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Causative alternation in Tianjin Sign Language

Abstract: This paper examines the phenomenon of causative alternation in Tianjin Sign Language (TJSL), a variety sign language used by deaf people in Tianjin, China, and addresses the long-standing debate about the relationship between classifier handshape and the verb argument structure of classifier predicates using TJSL data. Initially, we adopt the classifier typology of Benedicto and Brentari (2004) and identify three types of causative alternation in TJSL. First, lexical causatives such as BREAK, which alternate between causative and unaccusative predicates without any change of the verb's morphological form and in the absence of classifier morphemes. Second, causative-unaccusative alternation in classifier predicates requiring classifier handshape change, namely a handling classifier for transitive predicates and a whole entity classifier for unaccusative predicates. Third, causative-unaccusative alternation in classifier predicates involving no change of classifier handshape and verb root. We argue that neither is the handling classifier a causative marker nor is the whole entity classifier an unaccusative marker in TJSL. Additionally, Benedicto and Brentari's (2004) proposal that classifier type determines the argument structure of predicates fails to apply to TJSL straightforwardly. The paper also attempts to align the current observations in TJSL with Haspelmath's (1993) typology of causative alternation in the world's languages, namely, TJSL displays properties of subtypes of non-directed alternation – labile and equipollent alternation. Such a typological alignment enables us to appreciate the nature of the verb root and the classifier morpheme of classifier predicates in TJSL.

Keywords: classifier predicates, causative alternation, argument structure

1 Introduction

There has been pervasive research on causative alternation in spoken languages, in particular the correlation between causativity and unaccusativity, and how

Acknowledgements: This research was supported by Hong Kong GRF Grant #450513 to Gladys Tang. We are also grateful to the audiences at FEAST 2017 for their comments. We wish to thank the deaf signers in Tianjin, China who participated in this research.

https://doi.org/10.1515/9781501510243-005

this correlation reveals the interaction of morphology, syntax and argument structure alternation. Causative alternation is often assumed to be lexical, which characterizes verb pairs that stand in both an intransitive use and a transitive use. The intransitive use typically denotes a change of state undergone by an entity, whereas the transitive use typically denotes that such a change of state is caused by some different entity (Levin and Rappaport Hovav 1995, Schäfer 2009). Therefore, verbs that undergo causative alternation generally incorporate the meaning of a change of state. Examples (1) and (2) illustrate causative-inchoative alternation with typical pairs of alternating verbs in English.

(1) a. John broke the vase.
b. The vase broke.

(2) a. Mary opened the door.
b. The door opened.

As shown in examples (1a) and (2a), the causative-transitive verbs *break* and *open* require an agent to act on a theme to bring about a change of state, whereas examples (1b) and (2b) are the intransitive-inchoative counterparts denoting a change of state of the theme argument. An underlying assumption of the alternation is that the object of the transitive verb and the subject of its intransitive-inchoative counterpart must bear the same thematic role (i.e. *theme*), and the causative-transitive verb involves an external argument that bears the thematic role of *agent* or *causer*.

Haspelmath (1993) examines such a relationship from a typological perspective and puts forward a causative, inchoative and non-directed alternation distinction based on 21 languages and the morphological characteristics of 31 verb pairs identified. In alternation of the causative type, the inchoative form is the basic and the causative form is derived. In alternation of the inchoative type, the causative form is the basic and the inchoative form is derived. In non-directed alternation type, neither the causative nor the inchoative verb is derived from the other. It can be further divided into three subtypes – equipollent, labile and suppletive, and each subtype comes with different morphological characteristics (see Section 1.1 below).

Research on causative alternation in signed languages so far has seldom attempted to compare spoken languages and signed languages from the perspective of Haspelmath's typology. Such a comparison is timely. It has been argued that signed languages are agglutinating in nature where different morphemes for lexical and grammatical functions combine to form words/signs (Dyer 1976;

Schwager 2004; Schuit 2007; Schuit, Baker and Pfau 2011). Additionally, classifier predicates from which most discussions on causative alternation originate are said to be morphologically complex. Seen in this light, whether there is morphological marking for causative alternation in signed languages constitutes a legitimate research question. For instance, Kegl (1985, 1990) argues that in ASL the handling classifier is a causative marker and the SASS an inchoative marker. Rather than taking up Kegl's causative/inchoative morphological marking proposal, Benedicto and Brentari (2004: 744) treat the classifier morphemes in ASL as agreement markers. They also argue that "changes in argument structure alternation are triggered by specific morphological items (the classifier morphemes) projecting as heads in the syntax". The morphosyntactic properties triggering the projections will accommodate either the internal argument only, the external argument only, or both the external and internal arguments hence potentially reflecting argument structure alternation. Their proposal has led to series of debates about whether classifier type in signed languages determines the argument structure of predicates.

This paper contributes to the continuing debate with evidence from TJSL, an underreported signed language in China. We will focus on verifying whether the descriptions of causative alternation in signed languages put forth by Benedicto and Brentari (2004) also exist in TJSL. Our analysis involves the commonly discussed handling classifiers and whole entity classifiers. We also examine bodypart classifiers, arguing for their participation in causative alternation. We assume that if evidence suggests that a certain classifier type can enter both a causative and an inchoative predicate, it will at least suggest that the pattern of causative alternation in TJSL differs from that reported in ASL. Last, analysing TJSL data from the perspective of Haspelmath's (1993) typology of causative alternation has the advantage of enriching our understanding of the relationship between the movement-as-verb-root and classifier morpheme in causative alternation in signed languages in a better light. Our findings show that TJSL does not have causative morphology for alternation. While the commonly cited causative-inchoative alternation with a corresponding change of classifier morpheme from the handling classifier to the whole entity/SASS also obtains in TJSL, we also found evidence for causative alternation that does not involve classifier change in our data. The findings thus suggest that crosslinguistic variation may be at work, especially in the correlation between classifier type and (in)transitivity of the predicates in signed languages (Benedicto and Brentari 2004). Due to space limitations, we will leave aside discussions concerning the syntactic representations of the different types of causative alternation to a separate report (He and Tang, In preparation).

The paper is organized as follows. First, we introduce Haspelmath's (1993) typology of causative alternation in spoken languages, followed by a summary of previous studies on causative alternation in signed languages and the debates relevant to the current study. After this introduction on the literature, we will present our study, including the backgrounds of the Deaf signers, data collection procedures, transcription methods and criteria for identifying causative alternation. The section on data discussion is organized according to classifier types to verify if a relationship exists between classifier types and argument structure alternation. The last part of the paper discusses the nature of verb root and how it accounts for the lack of a direct association between classifier morpheme change and causative alternation. Given the findings, we call for a crosslinguistic re-examination of Benedicto and Brentari's (2004) prediction on the correlation between classifier morpheme and argument structure.

1.1 Causative alternation in spoken languages

As mentioned in the introduction, Haspelmath (1993) makes a distinction among causative, inchoative and non-directed alternation. However, he also points out that crosslinguistically languages do show substantial variation in the direction of alternation based on morphological marking. Within the causative and inchoative alternation types, either the causative-transitive alternate is the basic and the causative verb is derived (causative type); or the causative verb is basic and the inchoative verb is derived (inchoative type). In example (3), one finds morphological marking on the causative-transitive variant only.

Causative: Morphological marking on the causative-transitive variant

(3) Georgian

a. duy-s	'cook (intr)'
b. *a*-duy-*eb*s	'cook (tr)'
	(Haspelmath 1993: 91)

The causative variant (3b) is marked by affix *a*-+-*eb*, whereas the inchoative variant (3a) is left unmarked. However, this causativization view is challenged by the existence of a reversed pattern in some languages in which the inchoative variant is overtly marked by specific morphology while the causative variant is unmarked.

Inchoative: Morphological marking on the inchoative-intransitive variant

(4) Russian

a. katat'-*sja*	'roll (intr)'
b. katat'	'roll (tr)'
	Haspelmath (1993: 91)

(5) Polish

a. złamać-*się*	'break (intr)'
b. złamać	'raise (tr)'
	(Piñon 2001: 347)

In examples (4) and (5), the morphological marking is on the inchoative variant. The inchoative verbs are marked by an affix (i.e. *-sja* in Russian and *-się* in Polish), whereas the causative verbs are unmarked.

In addition to morphological marking, some languages exhibit non-directed alternation, namely, neither the causative verb nor the inchoative verb contains morphological marking to indicate the direction of alternation. Such alternations can be further subdivided into *equipollent*, *labile* and *suppletive* alternations.

Non-directed causative alternation

(6) Japanese (equipollent)

a. atum-*aru*	'gather (intr)'
b. atum-*eru*	'gather (tr)'
	(Haspelmath 1993: 91–92)

(7) English (labile)

a. break	(intr)
b. break	(tr)
	(Haspelmath 1993: 91–92)

(8) English (suppletive)

a. die	'die' (intr)
b. kill	'cause to die' (tr)

(9) Russian (suppletive)
a. goret' 'burn (intr)'
b. žeč 'burn (tr)'
(Haspelmath 1993: 91–92)

(10) German (suppletive)
a. sterben 'die' (intr)
b. töten 'kill' (tr)
Schäfer (2009: 36)

According to Haspelmath (1993: 91), "in non-directed alternations, neither the inchoative nor the causative verb is derived from the other. In equipollent alternations, both are derived from the same stem which expresses the basic situation, by means of different affixes, different auxiliary verbs, or different stem modifications". In the Japanese example in (6), the causative/inchaotive verbs are derived from the same verb stem *-atum*. An independent affix *-aru* is attached to the stem to derive the causative verb, while *-eru* to derive the inchoative verb.

Example (7) illustrates *labile* alternation in English in which the same verb form *break* is used as either a causative verb or an inchoative verb. Examples (8), (9) and (10) exemplify *suppletive* alternation, in which different verbs are adopted for the causative and the inchoative verbs.

Crosslinguistically, languages also vary in terms of whether they display different combinations of types of causative alternation. Examples (7) and (8) above show that there are languages such as English which has more than one subtype of non-directed alternation – labile and suppletive alternation. There are also languages like German which involve two or three major types of alternation types, including causative, inchoative and non-directed alternation.

German
(11) a. Hans verändert die Temperatur.
Hans changes the temperature
b. Die Temperatur veränderte *sich*
The temperature changed REFL

(12) a. Hans schmilzt die Schokolade
Hans melts the chocolate
b. Die Schokolade schmilzt
The chocolate melts

Schäfer (2009: 29)

Examples (11a) and (11b) manifest inchoative alternation in which a reflexive pronoun 'sich' in (11b) occurs to mark the inchoative variant. This pronoun is absent in the causative-transitive predicate, as shown in (11a). Non-directed labile alternation is shown in examples (12a) and (12b), where the causative (12a) and inchoative (12b) share the same verb and a reflexive pronoun is not required with the inchoative (12b).

From the review above, we observe that spoken languages do vary in the morphological realization of causative alternation as well as types of causative alternation that may occur in a language. In the following section, we will review the literature on causative alternation in signed languages.

1.2 Causative alternation in signed languages

Not many studies have focused on causative alternation in signed languages. (Kegl 1985, 1990 on ASL; Lau 2002 on HKSL). Kegl (1985, 1990) claims that causative alternation occurs in the classifier predicates in ASL, analogous to that observed in spoken languages.

ASL

Transitive/causative classifier predicate

(13) a. topic head nod
STICK$_{10}$, M-A-R-I-S-A$_0$ SBP$_0$#$_{10}$CL: HAND [S/S]+BREAK
'Marisa broke the stick.'

(Kegl 1990: 157)

Intransitive/inchoative classifier predicate

(13) b. topic avert
STICK$_{10}$ SBP$_{0\#10}$ CL:G/G +BREAK [inchoative]
stick-topic RP-negated-Ito-break

(Kegl 1990: 158)

According to Kegl, the handling classifier of a two-handed[1] CL:*HAND[S/S]* sign as shown in (13a) serves as a causative marker in a transitive predicate. The role

1 Most of the previous research of classifier predicates focus on one-handed classifier predicates only. Yet two-handed classifier predicates are also found to represent different types of events,

prominence clitic ($SBP_0\#_{10}$[2]) in this example is used to encode an agent (i.e. Marisa) from whose perspective the action of the verb BREAK is construed. *CL: HAND [S/S]+BREAK* is articulated at the locus of the sign $STICK_{10}$ previously established in space. In (13b), the two-handed SASS sign represented by *CL:G/G* (i.e. long thin object) refers to $STICK_{10}$ only. Additionally, the nonmanuals of the signer, a head twist and aversion of the eyes, signal non-involvement of an agent. Therefore, the predicate is unaccusative-intransitive. Kegl (1985) further claims that the handling classifier is associated with both the external and the internal argument of a causative-transitive predicate while the SASS is only associated with the internal argument in an unaccusative inchoative. According to her, other verbs that show similar properties of causative alternation are SPILL, OPEN, SLIDE, MOVE, and CLOSE.

Similarly, Lau (2002) observes causative alternation in classifier predicates of HKSL (see examples 14a and 14b). Just as in ASL, the causative-transitive predicates involve a handling classifier and unaccusatie-intransitive predicates an SASS (a subtype of whole entity classifier). However, she rejects Kegl's (1985) proposal that the handling classifier is a causative marker. Instead, she argues that the classifiers serve a reference tracking function since they are co-referential with either the agent or theme NP hence behaving like a proform. She further claims that the causative-transitive variant requires a volitional agent to be an external argument.

(14) a. MALE-CHILD BALL CL:BOUNCE_A 3D_ROUND_OBJECT [HANDLE]
'A boy bounced a ball.'
b. BALL CL:A_3D_ROUND-OBJECT_BOUNCE [SASS]
'A ball bounced.'

(Lau 2002: 60–61)

The handling classifier in (14a) refers to two arguments at the same time – the external argument MALE-CHILD and the internal argument BALL. In contrast, the unaccusative variant in (14b) involves an SASS that outlines the size and shape of the internal argument BALL. In sum, while the grammatical status of the classifier morpheme remains arguable, both ASL and HKSL offer evidence reflecting a typical pattern of causative alternation in the classifier predicates.

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among which sometimes two-handed classifier as a whole refers to one event participant, and sometimes each of the two hands represents a separate event participant of the predicate.

2 The subscript 10 indicates that the sign BREAK is located at $position_{10}$ (agreeing with $STICK_{10}$).

Benedicto and Brentari[3] (2004) explicitly argue for a correlation between the classifier morpheme and the valency of the predicate in ASL, namely, morphosyntactic properties of classifier morphemes determine the valency of the predicate.

(15) a. 'MOVE_FROM_VERTICAL_TO_HORIZONTAL_POSITION'
[ø] BOOK C+MOVE
pron.3sg book obj_grab$_{hdlg}$ +move_vert. > hor.
's/he took the (standing) book and load it down on its side'
b. 'BOOK B+MOVE.'
book 2D_flat_obj$_{w/e}$ + move_vert. > hor.
'The (standing) book fell down on its side'
(Benedicto and Brentari 2004: 752)

In (15a) and (15b), while the meaning of the predicate remains the same, i.e. 'move from vertical to horizontal position', example (15a) exemplifies a transitive classifier predicate which involves a handling classifier (C-handshape) referring to both an external argument *s/he* and an internal argument BOOK (meaning 'someone flips the book). Example (15b) exemplifies an unaccusative classifier predicate which involves an SASS (B-handshape) referring only to the internal argument BOOK (i.e. the book flips). According to Benedicto and Brentari (2004), since example (15a) and (15b) share one movement, they present themselves as transitive-unaccusative alternation in ASL. Instead of treating the handling classifier as a causative marker, these researchers propose that it is an agreement marker which bears the relevant morphosyntactic features for a syntactic projection to accommodate both the external and internal argument of a causative predicate. Alternatively, properties of a whole entity classifier will lead to a syntactic projection to accommodate only the internal argument. Benedicto et al. (2007: 1208) further confirm the correlation in Argentina Sign Language (LSA) and Catalan Sign Language (LSC). According to them, 'LSA and LSC should display transitive-unaccusative alternation of the same sort we find in languages such as English (e.g., 'they opened the door' versus 'the door opened'). This prediction is borne out in examples (16a) and (16b):

3 Although Benedicto and Brentari (2004) do not focus on causative alternation per se, since causative alternation belongs to one typical type of transitivity alternation, we believe their proposal on the correlation between classifier type and argument structure also covers causative alternation.

(16) a. LAURA LIBRO. . .C+PONER_DE_COSTADO [LSA]
Laura book book_hndl$_{hndl}$+turn_on_its_side
'Laura put the book on its side.'
b. LIBRO. . ..B+CAER_DE_COSTADO
book book$_{w/e}$+turn_on_its_side
'The book fell down on its side.'

(Benedicto et al. 2007: 1208)

To conclude this section, we have summarized research on causative alternation in spoken languages, where the focus is primarily on the change (or no change) of the morphological structure of the verb form in the causative and unaccusative alternates. On the other hand, research in signed languages focuses on the change of classifier morphemes in the alternates, the latter of which assumes that classifier morphemes are affixes merged to a verb root expressed by movement (i.e. movement-as-root). The claim that it is the classifier morpheme that determines the argument structure of predicates as put forward in Benedicto and Brentari (2004) has subsequently attracted much debate. While not all discussions center upon causative alternation, but explore if other classifier types (e.g. bodypart classifiers and instrumental classifiers) exert similar morphosyntactic constraints on argument structure or (in)transitivity and if such a constraint holds crosslinguistically. In the ensuing section, we will provide a brief summary of other researchers' views on this claim, and by way of which we identify insights to guide our current analysis. We will focus on the correlation between classifier type and argument structure/(in)transitivity.

1.2.1 Interim discussion

Although Zwitserlood (2003, 2008) does not examine causative-unaccusative alternation in the Sign Language of the Netherlands (NGT), she also highlights the relatively more systematic occurrence of the handling classifier in transitive predicates and the whole entity classifier in intransitive predicates. Contrary to Benedicto and Brentari (2004), Zwitserlood (2003) proposes that 'the choice between an entity classifier and a handling classifier is determined by the argument structure of the verb' (Zwitserlood 2003: 141). She also highlights that sometimes it is difficult to differentiate between a handling classifier and a whole entity classifier. She cites the C-handshape in NGT as an example, which is either a handling classifier in transitive predicates (i.e. 'someone is holding a cup') or in other contexts an entity classifier (i.e. a 'cup exists here'). According to Zwitserlood (2003: 128), it is the movement root that gives clues to its morphological status.

Enlightened by Benedicto and Brentari's (2004) proposal, de Lint (2010, 2018) developed two experimental studies to further verify the correlation between classifier type and argument structure in ASL and NGT. For both experiments, she observes consistent occurrences of the handling classifier in transitive predicates and a whole entity classifier in intransitive predicates, thus justifying the transitive-intransitive alternation. However, the informants' performance on unergative-unaccusative and transitive-transitive alternation shows various degrees of variation. Interestingly, she also predicts that whole entity instrumental classifiers can appear in transitive predicates involving SAW-type manner verbs where the agent is semantically/implicitly realized. Clearly, these findings challenge Benedicto and Brentari's (2004) claim, especially classifier predicates involving a whole entity instrumental classifier must be intransitive because it involves a non-agentive internal argument only.

Kimmelman et al. (2019) examines whether Benedicto and Brentari's (2004) proposal can be extended to Russian Sign Language (RSL). They argue that whole entity classifiers also occur in contexts other than unaccusative-intransitive predicates. Also, whole entity-semantic classifier for vehicles, such as planes, cars and buses, can occur in clauses where the subjects are not vehicles but agents such as driver, pilot and passenger. Instead of adopting a lexicalization approach, they propose that the whole entity classifier is an agreement marker only and does not determine argument structure. They also examine the transitivity properties of bodypart classifiers. They observe that bodypart classifiers behave similarly to whole entity classifiers in terms of its occurrence in transitive predicates. Their analysis assumes that the whole entity and bodypart classifiers (excluding the moving legs classifiers) are agreement markers, hence they are merged at the specifier of the relevant agreement nodes. Moreover, they postulate that handling classifiers and moving-legs classifiers (i.e. 2B_handshape) are arguments hence bearing eventive properties, as such, they occupy the specifier position of the verbal projections, not agreement nodes. Clearly, this proposal assumes that classifiers serve different linguistic functions and occupy different positions in the syntactic structure, contrary to the previous analysis that classifiers belong to one morphology subgroup. Based on the variable results, these researchers conclude that classifiers in RSL do not straightforwardly determine the argument structure of classifier predicates.

In the spoken language literature, the criterion for identifying causative alternation rests upon the existence of certain verb pairs from which either the causative-transitive or the inchoative-intransitive variants are derived, plus all other mechanisms reflecting change of valency and argument structure. In the current analysis, we will adopt the same set of criteria as observed in spoken languages and resolve to analyzing the occurrence of classifier morphemes in classifier predicates of TJSL. Assuming the movement as root hypothesis, we pay attention to the properties of movement in identifying and analyzing the alternating verbs.

2 Causative alternation in TJSL: The current study

2.1 Some background information

Before providing the backgrounds, it is necessary to clarify why we adopt TJSL in the analysis. This language is used by deaf people in Tianjin, a northern city next to Beijing, China's capital city. According to our research experience, Tianjin Sign Language (TJSL), Beijing Sign Language (BJSL) and Hong Kong Sign Language (HKSL) are not necessarily mutually intelligible. While lexical variation abounds, it is currently unclear to what extent their syntax overlaps, as few studies have been conducted to verify the dialectal status of these signing varieties. Additionally, since none of these varieties has been claimed to be an official sign language in China, we decide to adhere to the name Tianjin Sign Language (TJSL) to refer to the signing variety used by deaf people in that region.

According to an informal source,[4] there are about 140,000 deaf people in Tianjin. The sign language variety used by Deaf people in Tianjin can be dated back to almost 150 years ago, although formal historical documentation about TJSL is lacking. Similar to BJSL, TJSL has not been considered as a natural language officially in the past and has never enjoyed a social status equal to Putonghua, the spoken language in the deaf community. This is partly due to a lack of linguistic research on the signing varieties in mainland China previously. He (2011) marks the first attempt to investigate the grammar of TJSL, focusing on some of the basic morphosyntactic properties of classifier predicates that involve an instrument argument.

2.2 Methodology

The current study aims to address the following research questions:

a) Does causative alternation exist in TJSL? If yes, does it pattern like HKSL and ASL? In other words, does it show a change of classifier morpheme between the handling classifier in a causative-transitive predicate and the whole entity classifier in an inchoative predicate?

4 The total number of the deaf population in Tianjin was not officially announced. This figure and the historical information of TJSL is obtained through personal communication with a deaf person who is interested in sign language research and deaf culture. This figure might not be very accurate.

b) Are there other patterns of causative alternation in TJSL?
c) How to characterize these patterns of causative alternation in TJSL within the typological framework set up by Haspelmath (1993)?

Crucially, we will attempt to verify whether the theoretical argument put forward by Benedicto and Brentari (2004) that classifier morpheme determines the argument structure of a classifier predicate also applies to TJSL. If evidence suggests that the handling classifier only occurs in causative-transitive predicates and the whole entity classifier only occurs in unaccusative-intransitive predicates, Benedicto and Brentari's prediction is borne out in TJSL. If there is evidence pointing to the otherwise, their proposal would need to be modified to address crosslinguistic variation, in the sense that different signed languages may adopt different mechanisms for causative-unaccusative alternation. Our data suggest this second possibility.

The TJSL data came from a larger project in which we examined patterns of causative alternation and resultative constructions in HKSL, BJSL and TJSL. In this paper, we will focus on causative alternation in TJSL only. Two deaf signers in TJSL were informants. One was an adult native deaf signer who grew up in a deaf family since birth. The other one was born in a hearing family but acquired TJSL when he entered a deaf school in Tianjin at the age of 7. These two signers were invited to respond to 72 vignettes designed to induce production of causatives, inchoatives and resultatives. They were also invited to attend interviews with the researchers to confirm data or their intuitions about grammaticality, based on their productions on the vignettes. Both the elicited production and interview data were transcribed using ELAN, and we extracted tokens of causative alternation for our analysis. We focus on the morphological make-up of the verb root and change of classifier types in the predicates. Note that some of the contrastive data presented below were elicited during the interview sessions with the deaf signers.

The design of the 72 vignettes was based on the following considerations: (1) classifier types: handling classifiers, whole entity classifiers, bodypart classifiers, (2) different types of dynamic predicates involving a change of state and a change of location, (3) animacy of event participants, and (4) the predicted argument structure and the semantic roles involved, namely the external argument (agent/inanimate causer), theme (animate being/inanimate being) and instrument (see Table 1).

In identifying classifier types, some researchers generally divide classifiers into two types: entity classifier and handling classifier (Zwitserlood 2003); other researchers provide a more detailed classification based on the semantic properties that the classifier handshape entails (Supalla 1982). The typology of classifier handshapes adopted in this study was adapted from Benedicto and Brentari

Table 1: Experiment design for data elicitation.

Argument Structure	Subject	Object	Classifier Types
1-place predicate	animate	--	CL_{WE_SASS} & CL_{WE_SEM}
	inanimate	--	CL_{WE_SASS} & CL_{WE_SEM}
	inanimate	--	CL_{BP}
2-place predicate (agent/ causer+theme)	agent/causer	inanimate theme	action verb
			CL_{HL}
			CL_{WE_SASS} & CL_{WE_SEM}
			CL_{BP}
		animate theme	action verb
			CL_{HL}
			CL_{WE_SASS} & CL_{WE_SEM}
	inanimate causer	inanimate theme	CL_{HL}
			CL_{WE_SASS} & CL_{WE_SEM}
			Natural force
		animate theme	CL_{HL}
			CL_{WE_SASS} & CL_{WE_SEM}
			Natural force
3-place predicate (agent+instrument+theme)	agent	inanimate theme	CL_{HL}
			CL_{WE_SASS} & CL_{WE_SEM}
			CL_{BP}

(2004) which was based on the semantically driven inventory proposed in Engberg-Pederson (1993).

Classifier handshape morphemes

a) Whole entity classifier ($CL_{w/e}$) makes use of the shape of the hand to refer to a whole entity.
   Subtypes of whole entity classifier:
   i. SASS (CL_{WE_SASS}) refers to whole objects defined mainly by their shape (e.g. a 'closed 4 handshape' refers to objects such as a knives that are flat in surface). B&B (2004) use the term *descriptive classifier* for SASS
   ii. Semantic classifier (CL_{WE_SEM}) refers to abstract classes of objects such as human beings, animals, vehicles . . . .etc (e.g. an 'upright 6 handshape' refers to human beings in TJSL).

b) Handling classifier (CL_{HL}) refers to the way that objects or instruments are held or manipulated.

c) Extension-and-surface classifier (CL_{EXT}) refers to the physical properties of the objects but not the whole objects themselves
d) Bodypart classifier (CL_{BP}) refers to a part of the body such as head, leg, ear, etc . . . (e.g. an 'S-handshape' refers to the head of human beings)

Benedicto and Brentari's (2004) proposal on the correlation between classifier type and valency of the predicates entails that the above classification on classifier morphemes should be in complementary distribution, because any overlap of one particular classifier handshape with more than one classifier type may cause confusion with the argument structure it is associated with. Yet, puzzles remain concerning whether the inventory of classifier handshapes can systematically reflect distinctive patterns of valency of the corresponding classifier predicate. In this study, we will show that there is no direct one-to-one correspondence between the valency of the predicate and the classifier type, as readers will see some classifier types in TJSL can occur in predicates with different valency and predicates of a particular valency can accommodate more than one classifier type.

In the following two sections, we will first show that the widely reported pattern of causative alternation that entails a change of classifier type also exists in TJSL. However, we will also include some data that violate this constraint of classifier type in causative alternation.

2.3 Causative alternation with classifier handshape change

This section will show that causative alternation accompanied with classifier handshape change can also be found in TJSL. However, such data do not necessarily suggest that classifier type determines argument structure because there also exist causative alternations without classifier handshape change.

TJSL

(17) a. MAN IRON-ROD CL_{HL}: bend the iron rod
'The man bends an iron rod (by holding it with his hands).'
b. IRON ROD CL_{WE_SASS}: bends
'The iron rod bends.'
c. WALL CL_{WE_SASS}_be located$_a$, MAN PICTURE CL_{HL}: hang the picture on the wall$_a$
'The man hangs the picture on the wall.'

d. WALL CL_{WE_SASS} be located$_a$, PICTURE CL_{WE_SASS}: picture hangs on the wall$_a$
'The picture hangs on the wall.'

HKSL

(18) a. BOOK-SQUARE MALE-CHILD BOOK CL: STAND_BOOK_ON_BOOK-SQUARE
'A boy stood the books on a book-shelf.'
(Lau 2002: 65)

b. BOOK-SQUARE BOOK CL: BOOK_STAND_ON_BOOK-SQUARE
'The books stand on a book-shelf.'
(Lau 2002: 65)

Examples (17a) and (17b) represent a typical case of causative alternation where the verb root (i.e. 'bend') remains the same phonologically (i.e. pronation of the wrist of both hands) but there is a classifier handshape change, from a handling classifier (i.e. S-handshape) in the causative predicate to a whole entity classifier (i.e. 1-handshape) in the inchoative predicate. Examples (17c) and (17d) represent similar examples, where the causative variant 'someone hangs a picture' is realized by a handling classifier and the inchoative variant 'a picture is hanging on the wall' adopts a whole entity classifier. Similar cases of causative alternation accompanying with classifier change has also been reported in HKSL (Lau 2002), as illustrated in examples (18a) and (18b) where the verb root (i.e. 'stand') remains the same whereas classifier handshape changes from a handling classifier (i.e. square-C-handshape) in the causative predicate to a whole entity classifier (i.e. B-handshape) in the inchoative predicate. Therefore, this phenomenon aligns with what has been reported in previous studies.

In what follows, we will show that classifier type as discussed in the literature, i.e. the handling classifier and the whole entity classifier, does not necessarily determine argument structure hence alternation. To verify it, we first tackle whether the handling classifier consistently marks causativity. We will show that although the handling classifier occurs in causative predicates, it is not necessarily a causative marker because it can also occur in non-causative-transitive predicates. Secondly, we examine whether the whole entity classifier occurs only in unaccusative predicates but not in transitive or causative predicates. Again, the data show that it occurs in both types of predicates. Given these findings, we argue that the handling classifier is not a causative marker, neither is the whole entity classifier an unaccusative marker.

2.3.1 Handling classifier is not a causative marker

When analyzing causative alternation represented by the handling classifier predicate and SASS predicate in ASL, Kegl (1985: 120) argues that 'the causative marker in ASL is a handling classifier, a gerund of sorts which refers to the handling of some object'. This claim was reiterated in Kegl (1990: 157), 'The causative/inchoative alternation exists in ASL, but the transitive verb is explicitly marked with causative morphology, which involves the presence of a handling classifier in the position of the verb generally associated with the theme (the element that undergoes the change of state).' That argument structure alternation manifests itself via different classifier types is confirmed in Benedicto and Brentari (2004), who further claim that the external argument in a handling classifier predicate is restricted to agents and classifier type determines the valency of the predicate.

Although the data so far reveal that causative alternation is associated with a change between handling and whole entity classifiers, there may be possibilities where the predicate in which a handling classifier occurs is just transitive but not necessarily causative. The answer to this question helps to disconfirm the proposal that the handling classifier is causative in nature.

The examples in (19a) and (19b) both adopt a typical handling classifier meaning 'holding' an object; however, the predicate it occurs in is just transitive. The predicate itself is not causative since no change of state or change of location of the internal argument is entailed.

(19) a. CUP MAN CL_{HL}: hold a cup
'The man is holding a cup.'
b. YOGURT-JAR MOM CL_{HL}: shake jar
'Mom shakes the yogurt jar by holding it.'

The examples in (19a) and (19b) encode an event of holding an object by an agent, as expressed by a handling classifier, such as 'holding a cup' in (19a) and 'holding a jar' in (19b). As such, the internal argument does not undergo a change of state, a criterial property of causatives. Based on these findings, the predicates in (19a) and (19b) which find a handling classifier are transitive but not causative.

Although the handling classifier is not a causative marker, can it demonstrate causative alternation without classifier handshape change, meaning that both the causative and the inchoative predicates involve a handling classifier? Such data do not seem to exist, as the handling classifier never occurs in intransitive predicates. We predict that it is due to the lexical meaning of 'manner of holding' which is already incorporated into the classifier handshape with a specific configuration denoting how the agent holds the object (i.e. the manner of holding it).

Such a requirement means that the argument structure with a handling classifier is transitive and agentive if a human hand is configured into the classifier handshape. He (2011, 2020) proves that predicates with a handling classifier can either involve an agent argument or an inanimate handler,[5] implying that the handling classifier may be defined broadly allowing both animate and inanimate handlers.

2.4 Causative alternation without classifier change

2.4.1 Lexical causative and the handling classifier

Causative alternation based on lexical rather than classifier verbs is highly restrictive. Only one verb BREAK was identified during personal interviews. This verb seems to be lexicalized from a handling classifier predicate. During one of the interviews, the signers were given a context 'X borrowed a car from Y. While X was driving, a bus hit the car at its back and a part of the car came off. When Y saw the broken car, she asked X who broke it'. The following sentences were extracted from the narrative above.

(20) _____top

a. IX-a CAR BAD // WHO BREAK?
'As for this car, it is broken. Who broke (it)?

b. IX-3 DRIVE BUS//IX-1 CAR CL_{WE_SASS} + CL_{WE_SASS}: bus hits car at the back// IX-CL_{WE}: car BREAK.
'Someone drove a bus. I drive a car. The bus hit my car at the back, the car broke'

c. STICK MAN CL_{HL} + CL_{HL}: break the stick
'The man broke a stick into two with his hands.'

The causative verb BREAK occurs in both a causative predicate (20a) and an inchoative predicate (20b). Although this verb has its origin as a handling classifier predicate, lexicalization results in the loss of meaning in the manner of handling an object encoded by the handling handshape configuration. As a consequence,

5 Whether or not the handling classifier is associated with an agent argument depends on how the handling classifier is defined. If it only refers to a human being manipulating something with the hand, then the handling classifier can only be associated with an agent argument. If the handling classifier is defined broadly as anything that handles something, it can refer to an inanimate handler such as a machine or other instruments such as a plier, a clamp or a clip which 'acts on' a theme by holding.

the handshape component of the lexical causative no longer varies according to the size and shape of the object. When BREAK is used as a causative verb in (20a), it expresses an abstract notion of causation whereby the manner of causation is unspecified, similar to causative alternation in spoken languages. In English, when the alternating verb 'break' is used as a causative verb, the manner of direct causation is also unspecified, as shown in (21a) and (21b):

(21) a. John broke the car.
b. The car broke.

Note that it is common for certain lexical verbs with a classifier origin to re-emerge as a classifier predicate. For instance, when the lexical verb BREAK re-emerges as a handling classifier predicate, the manner of direct manipulation will be specified through the handshape configuration of the handling classifier. Therefore, we predict that causative predicates in which the causing event does not encode manner of direct manipulation will not involve a handling classifier. In (20b), the breaking of the car is not caused by an agent directly manipulating the car by the hand, but by its crashing with another vehicle. Under these circumstances, use of a handling classifier will crash semantically. However, when the change of state of the theme is caused by the manner of direct manipulation of an agent, the handling classifier will surface. As shown in (20c), the change of state of the theme STICK from one whole stick into two parts is caused by the agent MAN holding and breaking it in a certain manner. In other words, only when the meaning of manner of direct manipulation is bleached can the lexical verb BREAK be used in a causative-transitive predicate. Similar cases have also been reported in Danish Sign Language (Engberg-Pedersen 2010: 49–50).

2.4.2 Whole entity classifier in causative alternation

Whole entity classifiers are consistently observed in unaccusative-intransitive predicates (Kegl 1985, 1990; Zwitserlood 2003, 2008; Lau 2002; Benedicto and Brentari 2004; Benedicto et al. 2007; de Lint 2010; Kimmelman et al. 2019). In this section, we will discuss a subtype of whole entity classifiers, namely SASS classifiers (WE_SASS henceforth), and argue that they behave differently from that has been reported in the literature in terms of argument structure.

WE_SASS classifiers represent the most typical of whole entity classifiers. In TJSL, they may occur in both causative-transitive and inchoative predicates, as shown in examples (22a), (22b), (22c) and (23).

(22) a. BOOK MAN (ON PURPOSE) CL_{WE_SASS}: open book
'A man opens the book (on purpose).'
(causative-transitive)

b. BOOK CL_{WE_SASS}: book opens
'The book opens.'
(inchoative)

c. BOOK THICK MAN CL_{HL}: open book
'A man opens the book.'

(23) BOOK THIN CL_{WE_SASS}: be $located_a$
WIND WIND-$BLOW_a$ CL_{WE_SASS}: book $opens_a$
'The wind blows at the book and it opens.
(inchoative)

(22a) and (22b) show causative alternation based on the same verb root 'open' and the classifier type 'WE_SASS'. It is the presence of the external argument MAN but not the classifier that yields a causative-transitive reading to the predicate. To test for agentivity, an agent-oriented adverb ON-PURPOSE is inserted in (22a) and it is still compatible with the external argument MAN. Note that the WE_SASS classifier in this transitive predicate, which denotes the theme argument's size and shape only, bears no lexical meaning about how the agent 'handles' the book while causing it to open. If this meaning is incorporated into the predicate, a handling classifier will merge with the predicate instead, as shown in (22c). In other words, whether or not a handling classifier is required in the causative-transitive variant of the alternation depends on whether the manner of direct manipulation (e.g. holding/bending an object) is specified or not, rather than whether it is triggered by the requirement for encoding causativity of the predicate.

In (23), WIND, a natural force serving as an external argument for the causative predicate occupies the subject position and the internal argument BOOK is represented by a WE_SASS classifier established at $locus_{-a.}$ This sentence is followed by a resultative classifier predicate indicating a change of state of the internal argument (i.e. the book 'opens'). While researching on HKSL, Tang and Yang (2007) and Lau (2011) analyze it as a resultative, a sub-type of serial verb constructions. According to Lau, the central argument supporting a resultative analysis rests upon the existence of a shared internal argument between the primary and the secondary predicate in the construction. Applying this analysis to (23), the complex predicate is constituted by a causative predicate 'blow at' and an inchoative predicate 'book opens' (i.e. result). Syntactically, the shared internal argument is the direct object of the causative predicate (i.e. 'wind blows at *the book*') but subject of the result predicate which is inchoative in nature (i.e. *the book* opens').

One piece of evidence justifying the shared argument analysis comes from locus assignment. In (23), locus-a is consistently selected for signing the locative predicate *CL_{WE_SASS}: be located$_a$*, the transitive predicate WIND-BLOW-a and the resultative predicate *CL_{WE_SASS}: book opens$_a$*.

There are different types of serial verb constructions, and resultatives represent a sub-type whose syntactic structure is different from causative alternation. Resultatives are monoclausal constructions structurally analyzed as a complex predicate consisting of a series of verbal projections to accommodate the cause and result predicates. On the other hand, causative alternation is analyzed using pairs of sentences whose verb forms display specific morphemes to mark the alternation. For instance, the lexical causative BREAK in example (20) shows no change of verb form in the alternation, analogous to example (1) in English. Obviously, the resultative construction in example (23) is a serial verb construction, hence the causative and the inchoative predicates do not share the same verb root. The verb of the causative is 'blow at', and that of the inchoative is 'open'.

In fact, it is not difficult to find a causative predicate that involves a handling classifier and a resultant predicate with an WE_SASS classifier, as shown in (24):

(24) BOOK CL_{WE_SASS}:be located$_a$ with cover facing upward+$CL_{WE_SASS:}$ table MAN CL_{HL}: turn the book over$_a$ CL_{WE_SASS}: book with cover facing downward$_a$+-$CL_{WE_SASS:}$ table
'The man turns a book over by holding it.'

In example (24), the primary predicate of the resultative construction is *MAN CL_{HL}: turn the book over,* the secondary inchoative predicate is *CL_{WE_SASS}: book with the cover facing downwards*. Taken as a whole, the handling classifier and the whole entity-SASS are generally observed in both causative alternation and resultative constructions. Necessarily, the syntactic representations of the constructions involved in causative alternation and resultative as a subtype of serial verb constructions are different (see Lau 2002 & 2012 for a detailed syntactic analysis).

To recall, the causative predicate in (22a) does not involve a handling classifier, but a WE_SASS classifier. One question may arise as to whether this WE_SASS classifier predicate in the causative variant is an output of lexicalization, just as INJECT (i.e. a shot with a needle). . .etc. In the context of a transitive classifier predicate in TJSL, one can easily find a handling classifier occurring in those contexts. However, examples (25a) – (25d) below show a variety of ways in which the WE_SASS classifier can be used in a causative context, implying that these WE_SASS classifier predicates are not necessarily lexicalized verbs.

(25) a. TABLE_a SMALL KNIFE $\text{CL}_{\text{WE_SASS}}$: be located$_a$ MAN $\text{CL}_{\text{WE_SASS}}$: turn over$_a$ (H-handshape)
'The man turns the small knife on the table over.
b. TABLE_a BOOK $\text{CL}_{\text{WE_SASS}}$: be located$_a$ MAN $\text{CL}_{\text{WE_SASS}}$: turn over$_a$ (B-handshape)
'The man turns the book on the table over.
c. WINDOW_a $\text{CL}_{\text{WE_SASS}}$: located$_a$ with one panel on top of the other
MAN $\text{CL}_{\text{WE_SASS}}$: open$_a$ (2B-handshape$_{\text{vertical}}$)
'The man opens the window by moving one panel upwards'
d. TABLE_a LAPTOP $\text{CL}_{\text{WE_SASS}}$: be located vertically on a surface
MAN $\text{CL}_{\text{WE_SASS}}$: open$_a$ (2B-handshape$_{\text{vertical}}$)/*(2B-handshape$_{\text{horizontal}}$)
'The man opens the laptop vertically.'

Both (25a) and (25b) show that the WE_SASS classifier appears in a causative-transitive predicate. All share the same verb root 'turn over' but different handshapes are adopted to reflect the semantic properties of the internal argument (i.e. H-handshape for a thin and long object vs B-handshape for a flat object). In (25c) and (25d), the causative verbs require a different orientation for the handshape morpheme to encode 'open the window horizontally' or 'open the laptop vertically'. The morphological property of the manner of causation (i.e. open X horizontally/vertically) as a meaning component to be merged with the verb root 'open' signals their status of a classifier predicate rather than a lexical verb. Native signers' intuitions also confirm that changing the orientation of the classifier handshape in signing (see example (25d)) leads to unacceptability, although they had no difficulty comprehending the predicates 'open the laptop'.

Next, we examine if the causative-transitive predicates involving WE_SASS classifiers are passives. Here, we report on the use of imperatives as diagnostics because imperatives only allow active sentences with an agent argument as subject (Jary and Kissine 2014). In imperatives, the null element has three important properties: (1) it is located in the subject position; (2) it refers to the addressee; (3) it is interpreted as involving an agent argument.

(26) a. IX-2! COMPUTER $\text{CL}_{\text{WE_SASS}}$: open
'You! Open the computer!'
b. IX-2! CALENDAR $\text{CL}_{\text{WE_SASS}}$: open
'You! Open the calendar!'
c. IX-2! BOOK $\text{CL}_{\text{WE_SASS}}$: open
'You! Open the book!'

Examples (26a), (26b) and (26c) show that the whole entity-SASS (i.e. CL_{WE_SASS}) occurring in the causative predicates is compatible with imperatives. Therefore, it excludes the possibility that these sentences are passives.

In this section, we have shown that whole entity-SASS can participate in causative alternation without changing the handshape into a handling one in the causative-transitive variant. In the following section, we will examine the argument realization and syntactic properties of bodypart classifiers by showing that bodypart classifiers, proposed to occur only in unergative predicates in ASL, do participate in causative alternation in TJSL.

2.4.3 Bodypart classifier in causative alternation

This section investigates whether the bodypart classifier participates in causative alternation, an area not tackled by Benedicto and Brentari (2004).[6] To recall, they propose that the bodypart classifier in ASL only occurs in unergative predicates, revealing its status as referring to the external argument of the predicates.

(27) a. ROSIE S+BOW
Rosie $head_{limb=BPCL}$ +bow
'Rosie bowed.'
b. ROSIE WILLING S+BOW
Rosie willingly head=BPCL+bow
'Rosie bowed willingly.' (in a theater play, for instance)
(Benedicto and Brentari 2004: 763)

Based on (27b), in which the bodypart classifier is compatible with an agent-oriented adverb WILLING, they argue that the argument associated with the bodypart classifier is agentive and the predicate is unergative.

Grose et al. (2007) challenge these assumptions of Benedicto and Brentari (2004). Instead, they argue that the bodypart classifier patterns with the handling classifier as encompassing both external and internal arguments, since both have handpart for external arguments and selected fingers for internal arguments in their morphophonological representations. The distinction between them is that the internal argument as referred to by the predicate's bodypart classifier is ana-

6 Benedicto and Brentari (2004) using S+BOW for unergative (S=bodypart classifier) and 1+BOW for unaccusative (1=whole entity classifier) in ASL as evidence to argue for unergative-unaccusative alternation.

lyzed as 'part' of the external argument. Also, predicates with a bodypart classifier can be correlated with telic and atelic events. Invoking the Event Visibility Hypothesis (Wilbur 2003, 2008), they claim that the possibility of internal arguments which can be quantified or delimited will give rise to a telic event reading.

(28) a. S+SHAKING (atelic)
'She shook her head'.
b. S+BOW (telic)
'She bowed her head.
(Grose et al. 2007; 1259)
c. ACTOR S+BOW NOTHING
#'None of the actors bowed.
'The actors didn't bow at all.
(Grose et al. 2007;1280)
d. BUTTER MELT NOTHING
'None of the butter melted.'
(Grose et al. 2007; 1279)
e. INDEX S+BOW_TO_EACH.
'S/he bows to each of them.'
(Grose et al. 2007; 1281)

Two pieces of evidence are put forward by Grose et al. to counteract Benedicto and Brentari's proposal. First, (28a) shows that the bodypart classifier (i.e. head) as represented by S-handshape occurs in an atelic predicate. The event as encoded in (28b) is telic because the bodypart classifier shows a wrist-orientation change to a halt denoting an endpoint of the event of BOW. Second, they claim that the NOTHING & distributive tests are not reliable syntactic tests for the presence of internal arguments. Briefly state, NOTHING in (28c) does not scope over the external argument, or the reading 'None of the actors bowed' would be acceptable. In (28d), NOTHING scopes over the internal argument BUTTER, thus 'none of the butter melted' is acceptable. Last, (28e) yields a reading that 'the woman' directs a bowing movement at 'each of them' (i.e. internal argument) at different loci (see Grose et al. 2007 for a detailed discussion). Based on these observations, they conclude that the predicate involving a bodypart classifier is not unergative, and the type of alternation may be transitive or unaccusative. However, since the bodypart classifier does not encode a change of internal state, it does not participate in causative alternation (Grose et al. 2007: 1270). Here, we will expand this discussion of Grose et al. (2004) by investigating the bodypart classifier in TJSL.

The findings in TJSL suggest that bodypart classifier predicates are not necessarily unergatives. Firstly, examples in (29) and (30) show that bodypart classifi-

ers may occur in unaccusative-intransitive predicates (as shown in Type 1) as well as causative predicates (as shown in Type 2) respectively. Bodypart classifiers in TJSL do participate in causative alternation, in which the bodypart classifier is associated with the internal argument in both the causative variant and the unaccusative variant.

Type 1. *Bodypart classifiers in unaccusative-intransitive predicates*

(29) a. RABBIT FALL ASLEEP //
CL$_{BP_EAR}$: drops sideway
'The rabbit falls asleep; (one of its) ears drops sideway.'
b. MAN SLEEPY //
IX-eye CL$_{BP_EYE}$: close
'The man is sleepy; his eyes close.'

The context of (29a) indicates the situation that the rabbit falls asleep, thus it does not have volitional control over its ears. By the same token, the context provided in the first clause of (29b) also implies that the sleepy man does not have volitional control over his eyes. These two examples suggest that an agentive reading is unavailable. We argue that the bodypart classifier in these examples occurs in an inchoative-intransitive predicate, despite the presence of an animate being in the context (i.e. RABBIT in (29a) and MAN in (29b). In other words, the bodypart classifiers represent an internal, theme argument that undergoes a change of state. In (29a), 'the ear drops sideway' and in (29b), the eyes close.

Type 2. *Bodypart classifiers in causative-transitive predicates*

(30) a. CAT HAPPY IX-3 CL$_{BP_TAIL}$: raises
'When a cat is happy, it raises its tail high.'
b. MAN WANT SLEEP //
IX-3 CL$_{BP_EYE}$: close
'The man wants to go to sleep, so he closes his eyes'

The causatives in (30a) and (30b) involve an internal argument represented by a bodypart classifier that undergoes a change of state through the internal control of an external argument whose referent is the possessor of the bodypart, CAT in (30a) and MAN in (30b). As shown, the internal control of the external argument is expressed through a bodypart classifier realized phonologically by extending the selecting finger of a 1-handshape (i.e. 'raises its tail') in (30a) and flexing of selected fingers (i.e. closes the eyes) of C-handshape in (30b). That the

bodypart classifier occurs in a causative-transitive predicate in (30a) and (30b) demonstrates that not only the handling classifier but also the bodypart classifier that may occur in a transitive or a causative predicate, under the condition that the causative reflects the semantics of 'internal bodily control of the agent'. In examples (30a) and (30b), the eventuality is under direct control of the external argument, CAT and MAN, who perform the activity leading to a change of state of the internal argument. If the change of state of the bodypart is caused by some accident or not under the direct internal bodily control of the causer or agent, e.g. the cat's tail is raised by another person in (30a), the existing structure with the bodypart classifier would be incompatible with such an interpretation.

Taken together, the data show that when a bodypart classifier represents an internal argument of a causative predicate, the change of state of the bodypart must be caused directly by the agent or causer exerting direct bodily control over the bodypart.

As said, if the change of state of the bodypart is caused by some accident or not under the direct bodily control of the causer, a similar structure like the one in the examples in (30) would fail to yield such an interpretation.

(31) a. . . .(signer describing a car accident). . . MAN IX-man LEG-BONE CL_{BP_LEG}: breaks
'The man's leg-bone broke.'

*b. LEG-BONE MAN CL_{BP_LEG}: break.
*'The man breaks his own leg (by exerting his will to break his own leg).'

In (31a), the bodypart classifier occurring in an inchoative-intransitive predicate denotes a change of state of a man's leg-bone. (31b) is unacceptable for the denotation that 'the man exerts direct bodily control over the leg causing it to break'. This is not the intended meaning for (31b) because one cannot break one's leg by exerting his will over it, unlike the 'opening eyes' events. The sentence could mean 'The man breaks his own leg', which is not the intended interpretation against the context of interaction.

The idea of direct bodily control leads us to propose that the bodypart classifier in a causative predicate has a [+volition] feature, following Grose et al.'s (2007) proposal that bodypart classifier embodies both external and internal arguments in the predicate. Our data in TJSL to some extent corroborate with their assumption that the bodypart classifier predicate can involve both an external

argument and an internal argument.[7] The internal argument, which is a part of the body, is subject to 'direct bodily control' by the external argument. In other words, an inherent possessor – possessee relationship is entailed between the agent and a part of the body that the classifier refers to, and only the bodypart that belongs to the agent can it be subject to direct control by the agent. This criterion of direct bodily control in the case of bodypart classifier can be further confirmed by the imperative test, as imperatives generally require an active voice realized by an external argument 'you'. In (32), the presence of an external argument IX-2 and an internal argument MOUTH with a causative verb 'open' clearly implies that the predicate is causative-transitive.

(32) IX-2! MOUTH CL_{BP_MOUTH} : open one's mouth! CANDY?
'You! Open your mouth! Any candy (in it)?'

(32) further disconfirms Benedicto and Brentari's (2004) proposal that bodypart classifiers only appear in predicates that are necessarily unergative. Here, the bodypart classifier morphologically represents the theme argument which is a part of the body, and the agent argument IX-2 is just a pronoun and is not morphologically realized through any classifier handshape. As we have argued previously, it is not necessarily the case that all arguments in a classifier predicate must be morphologically represented through a classifier handshape; it is possible to find other morphological components for argument realization, such as signer's body,[8] imperative constructions offer a litmus test for this condition.

Do predicates with a bodypart classifier participate in causative alternation? Our data confirms such a claim. Comparing (33a) and (33b), the same bodypart classifier handshape and movement (i.e. selected fingers change from open to close near the eyes) are used. What distinguishes the argument structure of the predicates is the grammatical subject, IX-man serving as the external argument of the causative predicate in (33a) and IX-eye serving as the internal argument of the unaccusative predicate in (33b).

7 The agentivity and (in)transitivity of bodypart classifier**s** also has something to do with the morphological status of the signer's body and signing perspective. Due to the limitation of space, we won't spell this out. Interested readers are recommended to refer to Perniss (2007) and the Ph.D thesis of He (2020).

8 We predict that the signer's body can also be a morphological marker in classifier predicate. Interested readers are suggested to refer to He (2020) for a detailed discussion on signer's body and signing perspective, and their relation to argument realization.

(33) a. MAN SLEEP WANT SLEEP //
IX-3 MAN (ON-PURPOSE) CL_{BP_EYE}: close
'The man wants to go to sleep, so he closes his eyes (on purpose)'
b. MAN SLEEPY //
IX-eye CL_{BP_EYE}: close
'The man is sleepy; his eyes close'

Another example to further confirm the existence of causative alternation is shown in (34a) and (34b)

(34) a. RABBIT IX-3 PLAY//INDEX RABBIT^EAR ON_PURPOSE CL_{BP_EAR}: drops.
'The rabbit drops its ears.
b. . . .LOOK! RABBIT^EAR CL_{BP_EAR}: drop, IX-3 APPEARANCE CUTE!
'Look! The ears of the rabbit are dropping (in front of its head), the rabbit's appearance is cute!'

In (34a) and (34b), the bodypart classifier morphologically represents the internal argument RABBIT^EAR which undergoes a change of state from an erected to a flexed position on the rabbit's head. The presence of an animate entity RABBIT in (34a) invokes a reading of direct causation, initiated by the external argument exerting direct bodily control over the internal argument, causing it to change its state. On the contrary, the occurrence of the grammatical subject RABBIT^EAR in (34b), especially when signed from an observer's perspective via the use of a vocative 'LOOK!', entails an eventuality of an unaccusative-intransitive predicate denoting a change of state of the internal argument of 'ears drop'. The same bodypart classifier occurs in a causative-transitive as well as an inchoative-intransitive predicate while the verb root remains the same, revealing a typical case of causative alternation in TJSL, contrary to Benedicto and Brentari's prediction that bodypart classifiers occur in unergatives denoting an external argument only.

With handling classifiers, the agent acts upon the theme argument by manipulating his hand 'hand as handler' in a certain manner. On the other hand, causation by direct bodily control of the agent on an internal argument may involve adoption of a bodypart classifier. As shown in the above examples, the change of state of the rabbit's ears from standing to lying on its head is not caused by the rabbit using its hand (i.e. hand as handler) to manipulate its position, but some direct internally bodily control, thus a directly caused eventuality. Under these circumstances, the bodypart classifier pattern after CL_{WE_SASS} in the sense that both may represent an internal argument undergoing a change of state. However, they differ in terms of the types of causation: direct internally bodily control for the bodypart classifier but direct manipulation for the CL_{WE_SASS}.

To conclude this section, it seems that causative alternation involving a bodypart classifier represents a case of labile alternation because of the absence of any morphological marking on the one hand, and on the other hand, absence of manner of manipulation in the eventuality as expressed by the handling classifier in specific handshape configuration or orientation.

3 Discussion

This paper discusses the phenomenon of causative alternation in TJSL. We have explored the claim put forward in Benedicto and Brentari (2004), namely, that classifier type determines the argument structure of a predicate. In particular, we examine the handling classifier and the whole entity classifier in TJSL systematically to verify if the claim holds crosslinguistically. The data discussed above reveal that the patterns of causative-unaccusative alternation in TJSL are similar to HKSL but some differ from ASL. Additionally, we have examined the bodypart classifier and shown that it participates in causative alternation, contrary to the claim that it only represents an external argument in unergatives. As a whole, the data show that causative alternation is not driven by properties of the classifier morpheme in TJSL. What seems to be the case is that classifier morphemes behave quite independently grammatically of the requirements for causativity, in(transitivity) and argument structure of predicates. Although the handling classifier only occurs in transitive predicates, it is not necessarily a causative marker because the handling classifier can also occur in non-causative-transitive predicates (see Section 2.3.1, example 19). The WE_SASS classifier as a subtype of whole entity classifiers occurs not only in unaccusative-intransitive but also in transitive predicates, hence not an unaccusative marker. In other words, both the handling classifier and the whole entity classifier do not systematically alternate between the causative and inchoative pair of constructions and each assumes its own argumental and grammatical functions as required by the predicate. Incorporating the bodypart classifier into our analysis, we observe that it occurs in either inchoative-intransitive predicates or causative-transitive predicates, providing further evidence to argue against the correlation between classifier type and argument structure.

Despite these findings concerning the correlation between classifier type and argument structure, we did observe some patterns of causative alternation in TJSL. To interpret the current findings within the framework of Haspelmath's (1993) typology of causative alternation, we have the following observations. Firstly, we have not observed data that suggest causative or inchoative alterna-

tion in TJSL. Secondly, we observe data suggesting that TJSL manifests itself more systematically with two subtypes of non-directed alternation – labile alternation and equipollent alternation. While the data are highly restrictive, instances of labile alternation are observed with lexical causatives realized by a lexical verb like BREAK, whose lexicalization pathway seems to originate from handling classifier predicates. With this verb, at least the handshape and movement are phonologically frozen, and, unlike the classifier morphemes, the handshape bears no anaphoric relation with the argument of the predicate.

The second piece of data suggesting labile alternation came from some causative alternation of classifier predicates in which we observe no change of the morphophonological form of the verb root as well as the classifier morpheme that merges with it. The occurrence of a WE_SASS classifier (see Section 2.4.2; example 22a and 22b) or a bodypart classifier (see Section 2.4.3; example 29 and 30) in both the causative and unaccusative predicates is consistent. This third type of causative alternation in classifier predicates in TJSL has not been reported in other signed languages in the literature and more research is necessary to confirm this preliminary observation. As for equipollent alternation, our evidence came from the language's systematic adoption of handling classifiers in causative-transitive predicates and WE_SASS classifiers in inchoative-intransitive predicates, hence instances of causative alternation (see Section 2.4.2 example 22b and 22c) Note that the phenomenon of change of classifier type is also observed in the causative alternation of HKSL, while researchers working on NGT and RSL adopt this distinction in exploring other types of alternation (e.g. transitive-intransitive alternation). In other words, this type of causative alternation involves a change of classifier type while the verb root remains phonologically the same. To summarize our observation, we provide a taxonomy of causative alternation in TJSL in Figure 1 below.

A corollary issue is what counts as the verb root of a classifier predicate and where argument structure is encoded in this type of constructions. Benedicto and Brentari (2004) adopt the movement-as-root proposal, but they put forward a syntactic approach to account for the correlation between classifier type and argument structure, arguing that eventualities can be built into syntax and the classifier morpheme triggers different syntactic projections to accommodate the different types of argument structure in classifier predicates. For instance, they assume that the verb root of a classifier predicate, such as MOVE or BE, only encodes information about the number of argument(s) within a predicate, but the assignment of external or internal arguments as well as their associated theta roles rests with the classifier morpheme. In their model, classifier morphemes are functional heads at which the corresponding argument is interpreted as external or internal.

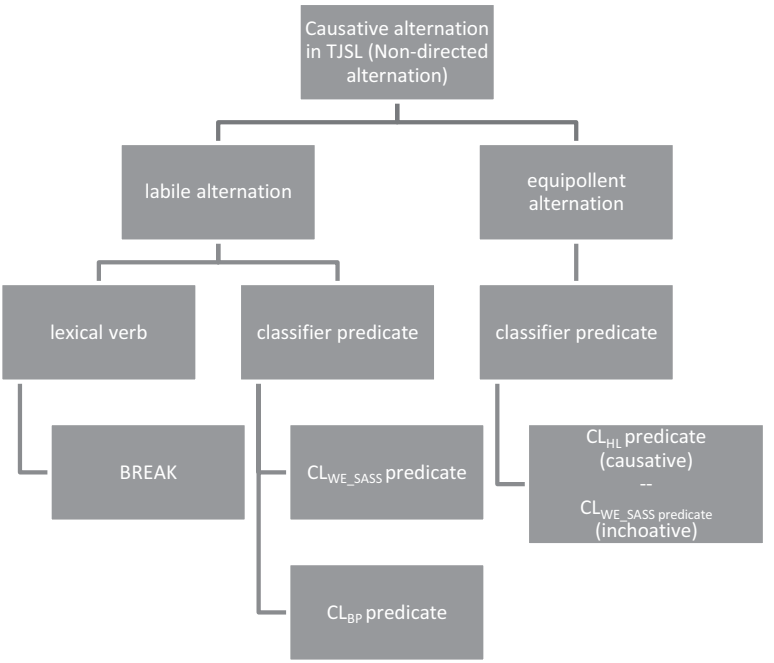


Figure 1: Taxonomy of causative alternation in TJSL.

One must point out that in order to appreciate the debate about the function of classifier morpheme in determining argument structure, it also requires a corresponding understanding of whether the verbal root expressed by the movement component of the sign plays a role in determining the argument structure of a predicate. Apparently, Benedicto and Brentari rejects this assumption. Tang (2003) and Tang and Yang (2007) adopt the 'movement-as-root' hypothesis, arguing that classifier morphemes provide information about the arguments of a predicate via co-reference between the classifier and the NP antecedent. It is the movement component that encodes information about the qualitative domain of predication such as event, state and location, as well as number of arguments to participate in these eventualities, hence argument structure information resides with the verb root. Zwitserlood (2003, 2008) and Kimmelman et al. (2019) are also in favor of it, arguing that the verb root encodes argument structure. For instance, adopting the analysis of First Phase Syntax (Ramchand 2008) where syntactic structure is motivated by eventualities, Kimmelman et al. (2019) argue that the MOVE root projects *proc* head to account for motion predicates, which encodes a dynamic event denoting the movement of an UNDERGOER argument. Syntactically, this argument is merged to the specifier of *procP* while the whole entity clas-

sifier or the bodypart classifier that refer to the UNDERGOER argument are heads of agreement projections to fulfil the referent identification function. Another evidence to support this alternative proposal came from labile and equipollent alternation in TJSL, where we observe that no matter whether the classifier morpheme changes or not to encode the external or internal argument, the verb root remains the same in causative alternation. In other words, the verb root encodes conceptual information, including eventualities and event participants with associated semantic features, to constrain the selection of an appropriate classifier morpheme to satisfy the requirements of the argument structure encoded in the verb root. Certainly, more research is necessary to verify this assumption and an understanding of the nature of the verb root and the classifier morpheme will enlighten how researchers conceptualize the grammatical function of the classifier morpheme.

4 Conclusion

This paper examines the nature of classifier morpheme from the perspective of argument structure in causative alternation, with TJSL data suggesting that causative-unaccusative alternation in classifier predicates does not necessarily trigger a change in classifier type. In other words, classifier morpheme does not necessarily determine the status (as external or internal) of the argument that lands. Whereas the handling classifier consistently occurs in transitive predicates, other classifier types – whole entity and bodypart classifiers–occur either in causative-transitive, transitive or unaccusative or intransitive predicates. Such evidence leads us to conclude that the classifier morpheme does not necessarily determine the argumental status of the predicate, be it external or internal. Based on these observations, we revisit the 'movement-as-root-hypothesis', and argue that it is the verb root that provides information about argument structure and constrains the selection of classifier morpheme as either external or internal argument. Couching the data analysis within the framework of Haspelmath 1993 typology, the verb root + classifier morpheme morphophonological template enables us to identify some predicates to be manifestations of labile and equipollent alternation, which are subtypes of non-directed causative alternation. As sign linguistics research on Asian signed languages is not as extensive as non-Asian signed languages, the current observations in TJSL, while corroborating the findings in HKSL, need to be further verified with data from other Asian signed languages for confirmation of areal properties and crosslinguistic variation.

Appendix: Annotations

In this paper, we follow the annotation conventions as adopted in the sign linguistics literature as follows:

1. Lexical signs are capitalized. For instance: BOOK
2. Pointing signs are glossed as IX. When an IX sign is followed by '-1/2/3', these signs refer to pronouns with person specifications. When it is followed by '-a/b/..', these alphabets refer to loci in space that the index signs are pointing at. This applies to localization of nouns in space, e.g. GROUND_s, showing a locus in space the sign GROUND is located. When IX points at an object, the object will be named directly, e.g. IX-mouse (pointing at a mouse)
3. Annotations for classifier predicates
   - General format: the type or sub-types of classifier predicate will appear first, to be followed by a colon ':' and a meaning translation of the predicate, e.g. CL_{SASS} : book moves.
   - Signs for two handed classifier predicates will be annotated by a '+' sign to show the combination of classifier handshapes. The annotation on the left of the '+' is for glossing the classifier on the dominant hand (i.e. H1) and the one on the right of the '+' is for the classifier on the non-dominant hand (i.e. H2). For instance, $\text{CL}_{\text{WE_VEH}}$ + $\text{CL}_{\text{WE_VEH}}$: bus hits car at the back
   - Types of classifiers will be presented in the following formats:
     - Whole entity_SASS – $\text{CL}_{\text{WE_SASS}}$
     - Whole entity_semantic classifiers– $\text{CL}_{\text{WE_HUM}}$ refers to semantic classifier that classifies human being, $\text{CL}_{\text{WE_VEH}}$ refers to semantic classifier that classifies vehicle.
     - Handling classifier – CL_{HL}
     - Bodypart classifier – CL_{BP}
4. Lines on the glosses will be used to mark the following:
   - ____nms: with difficulty
   - Adverbial nonmanuals, e.g. BOY CL_{BP}: standing on one leg.
     ___top
   - Syntactic nonmanuals, e.g. BOY MAN LIKE.

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