Negation in San Juan Quiahije Chatino Sign Language: The Integration and Adaptation of Conventional Gestures

Sign languages do not arise from thin air: rather, they emerge in communities where conventions are already in place for using gesture. Little research has considered how these conventions are retained and/or adapted as gestures are integrated into emerging sign language lexicons. Here we describe a set of five gestures that are used to convey negative meanings by both speakers and signers in a single community: the San Juan Quiahije municipality in Oaxaca, Mexico. We show that all of the form-meaning mappings present for non-signers are retained by signers as they integrate the gestures into their lexicon. Interestingly, additional meanings are mapped to the gesture forms by signers—a phenomenon that appears to originate with deaf signers in particular. In light of this evidence, we argue that accounts of 'wholesale borrowing' of gestures into emerging sign languages is overly simplistic: signers evidently adapt gestures as they integrate them into their emerging lexicons.

Keywords: Gesture, Emblems, Recurrent, Conventional, Sign Language, Language Emergence, Lexicon, Conventionalization

1. Introduction

Sign languages emerge from interaction between deaf people and their willing interlocutors, and necessarily do so in communities where conventions are already in place for using gesture. While this fact is undisputed, few studies have directly compared the

conventions for gesturing in a given community with the conventions for signing within the same speech community.[1] In this paper we describe a set of five gestures that are used to convey negative meanings by both speakers and signers in a single community: the San Juan Quiahije municipality in Oaxaca, Mexico. We investigate how signers adapt negative gestures for the lexicon of San Juan Quiahije Chatino Sign Language (hereafter, SJQCSL), a recently identified emerging language in the municipality. We identify some of the changes to the semantic functions and syntactic distribution of the gestures when they are used in signed utterances, and consider whether deaf or hearing signers are the source of these changes.

1.1. The San Juan Quiahije Municipality as a Communicative Ecology

The San Juan Quiahije (SJQ) municipality consists of two neighboring villages, Quiahije and Cieneguilla. The municipality occupies a mountainous, forested area in the Juquila District in the Costa region of southern-central Oaxaca, Mexico. The municipality is home to an indigenous Mesoamerican group, the Chatinos. They speak San Juan Quiahije Chatino as their first and dominant language, a variety of Eastern Chatino that belongs to the Zapotecan language family of the Otomanguean stock (E. Cruz, 2011; H. Cruz, 2014). Some Chatinos speak Spanish as their second language, which is the language of

[1] See, however, Senghas, Kita, and Özyürek (2004), Le Guen (2012), Nyst (2016), and Mesh (2017). For comparisons of signers and gesturers in separate but culturally and linguistically similar communities, see Padden, Meir, Hwang, Lepic, Seegers, & Sampson (2013), and Fenlon, Cooperrider, Keane, Brentari & Goldin-Meadow (2019).

instruction in local schools; more and more young people are becoming bilingual in Chatino and Spanish (E. Cruz, 2011).

The SJQ Chatinos call themselves *neq-A tnya-E* 'Chatino people' and their spoken languages *chaq-F tnya-J* 'our language.'[2] They call Quiahije *kchin-A* 'village' or 'town' and Cieneguilla *ntenq-F* 'flatland' or 'valley.' The villages are situated about two and half kilometers apart and accessed from one another by unpaved roads, around half an hour's drive. Both villages are situated more than eight kilometers away from Santa Catarina Juquila, or simply Juquila, a major commercial center for the Chatino communities of the Juquila District. Improvements in the condition of the roads between the villages and Juquila have shortened the commuting time by car and truck transportation and eliminated much of the tradition of commuting by foot.

The population of the SJQ municipality is 3,628 (INEGI 2015). This number includes 11 deaf people: four adult men, two adult women and five girls. All 11 deaf people were born in Quiahije and all but two are biologically related to one another. None of the deaf people have enough residual hearing to acquire a form of Chatino or Spanish. They have had no contact, or minimal contact, with Mexican Sign Language (*Lengua de Señas Mexicana*, or LSM), the national sign language used by deaf people in urban areas of Mexico (Ramsey & Quinto-Pozos, 2010) nor have they had contact with American Sign Language (ASL). Rather, they have created their own sign language which we have designated as San Juan Quiahije Chatino Sign Language (hereafter, SJQCSL), for the

[2] SJQ is a tone language in which a phonological tone occurs on every syllable. In the SJQ transcriptions provided here, a letter representing the tone phoneme is placed at the end of every written Chatino word. A guide to the representation of tone in SJQ is presented in Appendix C.

academic purposes of language documentation. The descriptor also distinguishes other possible sign languages that may be used in other Chatino municipalities in the region.

However, deaf and hearing Chatinos do not use the descriptor to refer to their practice of signing. Rather, in their Chatino vernacular, hearing people refer to deaf people as either *no-A ja-A la-I ntykwiq-A* 'one/the ones who do not speak' or *no-A ja-A ntyka-E ntykwiq-I* 'one/the ones who cannot speak' and refer to signing as *qne-I yanq-C ten-E qo-E* 'we make hands to talk to them', i.e. making gestures and signs. There is no lexical (and no conceptual) distinction between gestures and signs. This is not unique to the SJQ community, as it has been reported in other communities (Kusters & Sahasrabudhe, 2018). Deaf people refer to themselves as TALK NO and HEAR NO, in reference to their abilities. They refer to the action of their signing as SIGN; this sign consists of a two-handed curved or clawed 5-hand configuration with alternating vertical movement in the physical space front of the signer's chest. Interestingly, this sign is homophonous with another sign, COOK (which generally denotes the action of cooking over fire).

The SJQ municipality has a rich repertoire of gestures with conventional forms and interpretations. Some of the gestures are present not only in the SJQ community but in the wider speech communities of Oaxaca and beyond (Meo Zilio & Mejía, 1980, 1983). Deaf people are exposed to these gestures through their family members and through interactions with others in the community (Hou 2016; Mesh 2017). In this way, deaf signers have access to a rich visual-manual communication system – one that serves as a semiotic resource for the sign language lexicons. The presence of conventions for gesturing appears to have facilitated the understanding of signs between deaf and hearing people from different signing families.

Thus the SJQ municipality can be understood as a single "communicative ecology"— a delimited physical environment in which spoken, gestured, signed, and written reflexes of language are used in multiple, overlapping contexts (Haugen 2001; Mühlhäusler 2003; Brookes 2004). Though the use of San Juan Quiahije Chatino predominates in the community (INEGI 2015), there are multiple additional resources available for meaning-making within the communicative ecology. At minimum, these resources include:

1. San Juan Quiahije Chatino, used by the majority of community members as their first and primary language;
2. Spanish, used by the subset of the population that has been educated in local primary and secondary schools;
3. Manual and non-manual gestures, with varying degrees of conventionality and (in)dependence from speech;
4. San Juan Quiahije Chatino Sign Language, an emerging sign language used by the deaf people and their families (Hou 2016).

There is doubtless a connection between the third and fourth resources in the list above: users of SJQCSL are developing conventions for signing practices within the same community where speakers already share conventions for the use of certain manual and facial gestures, some of which can be used and interpreted without speech. The most striking evidence for the connection between gesturing and signing practices comes from signers' and speakers' shared use of a set recognizable gestures with predictable forms and

meaning associations. The presence of these gestures in SJQCSL is evidence that deaf signers and their hearing family members treat the gestural practices of the Chatino communicative ecology as a rich resource for lexicon building.

1.3 Some Terminological Clarifications

In this paper we use the term *conventional gestures* to describe manual gestures for which at least some components are formed, and interpreted, according to the conventions of a given community. The category of conventional gestures comprises fully conventional gestures, prototypically categorized as *emblems* or *quotable gestures*, in which both form and meaning are stable and interpretable across use contexts in a given communicative ecology (Ekman & Friesen 1972; Payrató 1993; Hanna 1996; Brookes 2004; Payrató 2014; Tessendorf 2014). The category also comprises semi-conventional gestures, in which certain kinesic features occur and are conventionally mapped to a core set of semantic themes. Gestures of this second kind have been called *recurrent* because they are used repeatedly and are interpreted stably across different use contexts, even though they retain spontaneous components (Ladewig, 2011, 2014; Cornelia Müller, 2004, 2017, 2018). Such gestures are produced and interpreted alongside speech, and often have *interactive* or *pragmatic* functions, such as providing meta-communicative information about the speaker's stance towards the utterance (Streeck, 2005; Payrató, 2014). Since our interest is in the integration of gestures with negative meanings—some of which are highly conventional and emblem-like, and others of which are mixtures of conventional and spontaneous elements—we use the broad term *conventional gestures* throughout, and frequently refer to the set of *negative conventional gestures.*

Importantly, we use the term *conventional gesture* to signal that the Chatino communicative ecology has conventions for the form and interpretation of a communicative manual behavior, and *not* to distinguish "gestural" uses of the behavior from "signed" uses. Like many other authors writing about contact between deaf and hearing people in a single community, we find the strict division between "gesture" and "sign" problematic (see, e.g., Kendon, 2013; Wilcox & Occhino, 2016; Kusters & Sahasrabudhe, 2018; Müller, 2018). We default to the use of *conventional gestures* with the meaning described above, and treat the question of how these gestures change as they enter sign language lexicon to be an empirical one, to be answered through studies like the present one.

1.2 Stability and Change of Conventional Gestures in an Emerging Sign Language

The small literature on the lexicons of emerging sign languages focuses on the process by which form-meaning mappings become conventionalized as stable lexical items in homesign systems (See Richie, Yang, & Coppola, 2014; Richie, 2017, for a computational modeling approach). In the case of the gestures under investigation here, however, the relevant form-meaning mappings were conventionalized in the community long before the birth of the first deaf signer approximately 60 years ago. SJQCSL signers, then, can be described as integrating, rather than lexicalizing, these already stable conventional gestures as they incorporate them into their emerging language.

To adopt a conventional gesture for use in a sign language lexicon is, necessarily, to retain at least some of the form-meaning mappings that have been conventionalized for its use. As it is integrated into a signing system, however, the gesture may undergo changes to

its form or its grammatical and/or lexical functions (Janzen & Shaffer, 2002; Wilcox, 2004, 2007, 2009; Janzen, 2012; Le Guen, 2012; Loon, Pfau, & Steinbach, 2014). In this study, we explore the uses to which signers put five negative conventional gestures as they integrate them into the SJQCSL lexicon. We consider evidence that some of the gestures are being assigned new semantic and grammatical functions, and we investigate the syntactic patterns that are emerging as the gestures are used in multi-sign utterances.

2. Negative Conventional Gestures in the SJQ Communicative Ecology

Here we introduce five negative conventional gestures used throughout the SJQ communicative ecology. We briefly describe the process of identifying the conventional gestures as a part of the larger Chatino Sign Language Documentation Project, and provide a guide to the glosses used to identify them throughout the paper. We introduce each gesture with examples of usage in interactions between SJQ speakers. We begin with examples from the interactions of hearing SJQ speakers expressly because speakers' usage patterns exemplify the conventional form-meaning mappings forged for the gestures before the emergence of SJQCSL in the past six decades.

The video recordings analyzed in this paper were collected from speakers and signers in the San Juan Quiahije municipality between 2012 and 2015. Recordings, and corresponding annotations created using the ELAN video annotation software, are archived with the Endangered Languages Archive at SOAS University of London (Hou & Mesh 2018; Mesh 2018). Each example in this paper is presented with a recording title that is searchable in ELAR, and an abbreviation that identifies the ELAR deposit in which the recording is archived. Examples with the identifier [GSS] are archived in the ELAR

deposit, "Gesture, Speech, & Sign in Chatino Communities" (Mesh, 2018). Examples with the identifier [DCSL] are archived in the ELAR deposit, "Documenting Chatino Sign Language" (Hou & Mesh, 2018). To the right of the recording title and deposit identifier is a time stamp corresponding to the onset of the talk in the example.

2.1 Identifying Conventional Gestures

Since 2012, both authors have participated in a joint project to document SJQCSL and its community of users and to relate it to the additional communicative resources in the Quiahije communication ecology: the first author has spent a total of 11 months in Quiahije, and the second author a total of 16 months. During this time, we interacted with deaf signers and their family members as well as with hearing non-signers. We observed and participated in signing and gesturing practices on a daily basis, developing a familiarity with these practices and documenting them in field notes. In addition, we video-recorded these practices extensively, documenting approximately 65 hours of SJQCSL signing and 14 hours of gesture-accompanied speech in SJQ Chatino. These videos comprise both elicited dialog and spontaneous talk in genres ranging from banter between family members to prayers at public events.

An early task in the project was to identify conventional gestures used by speakers and signers throughout the communicative ecology. This was accomplished through informal metalinguistic conversations with SJQ Chatino speakers and SJQCSL signers, as well as through semi-structured interviews about the use of conventional gestures in the community. These methods led to the identification of a set of negative conventional gestures, distinguishable on the basis of the following criteria: (1) they were observed more than once in spontaneous communicative situations among SJQ Chatino and Mexican

Spanish speakers; and (2) they exhibit stable form-meaning mappings across different communicative situations; and for the subset of the gestures with the highest degree of conventionalization, (3) they can be used meaningfully without accompanying speech. Individual gestures were identified based on recurrent formational features, and these, in turn, were confirmed to reliably convey a core set of semantic themes. The gestures were assigned the unique glosses listed in Table 1. Formational variants were identified for some gestures: each variant may convey a slightly different meaning, as is often found for the formal variants in 'families' of recurrent gestures (see, e.g., Kendon, 2004; Bressem & Müller, 2014): yet in these cases the semantic core of the gesture was judged to be unitary, so that the formational variants were not classified as separate gestures. The handshape of each variant was labeled using codes drawn from Battison (1978). Where relevant, variation in palm orientation and number of hands used to articulate a form was annotated.[3] Codes used to identify variants appear in Table 1.

Table 1: Codes used to identify gesture variants.

Further interaction with speakers and signers led to the observation that in many cases, particularly for signers, negative conventional gestures were accompanied by non-manual expressions that included head shake, downward turn of the lips, and brow lowering. While the non-manual behaviors clearly contributed a negative meaning, they occurred optionally and only in addition to manual gestures—that is, they did not function as independent

[3] There is a difference of opinion over whether certain one-handed and two-handed negative gestures are variants of a single gesture (Calbris 1990; Kendon 2004; Harrison 2009). Here we treat one- and two-handed articulations as variants of a single gesture.

gestures that could be used in isolation to convey a negative meaning. Kendon (2002) observes that head shakes and their accompanying facial signals do not always constitute kinesic equivalents of negative statements in co-speech gestures. We assume this is also the case in sign languages; for this reason, we chose to maintain our focus on the set of manual conventional gestures for the first stage of analysis.

In the descriptions to follow, we identify both the form of each negative conventional gesture and the semantic function that it bears for SJQ speakers. A list of negative functions identified in this study are provided in Table 2.

Table 2: Negative functions identified for conventional gestures in the present study

2.2 Negative Conventional Gestures and Their Uses

2.2.1 WAG

The WAG gesture is fully conventional or emblematic, and is produced by extending a hand, palm facing out, and wagging it back forth laterally. This wagging movement originates at the elbow joint and can include oscillation at the wrist joint. The gesture has two handshape variants: the first is produced with a 1-handshape (the index finger is extended while the remaining fingers and thumb are closed – see Fig. 1a).[4] The second variant is produced with a 5-handshape (All fingers and the thumb are extended: see Fig. 1b).

[Figs. 1a and 1b]

[4] Figures exemplifying negative conventional gestures in this paper feature the productions of deaf signers and hearing, gesturing non-signers. Figure captions clarify whether the individual pictured is a signer or non-signer.

The WAG gesture in all its variants has been documented as a gesture of rejection present in Western cultures since classical antiquity (de Jorio 2000; Kendon 2004). The 1-handshape variant of the gesture has been observed across Mexico and in other Latin American countries, where it is described as a gesture of general negation (Meo Zilio & Mejía, 1983, 2: 76).

The WAG gesture is used by hearing SJQ Chatino speakers in the municipality to express denial of multiple types, including the expression of a negative imperative ("don't"). The gesture is often used alongside speech in which proposition is denied using a negative particle (for an introduction to this type of negative function word, see Dahl, 2009). WAG occurs frequently with the SJQ Chatino negative particles *ja-A* and *ja-A la-J* (for a detailed discussion of the "affiliation" of negative gestures like WAG to spoken language negative particles, see chapter 3 in Harrison, 2018). Meanings mapped to the two formational variants of the WAG gesture were not readily distinguishable in our early observations.

In (1), a monolingual SJQ speaker denies that she can use Spanish, elaborating on her answer to an interview question about her language preferences.[5] The negative gesture co-occurs with the entire second clause, reinforcing the speaker's denial of being able to speak Spanish.

(1) 1 *chaq-C niqan-J ndywin-E ne-C jan-A qan-G*
'I'm speaking Chatino since'

[NEG:WAG-1]

[5] In this and all other examples of speech-accompanied gesture, speech coextensive with the articulation of the gesture is marked with square brackets.

2 [*ja-A ntyka-E qiyan-I chaq-C xlyqa*]
['I can't speak Spanish']

20150219_INTlei_CF13_CIEN_KAM_VID1_AUD1 [GSS], 00:09:46

2.2.2 TWIST

The TWIST gesture is fully conventional or emblematic, and is produced by extending the hand at approximately the height of the shoulder and rotating it back and forth in a lateral movement originating at the elbow. The gesture has two handshape variants: the first is produced with a 5-handshape (all fingers and thumb extended, see Fig. 2a). The second variant is produced with a Y-handshape (thumb and pinky are extended while all other fingers are closed, see Fig. 2b). Notably, the location of the TWIST gesture can be modified to indicate (draw attention to) locations in space or on the gesturer's body.

[Figs. 2a and 2b]

The 5-handshape variant of the TWIST gesture has been observed to express existential negation, i.e., to assert the lack or nonexistence of a given item, across Mexico and other regions of Latin America (Meo Zilio & Mejía 1983, 2: 180). To the authors' knowledge, the Y-handshape variant has not been documented in the literature on gestures and sign languages, though we observe it to have a negative existential reading in Oaxaca.

Hearing SJQ Chatino speakers use both the variants of the TWIST gesture to express existential negation. Although there is no conventional title assigned to the gesture, speakers readily associate the gesture with the SJQ expression, *ja-A la-J squ-yJ,* 'doesn't

exist'. In (2), an SJQ-speaking interviewee responds to a question about the meaning of the TWIST gesture. He produces the gesture while describing a context for its use.

(2) 1 *qan-E ngya-E chaq-C qa-J*
'it's how to say,'
[NEG:TWIST-5]
2 [*ja-A la-I qa-J squy-J ran-C qi-H ja-A la-J squy-J ran-C…*]
[*there isn't any, there isn't any anymore…'*]

20140730_INTneg_CM05_CIEN_KAM_VID1 [GSS], 00:01:45

2.2.3 PALM-DOWN

The PALM-DOWN a semi-conventional or recurrent gesture, produced by positioning the hand in front of the signer's torso, then moving the hand outward rapidly along the horizontal axis. The hand has a B-handshape and the palm may face downward (see Fig. 3a) or away from the speaker (see Fig. 3b). This form is typically produced with two hands that move outward from the center of the torso.

[Figs. 3a and 3b]

Gestures with the form of the PALM-DOWN have been called members of the Open Hand Prone (OHP) family, with two formational variants distinguished on the basis of palm orientation (Kendon 2004; Harrison 2009).

i. OHP gesture variants produced with the palms facing downwards largely carry meanings clustering around stopping (an activity or action sequence) and/or completion. In Mexico, these variants have been described as denoting completeness or sufficiency (Meo Zilio &Mejía 1980: 50; Le Guen 2012: 234).

ii. By contrast, OHP gesture variants produced with the palm facing outward from the speaker have been said to convey rejective meanings. In Mexico, such gestures have been described as denoting completion and existential negation (Meo Zilio & Mejía, 1983: 2: 76).

In the San Juan Quiahije municipality, hearing non-signers use the PALM-DOWN gesture to express (1) that a physical or mental activity will not continue, typically because it has reached a point of completion, (2) to express the uniqueness of a concept by denying the relevance or reality of additional phenomena or (3) an intensive negative meaning. These meanings are conveyed by forms with both palm orientations, though additional investigation of how contexts in which each orientation appears is merited. Given that the negative reading of interest here is available for PALM-DOWN gestures produced with both palm orientation variants, we treat the variants as related here.

In (3), an SJQ Chatino speaker discusses his general preference to be audio-recorded without an accompanying image. He uses the PALM-DOWN gesture alongside the phrase

'when a person's voice is recorded' to contribute the meaning *and nothing more than the voice*.

[PALM-DOWN]

(3) 1 *chaq-C non-A ndya-J* [*gra-J ba-E no-C chaq-C tyqi-C ti-C nten-B*]

'Whenever [a person's voice is recorded]

2 *jan-G ska-A la-E niyan-J ran-C*

'it's different…'

20150418_INTlei_SJM05SJF06_SJQ_KAM_VID1 [GSS], 00:21:33

2.2.4. PALM-UP

The PALM-UP gesture is semi-conventional or recurrent, and is highly polysemous, with dubitative, potential, and other related functions, including conveying uncertainty or lack of knowledge (Cooperrider, Abner, & Goldin-Meadow 2018). We consider it to be semantically negative when gesturers use it to express lack of knowledge, i.e. to mean 'I don't know.' To produce the PALM-UP gesture, both hands are extended, forearms parallel and approximately level with the elbows, the shoulders are shrugged. The hands may assume a B-handshape or the fingers may spread to a 5-handshape. There are two palm orientation variants for the PALM-UP form. In the first variant, the palms face upwards and

occasionally shift into a 'neutral' palm orientation (see Fig. 4a.) In the second variant, the palms face outwards, away from the speaker's torso. (See Fig. 4b)

[Figs. 4a and 4b]

"Palm presentation gestures" like the PALM-UP gesture are often used as co-speech or silent gestures to indicate "an unwillingness to intervene with respect to something, or an inability to do so" (Kendon 2004: 265). Other negative associations with PALM-UP cluster around the concept of absence or lack, whether of physical objects or inner states such as knowledge or certainty (Cooperrider et al., 2018). These meanings are interpretable as basically negative, since even "an uncertain statement can be argued to be under the scope of an implicit negative predicate such as 'not sure'…" (Loon et al 2014; 2141). Palm presentation gestures with this array of negative meanings have been documented to occur in Western cultures since classical antiquity (de Jorio 2000). Müller (2004) reviews the literature describing this gesture, highlighting modern accounts of the gesture from Eastern Europe, France, Germany and the United States. Meo-Zilio & Mejía (1983, 2: 18) document a use of the gesture throughout Latin America with a communicative function of indicating uncertainty.

SJQ Chatino speakers use both variants of the gesture to indicate that they do not know information about a particular situation. In some cases, the speakers use the PALM-UP gesture with palms facing outward to indicate that they refuse to comment on a topic. In (4), a speaker responds to a question about whether there are alternative ways to travel to Oaxaca other than to drive on the highway. He explains that there is a walking path known

to the community (line 1) then pauses while producing the PALM-UP gesture to indicate uncertainty (line 2). He follows the gesture with an explanation for his uncertainty: he does not have firsthand knowledge about the route (line 3).

(4) 1 *ti-E squy-E no-A ti-C sqne-E ndywiq-A yu-A qi-H non-A como-A…*
'there still is (a footpath), from before, they say,'
2 [NEG:PALM-UP]
3 *na-E chaq-C ndywiq-J non-A nga-J ne-I tla-A ti-A styqan-J chaq-C ja-C ne-I*
'one hears it said by the elders, one supposes.'

20150728_INTlei_CM08_CIEN_KAM_VID1 [GSS], 0:08:34

2.2.5. DEAD

The DEAD gesture is fully conventional or emblematic and is produced by tracing the fingertips in a horizontal movement along the front of the neck, as if to imitate the act of decapitation with a blade. The gesture has two formational variants: the first is produced with a bent B-handshape (all fingers held together and bent at the first joint, with the thumb held straight and unopposed – see Fig. 5a). The second variant is produced with the 1-handshape (see Fig. 5b).

[Figs. 5a and 5b]

A variant of the DEAD gesture in which the side of the hand contacts the back of the neck has documented in multiple countries in Latin America. In Puerto Rico, it is reportedly used to refer to the state of being dead, to the act of cutting off a head, or to the sentiment of being fed up with someone or something; in Ecuador, the gesture is reported to convey overwhelming, and in some cases insulting, negation (Meo Zilio & Mejía 1983, 2: 72).

SJQ Chatino speakers typically use the DEAD gesture with both formational variants to refer to the state of being dead. They also report using the DEAD gesture to teasingly threaten children with punishment when they are engaging in a behavior that the speaker wishes for them to stop. Finally, they report using the gesture to indicate that an activity has ended, or to report that they have run out of an item in limited quantity, such as produce for sale.

In (5), a young SJQ Chatino speaker with little signing experience is struggling to explain to her deaf cousin that someone they both know has died. A hearing family member instructs her to use a gesture to convey the message. She responds immediately, silently producing the DEAD gesture.

(5) Participant A *qne-I la-B yaq-H chaq-A nkjwi-F*
'do (a gesture) with your hand (to express) that he is dead'

Participant B NEG:DEAD

20120713_SP_DM01_RANCHO_KAM_VID2 [DCSL], 00:00:44

2.3 Research Questions

In §2.2 we identified semantic/pragmatic functions for the five negative conventional gestures used by SJQ speakers. We now turn our attention to the use of these conventional gestures by signers—deaf and hearing—in the same communicative ecology. We pose the following research questions, targeting the use of negative gestures in the emerging sign language, SJQCSL:

i. *When adopting negative conventional gestures from the surrounding communicative ecology, do SJQCSL signers retain all of the form-meaning mappings conventionalized by SJQ Chatino speakers?*

Phrased differently: given that SJQ Chatino speakers map multiple negative functions to each of the five gesture forms, do the SJQCSL signers retain all of these mappings?

ii. *Do the negative conventional gestures acquire new functions in SJQCSL?*

That is, do signers map different negative functions to any of the gesture forms than do hearing SJQ Chatino speakers?

iii. *What is the syntactic distribution of the negative conventional gestures in signed utterances?*

In the examples of co-speech gesture use provided above, hearing SJQ Chatino

speakers typically produced a single gesture together with a spoken language clause. This reflects the pattern of "one gesture per clause" observed in gesture-speech composites in a variety of languages (McNeill 1992). A variety of interpretations are available for how the negative gesture relates to the co-occurring spoken language. But when the gestures are used in SJQCSL, they can be anticipated to co-occur with other signs in multi-sign clauses. The questions arise, then: what syntactic distribution will the gestures have relative to other visual-manual material in the signed clause? Does the distribution reveal conventional ordering rules for the use of the gestures in SJQCSL ?

iv. *Do deaf and hearing people pattern differently in their placement of negative conventional gestures when they sign*?

We might expect to see differences between the deaf and hearing signers in our study on the basis of the differing contexts in which they developed usage patterns for the gestures: the deaf signers were exposed to gestures in the absence of speech, and developed practices for using them in a fully visual-embodied system. By contrast, all of the hearing signers in this study received and developed practices for incorporating conventional gestures into multimodal speech long before they began signing with deaf interlocutors.

To answer these questions, we conducted a study of SJQCSL signers' use of the five negative conventional gestures in spontaneous and elicited talk. We present the study

methods and results in the sections to follow.

3. Methods

To analyze the use of negative conventional gestures among SJQCSL signers, we consulted filmed interactions between SJQCSL signers and a variety of interlocutors. Five hours and 20 minutes of video recordings of signing were selected for analysis. These were drawn from a larger corpus created for the Chatino Sign Language Documentation Project and archived in the Endangered Languages Archive (ELAR, University of London). Selected videos feature conversations in three types of participation frameworks, which we defined in terms of participant type and discourse genre. Participation framework definitions are provided in Table 3. Filmed conversations were spontaneous in all but two cases (total time: 00:20.0) in which signers responded to photographs depicting local landmarks, farming tools, and animals. Since one or both researchers were present during the filming of all video data, the selected conversations frequently included a researcher as a participant. Any signing from a researcher was excluded from the analysis.

Table 3. Participation frameworks in the selected video recordings

We coded negative conventional gestures observed in the selected videos, creating a dataset that has been made publicly available.[6] Coding was performed according to the following

[6] A coding manual, as well as our coded dataset, are archived with the Texas Data Repository in "Replication Data for: Negation in San Juan Quiahije Chatino Sign Language" (Mesh & Hou 2018b).

protocol. Tokens of negative conventional gestures in the selected recordings were identified via their formational features and glossed accordingly. Gestures were additionally labeled with a code representing variant handshape where applicable. Glosses and variant codes were identical to those used to annotate gestures in SJQ Chatino speakers' utterances; see Table 1 in §1.2.

A negative function was coded for each gesture token. Codes reflected the three negative functions described in Table 2 in §1.2. In some cases, the function of a gesture could not be determined because the utterance in which it occurred was uninterpretable or ambiguous for the researchers. In these cases, the gesture was and coded as "uninterpretable" and subsequently excluded from analysis.

This coding protocol allowed us to determine whether signers retained the form-meaning mappings conventionalized for gesture usage among SJQ speakers, and to identify new form-meaning mappings where they occurred. We discuss the results of this analysis in §4, Form-Meaning Mappings for Negative Conventional Gestures in SJQCSL.

To prepare for an analysis of the syntactic distribution of the negative conventional gestures in SJQCSL utterances, we completed the following coding.

i. For utterances containing negative conventional gestures, utterance boundaries were identified using semantic and prosodic criteria.[7]

[7] The prosodic criteria used to identify utterance boundaries for this study were hand lowering, pausing, and torso shift, which have been shown to function as major prosodic boundary markers in older, established sign languages (see, for example, Nespor & Sandler 1999; Fenlon, Denmark, Campbell, & Woll 2008; Ormel & Crasborn 2012) and emerging sign languages (Sandler et al. 2011).

ii. Utterances were coded to indicate whether they comprised a single gesture (a negative conventional gesture produced in isolation) or whether they contained multiple signs.

iii. All multi-sign utterances were coded for the presence/absence of an overt negated predicate. This step was necessary because in many cases signers produced a negative conventional gesture and left the negated predicate unsigned, relying on shared background information or discourse or physical context to make the intended predicate salient to their interlocutor.

iv. All utterances with an overt negated predicate were coded for relative order of negative gesture and predicate, where coding categories referred to a gesture as occurring in pre-predicate and post-predicate position.

This coding protocol allowed us to analyze the frequency with which negative conventional gestures occurred in single-sign or multi-sign clauses, and to investigate whether signers showed clear preferences for pre-or post-predicate negation. We discuss the results of this analysis in §6.4, Syntactic Realization of Negative Conventional Gestures in SJQCSL.

4. Form-Meaning Mappings for Negative Conventional Gestures in SJQCSL

4.1. Quantitative Overview

In five hours and 20 minutes of signed conversation, deaf signers produced a total of 565 negative conventional gestures. We excluded 42 tokens that were uninterpretable for both researchers, leaving a total of 523 available for analysis. Although hearing signers appeared

in 92 minutes of conversation–approximately 35 percent of the total dataset – they produced proportionally fewer interpretable negative conventional gestures, just 51 in total (all of which were interpretable for the researchers). The low number of tokens produced by hearing signers may be attributable to the context in which the signers conversed: in the selected videos, hearing signers frequently initiated and maintained conversations with deaf signers by asking questions that deaf signers answered. This gave deaf signers relatively more opportunities to use negative conventional gestures as expressions of denial or correction.

The fact that hearing signers used a small number of negative conventional gestures presents a challenge for an analysis that aims at comparing data from deaf and hearing signers. Any finding, for example, that deaf signers use a gesture in a particular way while hearing signers do not, must be qualified with the observation that the data sample of hearing signers may not be representative. For this reason we will proceed cautiously when making comparisons between the two groups.

The total time in which each signer appeared in the video data, and the total number of interpretable negative gesture tokens that each signer produced (subcategorized by gesture type) is in Table 4.

Table 4. Negative conventional gestures produced by deaf and hearing signers

4.2 WAG

4.2.1. WAG in Emerging Sign Languages: Precedents for Integration

Gestures like WAG that are produced with the palm facing outward are said to develop from mimicry of pushing away a rejected item, or stopping an advancing action. Other negative functions can develop from this initial function of rejection over time (Calbris 1990; Kendon 2004; Streeck 2009; Bressem & Müller 2014). The widespread presence of this gesture in a variety of communicative ecologies (see discussion in §2.2.1) and its near-universal mapping to semantically negative functions suggests that the metaphorical extension, "negating is pushing away" is cross-culturally common. Many language users come to develop a strong association between the pushing-away gesture with negation, and the association appears to be shared across many cultures, rendering the gesture highly iconic for both hearing and deaf users alike. This makes the WAG gesture an ideal candidate to be incorporated into the lexicon of an emerging sign language without substantial alteration to the form-meaning mapping.

Evidence that the WAG gesture is readily integrated into sign language lexicons comes from the prevalence of WAG analogues in many typologically distinct sign languages, with mappings to a variety of negative functions (Zeshan 2004, 2006; Bauer 2013; Palfreyman 2015). Languages that give evidence of having adapted this type of negative gesture include Chinese Sign Language, Finnish Sign Language, Greek Sign Language, Hong Kong Sign Language, Indo-Pakistani Sign Language, Kata Kolok, Thai Sign Language, Turkish Sign Language, Yolngu Sign Language, and Yucatec Maya Sign Language (Le Guen, p.c.).

The WAG form is one of the most frequently used negative conventional gestures in SJQCSL. The availability of the "rejecting is pushing away" metaphor to deaf signers, and

the shared metaphorical association appears to facilitate how deaf signers employ it in their daily communicative practices.

4.2.2. WAG Use by Deaf SJQCSL Signers

In the analyzed video recordings, deaf signers used the WAG gesture in isolation with a negative imperative function (a subcategory of the semantic function, denial). For example, signers used WAG to instruct other signers not to interrupt them. In (6), Koyu turns away from a conversation he is having with a researcher to address his hearing daughter, who has been pulling at his shirt sleeve for attention.

(6) NEG:WAG-1
'no/don't (interrupt)'

20150403_SP_DM03_SJQ_LYSH_VID1 [DCSL], 00:10:39

Deaf signers also used the gesture with a negative imperative (denial) function in multi-sign utterances, either to issue their own negative imperatives or to quote those of others. In (7), Sendo describes a time when the village authorities instructed people to remain in their homes while they investigated a crime:

(7) 1 PT:LOC[government building] COME TELL PT:PRO1 GO NEG:WAG-1

'They came and told me, don't leave,'

2 PT:LOC[here] GOOD PALM-DOWN
'(staying) here (is) good, that's all (they said).'

20120723_SP_DM03_CIEN_KAM_VID1 [GSS], 00:07:59

Deaf signers used the WAG form for other types of denial, as well. Often these cases of denial took the form of a correction and were responses to misstatements or misunderstandings of others. In (8), Koyu answers a researcher's question by denying that the vendors come to his house to sell him oranges and correcting her. In (9), Angela, a deaf girl, corrects a researcher who asked if the puppy she is holding has a foul odor.

(8) 1 NEG:WAG-1 IX:PRO1 GO SEE DC:small.round.object[orange] PESOS
''No, I go see the oranges for sale,'

2 NEG:WAG1 COME NEG:WAG-1
'no they don't come here, no.'

20150219_SP_DM01_SJQ_LYSH_VID1 [DCSL], 00:05:48

(9) NEG:WAG1 SMELL NEG:WAG1
'No (the puppy) does not smell.'

20140408_SP_DF03_SJ_LYSH_VID1a [DCSL], 00:06:00

In some cases deaf signers used the WAG form to produce denials that were not corrections. In (10), Gina, the young deaf woman teased her sister about the researcher taking away her lollipops, continues her line of teasing, this time denying that the researcher (who has stayed) will give the child a lollipop.

(10) 1 DC:bag TAKE LOLLIPOP GIVE NEG:WAG1
'She (will) take the bag (of lollipops),'

2 IX:PRO3[Lina] NEG:WAG-1 IX:PRO3[Lina] NEG:WAG1
'(she will) not give you a lollipop, she (will) not,'

3 IX:PRO3[Lina] NEG:WAG1
'she (will) not.'

20150226_SP_DF03_SJ_LYSH_VID1 [DCSL], 00:14:16

4.2.3. WAG Use by Hearing SJQCSL Signers

Like deaf signers, hearing signers used the WAG form to produce negative imperatives and to issue corrections. In (11), Alejo, the hearing brother-in-law of Koyu, responds to a joke that Koyu has made about using commercial insecticide powder on his own skin. Alejo smilingly advises Koyu against this action.

(11) NEG:WAG-1 PT:LOC[insecticide powder bottle] NEG:WAG-1 CA:rub-on-arm
'Don't put the insecticide on your arm.'

20150403_SP_DM01_SJQ_LYSH_VID1 [DCSL], 00:02:44

Again mirroring the use of deaf signers, hearing signers employed the WAG form to produce statements of denial. In (12), Sótera explains to a researcher that a church she has been discussing is evangelical, and not Catholic.

(12) NEG:WAG-1 CATHOLIC NEG:WAG-1 PT:LOC[evangelical-church]
'It's not the Catholic (church), it's that Evangelical (church).'

20121125_SP_DM05_CIEN_LYSH_VID1 [DCSL], 00:30:10

4.2.4. WAG: Interim Summary and Discussion

The WAG form in SJQCSL is mapped to precisely the same functions as its gestural source in the San Juan Quiahije community: rejection, negative imperatives, and denial. We interpret this as evidence that the iconic representation of the "rejection is pushing away" metaphor is transparent to deaf people, even when they have no access to the spoken language that typically accompanies the WAG gesture.

4.3. TWIST

4.3.1. TWIST in Emerging Sign Languages: Precedents for Integration

Thus far no semiotic process has been theorized to explain how gestures with a back-and-forth twisting motion come to be associated with a meaning of non-existence. These gestures may be related to the "brushing away," "brushing aside," or "wiping off" gestures that rapidly twist the wrist outward to represent ridding the space in front of the gesturer of a physical or metaphorical object (Müller & Speckmann 2002; Bressem & Müller 2014;

Payrató & Tessendorf 2014). While the "brushing aside" gesture is attested to convey "negative assessment" in multiple cultures (see discussion in (Bressem & Müller 2014). the mapping of the back-and-forth twisting form with semantically negative functions is far from universal in gestural systems.

There is little precedence for integration of TWIST analogues into sign languages. Indo-Pakistani Sign Language provides an exception, as it incorporates a twisting motion into a negative existential form, glossed NOT-HAVE, though this form is produced with an F-handshape (Zeshan 2000, 2004: 37–38). The paucity of examples of TWIST analogues in sign language lexicons may be due to the small number of such negative gestures available for integration worldwide.

SJQCSL signers employ the TWIST gesture in their signing. Like speakers, they modify the location of the gesture to draw attention to locations in space and on their own bodies. Whether signers map the negative existential meaning to the gesture form may depend on the availability of this meaning in the absence of the speech component of gesture-speech composites in the SJQ communicative ecology.

5.3.2. Use of TWIST by Deaf Signers

In video recorded interactions, deaf signers frequently used the TWIST gesture when describing the absence or removal of an item. In (13), Gina, a young deaf woman teases her sister by telling her that the researcher (Lynn, known as Lina in the field), who is present at the time of the interaction, will leave and take away all of the lollipops that she brought with her.

(13) 1 IX:PRO3[Lina] GO LOLLIPOP NEG:TWIST-5
'Lina's going, there will be no (more) lollipops,'

2 CA:put-somethingintobag GO
'(she will) put them in the bag (and) go'

20150226_SP_DF03_SJ_LYSH_VID1 [DCSL], 00:10:25

The TWIST gesture was also used to assert the non-existence of items. For example, deaf signers used the gesture to explain the seasonal availability of crops grown in the municipality. In (14), Sendo, a young deaf man, responds to an image of a chayote squash by explaining that he is growing a chayote vine, but that it does not have any fruit yet.

(14) 1 NEG:TWISTY LITTLE-BIT FUTURE DCtracing:trellis
'There aren't any (chayotes now),'

2 IX:LOC[outsidebehindhouse] DC:round.small.object
'soon the trellis over there will have chayotes.'

20150610_EL_DM03_CIEN_LYSH_VID1 [DCSL], 00:02:25

Similarly, signers used the gesture when asserting that an animal or tool was not present in the community, or to state that they themselves did not own the item. In (15), Koyu, a middle-aged deaf man, responds to a photo of a pickaxe with the denial that he owns this type of tool in his home. In (16), Koyu responds to another photograph of a pig by denying

that there are pigs in the municipality. He uses the TWIST gesture to assert the non-existence of the pigs, and uses the gesture to deny that he sees them.

(15) 1 IX:PRO1 NEG:TWISTY PICKAXE IX:LOC[here]
'I don't have a pickaxe here,'

2 NEG:TWISTY IX:LOC[here] NEG:TWISTY IX:LOC[here]
'don't have it here, don't have it here,'

3 (NEG:TWISTY)
'don't have it...'

20150608_EL_DM01_SJQ_LYSH_VID1 [DCSL], 00:07:34

(16) 1 IX:LOC[Quiahije]+AROUND NEG:TWISTY SEE
'Around here (in Quiahije) I don't see (pigs),'

2 IX:LOC[Quiahije]+AROUND NEG:TWIST-Y
'around here, no (pigs).'

20150608_EL_DM01_SJQ_LYSH_VID1 [DCSL], 00:06:22

As demonstrated in (16), signers made use of the TWIST gesture for expressions of denial. It was especially frequent for signers to combine the gesture with a verb of sensory perception or cognition like SEE, HEAR, and THINK/UNDERSTAND. In (17), Sendo uses the gesture while laughingly commenting to the researchers that his nephew misunderstood a request for a tube of toothpaste and brought Sendo a toothbrush instead.

(17) KNOW NEG:TWISTY IX:PRO3
'He doesn't {know, understand, get} it.'

20150602_SP_DM03_CIEN_LYSH_VID1 [DCSL], 00:02:07

4.3.3. Usage of TWIST by Hearing Signers

In the collected video data, hearing signers used the TWIST gesture primarily to make statements of denial. They were more likely than deaf signers to use the negative conventional gestures in one-sign or two-sign utterances, omitting signs with meanings that their interlocutors could infer from the discourse context. In (18), Sótera, a middle-aged hearing woman, questions her deaf friend about a conversation he had with a woman he was trying to court. Her friend first explains that he asked the woman to marry him, and the woman said no. In response, with brows raised, Sótera produces a two-handed TWIST gesture followed by a point toward her friend.

(18) NEG:TWIST-Y-2H PT:PRO2
(she said) no (to) you?

20121111_SP_DM02_CIEN_LYSH_VID1a [DCSL], 00:04:52

In (19), Héctor, a younger hearing man, responds to a deaf friend's assertion that he does not know how many children he wants to have. He raises his brows and uses the TWIST gesture, followed only by a point to his friend, to ask whether his friend does not actually know the answer to this question.

(19) NEG:TWIST-5-2H PT:PRO2
You don't (know)?

2012-07-15_DM01CM10_CIEN_KAM_VID2 [DCSL], 00:02:12

4.3.4. TWIST: Interim Summary and Discussion

The evidence presented above reveals that SJQCSL signers have both retained the negative function original to the gesture – that of non-existence – and have additionally mapped the gesture to a general meaning of denial for concrete and abstract objects. That the semantic function of denial is mapped to the TWIST gesture is made evident through the signers' use of the TWIST gesture for denials related to sense experience (e.g., she doesn't hear, he didn't see anything). These uses are unrelated to the function of non-existence and indicate that the signers have extended the functions of the TWIST gesture from the gestural meaning. This extension may result from the fact that, in the utterances produced by hearing non-signing people, information about what is non-existent is not conveyed in the visual modality—that is, that hearing non-signers provide crucial information about the non-existent item in their speech alone. Deaf signers do not have complete access to the full multimodal construction in which the gesture is prototypically used; they can only access what they see and thus interpret the meaning of the gesture based on the contextual information that is visually accessible. This would account for how deaf signers come to associate the TWIST gesture with a broader negative meaning rather than a negative existential one.

4.4. PALM-DOWN

4.4.1. PALM-DOWN in Emerging Sign Languages: Precedents for Integration

The PALM-DOWN gesture has a wide distribution in conventional gesture systems worldwide (see discussion in §2.2.3). The metaphor, "to do no more is to not cross a linear threshold" appears to be near-universally available across cultures. The PALM-DOWN gesture traces such a horizontal threshold iconically, in a manner that appears to be transparent to a wide variety of language users (Kendon 2004). Given this fact, it is perhaps unsurprising that analogues of the PALM-DOWN gesture with various meanings connected to completion and sufficiency, and to the concept of 'no more', have been documented in many sign languages, including American Sign Language, British Sign Language, Finnish Sign Language, Inuit Sign Language, Swedish Sign Language, and Yolngu Sign Language (Zeshan 2004: 37; Bauer 2013; Schuit 2013).

Importantly, since the PALM-DOWN is frequently associated with meanings of sufficiency or of stopping a line of physical or mental action, gestural analogues of the gesture are frequently integrated into sign languages with a mapped meaning of 'finished' or 'complete' (Kendon 2004). It is but one step further for such gestures to be grammaticalized into aspect markers denoting completion, or to take on a general discourse-marking function indicating that a unit of talk is ending. But these gestures may also remain lexical items in sign languages and take on negative meanings, particularly ones related to sufficiency through the concept of requiring 'no more'.

The PALM-DOWN gesture is used in SJQCSL as a polysemous item: (1) it has a variety of negative readings; (2) it serves as a discourse marker indicating that a stretch of

823talk is ending, and (3) it functions as a lexical item meaning 'complete' or 'finished'. In this
824study we focus on its negative uses among signers.

825

826<u>4.4.2. PALM-DOWN Use by Deaf Signers</u>

827Deaf signers used the PALM-DOWN gesture in statements of denial. They tended to
828reserve the gesture for a specific function: to deny the possibility that further action would
829be required. In (20), Sendo explains that people in the community do no more than shoot
830owls and throw them away, since they do not eat them.

831

832 (20) 1 SHOOT-GUN FALL-DOWN PALM-DOWN:PV-2H
833 '(We) shoot (it), (it) falls down, nothing more,'
834
835 2 OUT NEG:WAG1 EAT NEG:WAG1
836 'it's out, no (we) don't eat (it), no, (we) don't eat (it).'
837
838 20150610_EL_DM03_CIEN_LYSH_VID1 [DCSL], 00:05:22
839

840Less frequently, the PALM-DOWN gesture was used for general statements of denial. In
841(21), Gina explains that since Puerto Escondido, a beach town, is hot, travelers do not bring
842their warm clothes there. She uses the PALM-DOWN gesture to deny that she wears her
843warm clothes to the beach.

844

845

846

847

(21) 1 HEY TOUCH:clothes IX:LOC[here] HOT IX:LOC[Puerto Escondido]
'Hey, the clothes (stay) here, Puerto Escondido is hot,'

2 TOUCH:clothes IX:PRO1 PALM-DOWN TOUCH:clothes IX:LOC[here]
'I don't (wear) the clothes, the clothes stay here.'

20141010_SP_DF01_SJ_LYSH_VID1 [DCSL], 00:17:07

In some cases, deaf signers used a string of multiple discrete negative gestures to express an intensive negative meaning. PALM-DOWN was typically the last gesture in the negative string, expressing a meaning roughly equivalent to "not at all" or "none at all". In (22), Stin, a middle-aged deaf man, tells an interviewer about what it was like to be raised by his brothers. The interviewer asks whether there was a female relative from his family in the house where he was raised, and he replies by first explaining that his mother died, then answering the question using a string of negative conventional gestures.

(22) DEAD-bentB NEG:TWIST-5-2H PALM-DOWN-2H
'(She) died, there weren't (any women), none at all.'

20121111_SP_DM02_CIEN_LYSH_VID1a [DCSL], 00:01:07

4.4.3. PALM-DOWN Use by Hearing Signers

In the analyzed video recordings, hearing signers largely did not use the PALM-DOWN gesture to express a negative meaning. There was a single exception: in (23), Sótera is talking with Stin, who has just produced a string of negative gestures in a statement of

intensive denial. Sótera mirrors back only the PALM-DOWN portion of her deaf interlocutor's construction with raised brows, for a meaning equivalent to 'not at all?'

(23) PALM-DOWN-2H
'Not at all?'

20121111_SP_DM02_CIEN_LYSH_VID1a [DCSL], 00:00:34

It may be early to conclude that hearing signers incorporate PALM-DOWN into their signing infrequently. We again remind the reader of the small sample size of the hearing signer dataset. At is notable that when a hearing signer does produce PALM-DOWN, she maps the gesture to the same intensive negative function as do deaf signers.

4.4.4. PALM-DOWN: Interim Summary and Discussion

In the case of the PALM-DOWN gesture, signers mapped the gesture's form to the same set of negative functions as did non-signing gesturers. This suggests that the iconic representation of the metaphor, "to do no more is to not cross a linear threshold" is transparent to deaf people, even in the absence of reinforcing speech that typically accompanies the gesture in multi-modal utterances.

4.5. PALM-UP

4.5.1. PALM-UP in Emerging Sign Languages: Precedents for Integration

When PALM-UP is used as a silent or co-speech gesture, one of its functions is to express uncertainty or refer to a lack of knowledge. Müller (2004) theorizes a semiotic process by

which a gesture displaying an open hand can originate with a meaning expressing "openness to the reception of an object" and can come to be associated with the *lack* of some object, even one as abstract as knowledge (237). Müller's account of this process may explain why analogues of the PALM-UP gesture recur with a similar meaning across cultures, and why this gesture commonly enters sign languages as a sign expressing uncertainty or lack of knowledge (Zeshan 2006; Loon 2012; Loon et al. 2014)(Zeshan, 2006; Loon, 2012; Loon et al., 2014).

Signs analogous to the PALM-UP gesture have been extensively documented in sign languages such as American Sign Language (Conlin, Hagstrom, & Neidle 2003; Hoza 2011), Danish Sign Language (Engberg-Pedersen 2002), sign language varieties of Indonesia (Palfreyman 2015), Inuit Sign Language (Schuit 2013), New Zealand Sign Language (McKee & Wallingford 2011), Sign Language of the Netherlands (Loon 2012) and many others. The PALM-UP gesture has been mapped to various communicative functions in these sign languages. Palfreyman (2015) analyzes the multiple functions of PALM-UP as a clause negator, as a predicate ('I wasn't sure, I didn't know'), and as a particle of uncertainty that co-occurs with another negator. Loon (2012) and Loon et al. (2014) claim that PALM-UP enters the sign language lexicon with the polysemous functions of turn-taking and question-marking and is easily integrated as an utterance-final item in the stream of signing. The PALM-UP gesture is re-analyzed as a sentence-initial discourse marker and may take on additional functions, becoming a conjunction for connecting clauses and an epistemic marker, signaling the signer's attitude towards an utterance.

In the current analysis we focus on signers' uses of the PALM-UP gesture with identifiable negative functions. We consider how both deaf and hearing signers use the map the gesture form to these functions in SJQCSL discourse.

4.5.2. PALM-UP Use by Deaf Signers

Unlike the other gestures in the SJQCSL negative gesture inventory, the PALM-UP gesture was rarely used by deaf signers to make statements of denial in the analyzed video data. A few examples of this kind of use could be found, however. In (24), Koyu uses the gesture to deny that his sister knows the answer to a question.

(24) KNOW PALM-UP-PV-2H PT:PRO3
'She doesn't know'

07212015_INTlei_DF02_SJQ_KAM_VID1 [GSS], 00:05:15

The PALM-UP gesture was much more frequently used to indicate that a signer did not know information, or to assert that the signer would not comment on a sensitive subject. In (25), Sendo offers an explanation for the uncharacteristic behavior of a community member. He suggests that the man might have been drinking, but qualifies his statement by expressing uncertainty, since he himself did not witness the man drinking.

(25) DRINK PALM-UP-PU-2H NEG:TWIST-Y PALM-UP-PU-2H
'(he could have been) drink(ing), I don't know, no, I don't know'

20120723_DM03_CIEN_KAM_VID_1 [DCSL], 00:02:08

945

946#### 4.5.3. PALM-UP Use by Hearing Signers

947In the selected video data, hearing signers did not use the PALM-UP gesture to create 948statements of denial. They did, however, use the gesture to assert their ignorance on a topic 949or to express their unwillingness to make further comment on sensitive topics. In (26), 950Yulia, the hearing sister-in-law of Sendo, responds to a question from Sendo with an 951isolated PALM-UP gesture. Sendo has just asked why Yulia didn't receive a money transfer 952that she had been expecting. Yulia replies that she does not know.

953

954 (26) NEG:PALM-UP-PU-2H

955 'I don't know'

956

957 20120812_DM03SF12_SJQ_KAM_VID1 [DCSL], 00:07:34

958

959#### 4.5.4. PALM-UP: Interim Summary and Discussion

960SJQCSL signers use the PALM-UP gesture in much the same way hearing non-signers in 961the community: to refuse to comment on a topic or to indicate uncertainty. But some deaf 962signers also use the gesture to in statements of denial, as shown in (26), where a signer 963produces the PALM-UP gesture immediately after the verb KNOW with the meaning, 'she 964doesn't know'. For these signers, the PALM-UP gesture is mapped to the negative function 965of denial. Whether the function of denial will become available for negation of verbs 966beyond KNOW is an open question. If this takes place, the change in the form-meaning 967mapping of the sign will have originated with deaf SJQCSL users.

968

4.6. DEAD

4.6.1. DEAD in Emerging Sign Languages: Precedents for Integration

In conventional gesture systems worldwide, the prototypical reading of analogues of the DEAD gesture is death. Archer (1997: 100) states that the "throat slashing" gesture in the U.S. means someone has been killed, though in Japan, it indicates that someone has lost a job. Brookes (2004: 222) lists the 1-handshape variant of the gesture as part of the repertoire of South African quotable gestures meaning 'kill.' This gesture moves across the actor's throat; the gesture may continue to move towards the direction of the sky for denoting that a referent is dead. Calbris (2003: 22–25) analyzes a variant of this gesture in French co-speech gesture, formed with a B-handshape that moves across the actor's throat, as resembling the act of slitting one's throat. However, she argues the gesture is polysemous. While the gesture can evoke the *means* of eliminating a referent, it can also evoke the general idea of a quick elimination of a referent.

Little is known about how gestures analogous to DEAD enter sign languages. Australian Sign Language and British Sign Language have a formally similar sign glossed as KILL in which the signer moves a 1-handshape variant away from her neck ipsilaterally (Johnston & Schembri 2007). However, there is no discussion about whether this sign can have a negative reading. There is no mention of the gesture DEAD/KILL used to express a negative statement in sign languages.

While hearing SJQ Chatino speakers report using the DEAD gesture as a negative imperative (a subcategory of the negative semantic function, denial) we found no examples of this usage in video recordings of non-signers (see §2.2.5). The DEAD gesture may not

have a fully conventionalized mapping to a negative meaning among signers, as evidenced by the infrequency of the mapping in gesture use in the communicative ecology. In our analysis of the DEAD gesture in SJQCSL we focused on uses in which the gesture form was mapped to an identifiable negative meaning.

4.6.2. DEAD Use by Deaf Signers

In the selected video data signers overwhelmingly used the DEAD gesture as a non-negative lexical item meaning "dead", "death", "graveyard" or "funeral". In one case, however, a deaf signer used the sign in a string of contiguous negative gestures that formed an intensive negative construction. In (27), Sendo complains about a time when another deaf man in the community was intentionally uncommunicative.

(27) 1 QUIET TELL NEG:TWIST-Y NEG:WAG-1 NEG:DEAD-bentB
'(He was) quiet and said nothing, no, nothing at all,

2 TELL NEG:WAG-1...
'he said nothing...'

20120723_DM03_CIEN_KAM_VID1 [DCSL], 00:08:21

While this sentence was the only one of its kind in the analyzed video data, it should be noted that both authors observed the use of the DEAD gesture for intensive negation in the spontaneous talk of multiple deaf signers during our fieldwork in the municipality.

4.6.3. DEAD by Hearing Signers

No hearing signers used the DEAD gesture with a negative meaning in the selected video data. It is an open question how hearing signers use the DEAD gesture for negation in spontaneous interaction, since SJQ Chatino speakers do report using the gesture as a negative imperative (a sub-type of the semantic function, denial). Neither of the researchers observed hearing signers using the form with a negative meaning during fieldwork.

4.6.4. DEAD: Interim Summary and Discussion

The dataset for our study does not offer enough tokens from deaf and hearing signers to identify a consistent form-meaning mapping for DEAD, though one token from the dataset, as well as our own observations, suggest that the form may be mapped to an intensive negative function by deaf signers.

5. Discussion: Form-Meaning Mappings for Negative Conventional Gestures in SJQCSL

Three of our initial research questions targeted form-meaning mappings in SJQCSL signers' negative gesture use. Here we bring the results of the analysis presented above to bear on these questions.

i. *When adopting negative gestures from the surrounding gesture ecology, do SJQCSL signers retain all of the form-meaning mappings conventionalized by SJQ Chatino speakers?*

We found that yes, signers do retain every form-meaning mapping conventionalized by SJQ Chatino speakers when they integrate the gestures into the SJQCSL lexicon.

Signers retained even the mapping that we hypothesized to be minimally accessible in the absence of speech—namely, that of the negative existential semantic function to the TWIST gesture form. That deaf signers in particular retain this mapping gives evidence that context of use makes the function of the gesture clear to deaf perceivers, even when the speech that typically accompanies the gesture is unavailable. Importantly, we cannot rule out an explanation invoking some iconicity for the TWIST form at this stage: the gesture may represent clearing a space in a manner that may be iconic to some language users. Nevertheless, we are cautious about the deaf signers' interpretation of the TWIST gesture, given its low frequency of occurrence in our dataset (not all deaf signers use this gesture). We cannot ascertain whether the signers' adaptation of the gesture is based on the association of the gesture to the absence of an object, and it is unclear whether such an association would be accessible to all of the signers.

ii. *Do the negative conventional gestures acquire new functions in SJQCSL?*

In three cases, we did find evidence for new form-meaning mappings for specific gestures. First, signers mapped the TWIST form not only to its conventionalized negative existential function, but also to the new function of denial. This change may be originating with deaf signers: in our dataset we find this form-meaning mapping occurring much more frequently in the signing of deaf people. In addition, we see limited evidence that at least some deaf signers have begun to map new negative functions to two other gestures. One deaf signer used the DEAD gesture

with an intensive negative function. Another deaf signer used the PALM-UP gesture for denial for the negated predicate, KNOW. Our analysis here is limited by the paucity of examples of these changes in our data set. Whether these mappings are robust in the usage patterns of even the two signers in question, and whether their conventions may be spreading throughout the signing community, are open questions at this stage.

iv. *Do deaf and hearing people pattern differently in their use of negative conventional gestures when they sign?*

Deaf and hearing SJQCSL signers pattern differently in their form-meaning mappings for negative conventional gestures in one respect: deaf signers appear to be the source of new mappings. The addition of a function for the TWIST form exemplifies the type of change that first-generation deaf users of a sign language can make to a gesture when integrating it into their lexicons. Since sign languages can emerge and change rapidly in a short period of time, we have a limited understanding about the contributions of deaf and hearing signers to the development of sign language lexicons. In the case of SJQCSL, it appears that only the deaf signers are reanalyzing the form-meaning mappings of negative gestures.

6. Syntactic Distribution of Negative Conventional Gestures in SJQCSL

6.1 Introduction

The development of syntactic patterning of negative conventional gestures in SJQCSL offers a glimpse of the changes that negative gestures may have undergone as they have been incorporated into an emerging sign language. Here we see deaf signers modifying the use of negative conventional gestures – in this case, by conventionalizing the relative order of negative gestures and predicates in multi-sign negative utterances.

6.2 Single- and Multi-Sign Negative Utterances

For each signer, the proportion of negative conventional gestures produced in isolation and in multi-sign utterances was calculated.[8] Results of the analysis of single-sign and multi-sign negative utterances are presented in Table 5.

Table 5. Negative conventional gestures produced in isolation and in multi-sign utterances by deaf and hearing signers (proportion out of total negative gestures, calculated for each signer)

Both deaf and hearing users of SJQCSL expressed negative propositions in utterances of varying lengths. Signers in both groups tended to use negative gestures in isolation when providing an initial response to a question. In many cases these short responses were followed by multi-sign negative utterances that elaborated the first message.

[8] To yield the proportion produced in isolation, the number of gestures produced in isolation was divided by the total number of negative conventional gestures. To yield the proportion produced in multi-sign utterances, the number of negative conventional gestures that the signer produced in multi-sign utterances was divided by the total number of negative conventional gestures produced by the signer.

It is notable that a greater proportion of the hearing signers' negative utterances were composed of a single sign. This result may be an artifact of a limited dataset, but it may also reflect the tendency of several hearing signers to repeat a sign from a deaf signer—either to prompt the signer to expand their message or to express agreement and affiliation with the signer, a practice observed in spoken language discourse throughout Mesoamerica. Hearing signers were observed to use negative gestures in isolation both when answering a question and when responding to an interlocutor's negative utterances.

6.3 The Emergence of Conventions for Predicate-Negative Gesture Ordering

For each signer, the proportion of negative conventional gestures used before or after an overt predicate was calculated.[9] Results of the analysis of predicate-negative gesture ordering are presented in Table 6.

Table 6. Distribution of negative gestures in the multi-sign utterances of deaf and hearing signers (proportion out of total negative conventional gestures, calculated for each signer)

Deaf signers placed negative gestures after the predicates with overwhelming frequency. This high degree of apparent conventionalization in predicate-negative gesture ordering is notable given the fact that deaf signers are members of different signing families. It appears then, that identical predicate-negative gesture ordering patterns arose among different

[9] To yield the proportion produced before the predicate, the total number of negative conventional gestures produced before a predicate was divided by the total number of negative conventional gestures in multi-sign utterances. To yield the proportion produced after the predicate, the total number of negative conventional gestures produced after a predicate was divided by the number of negative conventional gestures produced in multi-sign utterances.

groups of deaf signers. There may be a factor motivating this ordering preference, one that can account for the strong trend of clause-final negation across the majority of developed and emerging sign languages (Zeshan 2004, 2006).[10] No single factor has been theorized, however, to account for this pattern.

Like deaf signers, several hearing signers showed a preference for placing negative gestures after the negated predicate. Notably, the pattern was weaker where it occurred in hearing signers, and in two cases, the pattern was reversed—that is, two hearing signers showed a preference for placing negative gestures before predicates. The weaker and occasionally reversed ordering pattern in hearing signers is likely attributable to contact with spoken Quiahije Chatino, and, for some trilingual signers, with spoken Spanish – two languages in which negative particles occur before a negated predicate.

Here again we observe that the number of negative gestures produced by hearing signers in multi-sign utterances was low: it is possible that the weaker and reversed patterns we observe in the hearing signers are an artifact of the small sample set collected from each signer. We limit our commentary to this: it is striking that the hearing signers show different syntactic tendencies from those of their deaf counterparts, given that hearing signers use SJQCSL exclusively with deaf interlocutors. Hearing signers are thus are exposed to a strong ordering pattern that they appear to mirror weakly, or, in some cases, not to mirror at all.

6.4 Discussion: Syntactic Realization of Negative Conventional Gestures in SJQCSL

[10] We observe that the post-predicate negation found in SJQCSL is consistent with a pattern of clause-final negation. More research on the clause structure of SJQCSL must be performed before confirming that negative gestures occur clause-finally in this language.

Two of our initial research questions targeted the syntactic realization of gestures in SJQCSL signers. We bring the findings above to bear on these combined questions.

iii. *What is the syntactic realization of the gestures in signed utterances?*

iv. *Do deaf and hearing people pattern differently in their use of negative conventional gestures when they sign?*

A tendency of both deaf and hearing signers was to leave negated predicates unexpressed when they could be supplied via pragmatic inference. In a substantial number of cases, however, both deaf and hearing signers produced overt negated predicates alongside negative gestures in multi-sign utterances. When producing this type of utterance, deaf signers showed a strong tendency to place the negative gesture in predicate-final, an often utterance-final, position. This patterning of manual negator ordering is not unique to SJQCSL, but rather reflects a larger cross-linguistic pattern of post-predicate and clause-final negation, observed by Zeshan (2004, 2006) in a sample of 27 typologically distinct sign languages. This striking pattern suggests a possible cognitive bias for users of sign languages to place negators after predicates and in clause-final position. The fact that hearing signers weakly mirrored the ordering preferences shown by their deaf co-signers (and in two cases, showed an opposite ordering pattern) suggests an influence from the syntax of their native languages — SJQ Chatino, and in some cases, Spanish — on their development of syntax in SJQCSL.

7. Conclusion

In this paper we investigated how signers integrate and adapt five negative gestures conventionalized in the Quiahije communicative ecology for use in the emerging sign language, SJQCSL. The word-like status of these gestures suits them to integration into sign language lexicons—that is, to retaining not only the gesture form but also the multiple meanings conventionally mapped to each form. An analysis of the semantic functions of the gestures in SJQCSL signing showed that every form-meaning mapping for negative conventional gestures in the broader community is retained in the gesture use of signers. While the conventional mappings are retained, the gestures are nevertheless undergoing changes as they enter the SJQCSL lexicon. Signers are mapping new negative functions to three of the gesture forms. And, since the gestures are increasingly being positioned alongside other signs in multi-sign utterances, conventions for their syntactic distribution are arising.

Deaf signers appear to be the primary source of every change that the gestures are undergoing: deaf signers map the TWIST form to a new negative semantic function – denial – much more frequently than do hearing signers. At this early stage of research, we have found some evidence of changes to functional mappings for the DEAD and PALM-UP gestures for deaf signers alone. Similarly, deaf signers are converging on a syntactic pattern for negative gesture use that is stronger than the pattern displayed by their hearing counterparts. It remains to be seen how the semantic functions and syntactic patterning of these negatives evolve in parallel with the growth of SJQCSL among second-generation users. Documenting such changes can better inform us about how the lexical and syntactic

patterning of signs become differentiated from conventional gestures, and can reveal the contributions of deaf and hearing users to the emergence of a new sign language.

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Both authors collected the data, participated in the coding and analysis of the data, and contributed to the writing of this paper.

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Figure 1. The emblematic gesture WAG, with its two formational variants

Fig. 1a. 1-handshape variant, produced by a deaf signer

1389 

1390Fig. 1b. 5-handshape variant, produced by a deaf signer

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1392Figure 2. The emblematic gesture TWIST, with its two formational variants

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1395Fig. 2a. 5-handshape variant, produced by a deaf signer

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1398Fig. 2b. Y-handshape variant, produced by a deaf signer

Figure 3. The recurrent gesture PALM-DOWN, with its two formational variants

Fig. 3a. Palm-down orientation variant, produced by a deaf signer

Fig. 3b. Palm-out orientation variant, produced by a hearing non-signer

Figure 4. The recurrent gesture, PALM-UP, with its two formational variants

Fig 4a. Palm-up orientation variant, produced by a hearing non-signer

Fig 4b. Palm-out orientation variant, produced by a deaf signer

Figure 5. The emblematic gesture DEAD, with its two formational variants

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1415Fig. 5a. Bent-B handshape variant, produced by a deaf signer

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1418Fig.5b 1-handshape variant, produced by a deaf signer

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Coding Category	Codes
Gesture Name	WAG, TWIST, PALM-UP, PALM-DOWN, DEAD
Handshape	1, 5, Y, Bent-B
Palm Orientation	PD (palm down), PU (palm up), PV (palm vertical: i.e., facing away from the signer's torso), PN (palm neutral: i.e., facing inward toward the space in front of the signer's torso)

Table 1: Codes used to identify conventional gestures and their variants.

Negative_function	Definition/Diagnostic Criteria
Basic clause	The denial of some predicate or proposition.

negation	
Emphatic negation	Negation that was translated using emphatic expressions such as "certainly not" or "not at all"
Negative interjection	An exclamatory remark in isolation, such as "no!"
Negative existential	The assertion that a given referent does not exist
Semantically negative	Expressions of uncertainty or unwillingness to comment further. No clear negated predicate or proposition.
Uninterpretable	The researchers or family members of the recorded signer could not provide a clear translation of the negative sentence, making it impossible to identify which negative function the token bears.

1445 Table 2: Negative functions identified for conventional gestures in the present study

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Interaction Framework	Total Time
Multiple deaf signers interact (hearing signers may participate)	02:57.00
One deaf signer converses with one hearing signer	02:57.00
One deaf signer tells a narrative to one of the researchers	00:51.00

Table 3. Participation frameworks in the selected video recordings

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	Signer	Total Min. of Signing in Dataset	Neg. Conventional Gestures: Total/Interpretable					
			Wag	**Twist**	**Palm-Down**	**Palm-up**	**Dead**	**Combined total**
Deaf Signers	RE	108	50/49	17/17	3/3/	2/2	0/0	72/71
	CR	78	13/12	43/35	2/2	4/4	0/0	64/53
	GR	63.5	53/52	19/19	0/0	2/2	0/0	74/73
	AG	32.5	38/35	32/28	17/15	9/7	0/0	95/84
	RO	53	41/40	84/77	16/11	70/65	1/1	209/191
Hearing Signers	SO	41	12/12	3/3	0/0	0/0	0/0	15/15
	JBG	12	3/3	11/11	3/3	6/6	0/0	23/23
	AL	12	5/5	0/0	0/0	1/1	0/0	6/6
	HBG	27	1/1	6/6.	0/0	0/0	0/0	7/7

1453

1454 Table 4. Negative conventional gestures produced by deaf and hearing signers

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	Signer	Total Single-sign	Total multi-sign
Deaf Signers	RE	16 (23%)	55 (77%)
	CR	8 (15%)	45 (85%)
	GR	13 (18%)	60 (82%)
	AG	24 (29%)	60 (71%)
	RO	23 (12%)	168 (88%)
Hearing Signers	SO	2 (13%)	13 (87%)
	JGB	10 (43%)	13 (57%)
	AL	3 (50%)	3 (50%)
	HBG	2 (29%)	5 (71%)

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1457

1458Table 5. Negative conventional gestures produced in isolation and in multi-sign utterances
1459by deaf and hearing signers (proportion out of total negative gestures, calculated for each
1460signer)

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Deaf Signers	**Deaf Signers**	**Total pre-pred**	**Total post-pred**	**Total ambiguous**
	RE	2 (5%)	39 (93%)	1 (2%)
	CR	1 (3%)	24 (73%)	8 (24%)
	GR	1 (2%)	43 (98%)	0 (0%)
	AG	2 (7%)	24 (80%)	4 (13%)
	RO	1 (1%)	84 (99%)	0 (0%)
Hearing Signers	SO	2 (22%)	6 (67%)	1 (11%)
	JGB	1 (10%)	8 (80%)	1 (10%)
	AL	3 (100%)	0 (0%)	0 (0%)
	HBG	1 (25%)	3 (75%)	0 (0%)

Table 6. Distribution of negative conventional gestures in the multi-sign utterances of deaf and hearing signers (proportion out of total negative conventional gestures, calculated for each signer)

Appendix A. List of Abbreviations

LSM	Mexican Sign Language
SJQ	San Juan Quiahije

SJQCSL	San Juan Quiahije Chatino Sign Language
RE	Regina, a deaf SJQCSL signer
CR	Cristina (Stina), a deaf SJQCSL signer
GR	Gregorio (Koyu), a deaf SJQCSL signer
AG	Agustin (Stin), a deaf SJQCSL signer
RO	Rosendo (Sendo), a deaf SJQCSL signer
SO	Sótera, a hearing SJQCSL signer
JGB	Juliana, a hearing SJQCSL signer
AL	Alejo, a hearing SJQCSL signer
HBG	Héctor, a hearing SJQCSL signer

Appendix B. List of Glossing conventions

2H	two-handed
CA	constructed action
DC	depicting construction
IX	index
LOC	locative
NEG	negative
PD	palm down
PN	palm neutral
PRO1	speaker/signer
PRO2	addressee
PRO3	non-addressee
PU	palm up
PV	palm vertical

Appendix C. Tone Representation San Juan Quiahije Chatino Transcripts

San Juan Quiahije Chatino (SJQ) has a large tone inventory that consists of 10 tone phonemes (14 lexical tone classes). There are 4 level tone phonemes and 6 phonemes with rising or falling tone contours. The tone-bearing unit in SJQ is the syllable, and words in the language are monosyllabic, so that every word bears one tone phoneme. To reflect this orthographically, a letter representing the tone phoneme is placed at the end of every written Chatino word. For a comprehensive description of tones of SJQ, see E. Cruz (2011) and E. Cruz and Woodbury (2014).

Letters Representing the Phonological Tones of SJQ in Transcriptions	
Low	A
Mid	C
High	E
Super-high	K
Mid-superhigh	H
Mid-high	I
Low-mid	F
Low-high	G
Superhigh-low	B
High-low	J