Classifiers, argument expression, and age of acquisition effects in Turkish Sign Language (TİD)

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This study investigates differences in language production of native, early-learner, and late-learner Turkish Sign Language (Türk İşaret Dili – TİD) signers in the domain of classifiers. For this study, we conducted a picture-signing task to elicit clauses with classifier constructions from adult Deaf signers of these three groups. The results indicate that there is no significant difference among these three groups with respect to the morphological encoding of thematic roles on verbal roots in classifier constructions. Nonetheless, a difference surfaces in the argument expression patterns among these groups. The data show that the age of exposure to a first linguistic input impacts the argument expression rates as well as which arguments are expressed or left unexpressed. Native signers drop the agent argument more frequently than early-learner and late-learner signers. Early-learner signers, in turn, drop the agent argument more frequently than late-learners. The data further indicate that perspective taking interacts with argument expression and age of acquisition. Overall, signers drop the agent more frequently under a character perspective than an observer perspective, with native and early-learner signers employing this strategy more than late-learner signers.

Keywords: first language acquisition, effects of delayed first language acquisition, Turkish Sign Language, classifiers, morphosyntax, argument expression

1. Introduction

Only 5–10% of deaf children are born to deaf families. These children acquire sign language (henceforth SL) from birth thanks to the exposure to primary linguistic input from deaf signing parents, which is the ideal situation for typical SL development (Lillo-Martin & Henner 2021). However, the remaining 90–95% of

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all deaf children are born to hearing families (Mitchell & Karchmer 2004), which often results in delayed exposure to a conventional SL. This is because the hearing parents of deaf children often do not know any sign languages and thus cannot provide accessible primary SL input to their children (Humphries et al. 2017). However, most people in the latter group end up using sign language as their first functional language, some of them before schooling starts and some of them with schooling. Our overarching research focuses on understanding how different exposure times to Turkish Sign Language (Türk İşaret Dili – TİD) affect the grammatical structures that deaf individuals develop.

Previous studies have shown that the age of language acquisition has a crucial impact on language outcome (Emmorey 2001; Lenneberg 1967; Penfield & Roberts 1959). Furthermore, exposure to linguistic input after the critical period is not sufficient for some aspects of language to develop fully, no matter how long an individual continues to receive relevant linguistic data. In other words, differences between the linguistic competencies of native and non-native deaf individuals of sign language persist into adulthood (Mayberry & Kluender 2018). Such differences could be stronger in complex morphosyntactic structures such as classifier constructions, which take time to be consistently used under all required conditions, even in children exposed to SL from birth (Kantor 1980; Newport 1990; Schick 1990; Schick et al. 2006).

To our knowledge, linguistic research on TİD started only a little more than 20 years ago (Açan 2001). Since then, researchers have made remarkable progress in describing the language. Nevertheless, to our knowledge, researchers have only very recently started to investigate the variation concerning the morphosyntactic domain across deaf adult TİD signers who are exposed to the SL at different ages in their childhood (Gür 2018; Kayabaşı 2020; Karadöller et al. 2017; Karadöller et al. 2021, 2022; Özdemir 2021; Sevgi 2019). A description of the structures sensitive to the age of acquisition (henceforth AoA) within TİD grammar is necessary for the development of essential assessment materials and, if needed, intervention strategies to ensure that deaf children at risk of language deprivation are provided with accessible primary linguistic input sooner rather than later (Humphries et al. 2016; Trovato 2013). In this study, we investigate classifier constructions in sign languages (CL henceforth in glosses) to explore whether there are any linguistic differences between adult native, early-learner, and late-learner TİD signers. As a first step, we show that the relation between classifier types and argument structure is not sensitive to AoA in TİD. Then, we show that argument expression in a classifier construction is sensitive to AoA, as evidenced by the fact that native signers drop the agent argument more frequently than early-learner and late-learner signers do. Finally, we investigate the effects of acquisition age and argument expression on perspective taking in classifier constructions.

The paper is organized as follows: Section 2 provides a brief description of SL classifiers and a review of studies on AoA effects. Based on this background, we lay out the objectives of this paper in Section 3. In Section 4, we describe the methodology including information about the participants, materials, and procedure. We present the results in Section 5 in three subsections. Section 6 discusses the results of the tasks and concludes the paper.

2. Background

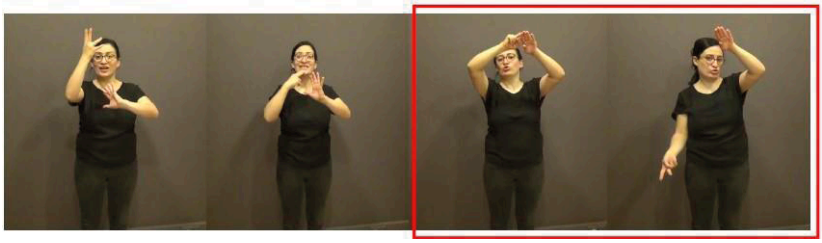
In this section, we provide the relevant background on sign language classifiers, their acquisition, and effects of age of language acquisition on children and adults.

2.1 Description of classifiers

Allan (1977: 285) defines classifiers as morphemes with a function of grouping, subcategorizing, and classifying nouns. Bearing these properties, sign language classifiers provide information about movement, location, and physical properties of the referents while expressing their salient semantic features (Supalla 1986). Almost all sign languages utilize classifiers.[1] Previous studies consider classifier constructions in SLs as multimorphemic structures (Supalla 1986; among others). Moreover, the morphology of these constructions has been argued to be unique to sign languages (Benedicto & Brentari 2004; Supalla 1986; Zwitserlood 2003) since the classifier morphemes, i.e., the handshapes, in a classifier construction (Aronoff et al. 2003; Benedicto & Brentari 2004; among others), combine with verb roots simultaneously unlike the classifier morphemes in spoken languages (Supalla 1982; Wilbur 1987) as illustrated in Example (1).

1. Nyst (2007) reports that Adamorobe Sign Language is an exception to this generalization.

(1) Turkish Sign Language



H1:	TREE	WOMAN	FALL.CL
H2:	TREE		TREE.CL

'The woman falls from the tree.'[2]

In (1), the signer introduces the lexical sign TREE with their dominant hand (H1) and non-dominant hand (H2) in the first frame. Afterward, the signer introduces the subject WOMAN, another lexical sign, in the second frame. The frames marked with the red rectangle include two classifiers: one on H1 (the right hand for the signer) and one on H2. The classifier on H1 has the upside-down V-handshape , which refers to an entity with two legs, WOMAN in this clause. The classifier on H2 has the 5-handshape , which refers to a tall entity with branches, the oblique argument TREE.

Classifier constructions in TİD have been investigated from different perspectives (Arık 2003, 2013; Kayabaşı 2020; Kubus 2008; Özkul 2013; Özyürek & Perniss 2011; Perniss & Özyürek 2008; among others). Among these studies, Kubus (2008) focuses on classifier handshapes concerning their phonology and morphology. He presents a list of classifier handshapes used in TİD. Özyürek & Perniss (2011) investigate classifiers in a discourse context. Their study shows that, both in Turkish Sign Language and German Sign Language, classifier predicates are used more frequently than lexical predicates to depict the events in narratives. Additionally, Özkul (2013) presents the morphological and phonological properties of instrumental nouns and verbs, focusing on handling instrumental and whole-entity instrumental classifiers.

2. We followed the glossing conventions in 'Corpus NGT Annotation Conventions' by Crasborn et al. (2015). We annotated 'every meaningful manual activity' on H1 and H2, each on separate tiers according to their scope. The glosses are presented in small caps, and these glosses usually consist of a single English word. We provided a clear and unambiguous gloss to refer to the same form consistently. Unlike the glossing convention for classifiers where more general descriptions, such as the classifier type (move, pivot, at, and be) and handshape, are used (see Section 5.3.19 in Crasborn et al. (2015)), we explicitly annotated the targeted predicate, i.e., JUMP, FALL, THROW, etc. since we aimed to compare each targeted data point later regardless of the handshape as represented.

The current study investigates the relationship between classifier types and verb types (therefore, the thematic roles of the arguments in a clause) as well as the argument expression patterns to reveal whether these aspects of TİD are sensitive to age of language acquisition. Therefore, we follow the account proposed by Benedicto & Brentari (2004), which claims that there is a tight relationship between the verb types and the classifier types. Since we are interested in this relationship, we investigate TİD classifiers under four categories following Engberg-Pedersen (1993). These are whole-entity classifiers (henceforth WECL), body-part classifiers (henceforth BPCL), handling classifiers (henceforth HCL), and extension classifiers (henceforth ExtCL).

It is crucial to explain these classifier types before presenting the details of a classifier's morphological properties. A whole-entity classifier (WECL) represents an entire animate or inanimate entity. Its realization is motivated by the physical properties of its referent. It can refer to upright human beings, animals, vehicles, books, etc. WECLs usually combine with a motion or location verb.

An extension classifier (ExtCL) refers to the physical property of an entity, typically tracing the perimeter or the surface of an object and expressing its size and shape (Engberg-Pedersen 1993). ExtCLs are used to specify nouns that refer to entities with different shapes such as a table, a book, a ball, etc. Within the scope of this study, we treated WECLs and ExtCLs in a unified way due to their syntactic similarity following Benedicto & Brentari (2004: 753).

A body-part classifier (BPCL) refers to a specific part of the referent in a clause. This classifier type can refer to the limbs, head, or mouth of an animate entity, and by extension, to the parts of inanimate or imagined objects such as a robot or an alien. Like WECLs, this classifier type may express the motion or the location of an entity.

Lastly, handling classifiers (HCL) describe how an entity handles another entity. This classifier type represents the object by finger selection and joint use, and how this object is used or manipulated by an agent referent by employing specific handshapes (Benedicto & Brentari 2004).

The morphosyntactic analysis of classifiers by Benedicto & Brentari (2004) proposes that classifiers project syntactic functional heads associated with the internal and external arguments. These functional heads determine the argument structure of the clause. They base their analysis on the fact that, in American Sign Language (ASL), a change in the classifier handshape results in a change in the predicate's syntactic behavior. An HCL licenses a transitive structure, while a WECL and a BPCL license an intransitive structure. WECLs and BPCLs are distinct concerning the thematic role of their single argument. A WECL licenses a theme argument, hence an unaccusative predicate, while a BPCL licenses an agent argument, hence an unergative predicate, as summarized in Table 1:

Table 1. Benedicto & Brentari's (2004) classifier type – thematic role correspondence proposal

Classifier type	Argument licensed
BPCL	Agent
WECL	Theme
HCL	Agent | Theme

It is important to note that there are different approaches to SL classifiers in the literature (Glück & Pfau 1998; Zwitserlood 2003; among others). Some of these studies provide counterarguments from ASL and other sign languages against the account of Benedicto & Brentari (2004) (de Lint 2018; Grose et al. 2007; Kimmelman et al. 2019; among others). In this study, we do not provide supportive evidence for Benedicto & Brentari (2004); nonetheless, we utilize the main outcome of this study which provides a testable correspondence between the classifier type and the argument structure.

Classifier constructions have been argued to have the capacity to license the arguments in a clause; therefore, it is possible to observe argument dropping in the presence of these constructions. Glück & Pfau (1998) show that a classifier morpheme helps signers recover the referent of a silent argument in German Sign Language (DGS). For spoken language classifiers, Drapeau & Lambert-Brétière (2011) find that in Innu (an Algonquian language), it is possible to "introduce a new semantic argument" with a classifier (p. 293). In other words, in this language, a classifier can be the only reference to an argument in a clause or discourse. Furthermore, Hakgüder & Brentari (2020) show that native TİD signers tend to drop the agent argument in clauses with an instrumental argument while they tend to keep the instrument noun in the clause. Following this line of research, it becomes an empirical question whether TİD signers will resort to a similar strategy of argument dropping in unaccusative, unergative, and transitive sentences with a classifier morpheme. This domain of inquiry can also shed some light on the over-explicitness phenomenon, which is observed in L2 signers (Bel et al. 2015) and heritage signers (Reynolds 2018). Our study differs from the last two in that we did not target discourse-level productions but single-clause productions. However, findings from clause-level use of arguments could still contribute to this discussion by allowing a comparison of conditions between sentence-level vs. discourse-level argument drop.

Another important issue in sign languages is the perspective, which has been argued to be challenging in the acquisition process (Slobin et al. 2003). A signer can express an event from different perspectives, which enables the signer to

encode the same participant in an event in different ways. Why are we interested in this aspect of the language? Slobin et al. (2003) argue that the function of classifiers is not only to classify the arguments but also to "identify discourse elements on the basis of various physical criteria" (p. 272), including the perspective of the signer. For example, an event can be expressed with a classifier construction from the perspective of the character who plays a role in the event (character perspective) or of an observer who is not involved in the event (observer perspective). Perspective taking is a complex domain of the language since the signers should choose a perspective "that is both grammatical" and easy to produce while the accurate and efficient production of a classifier requires using and shifting between the perspectives during the production (Slobin et al. 2003: 291). In line with this information, Perniss & Özyürek (2008: 103) show that classifiers require the choice of a perspective, which might affect the classifier type in a clause for TİD and DGS.

The aforementioned studies suggest that classifier constructions have a complex structure in many aspects; therefore, we expect to see differences in their acquisition among different signer groups who started to acquire TİD at different ages. In the next subsection, we provide brief information on the acquisition of sign language classifiers and AoA effects.

2.2 Acquisition of classifiers and age of acquisition effects

Previous studies show that SLs are not different from spoken languages in terms of grammatical complexity and expressiveness as well as the developmental patterns shown during acquisition (for ASL, see Newport & Meier 1985; Supalla 1982; among others). Although the use of classifier constructions by very young children (less than 4-years-old) has been attested (Brentari et al. 2013; Slobin et al. 2003), the full acquisition of each classifier type has been argued to be completed at the age of 7–8 even by the children who are exposed to a SL from birth, i.e., deaf children of deaf parents (Kantor 1980; Schick 1990; Supalla 1982). Moreover, Brentari et al. (2013) show that there is a difference between the production of object-handshapes in no-agent contexts and handling handshapes in agent contexts across the age groups. In agent contexts, 4–6-year-old children produced the expected handling handshape 34% of the time while 7–10-year-old children did 64% of the time, where the adults produced the expected classifier handshapes 79% of the time. On the other hand, no such difference was observed across groups in the production of the object handshapes in no-agent contexts. In addition, Zwitserlood (2012: 174) indicates that these constructions involve the use of "the iconic mapping between the event and linguistic representation", and children gain the full competence of using classifiers in their early teens.

As indicated in the previous sections, the language experience of deaf individuals is not uniform, and only about 5–10% of deaf children are born into a family with signing deaf parents (for the facts in Türkiye: İlkbaşaran 2015). The linguistic development of these deaf-of-deaf children parallels the linguistic milestones observed for spoken languages (see Lillo-Martin & Henner (2021) for review). However, the majority of deaf children, that is about 90–95%, is born into a family with hearing parents, who most often do not know a sign language. This is more often the case in Türkiye than in other countries where early sign language intervention is available. The linguistic development of these deaf-of-hearing children is usually delayed until they attend a school for the deaf where they receive sign language input through interaction with other children, usually the deaf-of-deaf peers. As widely known, the period from birth until schooling is the most crucial period in linguistic, cognitive, and social development. Thus, without much input for the development of these domains, a great majority of deaf children experience linguistic deprivation, the effects of which persist into adulthood and cannot be reversed by long years of exposure once childhood has passed (Mayberry & Kluender 2018).

These long-lasting effects observed in the grammar of deaf adults are known as age-of-acquisition effects in the sign language literature. In this context, previous studies on delayed acquisition of a sign language reveal that morphology is the most fragile part of the language (Newport 1990). Therefore, it is possible to observe significant differences between the performance of adult native signers (i.e., deaf-of-deaf) and late-learner signers (i.e., deaf-of-hearing) in this domain (Newport 1990). Mayberry & Eichen (1991) found that late-learner signers are as analytic as native signers concerning morphological structures. However, native signers use more morphological units in their production than late-learner signers do. Moreover, Mayberry et al. (2018) show that late-learner signers pass through a language development process in which they do not acquire complex morphosyntactic structures completely. Similarly, Mayberry & Kluender (2018) show that AoA has a crucial impact on morphosyntactic processing. They reveal that late-learner signers do not use inflectional morphology and complex sentences as much as native signers do. Boudreault & Mayberry (2006) investigate the processing of different structures in ASL and reveal a direct relationship between the competent use of classifiers in adults and the age of exposure to ASL. Moreover, Singleton & Newport (2004) show that late-learner adult signers produce native-like motion and location morphemes in classifier constructions (70% of time). In contrast, these signers perform worse in producing native-like classifier handshapes (45% of accuracy) despite exposure to a sign language for a long time. This finding indicates that the handshape component of classifier constructions in ASL is sensitive to the age of language acquisition.

There is a growing body of studies on AoA effects in TİD (Karadöller et al. 2017, 2021, 2022; Kayabaşı 2020; Kayabaşı & Gökgöz 2022; Keleş et al. 2022; Özdemir 2021; Sevgi 2019). Among these studies, Kayabaşı (2020) and Kayabaşı & Gökgöz (2022) investigate the use of classifiers and the construction complexity in the causative-inchoative alternation in TİD. They did not detect any significant AoA effects on the preference of alternation types (i.e., classifiers for both types of verbs or labile alternation) between native and late-learner signers. However, they found that late-learner signers produced fewer multi-predicate and complex constructions. Karadöller et al. (2017) show that late-learner signers acquire locative classifiers while they do not use these constructions in their production as often as native TİD signers do, and they prefer using less complex strategies, i.e., relational lexemes (such as the lexical signs IN, UNDER, and ON) to describe the spatial information between the entities (p. 2375). Similarly, Karadöller et al. (2021) argue that both late-learner adult signers and late-learner child signers who have been exposed to TİD only for two years produce accurate structures to express spatial information. However, the late-learner TİD signers do not use classifier constructions as much as native signers do to encode spatial information but tend to use other linguistic strategies. In addition, their study shows that late-learner adult TİD signers use fewer classifier constructions than late-learner child TİD signers who have been exposed to the sign language for only two years. Therefore, they argue that AoA, but not the length of exposure, plays a crucial role in language development (p. 21). Lastly, Karadöller et al. (2022) show that there is a significant difference between native signers and late-learner signers in the production of 'morphologically complex forms' such as locative classifiers.[3]

3. Objectives

In light of the aforementioned issues on the acquisition of sign language classifiers (Kantor 1980; Schick 1990; Slobin et al. 2003; Supalla 1982) and the age-sensitive nature of complex morphological structures including classifier constructions (Karadöller et al. 2017; Kayabaşı 2020; Kayabaşı & Gökgöz 2022; Mayberry & Eichen 1991; Mayberry & Kluender 2018; Singleton & Newport 2004), we explore the effects of acquisition age on the language performance of deaf adult signers. For this purpose, we explore the possible AoA effects between native (henceforth

3. Karadöller et al. (2022) investigate the relationship between the use of spatial language and spatial memory. They reveal that even though there is an effect of late exposure to the language on spatial language use, there is no significant AoA effect on spatial memory. Therefore, they argue that spatial language and cognition are independent mechanisms.

N in the graphics), early-learner (henceforth EL in the graphics), and late-learner (henceforth LL in the graphics) adult deaf TİD signers on classifier production with a focus on the morphological correspondence between thematic roles of the arguments and classifier types.

We investigate whether we observe any AoA effects on the argument expression determined by the clause type or not. We base our question on the literature that correlates argument drop with classifier constructions in sign and spoken languages (Drapeau & Lambert-Brétière 2011; Glück & Pfau 1998; Rose 2019), by showing that classifier morphemes license null arguments in a clause. Lastly, we investigate the effects of perspective taking on the production of classifier constructions and its potential relation with acquisition age following arguments on the function of classifiers at the discourse level which also includes perspective taking (Slobin et al. 2003).

To answer these questions, we conduct a production task that targets elicitation of classifier handshapes and grammatical arguments. In the next section, we describe the details of the current task.

4. Methodology

In the following subsections, we present information about the participants, the stimuli, and the procedure used for collecting the data for this study.

4.1 Participants

For this study, we consulted a deaf colleague who has a network of people in the Deaf community while preparing the list of eligible participants based on our sign language laboratory's participant pool. We invited forty-three participants to join the task. In this study, we report data from twenty-one participants whose data we have completed annotating so far.

Previous studies show that young children show better performance while acquiring a language due to neuroplasticity (Penfield & Roberts 1959). As mentioned in the previous section, the situation of children who are born deaf is different from hearing children. Deaf children whose parents are hearing and do not use any sign language to communicate cannot receive the primary linguistic input for the acquisition of their first language. Thus, the age of first exposure to a systematic first functional language is highly variable across deaf children (Mayberry 1998). These children are mostly able to acquire sign language at older ages when they enroll in a Deaf school where sign language is used as the primary means of communication, at least between the students. Due to the potential effect of the

variation in the age of language acquisition, we grouped the participants as native (eight participants), early-learner (six participants), and late-learner (seven participants) based on the criteria below:

- Was the participant born deaf?
- If so, was s/he born to a family with at least one deaf signing parent so that exposure to a systematic linguistic input started from birth?
- If s/he was not born to deaf signing parents, what was the age of exposure to the sign language for the participant?

We considered a participant who provided an affirmative answer to the first and second questions as a native TİD signer. We defined two age intervals for the participants who are not in the native group, following previous studies on the acquisition of sign language classifiers (Newport 1990; Mayberry & Eichen 1991). These age intervals are 4–7 and 8–12, which we define as early-learner and late-learner, respectively. The motivation for this classification is the expectation to observe certain similarities as well as significant differences between the native and early-learner group. We also expect to see crucial similarities and differences between the early-learner and late-learner group since classifiers are produced accurately at the age of 7–8 with input from birth (Schick 1990; Supalla 1982).

The age range for the native signers is 24–35 (M_{age} = 27.6, sd = 3.7), 31–36 for the early-learner signers (M_{age} = 33.6, sd = 2), and 24–49 for the late-learner signers (M_{age} = 37, sd = 10). Early-learner and late-learner signers stated that they started to learn TİD at a Deaf school. The background data showed that the average total duration of exposure to a sign language of the early-learner signers is 29.6 years and 29.3 years for the late-learner signers, while it is 27.6 years for the native signers as they are exposed to TİD from birth. Therefore, we consider that there is no difference among these three groups concerning the duration of exposure to TİD.[4]

Although their birthplaces vary, all participants currently live in İstanbul. There were four female and four male participants in the native group. These signers attended different primary and middle schools for the Deaf. Six of the eight native TİD signers are graduates of high school. Two native signers are graduates of universities; however, these universities are not specialized for deaf students' education. There are four female and two male participants in the early-learner group. All early-learner TİD signers attended at least primary or middle schools for the Deaf. Four of these participants are high school graduates, while two are graduates of universities that are not specialized for deaf students'

4. We conducted a one-way-ANOVA test on the duration of exposure to a linguistic input of the acquisition age groups. The result shows that there is no significant difference between these three groups (f-ratio = 0.05852, $p < .05$)

education. Lastly, there are three female and four male participants in the late-learner group. These signers attended different primary and middle schools for the Deaf. Two of these participants are high school graduates, two participants are university graduates, and three are middle school graduates. It is important to note that educational institutes specialized for deaf students in Türkiye do not exhaustively provide classes in sign language. This information is confirmed by the survey that our participants filled in before the task. This form was a written document in Turkish due to the requirement to submit written documents about the details of our project to the administrative body. However, our deaf assistant in the lab explained each inquiry in TİD to the participants before the task and assisted them while they were filling in the form. Their response to the question "Which language did the instructors use in classes?" shows that the instructors did not solely use TİD as the language of education. What is more striking is that the language of education was Turkish in most cases, and the instructors did not have any TİD knowledge. Moreover, our participants stated that reading and writing Turkish during the courses were inevitable while there was almost no educational setting that embraced the use of sign language as a primary way of communication. Nonetheless, students in these schools use sign language among each other, which is the main source of linguistic input for early-learner and late-learner signers.

4.2 Stimuli

To obtain clauses with classifier constructions, we used the elicitation material of Zwitserlood (2003) with her permission. This material consists of drawings that include a wide range of events and situations with various referents that differ in animacy:

Figure 1. Examples of stimuli used in the task

As a first step, we investigated Zwitserlood's entire material, which includes 152 pictures in total. We listed potential classifier types that each stimulus could elicit following Engberg-Pedersen's (1993) classification. We selected ten pictures that target unaccusative events, fourteen pictures that target unergative events, and seventeen pictures targeting transitive events.

The stimuli that target elicitation of unaccusative predicates are presented in Table 2. Some of the target predicates in the list re-occur since the sole theme argument of these predicates varies regarding the animacy and the visual shape of the referent in each picture.[5]

Table 2. Unaccusative predicates targeted in the stimuli ($N=10$)

Target	Description of stimulus
bleed	A man cuts his finger (with a knife) and his finger bleeds.
exist	There is a water pond on the ground.
exist	There is a (cylindrical) robot (with four eyes and ten legs) that jumps with other kids.
exist	There is a (cylindrical) robot (with four eyes and ten legs) that looks at a girl.
exist	There is a rock on the ground.
fall	A woman falls (from a tree).
fall	An apple falls (from a tree).
fall	A plate falls (from a table).
fall	An elephant falls (from a tree).
fall	A woman falls (tripping over a rock).

The stimuli that targeted elicitation of unergative predicates are presented in Table 3. The referent of the sole agent argument of the target verb varies regarding the properties of the referent in each picture, although some predicates occur a few times similar to the unaccusative predicates.

Table 3. Unergative predicates targeted in the stimuli ($N=14$)

Target	Description of stimulus
bow	A man (in karate outfit) bows.
bow	Two men (face-to-face and in karate outfit) bow.
crawl	A baby crawls.
crawl	A baby crawls (towards a (standing) man).
fly	A man (with wings) flies (to a nest on a tree).
fly	A dog (with wings) flies (to a nest on a tree).
jump	An athlete jumps.

5. Due to the presence of repeated verbs in each group, we included by-item analysis of our data, which we discuss in Section 5.

Table 3. *(continued)*

Target	Description of stimulus
jump	A man jumps (over a fence).
jump	An athlete jumps (over a hurdle).
jump	A woman jumps (from a tree).
land	A man lands on a tree.
land	A dog lands on a tree.
sit	A woman and a girl sit (on an armchair).
step	A man steps on a water pond.

Lastly, the stimuli that targeted elicitation of transitive sentences are presented in Table 4.

Table 4. Transitive predicates targeted in the stimuli ($N=17$)

Target	Description of stimulus
bite	A dog bites (the ankle of) a woman.
climb	A man climbs a pole.
grab	A cat grabs a mouse (with its mouth).
hold	A boy holds (and eats) a chicken.
hold	A firefighter holds (and carries) a girl.
hold	A man holds (and carries) a (wrapped) carpet.
hold	A man holds a nail (on the wall).
kick	Two children kick a ball.
lick	A man licks (the head of) a dog.
lick	A dragon licks (the hand of) a man.
lick	A mouse licks (the fingers of) a (standing) woman.
lick	A dog licks (the hand of) a man (who is sitting).
open	A man opens a door (with a round knob).
pick	A girl picks flower.
push	A boy pushes another boy.
push	A boy pushes a pillow.
throw	A girl throws a pillow.

Transitive predicates targeted by stimuli in Table 4 vary in animacy and shape of their external and internal arguments although some predicates occur a few times in this category as well.

The signers saw each stimulus (a total of forty-one pictures) on an A4-sized paper. We put the images in an order so that no similar item followed any other. Each participant saw the stimuli in the same order.

4.3 Procedure

We conducted a practice session with our deaf colleague. We placed one SONY Handycam camera, which recorded in HD format, opposite of the signer. We asked our colleague to consider the camera as their deaf friend and describe each picture in everyday conversation style to 'this deaf friend', who did not know the event depicted in the pictures. We conducted the task by applying the picture signing method since we aimed to avoid any influence of the spoken or written form of Turkish, the official language of the hearing community in Türkiye. We went over the data out of this practice session, which revealed the kinds of classifiers we aspired to elicit.

We repeated the task with 43 participants, 21 of whom we annotated and report on in this paper. Our deaf colleague assisted us during the whole task process. Before recording, we asked the participants to fill out a consent form to obtain their informed consent for the data to be recorded, analyzed, and used for academic purposes. Furthermore, through a comprehensive background questionnaire, we gathered information about the participants' age, educational background, the severity of their hearing loss, their language preference in daily life, their AoA of TİD, and whether they have any family members who are TİD signers. We based the division of the participants into three groups on this information.

Our deaf colleague explained the task to the participants in TİD before the task. Their task was to describe the event in each picture to the camera as if it were a deaf friend. She did not give any explicit instructions, which would lead the participants to use classifiers or any other way of description. The participants looked at the pictures one by one and then turned to the camera to sign the event. All signers viewed the stimuli in the same order.

4.4 Annotations

We used ELAN for annotations, a free software program that displays audio-visual material and makes it possible to align the visual data with annotations on tiers created from scratch (Crasborn & Sloetjes 2008). First, we specified the boundaries of the clauses produced for each picture. To detect clausal boundaries, we focused on predications that express a single event, activity, or state following Berman

et al. (1994) as well as the length of the pauses between the signs.[6] Moreover, we paid attention to non-manual markers such as eyebrows, eye blinks, head tilts, and mouth in addition to the overall change in non-manuals to ensure clausal divisions were accurate (Crasborn 2007; Nespor & Sandler 1999; Wilbur 1994). We consulted our deaf colleagues in detecting clausal boundaries when we had any doubts.

We encoded verb type (UNACCUSATIVE, UNERGATIVE, and TRANSITIVE), classifier type (WECL, BPCL, and HCL), and perspective taken towards the event (CHARACTER and OBSERVER) for each target predicate using the controlled vocabulary function in ELAN. We focus on the eyegaze, non-manual markers on the face, and posture to track varying perspectives following Slobin et al. (2003: 291). To annotate the absence or presence of the arguments,[7] we annotated the word order of each target clause produced for each stimulus by using a controlled vocabulary list, as shown in Table 5, where we also show for which clause type each word order was relevant. If the target predicate was not produced by a signer, we chose NA for that stimulus.

Table 5. List of controlled vocabulary items for word order (S: Subject, O: Object, V: Verb)

Word order	Relevant clause type
SOV	Transitive
OSV	Transitive
OVS	Transitive
OV	Transitive
VO	Transitive
SV	Transitive, Unaccusative, Unergative
VS	Transitive, Unaccusative, Unergative
V	Transitive, Unaccusative, Unergative
NA	Transitive, Unaccusative, Unergative

6. Grosjean & Lane (1977) claim that the length of a pause is an indicator of a syntactic structure for ASL. For example, it is possible to observe a pause of 229 ms on average between sentences while this pause is shorter between the noun phrases and the verb phrases (approximately 106 ms).

7. In our coding system, we annotated the surface grammatical functions of the arguments. Therefore, the label 'Object' is available only for transitive structures. We encoded the sole argument of unergative and unaccusative structures as Subject without making a distinction between underlying object and surface subject for the unaccusative cases.

Table 6 exemplifies the conditions of the overt expression and dropping of the arguments in a target transitive clause (TC) attested in our data:

Table 6. Attested overt and covert expression of the arguments in the current data (TC = transitive clause)

Preceding sentence	Utterance	Overt arguments in TC
Absent	(MAN CARPET HOLD)	SOV
	(∅ CARPET HOLD)	OV
Present	(MAN$_i$ GO) (MAN$_i$ CARPET HOLD)	SOV
	(MAN$_i$ GO) (∅$_i$ CARPET HOLD)	OV
	(DOG$_i$ STAND) (MAN DOG$_i$ LICK)	SOV
	(DOG$_i$ STAND) (∅ DOG$_i$ LICK)	OV

Our data include these six types of argument expression for both the Subject and the Object although we illustrated the types only with the Subject here. We observe the overt expression of the argument(s) when there is no coreferential argument in the preceding sentence. As expected, the argument can be dropped when the preceding clause contains the coreferential argument. However, it is also possible to drop the argument even if there is no coreference of the argument in the discourse in TİD. Moreover, the presence of a coreferential argument in the preceding sentence does not entail argument dropping in every case. Based on this distribution, we argue that argument dropping is not driven purely by anaphoric factors, i.e., the presence of the coreferential argument in a neighboring clause.

The data was annotated by both authors, who are hearing but have a good command of TİD. Approximately half of the data was annotated by the first author while the rest was annotated by the second author. The data was first annotated separately by the authors. After the completion of the annotations, the authors compared their annotations. When there was a need for a resolution of a disagreement, the authors discussed the cases of disagreement and reached total agreement. As a second step, we conducted a reliability check with a deaf native TİD signer who has been involved in other linguistic studies. Due to time limitations, we focused on 20% of the data. We chose two unaccusative, three unergative, and four transitive constructions from the data of each participant by using an online randomizer. Before the annotation process, we provided a training session to our deaf annotator since the structures we focus on require linguistic background, unlike simple glossing. After the annotation process, we discussed some data points and reached an agreement.

After these revisions, we had an agreement of 96% for the choice of classifier type.[8] On the other hand, we had an overall agreement of 77.4% for the choice of perspective. In order to understand the difference in our annotations, we investigated the choice of perspective with respect to the classifier type. Such analysis showed that we had an agreement of 92% when the classifier type is HCL (0.61 of Kappa score – substantial agreement) while the agreement was 88% when the classifier type is WECL.[9] However, when we looked into the utterances with BPCLs, the agreement ratio decreased to 65% (0.36 of Kappa score – fair agreement). After the discussions we had with our consultant, we concluded that this difference is due to the cues we use for determining the perspective. We focused on non-manual cues such as head tilt, torso, eyegaze, and non-manual expressions since we had the idea that just focusing on the hands might be circular and not explanatory for our study. Our consultant, on the other hand, indicated that she only focused on the manual cues. It is also important to note that the main reason for the low agreement for the perspective with BPCL is that our consultant indicated that both observer and character perspective are possible for some target predicates, and that she was not sure which one to choose. For such cases, we, the authors, tended to annotate the data as character perspective since the signers overtly use the signing space and their body posture as if they were involved in the event (see Özyürek & Perniss (2011) for a detailed discussion).

After the annotation process, we exported the data from ELAN into Microsoft Excel; thus, we analyzed and compared the data from twenty-one participants to find an answer to our research questions. Before conducting our statistical models, we excluded clauses that occurred without a classifier.

5. Results

As indicated in the previous sections, we investigate differences among different acquisition age groups of TİD signers in the production of classifier constructions. Within the scope of this paper, we focus on three different aspects of grammar and the effect of AoA on these aspects: correspondence between argument structure and classifier type (Section 5.1), expression or dropping of arguments in classifier constructions (Section 5.2), and perspective taking (Section 5.3). In the next subsections, we provide the results of the related analyses.

8. We could not agree on whether body parts such as the eyes, legs, etc. are WECL or BPCL in a context where these body parts are described in the target clause.

9. Since our data does not include any relevant disagreement required for the calculation, we cannot provide the Kappa score for this category.

5.1 Correspondence between argument structure and classifier type

As a first step, we investigate whether there are any effects of language acquisition age on the morphological encoding of the classifier morphemes with respect to the argument structure. For this purpose, we analyze the classifier types (WECL, BPCL, HCL) produced by native, early-learner, and late-learner signers in clauses with different argument structures (UNACCUSATIVE, UNERGATIVE, and TRANSITIVE). The ratios and numbers of tokens in our data are as follows:

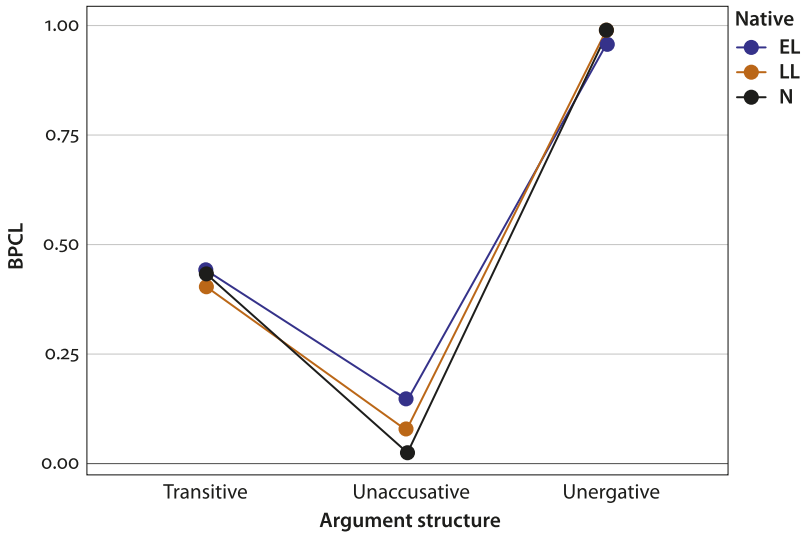
Table 7. The ratios and numbers of tokens by acquisition group, classifier type, and argument structure

Acquisition group	Argument structure	WECL	BPCL	HCL	N
Native	Unaccusative	0.984	0.0151	0	66
Early-learner		0.860	0.140	0	50
Late-learner		0.927	0.072	0	55
Native	Unergative	0.0288	0.971	0	104
Early-learner		0.0533	0.946	0	75
Late-learner		0.0219	0.978	0	91
Native	Transitive	0.0173	0.426	0.556	115
Early-learner		0.0119	0.440	0.547	84
Late-learner		0.0104	0.395	0.593	96

Figure 2 is a representation of each classifier type and their occurrence rates with different argument structures in our data.

The visualization of the raw data indicates that the age of acquisition groups do not differ significantly with respect to the morphological encoding of argument structure. In order to get a better understanding of the data, we conducted a mixed effects regression model by using brms (Bayesian Regression Models using 'Stan') package (Bürkner 2017) in R (R Core Team 2020).[10] In our first model, we tested the effects of acquisition age (N, EL, and LL) and argument structure (UNACCUSATIVE, UNERGATIVE, and TRANSITIVE) on the type of the produced classifiers (WECL, BPCL, and HCL). We included the items as random effects in our model.

10. In order to obtain the accurate p-values of the coefficients, we also conducted *glm* models of lme4 package (Bates et al. 2015) on the same predictors.


1.00
0.75
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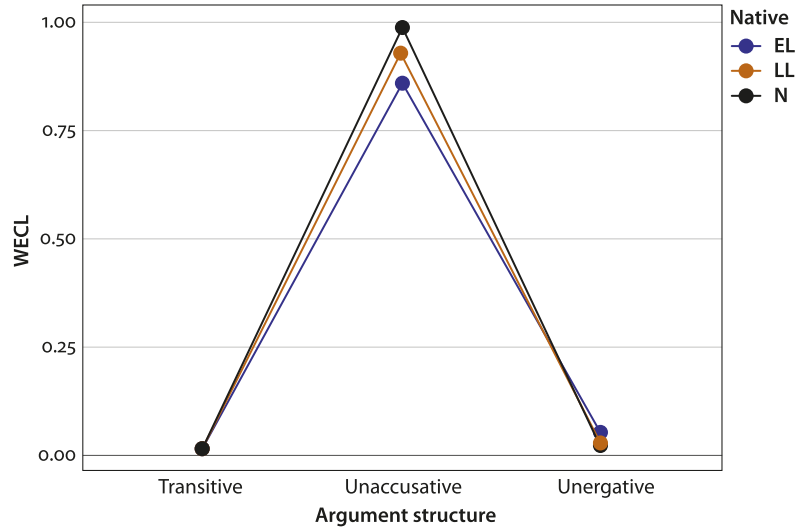
0.00
BPCL
Native
EL
LL
N
Transitive
Unaccusative
Unergative
Argument structure

A.


1.00
0.75
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WECL
Native
EL
LL
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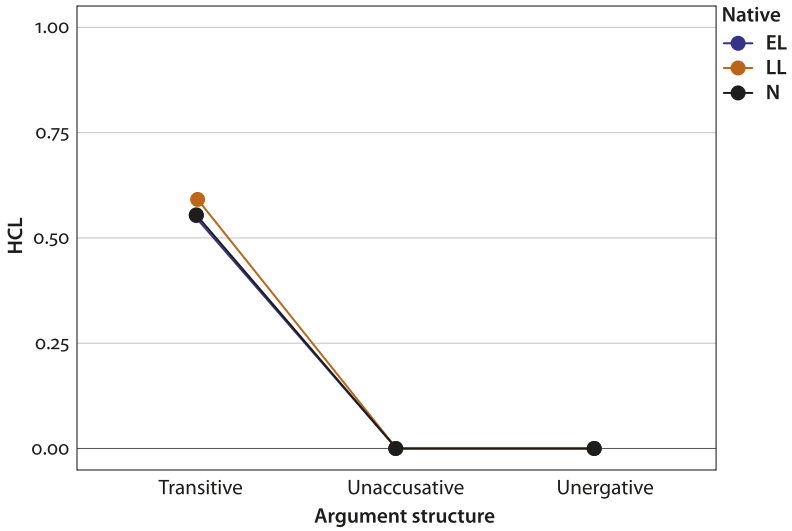
Transitive
Unaccusative
Unergative
Argument structure

B.



C.

Figure 2. Distribution of classifier types with respect to argument structure: (A) body part classifiers – BPCL, (B) whole entity classifiers – WECL, and (C) handling classifiers – HCL. Abbreviations for AoA groups are as follows: EL – early-learner signers, LL – late-learner signers, and N – native signers

The results show that there is a significant effect of argument structure on the production of the classifier type ($\beta = 0.86$, $SE = 0.022$, $p < 0.001$)[11] while age of acquisition does not have any effects ($\beta = -0.014$, $SE = 0.025$, $p > 0.5$). Moreover, we do not observe any significant random effects of items (the average credible interval for unergative clauses = [−2.74, 2.26]). Lastly, the interaction of two predictors does not have a significant effect either ($\beta = 0.05$, $SE = 0.058$, $p > 0.3$).

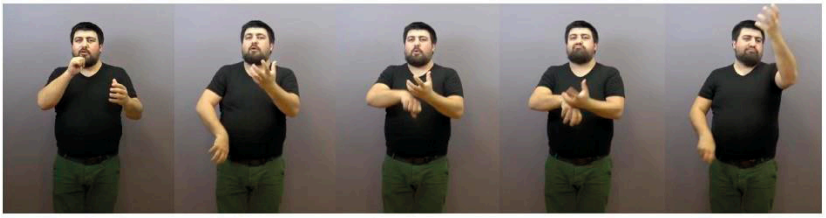
These results indicate that, regardless of their acquisition age, TİD signers mostly produced the expected classifier type, i.e., WECLs for unaccusative clauses and BPCLs for unergative clauses as proposed by Benedicto & Brentari (2004). On the other hand, the TİD signers produced HCL, BPCL, and a few WECLs in transitive clauses.

At this point, it is important to point out that the use of a BPCL in a transitive clause is driven by the type of the transitive event and the nature of the agent (Kayabaşı & Gökgöz 2022). Benedicto & Brentari (2004) only investigate transitive events where the object is grasped by the human agent. However, in line with

11. The notations in the analyses are as follows: β for fixed effect, SE for standard error, and p is for p-value.

our previous and ongoing research (Gökgöz & Sevgi 2020), as well as studies by other researchers (Grose et al. 2007; Kimmelman et al. 2020; among others), if a transitive event entails contact by the body part of a human agent or an animal rather than a grasp by a human hand, a BPCL on H1 is used to cross-reference the body part of the contacting agent and an optional WECL on H2 is used to cross-reference the contacted object. We observe a similar pattern in our data. Some predicates in our stimuli involve a human agent grasping an object in the real-world action, i.e., CLIMB, HOLD, OPEN, PICK, and THROW. The remaining predicates entail contact by the body part of a human or a non-human agent: BITE, GRAB (of a cat), KICK, LICK, and PUSH. In our current data, an HCL is used in 92% of the clauses in the productions elicited by the "grasp" group of stimuli. In contrast, a BPCL is used in 83% percent of the clauses in the productions elicited by the "contact" group of stimuli. Nonetheless, this does not bring along a difference among the acquisition age groups as the statistical results show above. We provide an example for the use of a BPCL in a contact transitive event in (2) below:

(2) Transitive event with BPCL in TİD



H1: [MAN KICK.BPCL$_{(foot)}$]
H2: [BALL.WECL] [MOVE.WECL$_{(ball)}$]

'The boy kicks the ball and (it) moves away.'

In (3), we provide an example for the use of a WECL in the absence of a BPCL in a transitive event:

(3) Transitive event with WECL in TİD

H1: CHILD NAIL HOLD.WECL

'The child holds a nail.'

Based on cross-linguistic data from TİD, our findings contribute to the research track initiated by Benedicto & Brentari (2004) by highlighting the importance

of the transitive event and showing that grasping and contact events exploit different classifier handshapes. On the other hand, the use of a whole entity classifier in a transitive event (albeit rare) is not predicted by the account of Benedicto & Brentari (2004) and requires further research. Nonetheless, this use is attested in other sign languages as well, i.e., Kata Kolok, Russian Sign Language, Sign Language of the Netherlands, and DGS (Kimmelman et al. 2019). In ongoing analyses, we treat this pattern under a perspective analysis, whereby an observer perspective can override the hand configuration information responsible for cross-referencing the agent in a handling classifier only leaving the selected-fingers and joints; thus, a WECL surfaces (Gökgöz, under review).

In the next subsection, we explore the argument expression patterns in clauses with classifier constructions and AoA effects in TİD.

5.2 (C)overt expression of arguments in classifier constructions

Following previous studies in the field (Drapeau & Lambert-Brétière 2011; Glück & Pfau 1998; among others), we aimed to find out whether we observe effects of acquisition age on the argument expression rates in relation with classifier types. For this purpose, we annotated the presence and/or absence of the argument(s) in a clause with classifier constructions produced by native, early-learner, and late-learner signers. In Table 8, we present the ratios and numbers of overt argument expressions in clauses. The higher the ratios, the less often an argument or arguments (in a transitive clause) are dropped:

Table 8. The ratios of overt argument expression with respect to classifier type in a clause

Acquisition group	Classifier type structure	Argument expression	N
Native	WECL	0.686	70
Early-learner	WECL	0.708	48
Late-learner	WECL	0.741	54
Native	BPCL	0.497	151
Early-learner	BPCL	0.530	75
Late-learner	BPCL	0.695	131
Native	HCL	0.562	64
Early-learner	HCL	0.609	46
Late-learner	HCL	0.772	57

At this point, it is important to point out that our data includes both mono-clausal and multi-clausal productions. The argument which was cross-referenced by a classifier occurred in a preceding clause 37% of the time. We observed that when the single argument was dropped in a target intransitive clause, native signers overtly expressed the antecedent of this dropped argument in a preceding clause for 87% of the time. This ratio was 86% for the early-learner signers and 91% for late-learner signers. When an argument was dropped in a transitive clause, native signers overtly expressed the antecedent of this dropped argument in a preceding clause for 74% of the time. The ratio was 88% of the time for the early-learners and 76% of the time for the late-learners. These ratios seem to indicate that it is not a necessary condition for TİD signers to have an overt argument in a preceding clause co-referential with a dropped argument in a target clause. Furthermore, when there is an overt argument in a preceding clause, the presence of the argument does not seem to correlate with either different AoA groups or clause types.

Figure 3 is a representation of the overt argument rates in a clause and the argument structures as well as the acquisition age groups in our data:

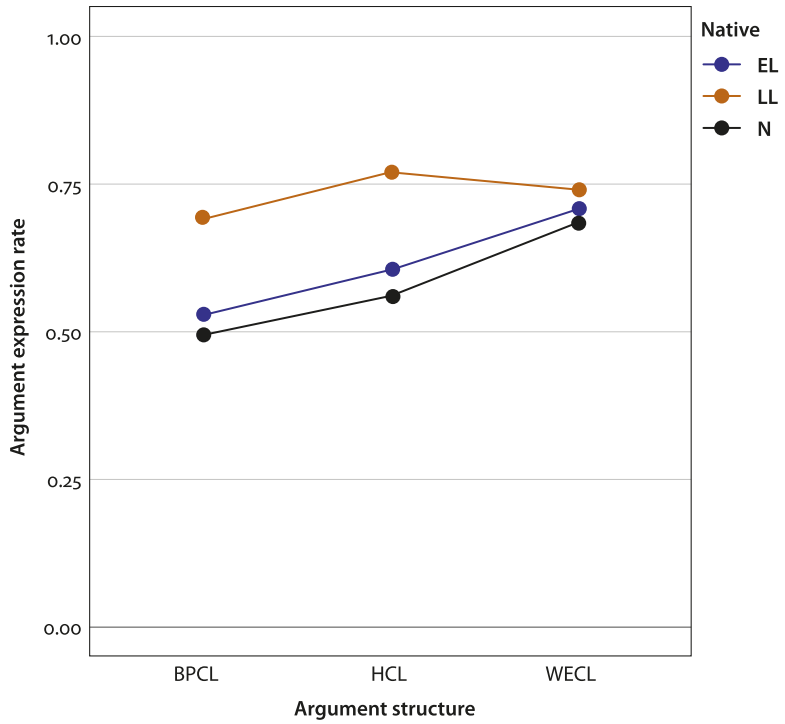


Figure 3. Distribution of overt arguments with respect to classifier types

The graphic indicates that native and early-learner TİD signers show a similar trend of production with respect to the relation between overt argument expression and classifier type while late-learner signers differ from these two groups. When we investigate the relationship between argument structure and argument expression, we observe that both groups tend to drop the sole argument of an unergative clause, which is an agent, while they tend to keep the sole argument of the unaccusative clause, which is a theme.

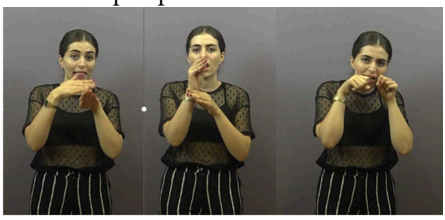
We conducted another mixed effects regression model in order to see whether this acquisition age difference is significantly meaningful for our data. With this purpose, we test the effects of acquisition age group (N, EL, and LL) and classifier types (WECL, BPCL, and HCL) as well as argument structure on the overt expression of the arguments in a clause. The results of the regression models show that there is a significant effect of acquisition age on the overt expression of the arguments ($\beta = 0.034$, $SE = 0.01$, $p < 0.001$), as well as classifier type ($\beta = 0.235$, $SE = 0.101$, $p < 0.05$) and argument structure ($\beta = 0.19$, $SE = 0.11$, $p < 0.1$). Moreover, the results indicate that the predictor 'acquisition age' has a very prominent effect on the argument expression. Classifier type, on the other hand, has slightly less effect when compared to acquisition group while argument structure has even less effect. When we focus on the interaction among the effects, we observe no interaction between the age of acquisition and argument structure, and among the age of acquisition, classifier type, and argument structure. However, there is a significant interaction between classifier type and argument structure ($\beta = 1.6$, $SE = 0.37$, $p < 0.001$).

Since we observe a robust effect of acquisition age on the argument expression while argument structure and classifier type have relatively less effect, we should explore the main reason behind this picture. Following the relevant literature, we investigate whether the perspective taken in a classifier construction is the determinant of the argument expression, which might influence the syntactic properties of a clause. More importantly, we also ask the question of whether AoA has any effects on the choice of the perspective taken in a classifier construction. For this purpose, we focus on perspective taking in classifier constructions and its relation to the other predictors in our data in the next subsection.

5.3 Perspective taking in classifier constructions

As a final step, we investigate the AoA effects on classifier productions with a special focus on the choice of perspective by the signers. (4) and (5) are examples of character and observer perspective in our TİD data, respectively.

(4) Character perspective in TİD



H1: CAT MOUSE GRAB.(CHARACTER)
H2: CAT MOUSE GRAB.(CHARACTER)

'The cat grabs the mouse.'

(5) Observer perspective in TİD

H1: CAT MOUSE GRAB.(OBSERVER)
H2: CAT MOUSE GRAB.(OBSERVER)

'The cat grabs the mouse.'

We observe that the body posture and facial expression of the signer in (4) indicate that she is taking the perspective of the character, i.e., the cat, while the same is not true for the signer in (5). We explore any significant effects of any predictors and their potential interactions. We excluded the data points which cannot be categorized as one of these two perspective types with the given cues. In Table 9, we present character perspective ratios and tokens by acquisition group and argument structure. The closer the ratio is to 1, the more often the character perspective is used. N is the number of clauses with a clear character or observer perspective.

Figure 4 visually displays the ratios of perspective used in a classifier construction in relation to the argument structure of a clause (on the left) and the argument expression (on the right) by acquisition age group. 1.00 on the y-axis represents the character perspective, while 0.00 represents the observer perspective. 'All' refers to the transitive cases where both subject and object arguments of a transitive clause get dropped, while 'None' refers to the cases in which we observe no dropping instances with the three verb types. 'Agent' covers the cases in which the subject of a transitive clause or the sole argument of an unergative clause gets dropped, while 'Theme' covers the cases in which the object of a transitive clause or the sole argument of an unaccusative clause gets dropped.

Table 9. Character perspective use with respect to argument structure of a clause

Acquisition group	Argument structure	Character perspective	N
Native	Unaccusative	0.089	56
Early-learner		0.256	43
Late-learner		0.066	45
Native	Unergative	0.512	84
Early-learner		0.639	61
Late-learner		0.606	71
Native	Transitive	0.827	81
Early-learner		0.930	46
Late-learner		0.946	74

The top graphic in Figure 4 suggests that signers of all acquisition groups follow a similar pattern with respect to the choice of perspective and argument structure. Unaccusative clauses occur with observer perspective, while transitive clauses occur with character perspective in general. Unergative clauses, on the other hand, do not present a clear pattern with respect to the choice of perspective. We observe that there is no clear tendency among signer groups to choose one of these perspective types with unergative clauses.

When we focus on the relation between perspective taking and argument expression (bottom graphic in Figure 4), we realize that the three acquisition groups behave differently with respect to the perspective they use when the agent argument in the clause is dropped. Early-learner signers use character perspective prominently, while late-learner signers use observer perspective in the same environment. Native signers, on the other hand, seem not to have any preference. In addition, we observe that when both agent and theme arguments in a transitive clause are dropped, the character perspective is preferred across all signer groups.

We conducted a mixed effects regression model to understand the significance of the differences between the predictors. We focus on the overt expression of the arguments and the perspective taken in a clause (CHARACTER and OBSERVER) with a classifier construction while investigating their relation with age of acquisition and classifier type. The results indicate that acquisition age ($\beta = -0.08$, $SE = 0.04$, $p < 0.05$), classifier type ($\beta = 0.38$, $SE = 0.038$, $p < 0.001$), and overt argument expression ($\beta = -0.037$, $SE = 0.01$, $p < 0.01$) have a meaningful effect on the perspective taking in classifier constructions.

In the next section, we discuss the results of these analyses and conclude the paper.

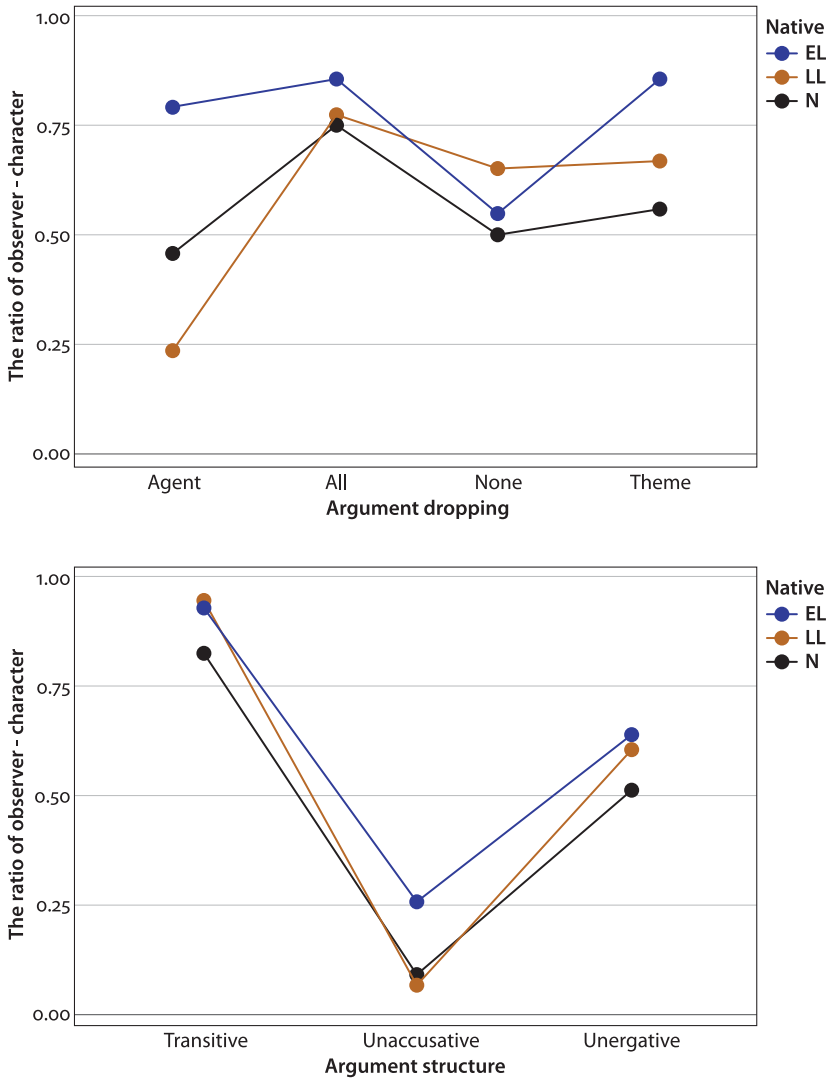


Figure 4. The ratios of perspective taking in clauses with classifier constructions with respect to argument structure (top) and argument expression (bottom)

6. Discussion and conclusions

The three analyses conducted on the data of a production task indicate that some aspects of TİD grammar are sensitive to the age of language acquisition, while other aspects do not show such sensitivity. The results of the analysis which focuses on the correspondence between argument structure and classifier type

show that regardless of the age at which they are first exposed to TİD, all signers display a similar pattern when encoding the argument structure morphologically in a classifier construction. Therefore, we claim that the correspondence between the morphological encoding of a classifier type and argument structure is not sensitive to acquisition age. This finding is crucial since previous studies argue that morphology is a complex aspect of a language, and it is susceptible to AoA effects (Boudreault & Mayberry 2006; Mayberry & Eichen 1991; Newport 1990; Singleton & Newport 2004). The current data, however, suggest that delayed exposure to the first linguistic input does not obstruct the morphological encoding of thematic roles on verbal roots in clauses with classifier constructions for TİD signers. This finding is in line with other recent works on TİD (Karadöller et al. 2021; among others), which claim that a specific amount of exposure to the input is enough to produce classifier constructions in a native-like manner. However, the current study focuses on the classifier predicates, rather than targeting spatial classifiers. Moreover, it supports the findings of Kayabaşı (2020) and Kayabaşı & Gökgöz (2022), who found that TİD signers across each acquisition age group encode the inchoative-transitive alternation by using whole-entity and handling/body part classifier pairs with similar frequencies.

However, differences among native, early-learner, and late-learner TİD signers emerge when we focus on the argument expression patterns. Based on the results of our first analysis, we expected to find a relation between argument expression and classifier types following the literature on classifiers and their capacity to license their arguments. The results show that acquisition age has the most prominent effect on the argument expression, while we still observe an effect of the other predictors, i.e., classifier type and argument structure.

Since we are aware that classifier constructions are not only clause-level but also discourse-level elements in the language, we argue that there might also be a display of a pragmatic ability sensitive to AoA (in line with Perniss & Özyürek 2008; Slobin et al. 2003). In this respect, we sought an answer to the question of why native and early-learner TİD signers tend to drop the agent argument, whereas late-learner TİD signers tend to express it overtly. Following previous works (Slobin et al. 2003; among others), we claim that this difference may derive from an AoA effect in perspective taking. According to the findings of Perniss & Özyürek (2008) on TİD and DGS, signers produce events either from a character perspective or from an observer perspective. The body of the signer represents the body of the character in the character perspective. In this sense, the signer displays an event-internal role in such cases. In the observer perspective, on the other hand, the signer is external to the narrated event while they produce the relevant event as they observe it. Perniss & Özyürek (2008) highlight that a handling classifier is used more frequently under a character perspective, whereas a whole-

entity classifier is used more frequently under an observer perspective. When we consider the thematic roles of the arguments in a clause involving a handling vs. a whole-entity classifier, we could suggest that the perspective of the agent is taken in a character perspective, whereas the theme is represented from the perspective of an observer.[12] Our results also show that TİD signers use a similar pattern in their production of classifiers. Moreover, we observe differences between acquisition age groups.

Another relevant issue is constructed action in sign languages. The term refers to "a stretch of discourse that represents one role or combination of roles depicting actions, utterances, thought, attitudes and/or feelings of one or more referents" (Cormier et al. 2015: 167). Lillo-Martin & de Quadros (2011) note that in ASL and Brazilian Sign Language (Libras), the subject-agent should be outside the constructed action, which corresponds to the character perspective. Leaving the overt subject-agent out of the constructed action implies that the subject-agent role is interpreted through the signer's body under constructed action. Following their work, we argue that the attested difference among the acquisition groups in our study may then be stemming from the age sensitivity of coordinating argument expression and character perspective. Native and early-learner signers may more readily coordinate character perspective and argument dropping. In particular, under the character perspective, the signer's body includes referential cues for the agent, such as the non-manual gestures on the face and the body's posture. Therefore, the body helps to recover the referential properties of the agent in such a perspective, and thus native and early-learner signers can more readily leave the overt agent argument unexpressed, perhaps also to reduce redundancy. On the other hand, late-learner signers may have a more difficult time coordinating the character perspective and dropping the agent which, then, results in overt expression of the agent, perhaps despite increasing redundancy.

If the age of acquisition sensitivity issue lies within the development of perspective taking and its coordination with argument dropping, it is not difficult to see the implications of this difference between signers from different age of acquisition groups. Being competent in perspective taking is crucial not only for linguistic development but also for social-cognition and Theory-of-Mind (Santiesteban et al. 2012; Tomasello 2003). In this regard, denying the primary and naturally accessible linguistic input (i.e., sign language input) to the deaf-of-hearing children in their early childhood inevitably puts 90–95% of all deaf chil-

12. Perniss & Özyürek (2008) indicate that these are not the only possible combinations of perspective and classifier use. Non-aligned combinations are also occasionally observed, i.e., the use of character perspective with entity classifier and observer perspective with handling classifier across languages depending on the narrative.

dren at a disadvantage for linguistic development and jeopardizes their overall healthy development. Crucially, these effects seem to persist into adulthood as the current study suggests. Therefore, we call policymakers in Türkiye to take immediate action not to let deaf children experience such long-lasting disadvantages.

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