

The chin as a domain widener in American Sign Language (ASL)*

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Abstract In this paper, we investigate a grammaticalized facial expression in American Sign Language (ASL) called flat chin, which we propose functions as a general-purpose domain widener, targeting both quantificational domains as well as the scales used by gradable predicates. Our analysis allows for flat chin to target nearly any expression involving a domain, and is based on [Morzycki’s 2012](#) analysis of extreme degree modifiers. Such an analysis both expands our understanding of ASL as well as Language more broadly, as few general-purpose domain wideners have yet been reported and fewer still are reported to occur as a non-manual (non-hand) markers in a sign language.

Keywords: modification, degrees, domain widening, sign language, American Sign Language, ASL

1 Introduction

All natural sign languages are produced via a combination of manual articulators (the hands) and non-manual articulators (the head, face, shoulders, etc.). Signs made by non-manual articulators—called non-manual markers (NMMs)—are typically suprasegmental, stretching over multiple manual signs, and can have a variety of grammatical functions.¹ These functions, particularly those of lower face NMMs, have remained relatively understudied, though. This paper on American Sign Language (ASL) focuses on the functionality of one such lower face NMM, the flat chin (‘fc’) (figures 1 & 2), which is produced by pulling the mentalis muscle taut.

Much of the previous work (as well as L2 ASL textbooks) done on ASL lower face NMMs has suggested that they function primarily as manner adverbials or adjectives of size and distance ([Liddell 1980](#); [Baker-Shenk & Cokely 1980](#)). Accordingly, ‘fc’ has been noted to act as a manner adverb meaning “contentedly,” “with pleasure,” or “in a normal way” ([Baker-Shenk & Cokely 1980](#)). However,

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¹ We will only be looking at the grammaticalized, morphemic uses of facial expressions here. Affective facial expressions are still used by signers, and do not pattern with regards to the syntax, while NMMs do.



Fig 1: Flat chin in *Bienvenu & Colonomos (1991)*



Fig 2: Flat chin in our elicited data

previous work by [Nikolai & Wilbur \(2019\)](#) has shown that while *fc* can indeed function as such a manner adverb, it seems to have additional functions. Here, based on both natural corpus and elicited data, we propose flat chin is a general-purpose domain widener in ASL, targeting both quantificational domains, as well as the scales used by gradable predicates.

2 Methods

Our research was conducted in two phases. The first phase took a qualitative approach, examining a small-scale corpus constructed using the instructional video series *The Faces of ASL* ([Bienvenu & Colonomos 1991](#)), as well as looking through data from previous projects that might contain flat chin based on the initial mini-corpus study. This allowed us to identify flat chin in relatively natural contexts. Here, all appearances of flat chin were marked, and we compared them to additional annotations that included various syntactic and semantic information, such as clause polarity and sentence complexity, in order to gain an understanding of flat chin's general pattern of appearance. This initial data helped us to form our proposal. Then from the information gleaned in the first phase, we developed our second phase as a set of targeted elicitation sessions collected from multiple signers aimed at confirming and adding nuance to our proposal.

The data presented in this paper comes from Deaf signers and adult children of Deaf adults (CODA) signers, all of whom began acquiring ASL before age 5. All signers had a high level of proficiency in English and were considered to be highly proficient signers by their local Deaf communities. All data from the second phase of our research was collected either face-to-face or over video chat software and was recorded for later annotation in ELAN.

In the second phase of collection, signers were shown an image with an English context sentence above and an English target sentence below. From this, signers

were asked first to sign through the full context and target sentence in ASL, then to sign just the target sentence in ASL, then to sign the target sentence in ASL with as few manual signs as possible. All of this was done with the intent of raising the chance for signers to use optional, subjective non-manuals, such as flat chin. Following this, flat chin was elicited more directly from signers by asking them if it could be added to a sentence (among other non-manuals, as distractors). If it could be added, we asked what change in meaning it contributed.

3 Results

We analyzed 158 ‘fc’ instantiations within in our small corpus, but only 7 of these instantiations could be interpreted as manner adverbs. While ‘fc’ does have a legitimate use as a manner adverb, it more frequently appeared to be acting as some kind of intensifier, which we then explored in data collected from other projects before we collected specifically for ‘fc’.

‘fc’ typically applies to gradable predicates, like STRONG in (1) or MISS in (2), where it acts as a strengthener; cf. English ‘*very strong*’ and ‘*really miss (someone)*.’ However, ‘fc’ also applies to quantifiers, like EVERY in (3) and NONE in (4), which are not traditionally thought of as gradable and which are not typically modified by simple intensifiers. Instead, in these quantificational cases ‘fc’ acts like English ‘*absolutely every/none*,’ substituting a wider domain of quantification (Horn 1972; Morzycki 2012): e.g., all students registered in the relevant course instead of just those present in class today.

- (1) #RUG #IF GERMAN $\overline{\text{STRONG}}^{\text{fc}}$
 ‘If the rug is German, it’s *totally/completely/really strong*.’
- (2) MOTHER IF NOT COME $\overline{\text{MISS ME}}^{\text{fc}}$
 ‘If my mom doesn’t come, she’ll *really/totally* miss me.’
- (3) $\overline{\text{IX-3++ STUDENT IX-3++ TEACHER HOMEWORK GIVE}}^{\text{fc}}$
 ‘The teacher gives homework to each *and every* student.’
- (4) IX-3 HEY SEE IX-3 $\overline{\text{CL:F “SPOTS” SEE NONE}}^{\text{fc}}$
 ‘He doesn’t see any spots there *at all*.’
- (5) IX-3 WATER CL:BENT-L ‘LAKE’ $\overline{\text{FREEZE}}^{\text{fc}}$
 ‘The lake froze *completely/totally* solid.’
- (6) IX-3 KNOW W-A-G-O-N $\overline{\text{CL:C CL:0 CL:BENT-B FINISH}}^{\text{fc}}$
 ‘He loaded the wagon *full*.’ or ‘He *completely* loaded the wagon.’

- (7) FULL FREEZE NOT-YET ^{fc}MAYBE IX-1 BAKE CAN
 ‘Is it (the pie) completely frozen yet? Maybe I could bake it, *even still*.’



Fig 3: Sentence (1), where flat chin seems to strengthen the signer’s claims about the strength of the rug

In (1), the signer uses flat chin to indicate that you may expect a rug to be strong, but German rugs are even stronger than most, perhaps even stronger than you might expect. In (2), flat chin indicates that the signer misses their mother more than might be expected in a given situation. In (3), flat chin seemingly acts as an exhaustive by expanding the domain of students you should consider—‘each student’ could just refer to the students present in class today, but it could also, in a wider domain, include even absent students. In (4), flat chin indicates that there were absolutely no visible spots, even though the version of NONE signed allows for there to be spots in existence that might not be visible. In (5), flat chin indicates that the lake has frozen completely, as opposed to being mostly frozen—which might be an acceptable interpretation when flat chin is not present. In (6), similarly to (5), the wagon’s absolute fullness to capacity, as opposed to it being mostly full, is marked with flat chin. In (7), there seems to be an interaction between the root modal “can” and flat chin, wherein the pie is more frozen than might typically be possible for baking, but the signer is extending the possibility that it could still be baked, regardless.

4 Analysis

As illustrated by the representative examples above, ‘fc’ most often seems to have an intensifying effect. Surprisingly, ‘fc’ can combine with a wide range of expressions, with varying semantics: gradable properties like STRONG and FREEZE; verbs like MISS; distributives like IX-3++ (‘each’); and even modals like MISS. To link these disparate uses, we propose that ‘fc’ is a broad, general-purpose contextual domain widener.

Contextual domains are invoked in a wide number of semantic analyses, notably for quantifier restrictions (Westerståhl 1984), for instance. In a nutshell, the idea is that the context provides a set of elements used to narrow down a larger set in the semantics. For instance, the sentence *Every student is sitting quietly* probably does *not* indicate that every student in the world is sitting quietly, just those in the room or immediate vicinity. This phenomenon might be captured by positing a contextual domain C comprising just those individuals salient in the current discourse (whether due to proximity, prior mention, etc.). In this way, we can formally capture the fact that quantifier restrictions may vary from context to context.

This type of analysis has been extended to the scales used by gradable predicates. A gradable adjective like *tall* operates over a scale of heights, but which heights are considered in play vary widely from context to context. (E.g., compare the most likely heights of buildings versus bookshelves.) One way to capture such varying portions of a larger scale is using contextual domains comprising only the relevant degrees: in one context a domain C might contain degrees relevant to the heights of buildings and in another, degrees relevant to the heights of bookshelves.

Morzycki (2012) adopts this approach in his analysis of what he terms *extreme degree modifiers* (EDMs). EDMs such as *absolutely* in *absolutely reckless*, under his analysis, widen the contextual domain of relevant degrees being considered for a given adjective, like *reckless*. In this case, *reckless* is evaluated with respect to a domain C called a *perspective scale*, the domain of contextually salient degrees of recklessness: maybe up to jay-walking or staying up late, in a normal context. Adding the EDM *absolutely* widens this scale to form a new (likewise contextually determined) domain C^+ , say up to playing with fire or remodeling while drunk, and lexically encodes this effect using a new degree d , which is found in the new scale C^+ but not in the original C :

$$(8) \quad \llbracket \text{absolutely} \rrbracket = \left[\begin{array}{l} \lambda a_{\langle dt, \langle e, dt \rangle \rangle} \lambda x : \mathbf{standard}(a_{C^+}) \in C^+ - C \\ \quad \cdot \exists d [a_{C^+}(x)(d) \wedge d \geq \mathbf{standard}(a_{C^+})] \end{array} \right]$$

Here, *absolutely* modifies an adjective meaning so that its standard (the degree at which the adjective applies) is (only) in the new, expanded scale C^+ . Thus, *absolutely reckless* will refer to one of the new degrees of recklessness, beyond jay-walking, etc.

A quite similar analysis might immediately be imported to the use of ‘fc’ to modify STRONG in (1), minus the presupposition (which encodes the fact that EDMs, unlike ‘fc’ are infelicitous on less extreme adjectives, like STRONG):

$$(9) \quad \llbracket \text{fc} \rrbracket = \lambda a_{\langle dt, \langle e, dt \rangle \rangle} \lambda x : \exists d \in C^+ - C [a_{C^+}(x)(d) \wedge d \geq \mathbf{standard}(a_{C^+})]$$

(to be revised)

And although MISS in (2) is not an adjective, it does refer to a scale, as evidenced by

its gradability: *I miss you more than you miss me*, and thus may admit to a similar analysis. But Morzycki’s analysis, built for gradable adjectives, will not import as easily to the other cases.

Morzycki does point out a parallel in the DP domain, though, following Horn (1972): the English EDM *absolutely* can also modify determiners as in *Absolutely every student received the homework*. Here, *absolutely* also seems to widen a domain, perhaps adding students one might not have immediately thought of: those in the bathroom, or home sick that day. Similarly, a modal like *MAYBE* is a quantifier, operating over a domain of possible worlds, which might be widened to include less likely worlds, such as those where baking a frozen pie could work as in (7).²

To capture all these cases, we propose that ‘fc’ applies directly to two domain variables like Morzycki’s perspective scales C . The surface domain of the NMM ‘fc’ is indicated by the overlines in examples (1) - (7). At LF, though, we assume that the ‘fc’ morpheme combines directly with two contextual variables within this surface domain. The standard and flat-chin LF structures for an adjective like *STRONG* are as follows, where C_{STRONG} and C_{STRONG}^+ are two contextual variables representing perspective scales for strength:

- (10) Standard: [#RUG [STRONG C_{STRONG}]]
 Flat Chin: [#RUG [STRONG [fc C_{STRONG}^+ C_{STRONG}]]]

With this structure in place, we assign ‘fc’ a very simple meaning:

- (11) $\llbracket \text{fc} \rrbracket = \lambda C^+ \lambda C : C \subseteq C^+ . C^+$

This meaning takes two scales (with the first, C^+ , presupposed to be a superset of the second, C) and returns the larger one, C^+ .

This definition immediately captures the simple domain-widening cases of quantifiers (3) and modals (7): the addition of ‘fc’ indicates that more students or more possible worlds are to be considered in the interpretation of these quantifiers. The analysis is also easily extended to closed-scale cases like (5) and (6). As Morzycki points out, widening a scale’s domain (a set of degrees) can also act to increase the precision, adding degrees between those originally available, instead of above or below the original degrees. For instance, if you originally consider 10 degrees of frozenness to be salient, *FROZEN* in (5), which chooses the top degree in its scale, might entail that the water is at least 90% frozen (within the top relevant degree). Without changing the top and bottom of the scale, you can still increase the number of salient degrees by adding degrees between these limits. For instance, if you were

² These cases where fc appears over a quantifier necessitate a domain widening account for fc, although fc shares many similarities with pragmatic intensifiers, such as the English *totally* (see Beltrama 2018).

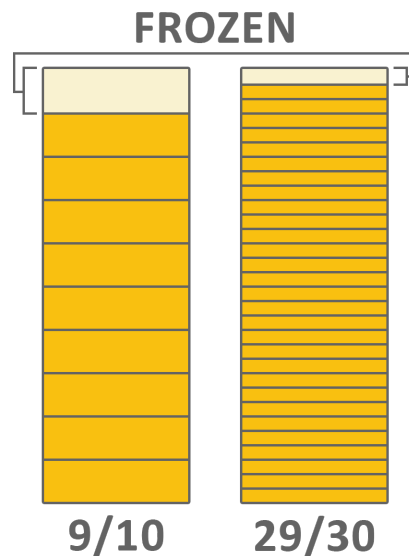


Fig 4: With 10 degrees of frozenness, 90% frozen might be enough to be considered frozen solid, but with 30 degrees of frozenness, the percent of freezing necessary shifts to 96.67%.

to expand the scale to 30 degrees of frozenness, FREEZE would entail that the water is at least 96.67% frozen (see figure 4).

For the other scalar cases, we propose a Gricean analysis: why would a signer use the more complex, ‘fc’ construction, widening the domain to C^+ , if the degree in question were already in the smaller domain C ? The pragmatics here is similar to that in effect for the following dialog:

- (12) A: Is he under 40 years old?
 B: Well, he’s under 45 . . .

B could have simply used the scale of ages provided by A’s question, namely those ages below 40 years old. But she chose instead to expand this scale up to 45 years old. Of course, if the man in question were 39, his age would be on both scales. However, by choosing to provide a new, expanded scale, B is implicating that his age did not, in fact, appear on the original scale, i.e., he was between 40 and 45.

Similarly, when ‘fc’ widens the domain for an adjective like STRONG, parallel reasoning would imply that the degree of strength is above the original domain C .³ For instance, the strength of the rug in (1) must be higher than expected for any standard (non-German-strength) rug. This pragmatic strengthening also explains

³ Note that while the new domain C^+ might well also contain new degrees *below* those in the original domain C , these will be ruled out, because they are necessarily below the contextual standard.

how 'fc' as a domain widener forms more informative statements in upward entailing environments: the restriction to new degrees adds more information.

5 Conclusion

Unlike many domain wideners thus far studied in spoken languages—which often have a more limited distribution—'fc' seems to be able to target just about any expression involving a domain. The simple, broad analysis we have provided above could in turn help explain cases of overlapping distribution of spoken language domain wideners, such as the two uses of *absolutely* mentioned above.

Furthermore, our findings here show that lower face NMMs have more functionality than previously acknowledged in the ASL literature; consequently, they merit further investigation as they can provide valuable descriptive and theoretical contributions to our knowledge of ASL and other sign languages as well as to our knowledge of modifiers more generally, especially given that we can more clearly observe the spreading—and thus the scope—of NMMs in sign language, whereas with speech we are more typically confined to the linear ordering of a modifier within a sentence. Additionally, the meanings of lower face non-manuals in general seem to involve manner adverbials or domains/scales. Further research would help to elucidate whether this is a true pattern, and might help to make commentary on research that has been done on similar adverbs in spoken language.

Many other questions also remain regarding flat chin and the lower face. Perhaps first and foremost, what is the difference between a domain-widening strengthener like fc, and a strengthener that maintains the same scale, such as English *very*? But also, are there any similar general-purpose domain wideners in spoken languages? Why or why not? Additionally, fc is often found in resultative constructions like (5,6); does it contribute to verbal aspect or merely complement existing scalar aspectual properties? Flat chin also appears on modals, as in (7), but what is the precise semantics in this case? There is much still to answer in future research, which will grow both our knowledge in ASL as well as more broadly our knowledge of domain widening.

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