT* HIT BREAK
i. Wh-initial	x3	WHAT MAN HIT BREAK

The predicate pairs for the structure categories given in Table 9 are listed below in Table 10:

Table 10. The Predicate Pairs Used for the Structure Categories in the Acceptability Judgement Task

Structures a, b, c, d	Structures e, f, g, h, i
HIT-BREAK	HIT-BREAK
SHOOT-DIE	SHOOT-DIE
HEAT-MELT	HEAT-MELT
POUR.WATER-(FIRE) GO.OUT	_
PUSH-FALL	_
PUSH/HIT-ROLL	_

The glosses with of all the sentences shown in the task can be found in Appendix C.

4.2.3.2 The procedure

The participants sat in front of a laptop computer with OpenSesame task open in front of them. They were requested to rank how acceptable/grammatical the sentence was from 1 to 5 (1: unacceptable/ungrammatical, 5: acceptable/grammatical) using the number buttons on the keyboard. Each stimulus video/sentence played twice, and then the acceptability ranking screen appeared. The participants did not have a time limit to rank the sentence that they just saw, but they were not allowed to go back to re-watch the stimulus or re-rank a previous sentence. All the participants were allowed to pause the task and take a break at any given time. Neither the Deaf assistant nor the hearing assistant who co-ran the tasks was present in the room during the task in order not to distract the participants, but they were observing the task from outside the room, in case the participant might need help or pause the task to take a break.

4.2.3.3 Analysis

The OpenSesame (Mathôt, Schreij & Theeuwes, 2012) logs for each participant were transferred to RStudio (R Core Team, 2013) for the analysis. First of all, the randomized order of the responses was normalized. Secondly, the responses were separated by structure category. Then the average acceptability ranking and the average response time for each structure category by the age-of-acquisition grouping was plotted into a line graph using the ggplot2 (Wickham, 2016) package.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter presents and discusses the results obtained from the production and comprehension tasks in Chapter 4, within the theoretical and experimental framework outlined in Chapter 2 and Chapter 3. Section 5.1. describes the ways in which the causative-inchoative alternation manifests itself in TİD based on the production tasks and compares the results to the previous literature on such structures summarized in Chapter 2. Next, Section 5.2 interprets the results obtained from the comprehension tasks on SVCs in TİD. Lastly, Section 5.3 discusses the age-of-acquisition driven differences or lack thereof in the production of SVCs, based on the descriptive statistics of the production data.

5.1 The causative–inchoative alternation in TİD

There seem to be two main strategies in TİD to mark the causative-inchoative alternation. The first one is using labile verbs that can convey both transitivity and intransitivity without displaying any morphological difference. The second one is the alternation between a WECL and a HDCL.

A labile lexical verb can express both a causative predicate and its inchoative counterpart as can be seen in (27):[14]

[14] In the examples, H1 means what is signed on the dominant hand and H2 means what is signed on the non-dominant hand. Non-dominant hand refers to the hand which the signer does not or cannot use dominantly or at all in tasks such as writing with a pen in everyday life.

(27) a.



H1: PERSON IX PEN BREAK
H2: BREAK
"A person broke that pen."

b.



H1: WOOD EXTCL SELF BREAK
H2: EXTCL BREAK
"The wood(en) stick broke by itself."

The alternation in (27) is also known as conversion, a morphosyntactic alternation without an overt morpheme. The labile verb BREAK in (27) has been lexicalized from an original form of a HDCL, similar to the case presented by Engberg-Pedersen (2010) and Kimmelman (2018) in Chapter 2, Section 2.1.2. It is used in both the transitive and the intransitive alternates. This shows that once lexicalized, the classifier handshape in such cases does not affect argument structure anymore (Benedicto & Brentari 2004, p. 773; Engberg-Pedersen 2010, p. 44). Indeed, such forms can also be extended in meaning so that the manipulation or contact component is lost altogether as the following example shows. This example (28) is borrowed from a linguistically organized online dictionary of TİD: [15]

[15] Source: http://tidsozluk.net/tr/K%C4%B1rmak?d=1172. The last example on the page.

(28) 

H1: IX$_{1SG}$ IX$_{3SG}$ MUCH HEART BREAK
H2: BREAK
"…s/he broke my heart very much."

The causative-inchoative alternation in TİD can also be marked by a HDCL-WECL pair. Handling comes in two ways, grabbing as in (29a) and contact as in (30a). The intransitive counterparts of the grabbing and contact predicates are both realized with a WECL handshape as can be seen in (29b) and (30b):

(29) a. 

H1: WOMAN DOOR OPEN$_{GHDCL}$ _____ CLOSE$_{GHDCL}$
H2: _____ DOOR _____ LOOK _____
"The woman opened the door, looked inside and closed the door.

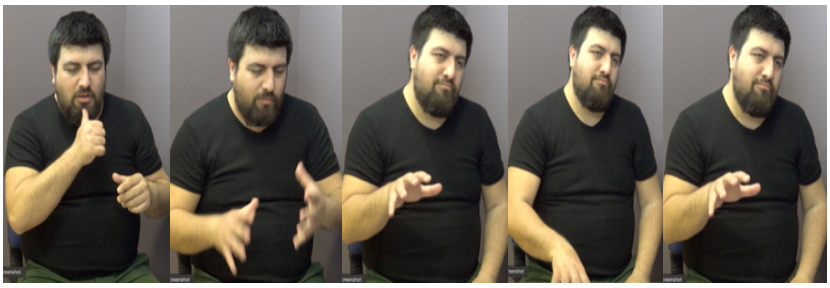
b. 

H1: DOOR OPEN$_{WECL}$
H2: DOOR OPEN$_{WECL}$
"The door opened."

In (30a) below, the causer/agent is initiating the causal event of a ball bouncing, but there is no indication for grabbing the object due to the nature of the caused event. This contrasts with (29a) in which the causer/agent is directly grabbing/handling the object that he is manipulating. Therefore, I propose that the type of classifier in (30a) should be called a contact-handling classifier (*henceforth*, CHDCL) as a sub-type of

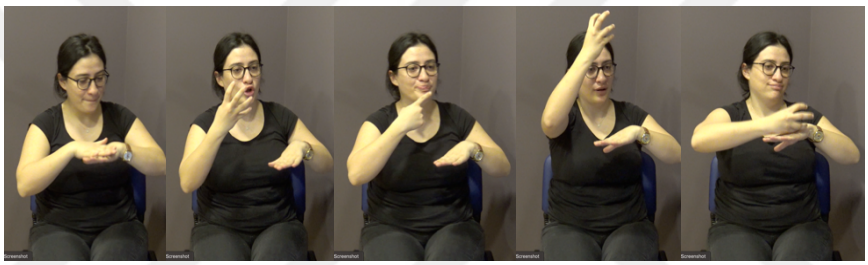
HDCLs while the type in (29a) should be called a grabbing-handling classifier (*henceforth*, GHDCL) (*see* also Supalla (1986) for a similar proposal for ASL). Note that the intransitive counterpart of (27a) is still realized as a WECL similar to (29b):

(30) a.



H1: BOY BALL $\text{BOUNCE}_{\text{CHDCL}}$
H2: BALL
"The boy is bouncing the ball."

b.



H1: FLOOR BALL RED $\text{BOUNCE}_{\text{WECL}}$
H2: FLOOR_____
"The red ball is bouncing on the floor."

What is observed in (29) and (30) is in line with Benedicto & Brentari's (2004) account, where the animate and agentive causer is argued to get introduced by a higher functional projection labeled as f_1, and the theme of the clause by a lower counterpart labeled as f_2 since the transitive predicate surfaces as a HDCL.

So far, we have surveyed human causers/agents in causative constructions and observed that the causative predicate can be a labile verb or either of the HDCL sub-types – GHDCL and CHDCL - while its inchoative counterpart can be either a labile verb or a WECL. When it comes to non-human causers such as the one in (31), we observe that the causative predicate is realized as a BPCL:

(31) 

H1: DOG BALL $PUSH_{BPCL}$_____

H2: DOG BALL $ROLL_{WECL}$_____

"Intended interpretation: The dog hit the ball roll."[16]

Given that the event in (31) is also of a causal nature, the only factor that affects the difference in the classifier type is the [±human] feature that the causer/initiator carries.[17] Since the animate non-human causer/initiator in this event does not have the same means of performing a grabbing/contact action as a human does, the initiation they perform gets realized through a BPCL, classifying a paw in this case. Therefore, we might also argue that BPCLs should be treated as a sub-type of contact HDCLs, differentiating based on [±human] feature. (31) is contra Benedicto & Brentari's (2004) observation that BPCLs can only be licensed in unergatives.

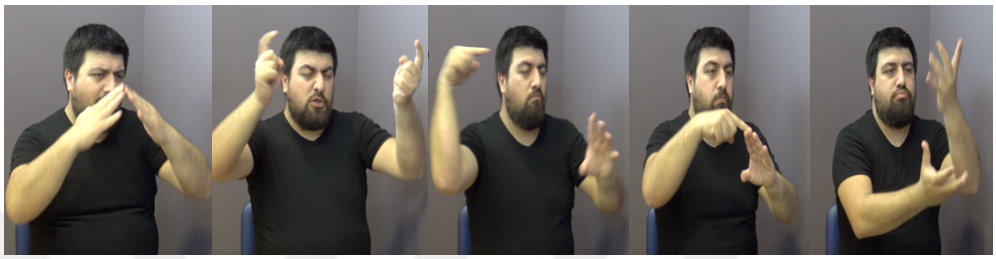
Having described animate non-human causers, now we can examine how causation with an inanimate causer manifests itself in TİD. Event structure-wise, verbs of natural events convey causatives, which makes the natural phenomenon in question the causer of the event even though it is inanimate and thus, inherently non-agentive. However, unlike all the causative structures we have seen so far, (32) does not include any variety of HDCLs, in fact, in such events, we observe WECLs which usually occur in inchoative structures with the causer overtly signed in the subject position:

[16] The glosses are translated to English in a way that reflects the original form and the meaning as intact as possible, which may result in ungrammatical sentences in English. If there are multiple possible interpretations or translations to English, we include all of them beneath the glosses.

[17] Among 17 causative/transitive stimuli presented, five of them had animal causers and all of the corresponding productions included a BPCL.

(32) a. 

H1: TREE PALM-TREE WIND.BLOW $\text{BEND}_{\text{WECL}}$
H2: ____ PALM-TREE WIND.BLOW $\text{BEND}_{\text{WECL}}$
"The wind makes the palm tree bend. / The wind is bending the palm tree. / The palm tree is bending because of the wind."

b. 

H1: HOUSE LIGHTNING $\text{LIGHTNING-FLASH}_{\text{WECL}}$ BURN
H2: HOUSE LIGHTNING HOUSE BURN
"The lightning-flash made the house (to) burn. / The lighting-flash burnt the house."

Whether the structures in (32) should be interpreted as a true causative or an inchoative with an adverb to convey the initiator is not entirely clear and should be tested further. However, Tang & Yang (2007) also consider a similar structure as a causative which they present as a counter datum to Benedicto & Brentari's (2004) claim that WECLs only appear in unaccusatives (15) repeated from Chapter 2):

(15) PAPER CL:a_flat_object_be_located_at_i, WIND CL:blow_flat_object_away
"A piece of paper is located here; the wind blows the paper away."
Tang & Yang (2007, p. 1247, 1251)

The lack of a HDCL in (32) is expected, given that a handling handshape of any subtype requires having limbs, thus animacy. In (31), we hypothesized that GHDCLs/CHDCLs and BPCLs are licensed depending on the [±human] feature of the causer: [+human] can license either a GHDCL or a CHDCL, and [-human] can only license a BPCL. Adding the information obtained from (32), one can

hypothesize that what licenses a HDCL versus a WECL is not the syntactic structure or the event structure of the clause but the [±human] feature of the causer, and what licenses different sub-types of HDCLs is, then, [±animate] feature of the causer, contra Benedicto & Brentari (2004). If this is the case, we should not observe any human causers expressed with a WECL. However, (33) below shows that this is not the story:

(33)



H1: WOMAN WALK$_{BPCL}$ ICE/COLD FLOOR$_{EXTCL}$
H2: _____ WALK$_{BPCL}$ ICE/COLD FLOOR$_{EXTCL}$



H1: FALL.WECL__ BY.MISTAKE BUMP.INTO$_{WECL}$
H2: FLOOR_____ FALL$_{WECL}$

"(Two) women are walking side by side on an icy surface. (One of them) falls and bumps into the other one by mistake, causing her to fall (too)."

(33) displays a causative event in which the initiation of the causation is unintentional, therefore not agentive by nature even though the causer is [+animate] and [+human]. We, once again, observe a WECL as the causer, which is also observed in Gökgöz (2020). This, then still being contra Benedicto & Brentari (2004), cannot be accounted for by [±animate] and [±human] features of the causer, but it also has to do with volition, in the sense that whether the causation event is initiated intentionally or unintentionally. This hypothesis makes the syntactic structure more dependent on the semantic features of the arguments of a verb, to

determine whether a clause is transitive or intransitive and whether the DP in the subject position licenses a variety of a HDCL or a WECL.

Let us go back to (31) and (33) and look at their event structure this time. The initiation and the process of the event are co-articulated by a BPCL and a WECL in (31) and by WECLs each of which refers to another participant of the event in (33). Co-articulation allows these structures to express both the initiation and the process simultaneously which is similar to the SVCs in the sense that the initiation and the process parts of the event are marked with different predicates (*see* Chapter 2, Section 2.2).

For (34), I will hypothesize that causative clauses with a HDCL+WECL combination are instances of SVCs. Let us look at (34) that shows that the HDCL does not always express both the initiation and the change of state but it is also possible that the initiation sub-event is encoded via a sub-type of a HDCL while the process initiated by it is encoded via a WECL immediately following it:

(34) a.

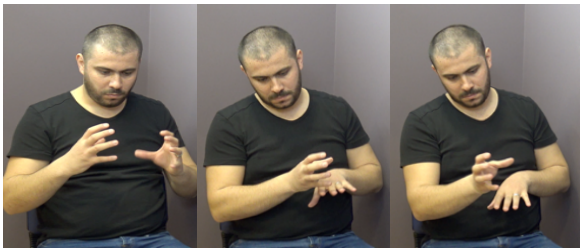


H1: CHILD MAN $\text{THROW}_{\text{GHDCL}}$ $\text{ROLL}_{\text{WECL}}$

H2: $\text{THROW}_{\text{GHDCL}}$ $\text{ROLL}_{\text{WECL}}$

"The child rolled the ball to the man."

b.



H1: BALL $\text{ROLL}_{\text{WECL}}$

H2: BALL $\text{ROLL}_{\text{WECL}}$

"The ball is rolling."

(35) is another example that encodes the same kind of sub-event structure as in (34):

(35) a. 

H1: _____ MAN $PUSH_{CHDCL}$ $FALL_{WECL}$

H2: WOMAN $STAND_{WECL}$ $PUSH_{CHDCL}$ $FALL_{WECL}$

"The woman is standing in front of the man. (He) pushed/caused (her to) fall."

b. 

H1: MAN $FALL_{WECL}$

"The man is falling."

Structures like (34a) and (35a) indeed resemble what Tang & Yang (2007) and Loos (2017) considered to be SVCs.[18] The manner of causation/initiation and the change of state that takes places due to this initiation is explicitly encoded even though the causal relationship is not inherently given like that of a lexical causative. As mentioned before, the second predicate of the SVCs in (34) and (35) encode a process initiated by the causer and the change of state.

To be able to elicit structures that might be indirect causation expressed by SVCs, we attempted to create events in which the causer initiates the causation without manually manipulating the theme, as exemplified in (36):

[18] Section 5.2 will elaborate on SVCs in TİD. Therefore we will not extend that discussion here in this section.

(36) a.



H1: SPELL PERSON CHILD CAST.SPELL



H1: SLEEP
H2: SLEEP

"The wizard bewitched the child to sleep."

b.



H1: OLD CAST.SPELL$_{GHDCL}$ CHANGE SLEEP
H2: CHANGE SLEEP

"(The) old (person) bewitched (the child) to sleep." [19]

c.



H1: OLD BALL CAST.SPELL$_{WECL}$ BOUNCE$_{WECL}$
H2: BOUNCE$_{WECL}$

"(The) old (person) bewitched the ball to bounce."

(36) shows instances in which the initiation of the causing event is not taking place by manual manipulation of the theme but by a relatively more abstract vessel. This allows us to see the separation of the initiation sub-event and the process sub-event,

[19] Our Deaf informant informed us that this sentence is ambiguous between "The wizard falls asleep" and "The wizard bewitches the child to sleep." without context because the signer preferred to use a null object. Yet, the signer himself was aware of the context since he produced the sentence looking at the relevant stimulus, and we have provided the translation of the sentence given the contextual information.

as opposed to how causation is manifested by different types of HDCLs. (36a) and (36b) are almost identical clauses, except that (36a) only displays the initiation and the result event, whereas (36b) includes an extra predicate "CHANGE" which overtly marks the "become" part of the causing event. It has been hypothesized in the literature that causative structures include a "become" sub-event layer which makes the difference between transitivity or intransitivity in verbs that alternate in valency (Schäfer, 2009), and (36b) seems to display such a structural property overtly. One can also draw a parallelism between the "CHANGE" sign and an auxiliary-like causativizer found in analytical causatives in spoken languages (Schäfer, 2009; Haspelmath, 2016 *inter alia*), and in sign languages (Sapountzaki, 2007; Quer & Frigola, 2006; Steinbach & Pfau, 2007; Engberg-Pedersen, 2010), one of them being DSL (63) repeated here from Chapter 2, Section 2.1.2):

(16) a. CHAOS$_f$ / ARBEJDE 1.p LEAVE /
"The disturbance made me leave."

b. DEAF / INDEX CHANGE HEAR / DUMB / CHANGE SPEAK
"He maketh both the deaf to hear, and the dumb to speak"
Engberg-Pedersen (2010, p. 56-57)

Another interesting difference in (36a) and (36b) is that (36a) does express the initiation verb with a GHDCL, however, what is being handled is not the theme but the instrument that initiates the causing event. One might expect this, given that (36a) is already an indirect causative in its event structure, yet GHDCLs as the instrument of initiation rather than direct handling are also observed in causative events in which the causer uses the instrument to directly manipulate the theme argument (37):

(37) 

H1: ALARM $HIT_{GHDCL/INST}$ SHATTER
H2: ALARM $FIRE.ALARM_{WECL}$_____ SHATTER
"(Someone) hit the fire alarm box shattered (with a hammer)."

Going back to (33c), we observe that the process of the event is realized with a WECL, as opposed to lexical verbs as in (36a-b). However, this is also observed in other multi-predicate causatives (31, 34, 35) that we hypothesized to resemble analytical causatives. Moreover, the instrument of initiation in (33c), is realized with a WECL, even though the (agentive) causer is indeed handling the instrument in the stimulus. Therefore, (36c) and (37) show us that the instrument of a causative event also does not have to be realized via a type of HDCL necessarily.

In the examples (31 to 37), we have seen that both the initiation of the causation event and the process itself can be encoded via separate predicates. Moreover, we observe SVCs in which the sub-events are expressed with separate predicates both in causative (38a) and inchoative (38b) structures:

(38) a. 

H1: MAN PENCIL BREAK SHATTER
H2: BREAK SHATTER
"(A) man snapped the pencil broken."

b.



H1: GLASS EXTCL SELF

H2: GLASS EXTCL



H1: SHATTER SPREAD

H2: SHATTER SPREAD

"(The) glass window shattered by itself (and spread everywhere)"

c.[20]



H1: MAN TOMATO $SQUISH_{GHDCL}$ CRASH SPREAD

H2: $SQUISH_{GHDCL}$ CRASH SPREAD

"A man squished the tomato crashed."

With the presence of multiple overtly signed predicates that express different sub-events in both inchoative and causative structures, (38) shows that the expressed events are complex (i.e. more than one sub-event is included) regardless of the valency of the predicate. This observation lines up with Talmy's (2000) and Tang & Yang's (2007) accounts that both causative and inchoative events include causation. However, what differs is whether the causation is internal or external. These parallel observations noted, (38) also displays a counterpoint to Tang & Yang's (2007)

[20] This utterance was acquired during the production tasks conducted for the BAP Project (Project Code: 14458) "Supporting Sign Language Development of Deaf Children with Hearing parents through linguistically-Informed Preschool Stories."

account. They argue that telic causatives which are realized through HDCLs cannot be followed by another predicate denoting the result sub-event, since the causation verb with a HDCL already encodes the change of state component. However, in TİD, we observe SVCs in which the first predicate is a HDCL in (38c). Therefore, I propose that the empty Cause head analysis for verbs that can alternate between transitives and intransitives (Alexiadou et al., 2006; Pylkkänen, 2008), which is also in line with Ramchand's (2008) empty InitP model, is compatible with the TİD findings. Moreover, since both transitive and intransitive predicates allow SVCs in TİD, one could also propose that these models should account for introducing multiple verbs that share one argument to the syntactic derivation. A mechanism to account for object sharing SVCs in another serializing language Dàgáárè has been proposed as Symmetric Sharing by Hiraiwa & Bodomo (2008) following Citko's (2005) idea of Parallel Merge and providing evidence for Double Headedness proposal of Baker & Stewart (1989). A discussion on potential accounts regarding the syntactic derivation of SVCs is beyond the scope of this thesis, however, there is no doubt that SVCs in TİD will provide valuable data for the continuation of such discussions in future studies.

Now that we described the types of strategies to make causatives, and the causative-inchoative alternation in TİD, we can move on to elaborating on SVCs.

5.2 A discussion of SVCs in TİD: are they truly SVCs or independent clauses?

SVCs in TİD are attested both in causative and inchoative clauses as can be seen in (38) from Section 5.1 repeated here:

(38) a.



H1: MAN PENCIL BREAK SHATTER
H2: BREAK SHATTER
"(A) man snapped the pencil broken."

b.



H1: GLASS EXTCL SELF
H2: GLASS EXTCL _____



H1: SHATTER SPREAD
H2: SHATTER SPREAD
"(The) glass window shattered by itself (and spread everywhere)"

The main question about structures like (38) is whether they are mono-clausal or not, as being mono-clausal is one of the main properties of SVCs among languages that can serialize their verbs (*see* Section 2.2). Section 2.2 summarized some of the relevant diagnostics for determining this property as a lack of coordinating or linking items, denoting a single event, negation, and extractability. SVCs observed in TİD so far (28-35) lack any overt coordination marker. Whether there are non-manual cues that suggest coordination is beyond the scope of this study but should be further tested. The single-event condition is discussed in Section 5.1 and this study argues that the serialized predicates denote the sub-events of the main event that is expressed by the clause. Our observation that the expression of causatives and

inchoatives in the form of SVCs are optional, i.e. causatives and inchoatives that are not serialized are also grammatical and attested for the same stimuli for which we observed SVCs, supports the argument that SVCs denote the same event as their non-serialized causative or inchoative counterparts. Aikhenvald (2006, p. 44) suggests that the semantic and pragmatic motivation behind forming optional SVCs must be further researched as there is not much literature on it yet. In the case of TİD, we can hypothesize that serializing a causative or an inchoative event probably has a pragmatic motivation, and it serves the purpose of transmitting more detailed information to the addressee. Producing SVCs also appears to be an early-acquisition group tendency, implications of which are discussed in Section 5.3.

To test for negation and extractability, two comprehension tasks were conducted. For negation, a picture selection task was used in which the participants were presented with negated SVC structures that might have two different interpretations depending on whether negation scopes over the whole SVC or just the predicate the negation follows.[21] The list of stimuli and their potential interpretations can be found in Table 8 from Chapter 4 repeated here:

Table 8. Test Sentences for The Picture Selection Test

Test Sentences	Potential Interpretations
1. MAN HIT VASE BREAK NOT	a. Neither the man hit the vase, nor the vase broke. b. The man hit the vase but the it didn't break.
2.SOLDIER SHOOT MAN DIE NOT	a. Neither the soldier shot the man nor did the man died. b. The soldier shot the man but he didn't die.
3.MAN KICK BALL ROLL NOT	a. Neither the man kicked the ball, nor the ball rolled. b. The man kicked the ball but it didn't roll.
4.MAN POUR WATER FIRE DIE.DOWN NOT	a. Neither the man poured water onto the fire, nor the fire died down. b. The man poured water onto the fire but it didn't die down.
5.MAN HEAT ALUMINUM MELT NOT	a. Neither the man heated the aluminum, nor the aluminum melted. b. The man heated the aluminum but it didn't melt.
6.MAN PUSH CHILD FALL NOT	a. Neither the man pushed the child, nor the child fell. b. The man pushed the child but he didn't fall.

[21] TİD is analyzed as a head-final language, in which the lexical negation items follow the other lexical item(s) or clauses that they negate (Sevinç, 2006; Gökgöz 2009, 2011).

In the (a) interpretations, the negation spreads over both semantic conjuncts, in the sense that neither of the given events has taken place. In the (b) interpretations, it is either the case that the semantic conjunct scopes over negation, resulting in either one of the given events being true while the other one is false, or the negation is strictly associated with the event denoted by the second predicate.

The participants were asked to choose between two visual stimuli showing these two interpretations (*see* Section 4.2.2 for a detailed explanation of the task design and the stimuli). Figure 11 below shows that more than 75% of participants chose the interpretation in picture b without a meaningful difference between age-of-acquisition grouping:

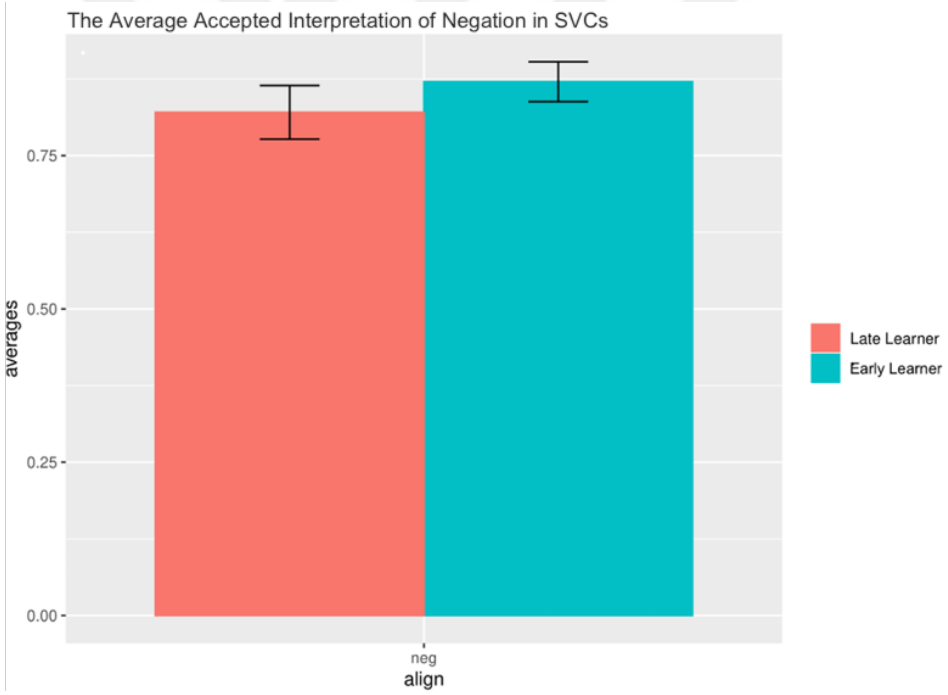


Figure 11. Average responses for the interpretation of negation in SVCs grouped by age-of-acquisition

However, this task fails to disambiguate the two potential semantic interpretations in (b) pictures, making the (b) interpretations potentially compatible with both a SVC analysis and a coordinated clauses analysis, thus providing us with insufficient information regarding our hypothesis. Such a difference in the interpretation of

negation in multi-predicative structures may be further tested out with a dialogue based task or a production task in which the participants are asked to negate or describe situations in context, in order to minimize the effects of lack of pragmatic cues.

The semantic interpretation of negation in SVCs aside, the test sentences may still provide us information on the status of lexical negation and its syntactic position in SVCs in TİD. Zeshan (2006) reports that "NOT" is the default clause negator in TİD, and it negates the predicate it follows. She notes that it might be difficult to decide whether "NOT" is placed claus-finally or just in the post-predicate position, because TİD is a head-final language. Therefore, she provides the surface syntactic pattern of a negated sentence in TİD as "argument – predicate – negation", without making further speculations about the exact position of "NOT" in the syntactic hierarchy. Moreover, "NOT" is also accompanied by certain non-manual markers of negation, such as a backward head tilt (Gökgöz, 2011). Gökgöz (2011) argues that the non-manuals are crucial to determine the syntactic scope of negation, as a counterpoint to the argument that the dominant negation strategy for TİD is the manual negation (Zeshan, 2003, 2004, 2006; Pfau, 2006). He notes that the backward head tilt accompanies %70 of the sentences he observes with a manual negation marker (39a), and in %30 of these cases the backward head-tilt spreads over the predicate and not just the negation item (36b):

(39) a.



IX$_1$	MUZ	(ÖNE) ATMAK	DEĞİL
I	banana	(front) throw	not

'I did not throw the banana to the front.'

b.



'I didn't do (it).'

Gökgöz (2011:60-61, with permission from the author)

Having laid out the basic observations about negation in TİD, let us see how negation appears in other SVC languages to have some context with which we can interpret the TİD data. Other SVC languages like Dàgáárè (spoken in Ghana and Burkina Faso) (40), and Ibibio (spoken in Nigeria) (41), allow negation to only appear before the first verb of the SVC, and the negated meaning spreads over the whole SVC:

(40) a. ò bá sɛ́ nɛ́nè ɔ̀ɔ̀.
3SG NEG roast meat eat
"He did not roast meat and eat it."

b. ?*ò sɛ́ nɛ́nè bá ɔ̀ɔ̀.
3SG roast meat NEG eat
"He roasted meat and did not eat it."

c. *ò bá sɛ́ nɛ́nè bá ɔ̀ɔ̀.
3SG NEG roast meat NEG eat
"He did not roast meat and not eat it."

Hiraiwa & Bodomo (2008, p. 801)

(41) a. bɔ̀ì ngwét ádò níé
receive.PL book DEM own
"Take those books and own them."

b. ké ù-bɔ̀ì ngwét ádò (*ké) ú-níé
NEG 2SG-receive.PL book DEM NEG 2SG-own
"Don't take and own the books."

Major (2015, p. 138)

(40) and (41) not only show that SVCs in Dàgáárè and Ibibio don't allow both verbs in an SVC to be negated at the same time, but it also shows that only one, in this

case, the first, verb can bear negation and the negated meaning spreads over the whole SVC. TİD shows a similar pattern in the sense that only one of the predicates can bear negation, but as the picture selection test revealed, the negated meaning only spreads over the predicate it immediately follows. (42) shows an example sentence with the two possible interpretations:

(42)[22] a.____re ___le _____le ____re
_____pc _____fht ___bht



H1: MAN VASE HIT BREAK NOT

Accepted interpretation: "The man hit the vase but it didn't break."
Unaccepted interpretation: "The man didn't hit and break the vase.

b.*MAN VASE HIT NOT BREAK[23]

The fact that TİD also allows negation in one position, and not in between the two predicates resembles the case in Dàgáárè (40) and Ibibio (41), yet in the case of TİD, negation is adjacent to the 2nd predicate and it follows the given predicate instead of preceding it. This is not expected, however, since TİD is a head-final language and whether the negation must be clause-final or just post-predicate is unclear as Zeshan (2006) mentions. Since there are two sequential predicates for the negation to follow in SVCs, we consider that the negation following the 2nd predicate cannot necessarily be the sole reason why the accepted negated interpretation remains limited to

[22] The abbreviations of non-manual markers in (39) and the following examples are as follows: fht: forwards head tilt, pc: puffed cheeks, le: lowered eyebrows, re: raised eyebrows, bht: backwards head tilt, hs: head-shake.
An elaborate analysis on what non-manual markers indicate for the structure of SVCs is beyond the scope of this thesis; however, the non-manual markers in the relevant examples are not left out for non-manual markers such as bht or hs are related to phenomena such as negation, wh-words, or the topic in the given sentences, and they are best given in the context of other non-manual markers that precede, follow or overlap them.

[23] This judgement was elicited by personal communication with our Deaf informant.

spreading over the 2nd predicate only. To be able to clearly conclude that the negation cannot spread over the 1st predicate in the SVC is due to the two predicates belonging to separate clauses, we must know more about whether the negation in TİD is constituent negation or sentential negation. Zeijlstra (2004) surveys several tests to determine whether a given negation item is sentential or constituent negation; such as NPI licensing, the co-occurrence of other negation items like "either", negative tag questions, negative quantifiers etc., but he notes that these tests vary depending on the specific language, therefore not only one needs to know how these structures function in a given language but also one needs to know whether they are suitable for the typology of it. He also adds that what is meant by constituent negation is often left unclear in many studies, making it difficult to interpret the results of such syntactico-semantic tests. To the best of my knowledge, there is not much previous study on how other negation items beyond the manual and non-manual negators work in TİD. Therefore, further studies on NPIs, negative quantifiers, and most importantly clause boundaries in TİD are required to be able to comment more on this topic.

To sum up, the accepted interpretations of negated SVCs in TİD indicate bi-clausalness at first sight, yet the lack of further information regarding the scope of negation, and clause boundaries in TİD leaves us with unclear results. Moreover, as we will see, the extractability results paint a different picture, which complicates the SVC analysis.

To test for extractability, an acceptability/grammaticality judgment test was conducted, in which the participants rated SVC sentences that include topicalization, clefting, and wh-questions where the wh- item is moved into various positions, between 1 and 5 (1: the most unacceptable, 5: the most acceptable) (*see* Section

4.2.3 for a detailed explanation of the task design and the stimuli sentences). The results can be seen below in Figure 12:

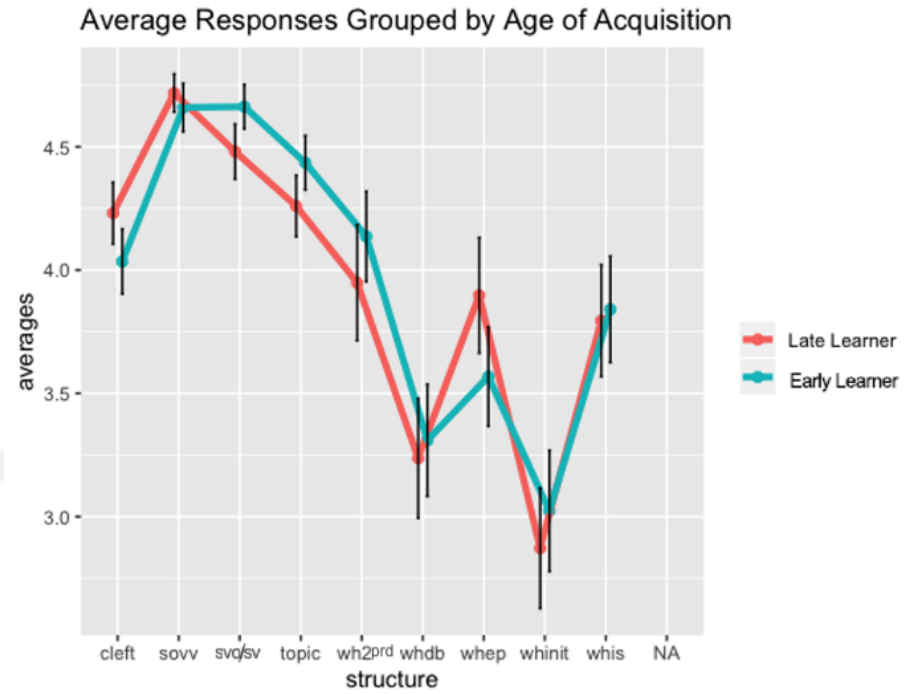


Figure 12. Average responses for acceptability judgement tests grouped by age-of-acquisition

The structural categories in the x axis are exemplified in Table 11 with their abbreviations:

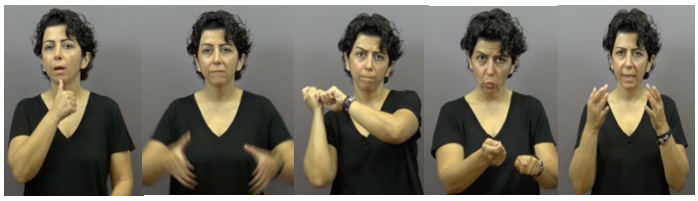
Table 11. Structures Presented in Table 9 with Their Respective Abbreviations

Category	# of Stimuli	Example Gloss
a. SOVV	x6	MAN VASE HIT BREAK
b. SVS/OV	x6	MAN HIT VASE BREAK
c. Cleft	x6	MAN HIT BREAK *WHAT* IX VASE
d. Topicalization	x6	$VASE_{TOPIC}$, MAN HIT BREAK
e. Wh-extraposed	x3	MAN HIT BREAK IX *WHAT*
f. Wh preceding 2nd predicate	x3	MAN HIT *WHAT* BREAK
g. Wh-double	x3	MAN *WHAT* HIT *WHAT* BREAK
h. Wh-in situ	x3	MAN *WHAT* HIT BREAK
i. Wh-initial	x3	WHAT MAN HIT BREAK

Note that SOVV (40a) structure is the default SVC structure observed in the production tests so far, and the fact that it is rated the closest to 5 by both acquisition

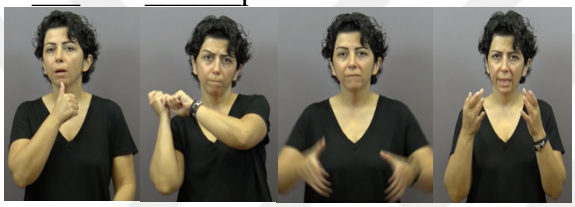
groups confirm that these structures can be accepted as a base which we can compare the clefting, topicalization, and the various wh-constructions (43):

(43) a. ____re _____le
___bht ____pc _____fht



H1: MAN VASE HIT BREAK (SOVV)
H2: VASE HIT BREAK
"Man hit the vase (it) broke(n)."

b. ___re _____le _____le
___bht _____pc



H1: MAN HIT VASE BREAK (SVS/OV)
H2: HIT VASE BREAK
"Man hit the vase (it) broke(n)."

SOV is also the default word order in TİD among the other possible word orders such as SVO (Arık, 2006; Sevinç, 2006; Açan, 2007; Kubuş, 2008; Gökgöz & Arık, 2011; Gökgöz, 2011; Dikyuva et al., 2015 *inter alia*), so it is not surprising that an SOVV serialization is rated highly acceptable.

The SVS/OV (43b) structure, which is also rated almost 5 by both acquisition groups, might be a case of verb raising or a coordinate structure that denotes the same event as its SVC counterpart does, but in two separate parts. However, it might also be the case that the SVS/OV (43b) is the base structure and the SOVV version above (43a) is a result of object shift. [24] In either case, these two word orders

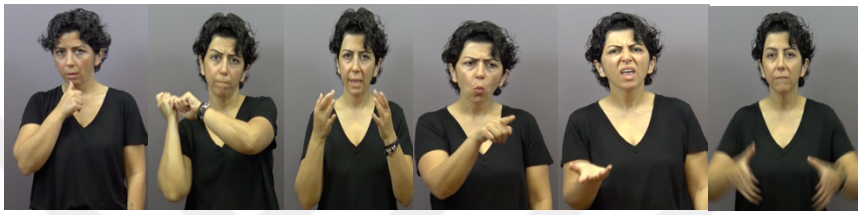
[24] Sevinç (2006) considered SVSV structures as coordination, yet the SVSV items she used included an overt "ve" (and) in between the SV clauses. She has one SVSV example that is not marked as coordination, which also does not include any "ve" (and) sign:

SOLDIER WAR MAN SHOOTi DIEi (Sevinç, 2006, p. 34)

are rated very highly accepted, and SVS/OV declaratives are attested in our production data as well (35a). Therefore, we are taking them as a base to compare to the other structures that we are testing in this task.

As for clefted and topicalized sentences, they are rated above 4 on average out of 5, which indicates that the shared argument by the two predicates can be extractable from its original position to the periphery.

(44) a. _____le
____fht _____ hs _____re



H1: MAN HIT BREAK IX WHAT VASE
H2 : HIT BREAK WHAT VASE
"What the man broke was the vase." (cleft)

b. _____ pc
_____re _____le
_____fht



H1: VASE$_i$ IX$_i$ MAN HIT BREAK
H2: VASE HIT BREAK
"(It is) The vase, the man broke (it)." (topic)

(44) brings up a general question about how clefts and topics works in TİD. There is not much literature on possible clefting structures in TİD. Wilbur (1996, p. 210) considers the structure in (45) a clefting in ASL:[25]

(45) IX$_1$ DISLIKE WHAT LEE POSS TIE
"What I dislike is Lee's tie."

Wilbur (1996, p. 210)

She also notes that signers often don't use conjunctions such as "ve" (and) or "ama" (but) and, prefer serializing structures to express sequential events. Whether she means a conjunction without an overt conjunction marker or a true SVC is unclear, as it is not the focal point of her argument.

[25] *See* Caponigro and Davidson (2011) for criticism.

The structure of (45) is almost identical to the one we see in (44a), with the only difference being the SVC in (44a). Note that ASL also commonly displays the SOV word order among other word orders (Padden, 2016), similar to TİD. Given the obvious similarity between the two structures in TİD and ASL, and our Deaf consultant's interpretation combined, we consider (45b) a clefting structure, and argue that it provides evidence for the extractability of the object out of an SVC.

As for topic structures like (45b), Makaroğlu (2012) notes that old information, i.e. topic, appears sentence initially (46a), and contrastive focused items also surface at the same position (46b):

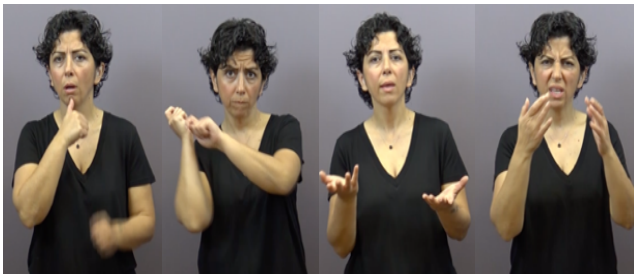
(46) a. FRUIT, APPLE ALI LIKE A.LOT
"As for fruits, Ali likes apples a lot."

b. Q: Did you go to Ankara or İstanbul yesterday evening?
A: ANKARA YESTERDAY EVENING GO
"Ankara is where I went to, (not İstanbul)".
adapted from Makaroğlu (2012, p. 68-69)

He does not make explicit claims as to whether the topic or focus items at (46) are moved or based generated there but he discusses and assumes movement for focus later on when dealing with more examples, and different word orders (Makaroğlu, 2012, p. 69-70). Therefore, especially for the sake of the extractability discussion, we can follow Makaroğlu (2012) on assuming movement and argue that the object being able to surface at the left periphery as topic (45b) instead of its more canonical position (43) shows that SVCs display a mono-clausal nature rather than two conjoined clauses, as an across-the-board movement operation would be banned in the latter since the moved constituent would start as the object of the first, SOV clause but the subject of the second, SV clause, as in "*What did [the man hit ___] and [___ break]?"

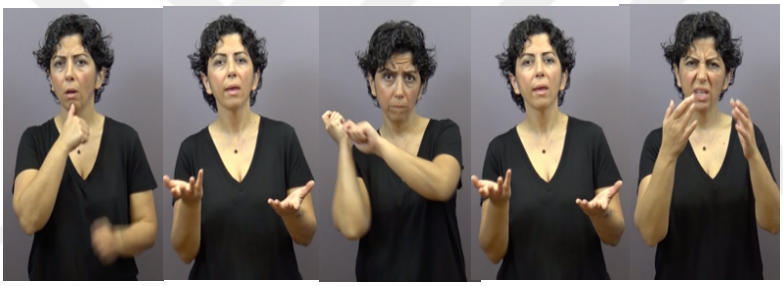
Now that we have discussed what topic, cleft, SOVV and SVS/OV structures might show, let us move on to the Wh-sentences used in the acceptability task:

(47) a._____le ____re _____le
___fht _ ____hs



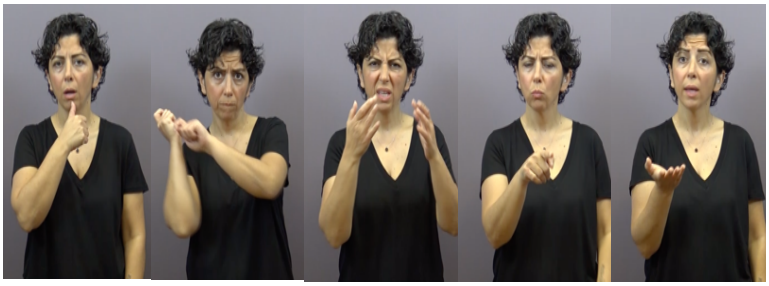
H1: MAN HIT WHAT BREAK (WH preceding 2nd predicate)
H2: HIT WHAT BREAK
"What did the man hit (e) break?"

b. _____le _____re _____le _____re _____le
_____hs _____fht _____hs



H1: MAN WHAT HIT WHAT BREAK (WH-double)
H2: WHAT HIT WHAT BREAK
"What did the man hit (what) break?"

c. _____le ____re
_____fht ____hs
_____pc



H1: MAN HIT BREAK IX WHAT (WH-extra-posed)
H2: HIT BREAK WHAT
"The man hit (e) break. What is that? / What is it that the man hit (e) break?

d. _____re _____fht
_____hs _____le



H1: WHAT MAN HIT BREAK (WH-initial)
H2: WHAT HIT BREAK
"What did the man hit (e) break?"

e. _____ re _____fht
_____le _____hs _____le



H1: MAN WHAT HIT BREAK (WH-in-situ)
H2: WHAT HIT BREAK
"What did the man hit (e) break?"

(47a), where the wh-element is in the object position of an SVOV declarative base, was rated the highest among all the wh-clauses in the task, with around 4 out of 5. (47c), where the wh-element is extraposed to the right with an accompanying pointing sign, and (47e), where the wh-element is in the object position of an SOVV declarative base, are the next highest-rated, with approximately 3.5 out of 5. (47b), where the wh-element is doubled in the two possible object positions, was judged to be slightly bad, with just above 3 out of 5, and lastly, (47d), where the wh-element is sentence-initial, received the lowest ranking with just below 3 out of 5. In order to interpret these results, let us first lay out some of the basics of Wh-structures in TİD. Wh-items can surface at multiple syntactic locations such as clause initially (48b), clause finally (48c), pre-verbally (48a), and doubled (48d) in which case one of the

copies usually surface in-situ and the other copy surfaces clause-finally (Zeshan, 2006; Göksel & Kelepir, 2013). İşsever & Makaroğlu (2013) suggest that the non-in-situ wh-element in (48b) involves wh-movement to the left, and the non-in-situ wh-element in the case of doubling in (48d) to involve movement to a position on the right:

(48) a. _____wh
INDEX$_2$ WHAT READ



INDEX$_2$ WHAT READ

b. _____wh
WHAT$_i$ INDEX$_2$ t_i READ



WHAT INDEX$_2$ READ

c. _____wh
INDEX$_2$ t_i READ WHAT$_i$



INDEX$_2$ READ WHAT

d. _____wh
INDEX$_2$ WHAT$_i$ READ WHAT$_i$



INDEX$_2$ WHAT READ WHAT

e. * WHAT$_i$ INDEX$_2$ WHAT$_i$ READ
'What did you read?'

İşsever & Makaroğlu (2013, p. 148-149, with permission from the authors)

Note that (48a) and (47a) correspond to each other except for the fact that in (47a), the wh-phrase is sandwiched between the two predicates in its in-situ position. We can also see that (48e), which is ungrammatical, and (47b), which is rated rather low

in our study, correspond too, which makes the low ratings of (47b) not unexpected since the doubled wh-element is not situated at the allowed right periphery position (cf. (47d)). Moreover, (47d) and (48b) correspond to each other; they include a clause-initial wh-element. (48b) is reported to be grammatical by İşsever & Makaroğlu (2013, yet (47d) in our data is the lowest rated structure. There might be dialectal variation in this regard between Ankara TİD dialect which İşsever & Makaroğlu (2013) base their work on and İstanbul TİD dialect which the current work is based on. İşsever & Makaroğlu (2013) don't seem to have any data that corresponds to (44c), which resembles the ASL cleft structure. However, we will comment on that structure later on. Before moving on to interpreting the ratings received for our test structures, we need to take a look at the non-manuals attested in interrogatives in TİD as well.

Zeshan (2006), Açan (2007), Göksel et al. (2009) and Makaroğlu (2012) among others report that there are multiple non-manuals related to content questions such as horizontal head shake, raised eyebrows or, forward or backward head tilt. Zeshan (2016) states that eyebrow positions (lowered or raised) regarding interrogatives vary across signers unlike head shake, and therefore she proposes eyebrow position, whether lowered or raised, might be an intonational marker rather than a grammatical marker for interrogatives. Horizontal head shake is observed by Zeshan (2016) and Göksel et al. (2009); however, Makaroğlu (2012) notes that Göksel et al. (2009) do not provide any examples for horizontal head shake, and further evidence is required to make this statement since his own data does not include this non-manual. This variation may also result from a dialectal difference. All the content questions prepared by our Deaf consultant include a horizontal head

shake that takes scope over the wh-phrase along with lowered eyebrows scoping over the SVC (47).

Now let us proceed to interpret what the wh-sentences might show. First of all, we argue that the lowered eyebrows spreading over the SVC in all the wh-sentences provide evidence that these predicates are in the same domain/clause. The acceptability ratings show that (47a), (47c), and (47e) are better favored compared to (47b) and (47d). Given that the wh-phrase in (47e) is in-situ, and this seems to be the default wh-position for TİD (İşsever & Makaroğlu, 2013), the higher rating of these items is expected, and we can use these as a base to compare other wh-structures. The relatively higher rating of (47a) shows us that the wh-phrase can indeed be extracted from its in-situ position, and possibly moved, following İşsever & Makaroğlu (2013). This might mean that the pre-verbal position of the second predicate in the SVC is in the same clause/domain with pre-verbal position of the 1st predicate. The fact that (47b), with wh-doubling, is rated lower assures us that it is probably not the case that (43a) has two wh-phrase copies in each pre-verbal position of the sentence, one of them not being phonologically realized. The acceptability rating of (44c) seems to be in line with İşsever & Makaroğlu's (2013) findings that the wh-phrase can be moved to the right periphery. Given that the wh-phrase would have to pass both the predicates of SVC, if we assume movement following İşsever & Makaroğlu (2013), the relatively higher rating of this structure indicates that the two predicates in the SVC must be local to each other or be dominated under the same functional head so that the locality constraint is not breached (*see* Chomsky, 1986; Manzini, 1992; Svenonius, 2001 among others for a detailed explanation on locality).[26] The relatively lower acceptability rating that (47b) receives may be

[26] This thesis does not aim to make strong claims as to how SVCs are built in the syntactic structure, further study would be required to be able to do such analyses.

explained by İşsever & Makaroğlu's (2013) previous observation that the second copy of a wh-element can only be at the right-most position (compare 48d to 48e), and the second wh-phrase in (47b) immediately precedes that position which is occupied by the 2nd predicate of the SVC. Therefore, (47b) does not show much as to whether SVCs are mono-clausal or bi-clausal. The lower acceptability of (47b) might also be due to that the object to which the wh-phrase refers is shared by the two verbs of the SVC, and this makes the existence of two wh-copies problematic, as it might lead to an interpretation of an object for each verb interpretation. Lastly, the relatively lower acceptability rating of (47d) seems to collide with (48b). However, our Deaf consultant's own judgment also rules out any wh-initial content question unless the wh-phrase is referring to the subject. We accept that there might be dialectal variation across signers with regards to clause initial wh-phrases that do not refer to subjects. Moreover, there might be other syntactic obstacles that affect wh-movement/appearance in the left periphery, which would require further research on this topic.

So far, the cleft, topic, and wh-phrase structures present a general picture that leads us to propose that the constructions under investigation can be interpreted as SVCs in TİD showing mono-clausal properties. Of course, a rigid statement would require the testing of more structures and a task with more early-acquisition participants. Having interpreted the acceptability ratings, we now discuss whether this task reveals anything about potential age of-acquisition effects.

Figure 12 above shows that acceptability/grammaticality rankings among the two age-of-acquisition groups do not differ from each other. Even though the comprehension of the SVCs does not seem sensitive to the age-of-acquisition, the comparison of the reaction times of early and late acquisition groups reveal that

comprehension speed might be an age sensitive phenomenon depending on the structure as Figure 13 shows:

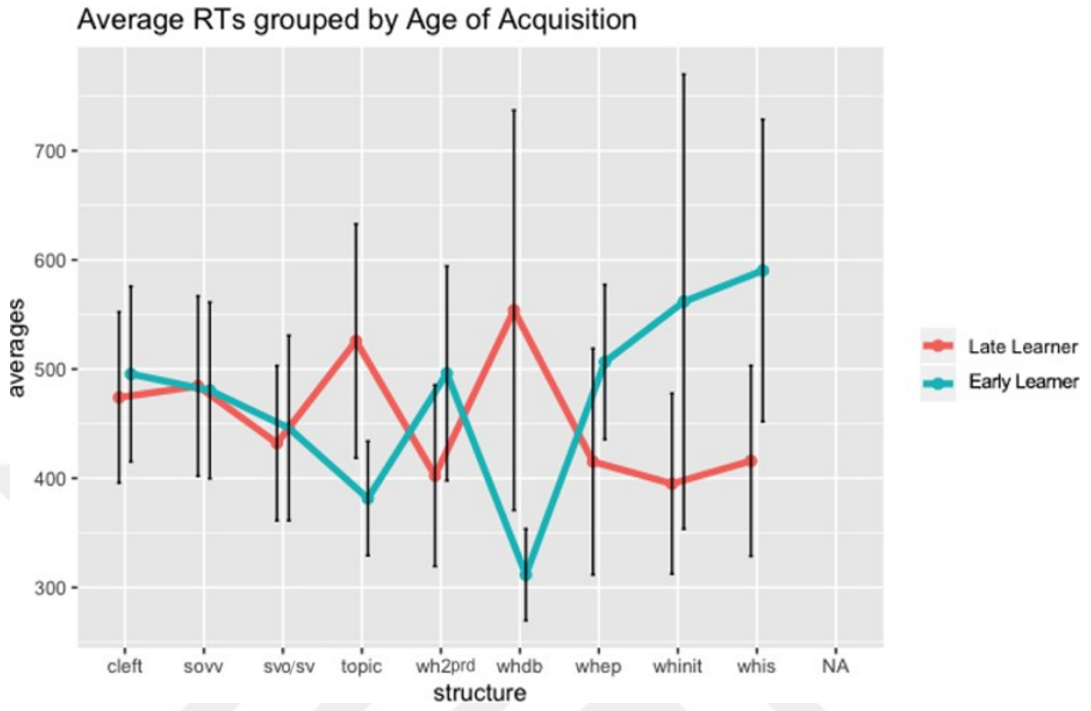


Figure 13. Average response times for acceptability judgement tests grouped by age-of-acquisition

The average RTs for clefting, SOVV, and SVS/OV structures seem to be almost identical. Note that all three of these structures were rated above 4.5 out of 5. The average RTs for the remaining structures tend to differ. Topicalized structures, which were also rated above 4.5 out of 5 by both groups, have lower RTs for the early acquisition group compared to the late acquisition group. The standard error lines do intersect even though by a small amount, which indicates that more participants would be needed to determine whether this difference in RTs is significant or not. What we observe for wh-preceding-2nd-predicate structures, which were rated around 4 out of 5 on average by both groups, is the opposite case of what we observed in the topic RTs. The early acquisition group has higher RTs compared to the late acquisition group. However, the standard errors of the two RTs

overlap, meaning that more participants would be needed to determine whether this difference in RTs is significant. The average RTs for whdb structures, unlike the ones before, seem to have a meaningful difference even though participant deviation is large in the late acquisition group; the early acquisition group have lower RTs, indicating that they were quicker to respond. Note that this structure received an average rating between 3 and 3.5, meaning that this structure is not clearly acceptable or not. This, then may be interpreted that early acquisition signers might be quicker at detecting acceptability/grammaticality anomalies. The average RTs for the following three structures whep, whinit, and whis show the opposite picture at first glance, as the average RTs for the early acquisition group seem to be 100-200 milli-seconds higher. Yet, the fact that standard error lines are so large for both groups and that they intersect indicates that there is a lot of participant variation on the RTs for these structures and we would need more participants to come to a clearer conclusion. Note that whep and whis structures are rated in between 3.5-4, showing that these are more likely to be acceptable/grammatical by both groups, while whinit structures are ranked the lowest of all structures presented as they got ranked 3 and below on average. These rankings between 3-4 indicate that these structures are not as clearly acceptable as the ones ranked 4 and above but not entirely unacceptable or ungrammatical given that 3 out of 5 is still in the upper half of the scale. Of course, one must keep in mind that the acceptability ratings may have been affected by semantic and lexical restrictions and the lack of context, as all these test items were stand-alone sentences given with no preceding context.

Having discussed the age-of-acquisition differences for the RTs observed in the acceptability/grammaticality task, we can now proceed to discuss the potential

age-of-acquisition differences in the production of complex clauses, i.e. multi-predicative clauses that are analyzed as SVCs.

5.3 Age-of-acquisition effects on the production of alternations and SVCs

In Section 2.2, I mentioned that age-of-exposure to linguistic input has been shown to affect the production and comprehension of complex structures. To examine whether it is the case for TİD users' production of causative-inchoative structures, the annotated production data for both early and late acquisition groups were analyzed.

We start with Figure 14 below to discuss the different alternation types produced by early and late acquisition groups:

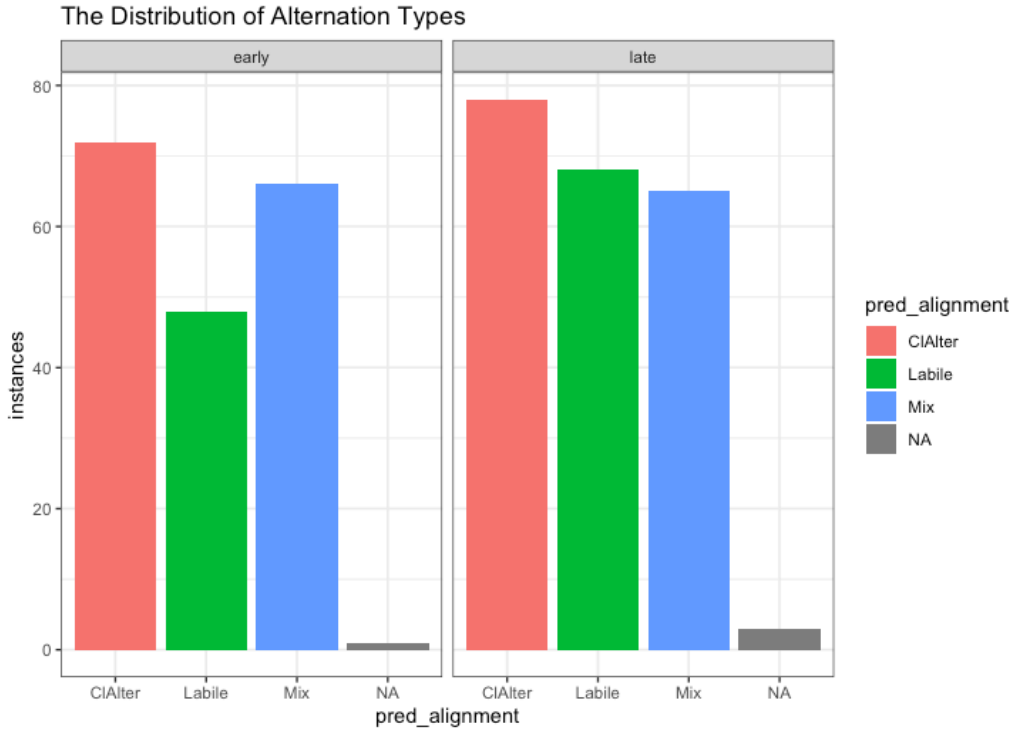


Figure 14. The distribution of types of causative-inchoative alternations produced by early and late acquisition groups

Figure 14 above shows the number of instances in which the two acquisition groups produced classifier alternation, labile alternation (lexical verbs), or a mix of these

two where either one of the causative-inchoative pair was signed with a classifier and its counterpart was signed with a lexical verb. The number of instances seems to show no significant difference between the early and the late acquisition groups regarding the instances of alternation expressed with classifiers, whereas the number of instances in which the late acquisition group produced labile verbs to express the causative-inchoative alternation is higher than those produced by the early acquisition group. The mixed instances seem to be roughly equal for both groups. Overall, the graphic tells us that there might be a tendency to prefer classifier alternations over labile alternations although mixed pairs are also acceptable. However, the number of instances in which these alternation types are produced alone does not give us a clear picture of whether any of these strategies for marking the causative-inchoative alternation is an early or late acquisition tendency.

Figure 15 below provides a more informative picture as to the rate of alternation types produced by the early acquisition group versus those produced by the late acquisition group:

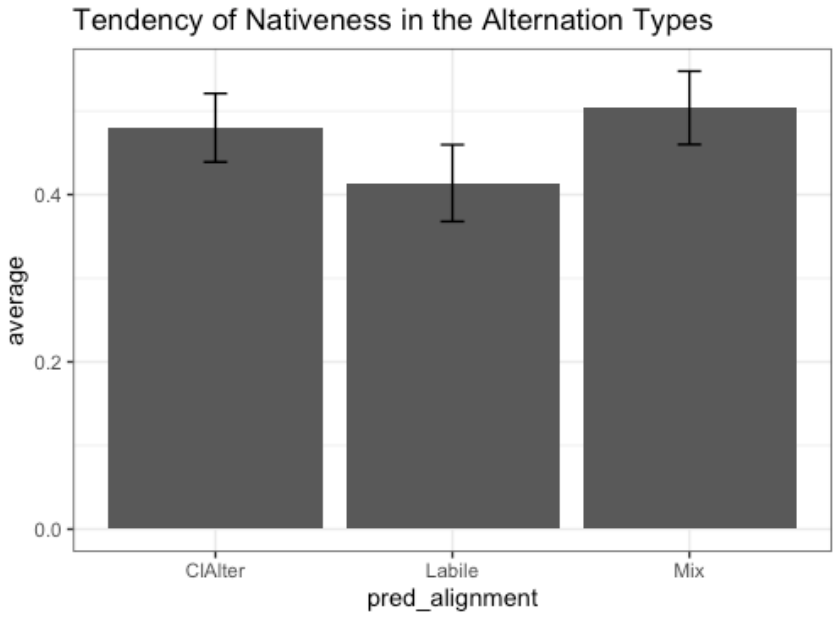


Figure 15. The degree of "nativeness" in the usage of alternation types produced

Figure 15 above shows the early acquisition group's tendency for producing each alternation. Such a tendency is calculated for each alternation type by dividing the number of instances produced by the early acquisition group by the total number of each alternation type including both the productions of early and late acquisition groups. Given that the standard error lines intersect, we cannot conclude that there is a particular early or late acquisition tendency towards employing any of these strategies to mark the causative-inchoative alternations.

Next, in Figure 16, we check the average rate of complex and simplex clauses produced per structure by early and late acquisition groups:

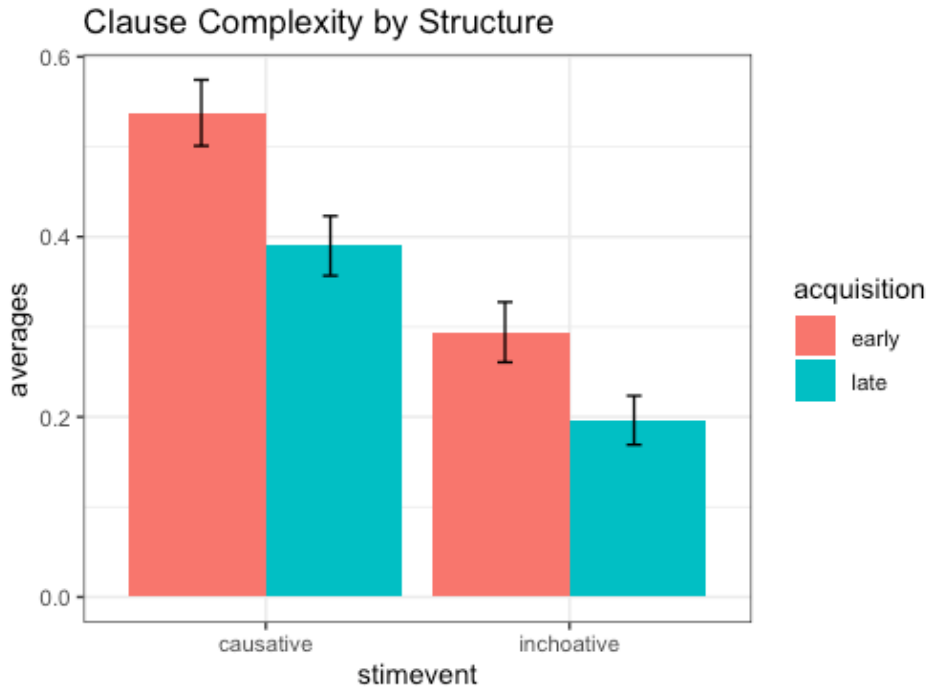


Figure 16. The distribution of clause complexity within each clause type grouped by age-of-acquisition

Figure 16 above reveals that the average number of complex clauses produced per structure is higher in the early acquisition group. The fact that the standard errors of early and late acquisition groups do not intersect points to a difference that might be significant with regards to age sensitivity. However, to be able to elaborate on the

possible age-of-acquisition effects on clause complexity, we need to take a look at this phenomenon in more detail.

Now, we consider whether there is a difference in the overall instances of complex and simplex clauses produced by early and late acquisition groups in Figure 17 below:

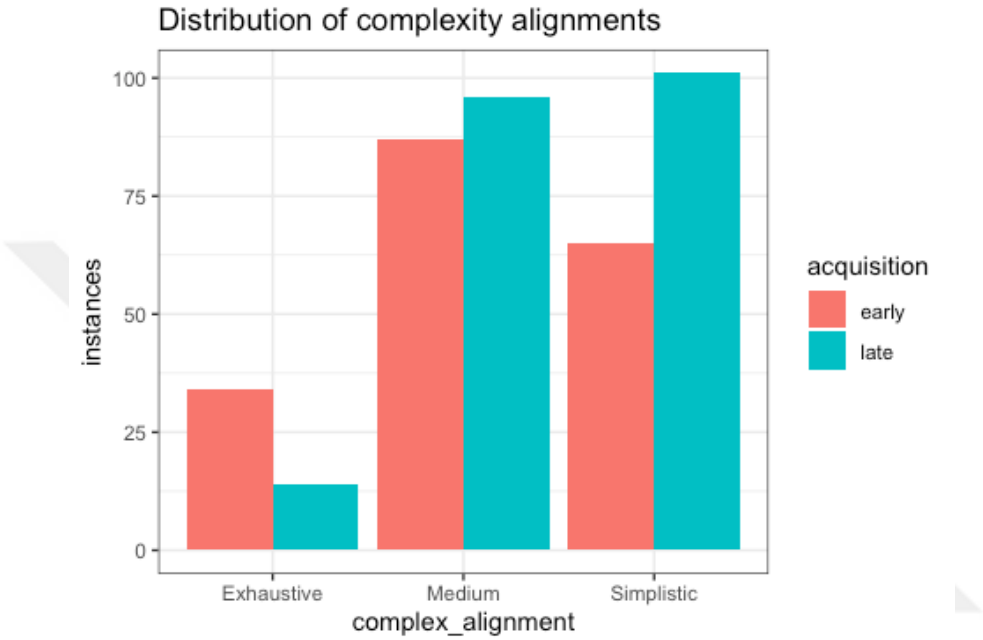


Figure 17. The distribution of clause complexity produced by early and late acquisition groups

We have already noted in Chapter 4 that clauses that are mono-predicative are analyzed as simplex, and clauses that encode multiple sub-types of the event by multi-predicative serial verb constructions were marked as complex. “Exhaustive” in Figure 18 above shows the instances in which both the causative and the inchoative alternate of the same verb were produced via complex clauses, whereas “simplistic” marks the instances in which both alternates are produced via simplex clauses. The “medium” marks the instances in which one of the alternates is produced in a complex clause and the other in a simplex clause. The distribution of these three types of clause complexity instances in the early and late acquisition groups shows that the early acquisition group produces exhaustive instances significantly more

than the late acquisition group, and the late acquisition group produces a higher number of medium and simplistic structures. However, the distribution of individual productions does not provide us with a clear-cut answer, until we evaluate the relative frequency of the productions of the early acquisition group, which is in Figure 18:

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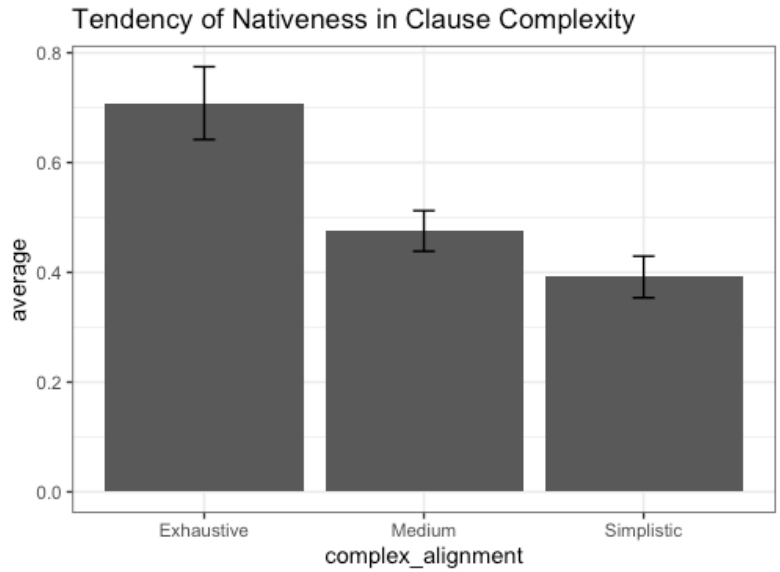


Figure 18. The degree of "nativeness" in the production of complex structures

Figure 18 above shows that the relative rate at which medium and simplistic structures are produced by the early acquisition group is significantly lower than that of the exhaustive structures. This shows that producing an exhaustive pair for the causative-inchoative alternation is an early acquisition group tendency compared to producing medium or simplistic pairs. Since the standard error of the exhaustive category does not intersect with those of medium and simplistic categories, we can conclude that this tendency in early acquisition signers can be considered significant.

In order to test whether the effect of age-of-acquisition on clause complexity is statistically significant, the data from causative-inchoative alternating clauses was fit into a Bernoulli model. The model had age-of-acquisition grouping (early or late) as one predictor and clause type (causative or inchoative) as another, with by-

participant and by-item intercepts and slopes. The intercept is the overall mean of the posterior probability of complexity, given the inchoative setting of the clause type predictor and the early acquisition setting of the age-of-acquisition predictor (b_intercept). This is taken as a base, and the effects of the remaining settings of predictors are concluded by adding their effect size (how close to zero they are on the x-axis) to the base effect. If the effect is above zero, it indicates a more complex structure, and it is added to the intercept towards the positive side of the x-axis for comparison. If the effect is below zero, it indicates a more simplex structure, and it is added towards the negative side of the x-axis. Figure 19 shows the model without the random effects, which means it shows the overall mean of all the results, without participant deviation taken into account. Figure 20 shows the model with random effects included, which means that participant deviations and outlier results are also taken into account. The comparison of the two shows how much participant deviation there is.

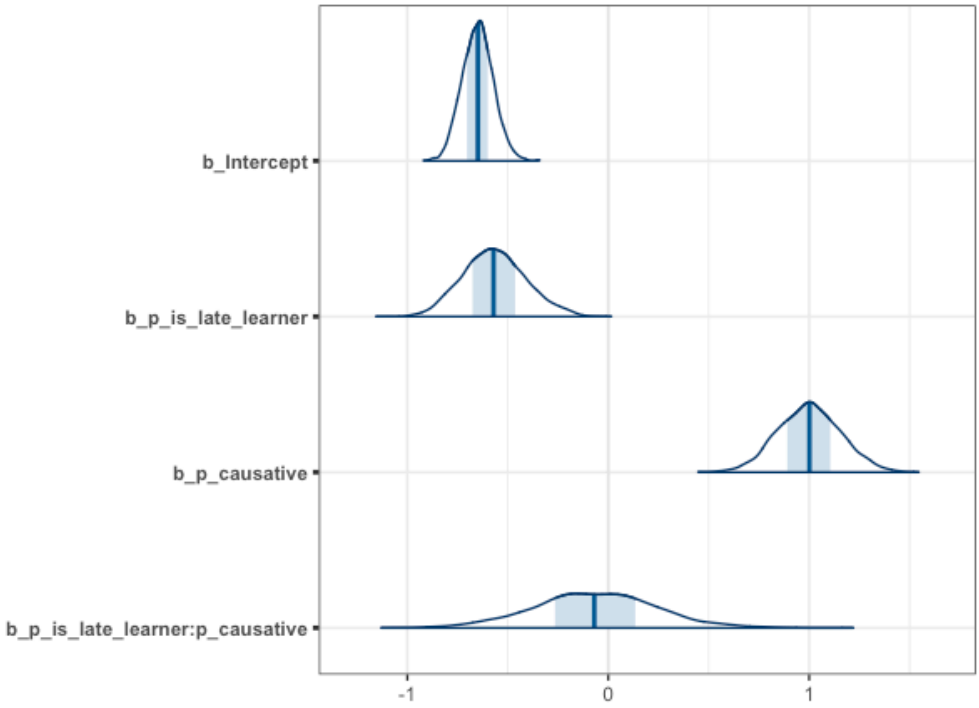


Figure 19. The relation between complexity, age-of-acquisition, and clause type with random effects excluded

The b_intercept in Figure 19 is slightly below zero, which shows that the general tendency among the early acquisition group is to produce more simplex clauses for the inchoative events. When the effect of the late acquisition setting of the acquisition group predictor (b_p_is_late_learner) is added to the base intercept, the effect toward the negative side of the x-axis is slightly greater, which indicates that the probability/tendency of producing simplex clauses for inchoative events is greater in the late acquisition group.

The value b_p_causative shows the posterior probability of complexity based on age-of-acquisition grouping while also taking clause type into consideration by changing the setting of clause type predictor to causative and keeping the setting of the age-of-acquisition predictor as early acquisition group. This value is well over zero, which indicates that the probability of complex clauses being produced for causative events is far greater compared to those of inchoative events by early acquisition group signers. The comparison of this value and the value b_p_is_late_learner:p_causative gives us the probability of late acquisition group signers' producing complex clauses for causative events. When the value of b_p_is_late_learner:p_causative is added to b_p_causative towards the negative side of the x-axis, it is clear that the probability of complex clauses being produced for causative events by late acquisition group signers is visibly lower than that of early acquisition group signers. Overall, Figure 20 confirms that there is a significant difference among the two age-of-acquisition groups with regard to producing simplex (mono-predicate) or complex (bi- or more- predicate) clauses in both inchoative and causative events.

When Figure 20 and Figure 21 is compared, Figure 22 appears to have larger deviation on the scale, which causes the model graphic to manifest less dramatic results compared to Figure 20:

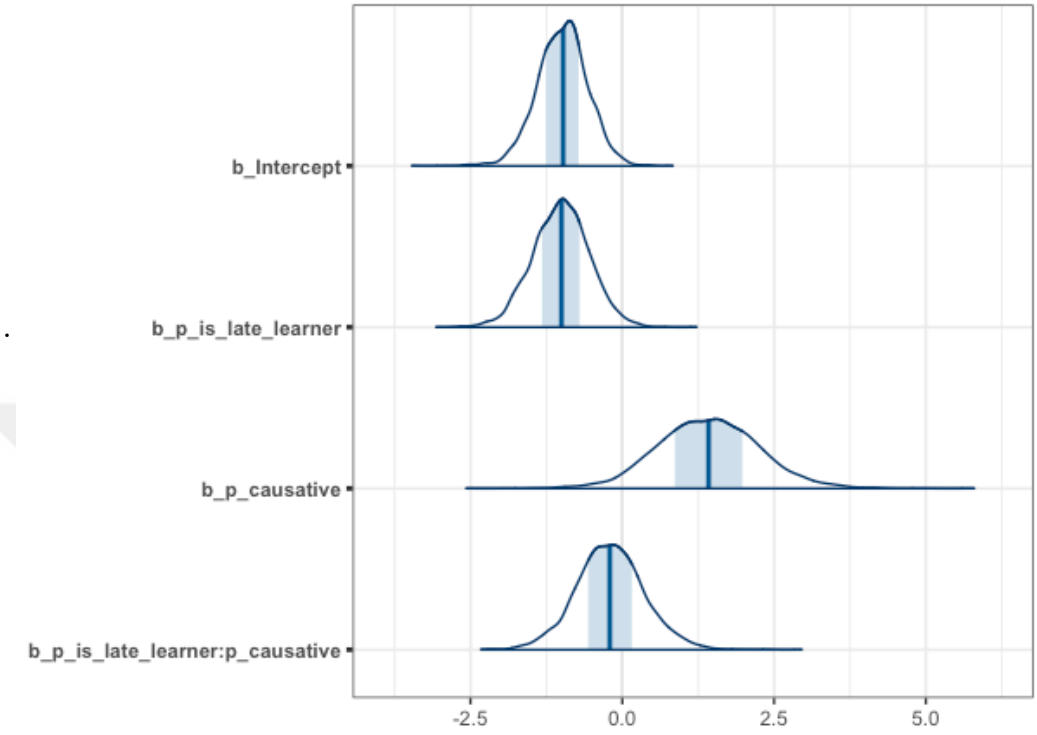


Figure 20. The relation between complexity, age-of-acquisition, and clause type with random effects included

The difference between the two versions of the model is due to the fact that participant deviation is rather high. This is not unexpected, given that our participant pool is significantly smaller than what is usually analyzed by statistical means. Smaller participant pools are common in studies of minority languages since the number of the users of that given language is lower and it is more difficult to find fitting participants for specific tasks (Lieberman & Mayberry, 2015). Therefore, this amount of participant deviation is not unexpected.

Lastly, the distribution of the adverb of "SELF" was examined. It is produced in the inchoative instances and it is only compatible with events that do not include a causer participant. Therefore, the production of it confirms that the signers who

choose to produce it in inchoative clauses are aware that the event structure of the said clause does not include a causer, and is inherently different from the event structure scheme of a causative clause. Figure 22 shows the distribution of the productions of the adverb "SELF" in inchoative clauses grouped by age-of-acquisition:

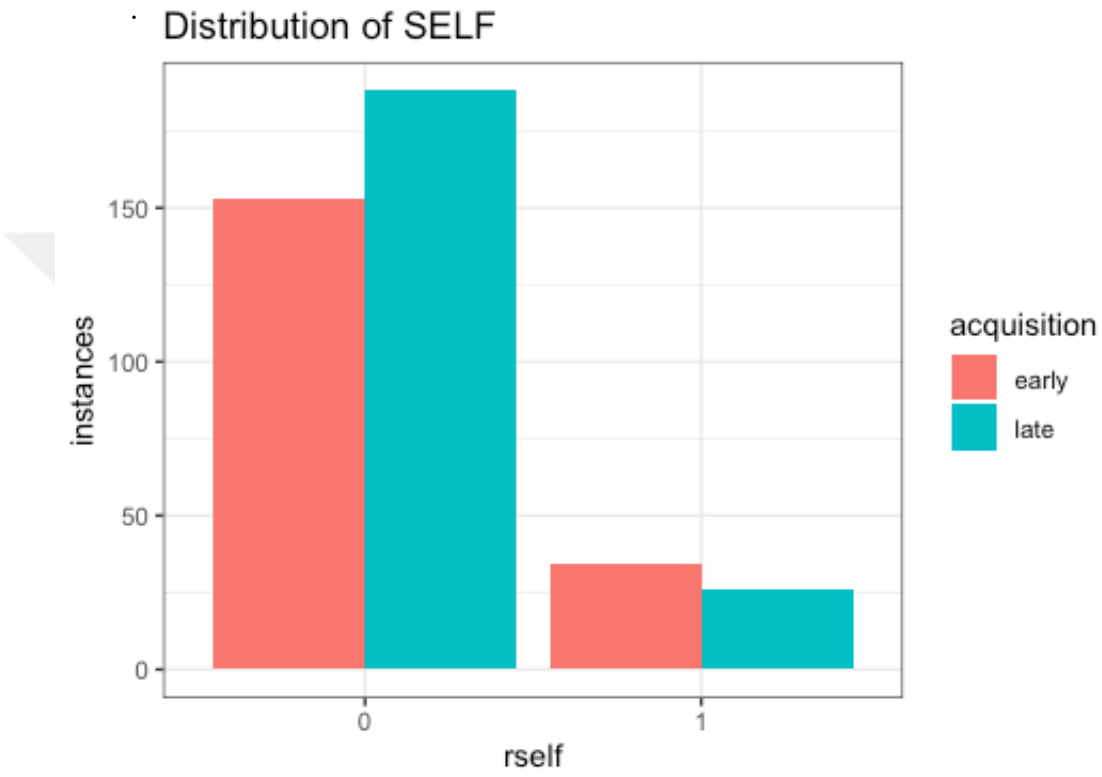


Figure 21. The distribution of "SELF" production in inchoative structures produced by early and late acquisition group

Figure 21 shows that the instances in which "SELF" is produced (1) in inchoative clauses both by early and the late acquisition groups is lower than the inchoative clauses without the said adverbial. This shows that overall, it is not a very common strategy to encode the lack of agent/causer in those structures overtly. However, the graphic also shows a small difference in the number of instances in which "SELF" was produced between the early and the late acquisition groups. To check if this constitutes a native tendency, we need to take a look at the relative frequency of "SELF" produced by the early acquisition group, which is in Figure 22:

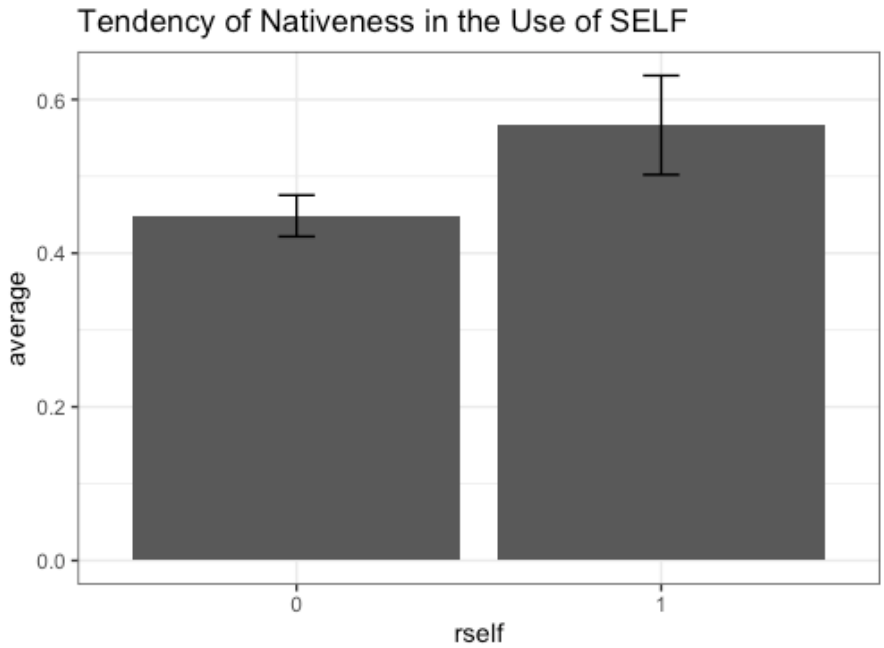


Figure 22. The degree of "nativeness" in the production of "self" in inchoative structures

Figure 22 shows the relative frequency of "SELF" being produced "1" or not produced "0" within the early acquisition group. Producing "SELF" in inchoative structures seems to be an early acquisition group tendency, although the fact that standard error lines barely abstain from intersecting might indicate that this effect is not as prominent as the one that is observed for clause complexity.

CHAPTER 6

CONCLUSION AND FURTHER REMARKS

In this study, I first provided an overview of the causative-inchoative alternation with respect to both argument and event structure in signed and spoken languages in Chapter 2. Then I provided an overview of age-of-acquisition effects on morpho-syntactic structures observed in other sign languages in Chapter 3. In addition, I provided detailed information on the production task, and the comprehension tasks performed to collect the data for this thesis, with a detailed background of the participants who performed these tasks. Later, in Chapter 5, I described the findings of these tasks and discussed their implications within the previously given literature.

In Section 5.1, I described how the causative-inchoative alternation manifests itself in TİD and briefly discussed whether it aligns with the generalizations reached in previous studies on different sign languages. The discussion in this section revealed that there are two main strategies to mark the causative-inchoative alternation in TİD; labile verbs (27), and a HDCL-WECL alternation (29), although a mixture of two strategies is also acceptable. Causatives can be constructed through either a labile verb (27a), a HDCL marking the initiation/causation alone (29a), or a HDCL+WECL (34a, 35a) combination that encodes the initiation and the process/change of state of the event respectively. Inchoatives can be constructed with a labile verb (27b) or a WECL (29b). In addition, both causative and inchoative structures allow for an SVC that enables further encoding of the sub-events involved (38). This indicates that both transitive and intransitive events are

complex events with respect to consisting of multiple sub-events. Moreover, TİD data for causative-inchoative alternating verbs seem to be in line with the empty Cause head analysis for verbs that can alternate between transitive and intransitive frames (Alexiadou et al., 2006; Pylkkänen, 2008), and Ramchand's (2008) empty InitP model for now. Furthermore, this section showed that models that try to account for the causative-inchoative alternation should also account for the presence of multiple verbs that share one argument to the syntactic derivation since SVCs seem to appear both in causative and inchoative clauses optionally. This Section closed up with a suggestion for further research on Symmetric Sharing, Parallel Merge, and Double Headedness discussed by Hiraiwa & Bodomo (2008), as the SVCs observed in TİD might contribute to this discussion.

In Section 5.2, the results of picture selection, and grammaticality judgment tasks were elaborated in order to discuss whether SVCs are mono- or bi-clausal. The tasks bore contradictory results between the negation test and extractability tests, with negation test indicating that SVCs might be bi-clausal, unlike the extractability tests which indicate that SVCs seem to be mono-clausal. In this regard, I raised debates within the existing framework of clause structure and negation research on TİD. The fact that linguistic cues for marking clausal boundaries in TİD are still under ongoing investigation limited the extent of the discussion I could hold in this thesis. For clearer claims, further search on several topics, such as clause boundaries, scope of manual negation, and how syntactic movement -if any- works in TİD are required.

Lastly, in Section 5.3, I discussed whether early and late acquisition groups differ from each other in producing causative-inchoative clauses. The analysis showed that there is no significant difference in which a specific alternation type is

preferred by early vs. late acquisition groups (Figure 15). Therefore, I concluded that the knowledge of alternation types does not seem to be age-sensitive. However, further analysis revealed that producing complex clauses is an early acquisition group tendency (Figure 18). Therefore, I concluded that clause complexity seems to be an age-sensitive phenomenon, which is in line with previous observations on age-of-acquisition effects on Deaf individuals, namely, that inadequate or late linguistic input affects one's linguistic performance and competence in adulthood (Mayberry & Eichen, 1991; Newport, 1990; Mayberry, 1994; Newport at al., 2001; Mayberry et al., 2002; Mayberry, 2007; Morford & Hänel-Faulhaber, 2011; Mayberry et al., 2011 *inter alia*).

Moreover, I concluded that producing "SELF" (by itself) in inchoative structures seems to be an early acquisition group tendency (Figure 22) as well, implying that the early acquisition group possesses more linguistic awareness about the thematic argument structure. Yet, this implication must be further tested out with certain adverbials sensitive to theta roles, i.e., agentive vs. non-agentive to reach more generalizable results. Future studies may also include further exploration of semantic implications of SELF for the causative-inchoative alternation as discussed in Schäfer & Vivanco (2016) and Lundquist et al. (2016). Another possible future study may be grouping the verbs which participate in the causative-inchoative alternation in TİD based on whether they display labile alternation, classifier alternation, or both in order to see if there is a pattern concerned with the participants or the lexical semantics of the alternating verbs with the morphological marking of the alternation or lack thereof. In addition to this, dialogue and production-based tasks may be conducted to obtain more definitive results on how negation is interpreted within SVCs.

APPENDIX A

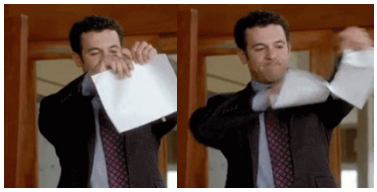
THE PRODUCTION TASK STIMULI[27]

1.1 Stimuli targeting intentional causatives

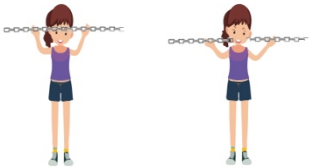
a[28].



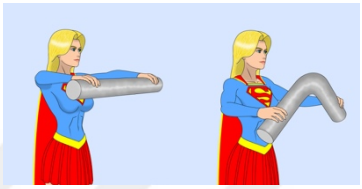
b[29].



c.



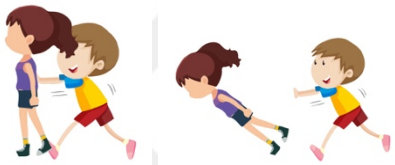
d.[30]



e.[31]



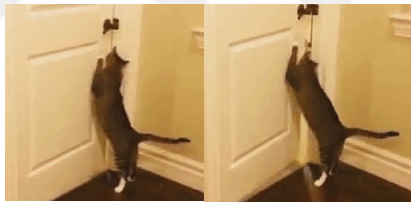
f.



g.



h.[32]



i.



j[33].



[27] The link of the original content for the visuals taken from online sources are given in the footnotes. All other visuals are prepared on Adobe Illustrator by me using copy-right free stock images (*see* Chapter 4 for details).

[28] https://areyousureits.in/memes/breaking.gif

[29] https://tenor.com/view/grinder-paper-rip-destroy-over-gif-5448849

[30] https://www.deviantart.com/runawayman71/art/Supergirl-Bending-steel-bars-animated-GIF-576283572

[31] https://tenor.com/view/slam-door-leave-walk-out-city-dwellers-go-cartoons-gif-11564592

[32] https://www.youtube.com/watch?v=JYFIV5NV7m4&t=31s between 00:25-00:30

[33] I no longer have access to the original video from which this .gif was made. It might be taken down or deleted from the original source.

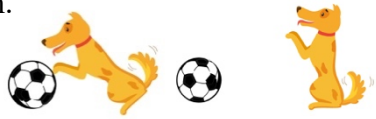
k.



l[34].



m.



n.



o.



p.



r[35].



[34] https://www.youtube.com/watch?v=6dZ7b7Bimrc

[35] https://tenor.com/view/alarm-breaking-glass-fire-small-hammer-gif-5438843

1.2 Stimuli targeting inchoatives

a.[36] 

b. 

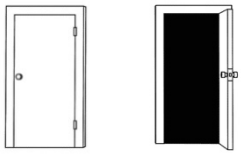
c. 

d. 

e. 

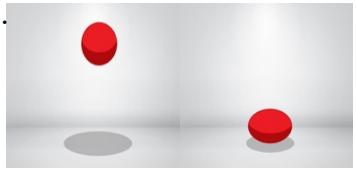
f.[37] 

g. 

h[38]. 

i[39]. 

j[40]. 

k[41]. 

l. 

m. 

[36] https://giphy.com/gifs/man-falling-silhouette-l41lOiGSzZtQ2y6vm
[37] https://images.squarespace-cdn.com/content/v1/5898cb735016e1eeef6c163e/1504542756766-7TV1AIBE719O80X0PIQI/ke17ZwdGBTodd I8pDm48kFjHQJ8znsbAtUG6h1OOF7JZw-zPPgdn4jUwVcJE1ZvWQUxwkmyExglNqGp0IvTJZamWLI2zvYWH8K3-s_4yszcp2ryTI0HqTOaaUohrI8PIaaULlL_AiE12stWdLJZSapsp9RN7TiRTYoEe85FUSeg/melt_FULL_SCREEN_2.gif?format=1500w
[38]https://dooroplaz.blogspot.com/1970/01/door-opening-gif.html
[39] https://tenor.com/view/boil-water-boiling-water-gif-12743647
[40] https://www.derpibooru.org/1112689?q=crib
[41] https://gandakohpersonaltradinghome.files.wordpress.com/2019/12/bouncing-ball.gif?w=350&h=200&crop=1

1.3 Stimuli targeting unintentional causatives

a[42].



b[43].



c.



d[44].



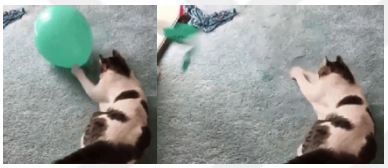
e[45].



f.



g[46].



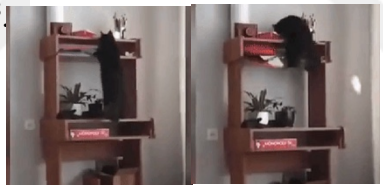
h[47].



i.



j[48].



k.



l.



m[49].



n.



[42] https://www.shutterstock.com/tr/image-vector/broken-vase-crash-vector-1244487964?src=nXZkXy5ZNFrRxhn0ltEiQQ-1-25

[43] https://www.youtube.com/watch?v=qWbFLlz3OQ0 between 00:00-00:05

[44] https://www.youtube.com/watch?v=vB3udCOzvgg between 00:25-00:30

[45] https://giffiles.alphacoders.com/121/12139.gif

[46] https://www.youtube.com/watch?v=JYFIV5NV7m4 between 00:20-00:30

[47] https://media.istockphoto.com/vectors/man-broke-the-glass-vector-id1084024764

[48] https://www.youtube.com/watch?v=79EvGkXHF9I&t=37s between 01:19-01:25

[49] http://4.bp.blogspot.com/-KZf6R0U6gxs/Vq1X5S0uilI/AAAAAAAALpc/3X4v7ETF7_8/s320/viento.gif

1.4 Stimuli targeting supernatural causatives

a.



b.



c.



d.



e.



f.



g.



h.



i.



j.



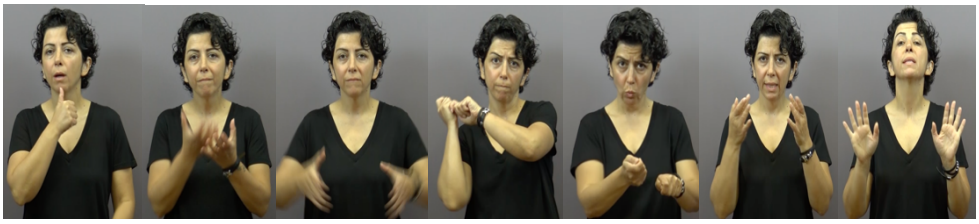
1.5 The stimulus for (34c)[50]



[50] https://giphy.com/gifs/v0H47Bbles3Xa/html5

APPENDIX B

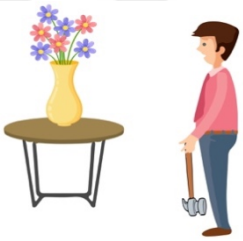
THE PICTURE SELECTION TASK STIMULI

(1) 

H1	MAN	VASE	HIT	BREAK	NOT
H2		VASE	HIT	BREAK	NOT

Interpretation a: “The man didn’t hit the vase (for it to) break.”
Interpretation b: “The man hit the vase but the it didn’t break.”

Interpretation a



Interpretation b



(2) 

H1	MAN	BALL	KICK		NOT
H2		BALL_____		ROLL	

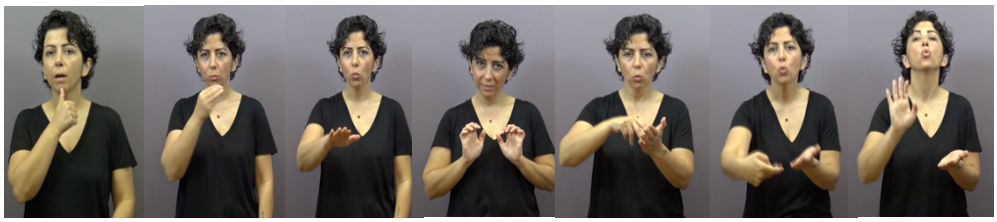
Interpretation a: “The man didn’t kick the ball (for it to) roll.”
Interpretation b: “The man kicked the ball but it didn’t roll.”

Interpretation a



Interpretation b



(3) 

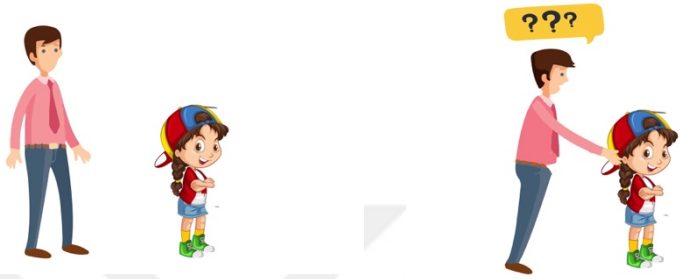
H1 MAN CHILD PUSH FALL NOT

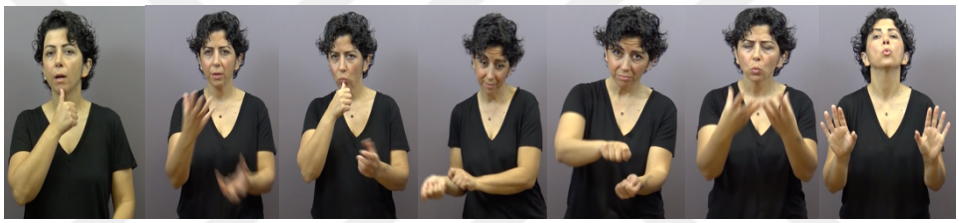
H2 PUSH FLOOR

Interpretation a: “The man didn’t push the child (for him to) fall.”

Interpretation b: “The man pushed the child but he didn’t fall.

Interpretation a Interpretation b



(4) 

H1 MAN FIRE WATER POUR DIE.DOWN NOT

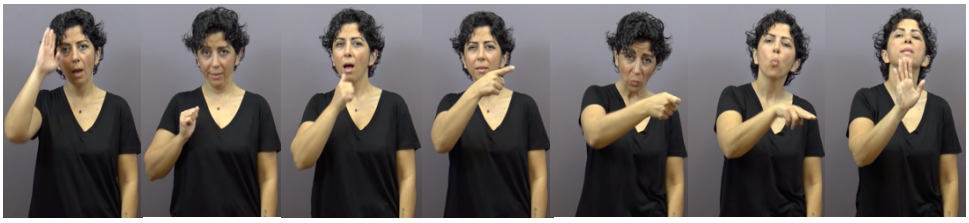
H2 POUR DIE.DOWN NOT

Interpretation a: “The man didn’t pour water onto the fire (for it to) die down.”

Interpretation b: “The man poured water onto the fire but it didn’t die down.”

Interpretation a Interpretation b



(5) 

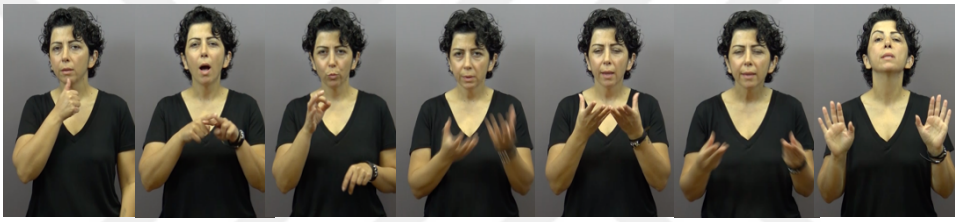
H1 SOLDIER MAN$_i$ IX$_i$ SHOOT DIE NOT

Interpretation a: “The soldier didn’t shoot the man (for him to) die.”

Interpretation b: “The soldier shot the man but he didn’t die.”

Interpretation a Interpretation b



(6) 

H1 MAN A$_{fingerspelled}$ IRON HEAT MELT NOT

H2 A$_{fingerspelled}$ HEAT MELT NOT

Interpretation a: “The man didn’t heat the aluminum (for it to) melt.”

Interpretation b: “The man heated the aluminum but it didn’t melt.”

Interpretation a Interpretation b



APPENDIX C

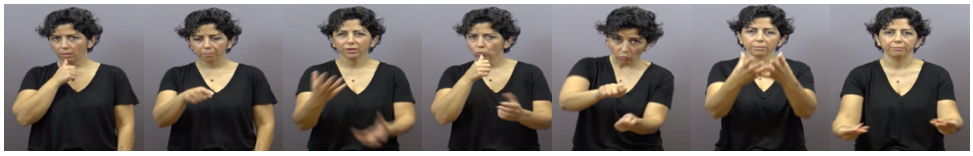
THE ACCEPTABILITY JUDGEMENT TASK STIMULI

3.1. SOVV

(1) 

H1 SOLDIER MAN SHOOT DIE

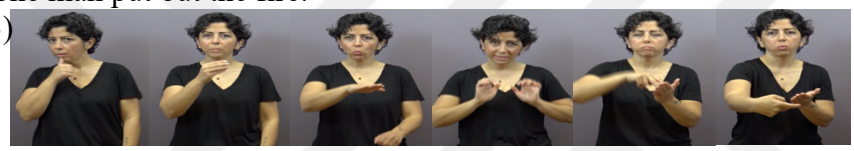
"The soldier shot the man dead."

(2) 

H1 MAN IX FIRE WATER $POUR_{GHDCL}$ DIE.DOWN

H2 FIRE $POUR_{GHDCL}$ DIE.DOWN

"The man put out the fire."

(3) 

H1 MAN CHILD $PUSH_{CHDCL}$ $FALL_{WECL}$

H2 $PUSH_{CHDCL}$ $FLOOR_{WECL}$

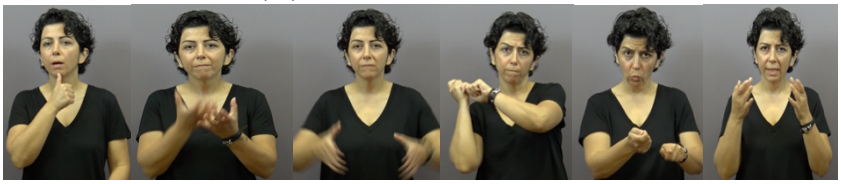
"The man pushed the child fall(en)."

(4) 

H1 MAN BALL $KICK_{BPCL}$ $ROLL_{WECL}$

H2 BALL $BALL_{WECL}$

"The man kick the ball (to) roll."

(5) 

H1 MAN VASE HIT_{GHDCL} BREAK

H2 VASE HIT_{GHDCL} BREAK

"The man hit the vase broke(n)."

(6) 

H1 MAN BUTTER HEAT MELT

H2 BUTTER HEAT MELT

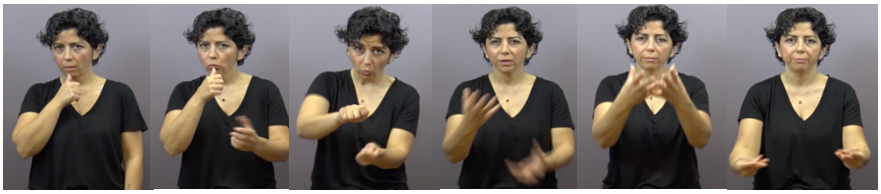
"The man heated the butter molten

3.2 SVS/OV

(1) 

H1 SOLDIER SHOOT MAN DIE

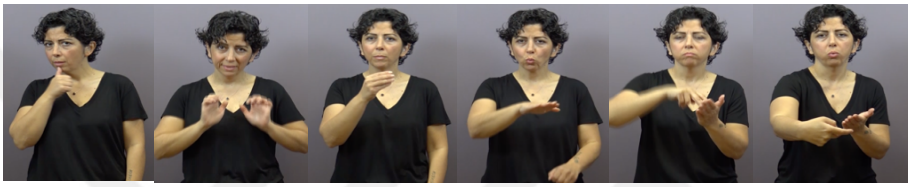
“The soldier shot the man dead.”

(2) 

H1 MAN WATER $\text{POUR}_{\text{GHDCL}}$ FIRE DIE.DOWN

H2 $\text{POUR}_{\text{GHDCL}}$ FIRE DIE.DOWN

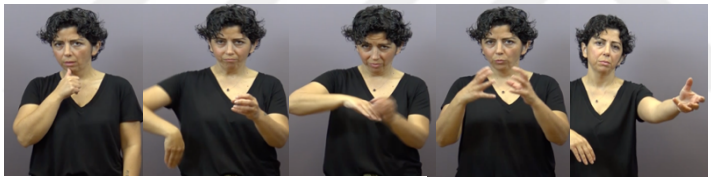
“The man put out the fire.”

(3) 

H1 MAN $\text{PUSH}_{\text{CHDCL}}$ CHILD $\text{FALL}_{\text{WECL}}$

H2 $\text{PUSH}_{\text{CHDCL}}$ $\text{FLOOR}_{\text{WECL}}$

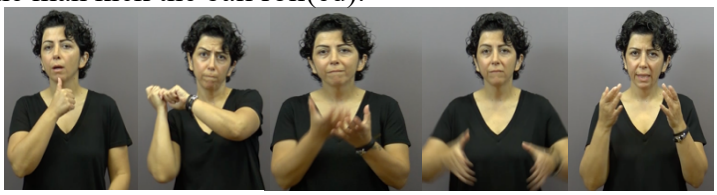
“The man pushed the child fall(en).”

(4) 

H1 MAN $\text{KICK}_{\text{BPCL}}$ BALL $\text{ROLL}_{\text{WECL}}$

H2 $\text{BALL}_{\text{WECL}}$

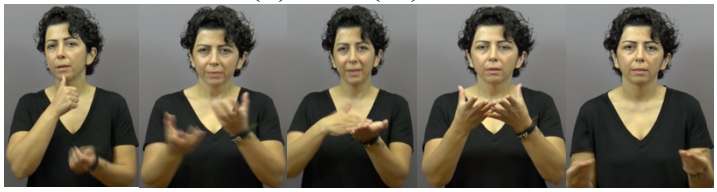
“The man kick the ball roll(ed).”

(5) 

H1 MAN $\text{HIT}_{\text{GHDCL}}$ VASE BREAK

H2 $\text{HIT}_{\text{GHDCL}}$ VASE BREAK

“The man hit the vase (it) broke(en).”

(6) 

H1 MAN HEAT BUTTER MELT

H2 HEAT BUTTER MELT

“The man heated the butter molten.

3.3 Cleft

(1) 

H1 SOLDIER SHOOT DIE IX WHO MAN

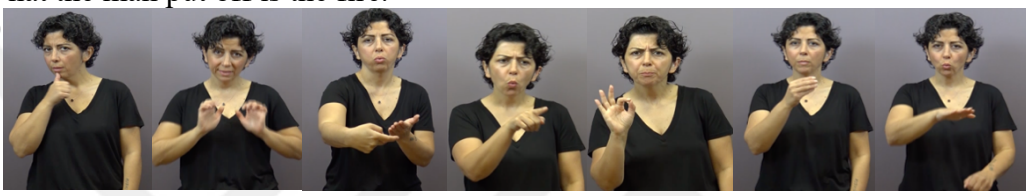
“Who the soldıer shot dead is the man.”

(2) 

H1 MAN WATER $POUR_{GHDCL}$ DIE.DOWN IX WHAT FIRE

H2 $POUR_{GHDCL}$ DIE.DOWN FIRE

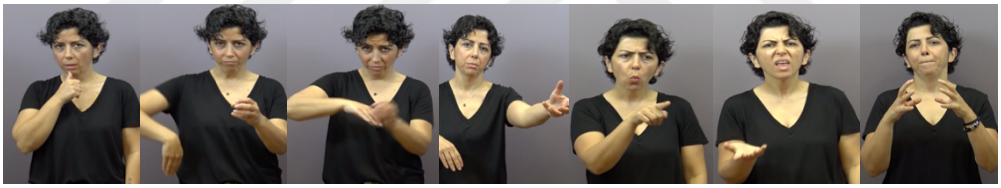
“What the man put off is the fire.”

(3) 

H1 MAN $PUSH_{CHDCL}$ $FALL_{WECL}$ IX WHO CHILD

H2 $PUSH_{CHDCL}$ $FLOOR_{WECL}$

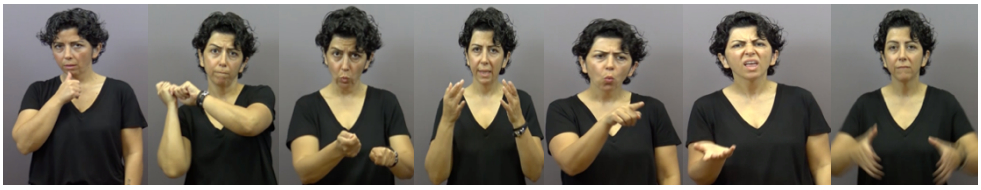
“Who the man pushed (to) fall(en) is the child.”

(4) 

H1 MAN $KICK_{BPCL}$ $ROLL_{WECL}$ IX WHAT BALL

H2 $BALL_{WECL}$

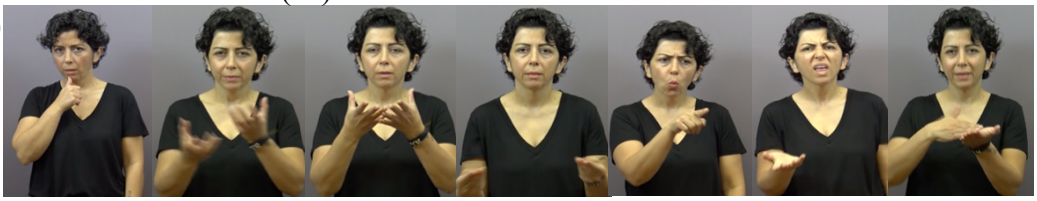
“What the man kicked (to) roll is the ball.”

(5) 

H1 MAN HIT_{GHDCL} BREAK IX WHAT VASE

H2 HIT_{GHDCL} BREAK VASE

“What the man hit broke(en) is the vase.”

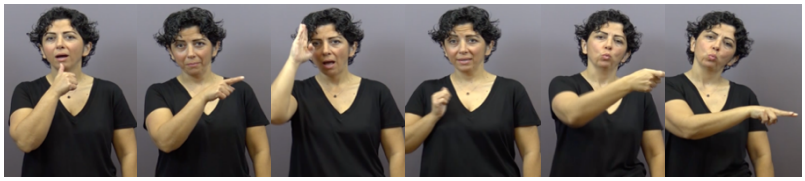
(6) 

H1 MAN HEAT MELT IX WHAT BUTTER

H2 HEAT MELT BUTTER

“What the man heated molten is the butter”

3.4 Topicalization

(1) 

H1 MAN IX SOLDIER SHOOT DIE

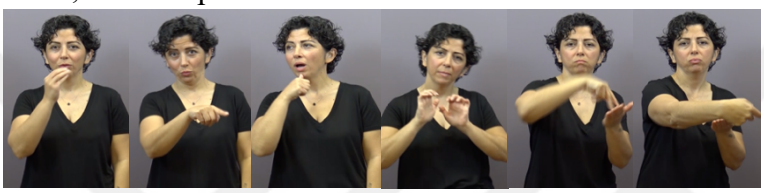
"The man, the soldier shot dead."

(2) 

H1 FIRE IX WATER $POUR_{GHDCL}$ DIE.DOWN

H2 FIRE $POUR_{GHDCL}$ DIE.DOWN

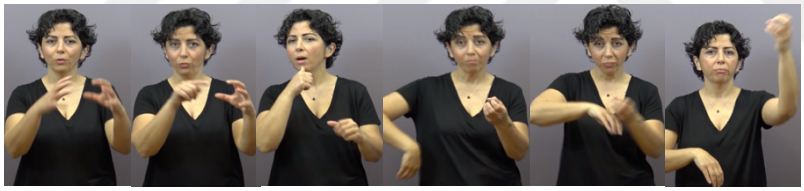
"The fire, the man put off."

(3) 

H1 CHILD IX MAN $PUSH_{CHDCL}$ $FALL_{WECL}$

H2 $PUSH_{CHDCL}$ $FLOOR_{WECL}$

"The child, the man pushed (to) fall(en)"

(4) 

H1 BALL IX MAN $KICK_{BPCL}$ $ROLL_{WECL}$

H2 $BALL_{WECL}$

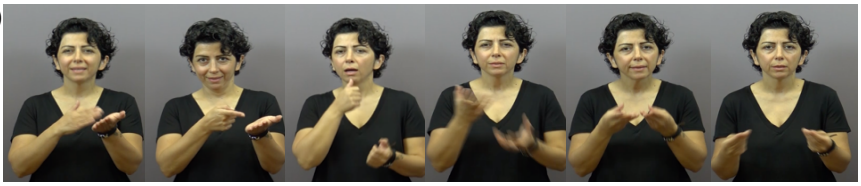
"The ball, the man kicked roll(ed)."

(5) 

H1 VASE IX MAN HIT_{GHDCL} BREAK

H2 VASE_____ HIT_{GHDCL} BREAK

"The vase, the man hit broke(en)."

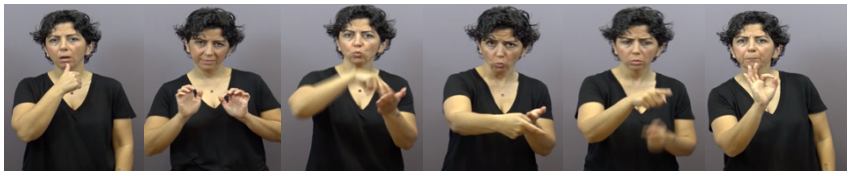
(6) 

H1 BUTTER IX MAN HEAT MELT

H2 BUTTER HEAT MELT

"The butter, the man heated molten."

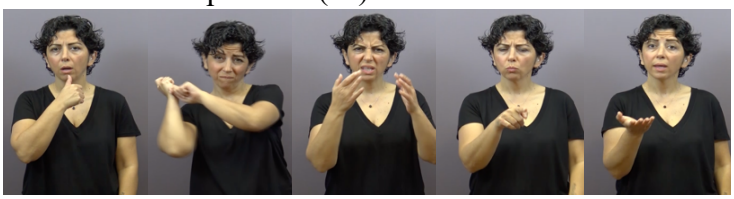
3.5 Wh-extra-posed

(1) 

H1 MAN PUSH $_{CHDCL}$ FALL$_{WECL}$ IX WHO

H2 PUSH $_{CHDCL}$ FLOOR$_{WECL}$

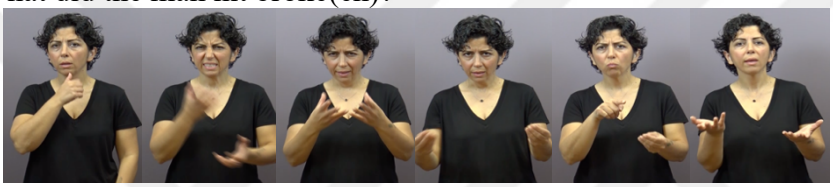
“Who did the man push fall(en)?”

(2) 

H1 MAN HIT$_{GHDCL}$ BREAK IX WHAT

H2 HIT$_{GHDCL}$ BREAK

“What did the man hit broke(en)?”

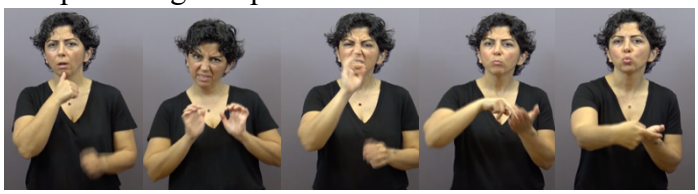
(3) 

H1 MAN HEAT MELT IX WHAT

H2 HEAT MELT

“What did the man heat molten?”

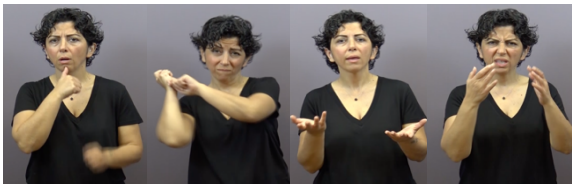
3.6 Wh preceding 2nd predicate

(1) 

H1 MAN PUSH $_{CHDCL}$ WHO FALL$_{WECL}$

H2 PUSH $_{CHDCL}$ FLOOR$_{WECL}$

“Who did the man push fall(en)?”

(2) 

H1 MAN HIT$_{GHDCL}$ WHAT BREAK

H2 HIT$_{GHDCL.}$ WHAT BREAK

“What did the man hit broke(en)?”

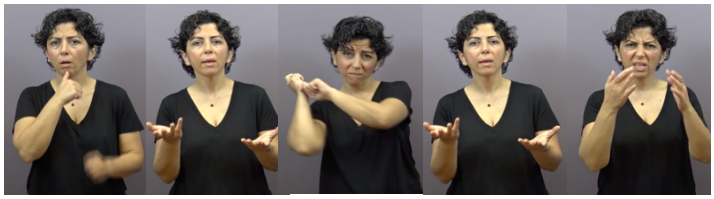
(3) 

H1 MAN HEAT WHAT MELT

H2 HEAT WHAT MELT

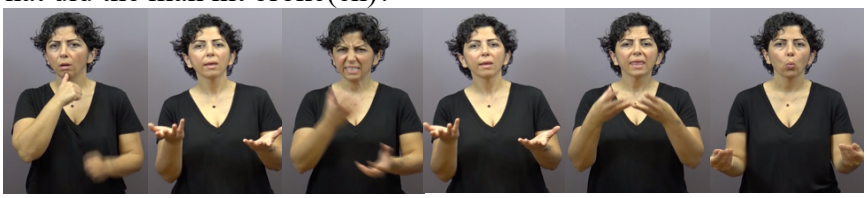
“What did the man heat molten?”

3.7 Wh-double

(1) 

H1	MAN	WHAT	HIT_{GHDCL}	WHAT	BREAK
H2		WHAT	HIT_{GHDCL}	WHAT	BREAK

“What did the man hit broke(en)?”

(2) 

H1	MAN	WHAT	HEAT	WHAT	MELT
H2		WHAT	HEAT	WHAT	MELT

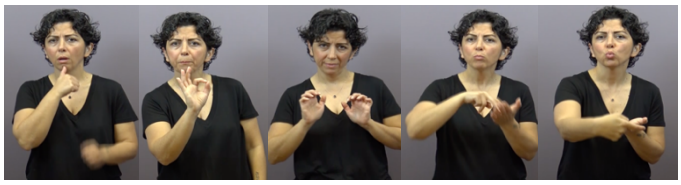
“What did the man heat molten?”

(3) 

H1	MAN	WHO	$PUSH_{CHDCL}$	WHO	$FALL_{WECL}$
H2			$PUSH_{CHDCL}$		$FLOOR_{WECL}$

“Who did the man push fall(en)?”

3.8 Wh-in situ

(1) 

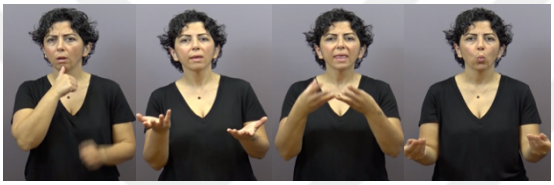
H1	MAN	WHO	PUSH $_{CHDCL}$	FALL$_{WECL}$
H2			PUSH $_{CHDCL}$	FLOOR$_{WECL}$

“Who did the man push fall(en)?”

(2) 

H1	MAN	WHAT	HIT$_{GHDCL}$	BREAK
H2		WHAT	HIT$_{GHDCL}$	BREAK

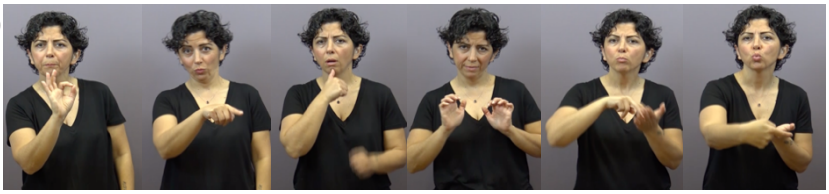
“What did the man hit broke(en)?”

(3) 

H1	MAN	WHAT	HEAT	MELT
H2		WHAT	HEAT	MELT

“What did the man heat molten?”
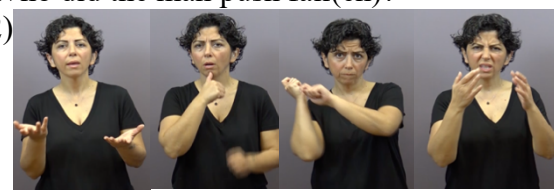
3.9 Wh-initial

(1) 

H1 WHO IX MAN PUSH $_{CHDCL}$ FALL$_{WECL}$

H2 PUSH $_{CHDCL}$ FLOOR$_{WECL}$

“Who did the man push fall(en)?”

(2) 

H1 WHAT MAN HIT$_{GHDCL}$ BREAK

H2 WHAT HIT$_{GHDCL}$ BREAK

“What did the man hit broke(en)?”

(3) 

H1 WHAT MAN HEAT MELT

H2 WHAT HEAT MELT

“What did the man heat molten?”

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