

FACIAL EXPRESSION AS INTONATION IN ISRAELI SIGN LANGUAGE: THE CASE OF NEUTRAL AND COUNTERFACTUAL CONDITIONALS

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ABSTRACT

The present paper demonstrates that Israeli Sign Language (ISL), like most languages of the world, can systematically distinguish between neutral and counterfactual conditionals. Although in the sign language literature only neutral conditionals have been described in detail (Liddell 1980, Baker-Shenk 1983, Reilly, McIntire and Bellugi 1990, Wilbur 1996), my study shows that Israeli Sign Language is capable of making a distinction between the two types of conditionals. This distinction is expressed by means of a device peculiar to sign language: neutral conditionals are systematically associated with raised brows, and counterfactuals with raised brows together with squinted eyes. Facial expressions have been compared, in both function and patterning, to intonation in spoken languages (Sandler 1999a,b, Nespor and Sandler 1999). The results of this study provide strong support for this view. Independent facial components marking the two types of conditionals can re-occur in a wide and varied range of constructions in ISL, contributing distinct, albeit general, pragmatic meanings to the overall interpretations of the utterances. In this way as well, they behave very much like tones in intonational systems of spoken languages.

1 Introduction

The present study unites two fields of investigation: intonation and conditionals. Each of them separately is potentially of interest to linguists. Intonation in spoken language is important because it shapes all our communication and helps interpret its structure and meaning. Conditionals are of central interest as well, because these structures exist in all languages and play an important role in verbal reasoning. As noticed by Ferguson et al. (1987: 3), “[c]onditional [...] constructions directly reflect the characteristically human ability to reason about alternative situations, to make inferences based on incomplete information, to imagine possible correlations between situations, and to understand how the world would change if certain correlations were different.” These two independent areas of investigation turned out to be closely interrelated in sign language modality.

Neutral and counterfactual conditionals in Israeli Sign Language (ISL) are shown to be distinguished by different configurations of facial expressions, which have been argued to be parallel to intonational patterns (Reilly, McIntire and Bellugi 1991, Wilbur 1991, 1996, Sandler 1999a,b)¹. The system of facial marking shares the most essential

1 In this paper I refer only to facial expression that corresponds to intonation (namely, it distinguishes sentence types and expresses pragmatic functions), and not to other uses of facial expression such as obligatory components of lexical units, adverbial markings or mouth gestures.

characteristics of intonation. For example, Sandler (1999b) and Nespor and Sandler (1999) claim that, like intonational patterns in spoken languages, facial configurations in signed languages are componential in nature². That is, different co-occurring facial configurations contribute individual meanings to the general interpretation of the utterance. The results of the present study provide new evidence for this theory, since the coding system used in this study – FACS³ – made it possible to decompose the facial configurations of counterfactuals into two separate action units, which can be independently associated with other linguistic material.

Although the important role of intonation in the interpretation of conditionals has been acknowledged in spoken languages as well, it has only rarely been discussed in any detail. The present paper proposes to look at the distinction between neutral and counterfactual conditionals in Israeli Sign language from the perspective of the formal devices marking these types of conditionals, namely intonational patterns and their components. Investigating the role of different intonational patterns in marking the two types of conditionals sheds light on the principled and, supposedly, universal correlation between semantic and pragmatic properties of conditionals on the one hand and their form on the other. In the ISL case, brow raise alone is shown to be the most frequent signal of neutral conditionals, whereas counterfactuals are most often marked by the combination of brow raise and squint.

Thus, my research involves two simultaneous categorization tasks, one phonological and the other semantico-pragmatic. The semantico-pragmatic task involves the identification of those tonal building blocks from the inventory of superarticulatory primitives which make a distinctive contribution to conditional meaning/function, and the phonological task has as a goal the identification of formal characterization of the relevant, tonally cued interpretational features. The results of the phonological analysis will be only briefly reported in this paper due to the space limitations. The main focus here will be on the semantico-pragmatic contribution of the facial components to the conditional interpretations. In particular, I examine how aspects of form (that is, different superarticulatory components) map onto aspects of the interpretation of conditionals. I do this by isolating invariant meanings of the superarticulatory components mentioned above in a corpus with a wide variety of linguistic constructions.

2 The componentiality of grammatical facial expression in sign language was first noted by Coulter (1978). Nespor and Sandler (1999) specify this componentiality to be a distinctive feature of the linguistic facial articulations which are parallel to intonational patterns.

3 FACS stands for the *Facial Action Coding System* devised by Ekman and Friesen (Ekman and Friesen 1978). FACS is an anatomically based, descriptive system which specifies a set of 44 Action Units (AUs). Alone or in combination, these AUs are supposed to account for any observed facial movement. With a few exceptions, the Action Units have a one-to-one correspondence with single muscles as defined by anatomists. FACS also specifies a way of coding the intensity level of AUs, using the letters A, B, C, D, and E, going from lowest to highest on the intensity continuum.

2 Conditionals

As stated above, the goal of the present study is to describe and analyze different patterns of non-manual markers that are correlated with the two basic types of conditionals in ISL. Since ISL is a language in a different modality from the predominant spoken one, and a language whose grammatical structure has only recently begun to be described, it is important to begin this undertaking with a clear definition of the category to be analyzed. Furthermore, if conditionals comprise a natural class of linguistic phenomena, then the formulation of universally valid features of form and meaning will be aided by the accumulation of detailed descriptions in different languages and different modalities. To begin, I will define and delimit the category of conditionals and its two major subcategories in subsections 2.1–2.2. In Section 4, this categorization will be validated against the corpus of ISL conditionals, where it will be shown that the most essential conceptual properties of conditionals in this language are expressed through non-manual patterns. Finally, in Section 5, I will argue that the superarticulatory patterns marking neutral and counterfactual conditionals in ISL can be better analyzed in terms of the individual facial components contributing to resulting conditional interpretations.

2.1 Conditionals as a category

Mutual dependency between the two clauses of the conditional construction has been claimed to be the crucial characteristic of conditional sentences (Comrie 1986, Palmer 2001, Dancygier 1998, Ziegeler 2000). Predictive conditionals in (1) and (2) predict, in terms of cause and effect, the occurrence of one event on condition of another. That is, the cancellation of the picnic in (1) will take place only after the rain has begun. In other words, in predictive conditionals the consequent **is predicted to follow from satisfying the condition** expressed in the antecedent (Dancygier 1998, Palmer 2001:208). Thus, predictive conditionals represent the most prototypical type of conditional constructions which reflect "thinking steadily forwards" (Dudman 1984), where the link between the clauses reflects the dependencies between the real world events.

(1)

If it rains tomorrow, the picnic will be cancelled.

(2)

If it had rained, the picnic would have been cancelled.

It turns out that the relation of interdependence is the only thing that is asserted in prototypical conditionals, where neither the antecedent nor the consequent is asserted (Dancygier 1998:14). This is explained by Searle's (1969) discussion of the speech act of assertion. According to him, to assert means to express belief about a proposition (but not necessarily to believe it). In case of conditionals the presence of *if* in front of the antecedent clause signals that the speaker has reasons not to assert the propositions: s/he either does not have enough grounds to do so, or does not believe *p* to be true (Dancygier 1998). These two different epistemic reasons for the non-assertion are encoded in the two main types of predictive conditionals, namely neutral and counterfactual. The distinction

between them reflects different attitudes towards the fulfillment of the condition in the protasis.⁴

2.2 The nature of non-assertion in neutral and counterfactual conditionals

Neutral conditionals are so named because they do not express any attitude (either positive or negative) towards the fulfillment of the condition in the protasis; they do not make any predictions about its fulfillment or non-fulfillment (Dancygier 1998:30, 34). This means that the protases of neutral predictive conditionals present tentative assumptions, where no knowledge of any kind is presupposed. Nevertheless, these assumptions are used to arrive at the prediction of the consequences in the apodoses (Dancygier 1998:47). For example, in (1) above, the speaker does not possess any knowledge about the next day's weather, but can predict the cancellation of the picnic, provided his/her assumption about the rain is true. Thus, for neutral conditionals, unassertability stems from the fact that the truth value of the expressed propositions at the time of the speech event is indeterminate.

For counterfactual conditionals, unassertability emerges from the fact that the truth value is inconsistent with what is known to have actually been the case (Jacobsen 1999:83). That is, in the case of counterfactual conditionals, the reason for the non-commitment lies in the speaker's awareness that the underlying proposition of the uttered counterfactual is contrary to known facts. Thus, the widely accepted definition of counterfactuality in conditional constructions states that it will obtain when the proposition contained in the protasis, or antecedent clause, is presupposed to be false (Lewis 1986). This characteristic has been usually illustrated with sentences like (3), where it is presupposed that he did not attend the classes.

(3)

If he had attended the classes, he would have passed the exam.

Different tenses have different interpretations. The past verb forms in English counterfactuals seem to point to the accessibility of the factual basis, which is absent from neutral conditionals with future reference like (1) above. As has been noted by Dancygier, the verb forms indicate that the speaker, while producing a counterfactual sentence, already has in mind other assumptions which contradict the assumption expressed in the protasis (1998:50). As a result, the speaker does not commit him/herself to the proposition expressed in the counterfactual. In other words, counterfactuals "are predictions made in spite of knowledge to the contrary" (Dancygier 1998:50). For example, in (3) the speaker predicts a person's success at the exam on condition of attending all the classes, even though s/he knows that in reality this person did not attend all of them. This means that the counterevidence for the proposition expressed in the counterfactual is accessible for the speaker, and should also be made accessible to the addressee.

Thus, the basis for the abstraction from reality associated with making a counterfactual statement is reality itself, and the stronger the evidential basis for assuming real facts, the stronger the prediction to the contrary to what is known (Ziegeler 2000). Since

4 The protasis of the conditional construction is the clause containing the condition; the apodosis is the clause containing the consequence of the fulfillment of condition.

this principle is pragmatic, it has been claimed by Ziegeler to be cross-linguistically valid. In other words, we can expect it to be realized in counterfactuals of different languages with the help of the grammatical means available to those languages (and not necessarily as tense used in English). What means are used by ISL, a language that does not have overt tense markers (Meir and Sandler 2004), and whose verb morphology, though complex, does not signal conditionality? Under these circumstances, a greater load is to be placed on other grammatical and contextual factors that signal the accessibility of counterevidence to the prediction made in the counterfactual conditional. This paper will show that ISL is capable of making a distinction between the two types of conditionals by means of a device peculiar to sign language: facial expressions.

3 Intonation in sign language

Sign language linguists' interest in grammatical facial expressions started in the late 1970s-early 1980s with Liddell's (1978, 1980) groundbreaking work on American Sign Language syntax. He was the first to systematically describe and analyze a range of facial expressions for different structures: yes-no questions, negation, assertion, restrictive relative clauses and topics. He was also the first to notice the most essential characteristics of grammatical facial expressions: their systematicity and requiredness, as well as their temporal co-occurrence with the linguistic constituents of the manual string. For example, Liddell (1980) identified raised brows, a backward head tilt, and raised upper lip as a non-manual marker of relative clauses, which co-occurred with the manual string of the relative clause, as illustrated in (4):

(4)


 WOMAN FORGET PURSE RECENTLY ARRIVE

'The woman who forgot the purse just arrived'

(Liddell 1980:21)

For Liddell, the distribution of non-manual signals served as a manifestation of the syntactic structure of subordinate clauses. In the case of ASL relative clauses this meant that the alignment of the non-manuals with the relative clause and its head made Liddell argue for the head-internal structure of this type of clause (Liddell 1980:127-153). The syntactic view on the role of facial expressions in sign language was further developed by many other linguists, for example, by Petronio and Lillo-Martin (1997) in their study of wh-questions. Under this approach various analyses of the distribution of non-manuals rest on the theoretical assumption that non-manual marking in sign languages is a direct reflection of syntactic structure (Aarons et al. 1992, Neidle et al. 2000).

Recently though, the strictly syntactic view on facial marking has been reconsidered in the light of the evidence that this marking has characteristics of intonational system (Reilly, McIntire and Bellugi 1990, Wilbur 1991, Sandler 1999a,b, Nespor and Sandler 1999, Sandler and Lillo-Martin 2006). In order to avoid the vocal connotation of the term "intonation", a new term, superarticulation, coined by Sandler (1999b) for the compara-

ble sign language system, is adopted here. Nespor and Sandler (1999) and Sandler (1999b) went on to argue that facial expressions are compositional. The authors follow Pierrehumbert's (1980) autosegmental theory of intonational structure, which describes tunes in spoken languages as sequences of low (**L**) and high (**H**) tones. Pierrehumbert's analysis of intonational structure suggests that intonational meaning is compositional, where each component of the tune contributes its meaning in accordance with its interpretation scope (Pierrehumbert and Hirschberg 1990). Like tones in spoken languages, individual facial movements in sign language can combine with each other, each one contributing its distinct meaning to the general interpretation of the utterance (Sandler 1999a,b, Nespor and Sandler 1999).

Sandler (1999b) illustrates the componentiality of superarticulation by providing examples of individual non-manual markings and then showing their co-occurrences in ISL. Below only one example of the possible combinations of various facial articulations is presented (Sandler 1999b:208-209)⁵. Figure 1 displays a typical wh-question marked by frown and forward head position. Figure 2 shows the facial articulation (squint) which signals that the constituent contains information marked as shared between interlocutors. In the end, the two distinct articulations co-occur⁶ in wh-question containing the constituent with shared information status (Figure 3). In this case frown and forward head position of wh-question combine with squint of "shared information" on one and the same prosodic constituent.



Figure 1: wh-question

frown
'Where is the house?'



Figure 2: shared information

squint
'The house we were talking about is here'



Figure 3: wh-question + shared information

frown+squint
'Where is the house we were talking about?'

In this paper, which is part of a larger study (Dachkovsky 2005), I support the intonational view, and show that the non-manual combinations can be further broken down into individual units with general meanings. I show that each facial component in neutral and

5 The examples in the figures are spontaneously signed ISL sentences translated into English.

6 The detailed discussion of the co-occurrence of non-manual marking with linguistic constituents is beyond the scope of this paper. The interested reader can be referred to my thesis work (Dachkovsky 2005), where my own detailed measurements of the non-manual timing in relation to prosodic constituents are provided.

counterfactual conditionals is associated with invariant meaning that characterizes other structures as well. Behavior of this kind is argued to support an intonational account of grammatical facial expression.

4 The study

4.1 Methodology

The main method of data collection in the present study is elicitation. Although there are limitations imposed by this way of collecting data, it provides a good starting point for the investigation of a language that linguists have begun to study only recently. At the same time, judgments and comments obtained from native ISL consultants provided valuable insights into the status and function of the non-manual and manual behavior in the data.

Intonational studies with fictive examples, based on speaker's or researcher's intuitions about constructed test sentences, are frequently found in spoken language research (Bartels 1999). Other researchers in the field of intonation prefer to elicit data from a few to several subjects, a practice I follow here (e.g. Cerrato and Imperio 2003). Specifically, analysis is based on data produced by five native signers, in an effort to control for individual variation.

The corpus of sixty elicitation sentences including nine neutral conditionals and nine counterfactual conditionals was presented to the subjects, all native signers of ISL. The rest of the elicitation sentences served as fillers, or distracters, in the sense that they were not conditional sentences. Instead, the other items included sentences which were considered likely to elicit the individual facial action units – brow raise and squint -- which together make up the prototypical facial expressions of counterfactuals. This was done in order to determine whether the individual action units correspond to invariant meanings in these environments. Each sentence was presented on a separate card, in order to avoid a prosodic list effect in producing the sentences. Elicitation sentences were presented to the subjects in Hebrew with some context provided in brackets. Below I give an example of a typical elicitation card with transliterated Hebrew counterfactual, glossed and translated into English.

(5)

(Kvuzat kaduregel ifsida ba miskhak.)
(Team football lose-Past in-the game)

Im ha-shoar ha'a tofes et ha-kadur, hem ha'u menatskhim.
If the-goalkeeper be-Past catch-Pres Acc the-ball, they be-Past win-Pres

(The football team lost the game.)
If the goalkeeper had caught the ball, they would have won.

Incorporating coding categories developed by Baker (1976), Baker and Padden (1978), Baker-Shenk (1983) and Nespov and Sandler (1999), all movements and positions of the signer's face, eye gaze, head, torso/ body posture, and hands were coded separately for various parameters. Ekman and Friesen's (1978) Facial Action Coding System (FACS)

was used to code numerically all facial behavior for each speaker. Hand movements were coded for the duration of a sign, reiterations of signs, holds and pauses (i.e., relaxation of the hands) in signing.

4.2 Results: superarticulatory properties of neutral and counterfactual conditionals

Two distinct patterns of non-manuals emerge from coding and analyzing the data systematically associated with neutral and counterfactual conditionals. Specifically, neutral conditionals are systematically associated with brow raise, forward and downward movement of the head, and in many cases, wide eyes. Counterfactual conditionals, in addition to the non-manual signals mentioned above, are typically also marked by squint. The establishment of the superarticulatory patterns associated with the types of utterances seems to contradict the main claim of this thesis, that grammatical facial expressions represent intonational rather than syntactic patterns. However, as I will explain below, a pragmatic/intonational analysis is more successful at explaining the empirical findings.

4.2.1 Neutral Conditionals

There were 33 examples of neutral conditionals in sentences that were judged by native ISL consultants to be felicitous. The IF conjunction introducing the conditional clause is optional in ISL as in other sign languages (Baker and Padden 1978, Liddell 1980 for ASL; Campbell et al. 1999 for BSL). It occurs in 25 out of 33 neutral conditionals, approximately 78% of the ISL sentences. Neutral conditionals in ISL, exemplified in Figure 4, are characterized by a particular pattern of non-manual behavior, broken down into action units in Figure 5.



Figure 4: Typical superarticulatory array of neutral conditionals

Figure 5 demonstrates that brow raise (AUs 1+2) and wide eyes (AU 5) are the most frequent facial expressions that mark protases of neutral conditionals. The former is present in all 33 exemplars – 100% – and the latter in 27 (82 % of the cases). The superarticulatory array for the protasis in neutral conditionals is also marked by a downward and forward head position (AU 54 and AU 57 respectively) in 30 sentences, 91% of neutral conditionals in the corpus. Unlike the other action units associated with neutral

conditionals, which were aligned with the entire intonational phrase⁷ with which they were associated, the forward head position does not characterize the whole intonational phrase, but rather starts and intensifies closer to the end of the protasis.

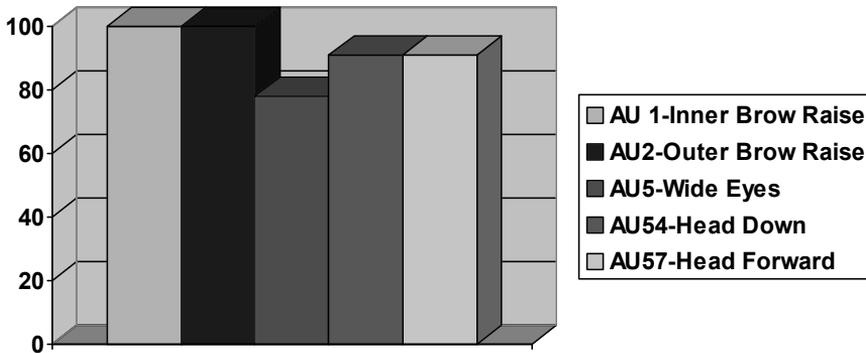


Figure 5: Facial Action Units of the protasis of neutral conditionals

4.2.2 Counterfactual Conditionals

There were 39 felicitous exemplars of counterfactual conditionals in the corpus. As in neutral conditionals, the lexical sign IF is common but optional, occurring in 33 exemplars (85%). The lexical sign itself is the same as in neutral conditionals. Figure 6 illustrates the typical superarticulatory array marking the protasis in ISL counterfactual conditionals. This array is clearly different from that occurring in neutral conditionals, as shown in Figure 4.



Figure 6: Typical superarticulatory array of counterfactual conditionals

⁷ According to Nespor and Sandler (1999), intonational phrase is often associated with certain syntactic constituents: parentheticals, nonrestrictive relative clauses, topicalizations and other extraposed elements. In more general terms, intonational phrase is equivalent to one breath group in spoken languages. In signed languages intonational phrase is characterized by blink, change in head position and facial expression at its boundaries. The last sign of the intonational phrase is often reduplicated or held, or it is followed by a pause.

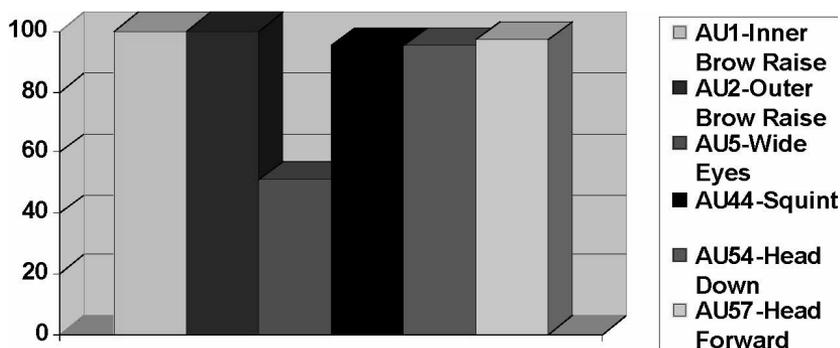


Figure 7: Facial Action Units of protasis in counterfactual conditionals

The main facial articulations of counterfactuals are brow raise (AUs 1+2), and squint (AU 44). Brow raise is present in all 39 exemplars (100% of the utterances), and squint appears in 37 counterfactuals (95%). Widened eyes appear in 20 exemplars (51%), which is much less frequent than in neutral conditionals. The head moves forward (AU 57) in 38 counterfactual protases (97.4 %) and downward (AU 54) in 37 (94.8 %). As in neutral conditionals, these head movements appear and get intensified closer to the end of the counterfactual protases.

These results demonstrate that neutral and counterfactual conditionals in the ISL data are marked by different constellations of non-manuals, where squint makes counterfactual conditionals distinct from neutral ones, and brow raise is the most frequent facial component for both types. Although sentence types strongly correlate here with intonational patterns, I will argue below that this co-occurrence is indirect, and that the systematic patterns are more directly tied to pragmatics.

5 Discussion: Interpreting the Facial Components of ISL Conditionals

In this part of the paper I will establish the invariant meanings of the individual facial components involved in the superarticulatory arrays of neutral and counterfactual conditionals, and will try to explain in what way they contribute to the interpretations of both types of conditionals. Adopting Grice's (1975) theory of pragmatics, the meaning of the superarticulatory components, like that of tones in spoken languages, can be given a pragmatic explanation. According to Grice, 'be cooperative' and 'be relevant' are general Maxims that underlie any successful communication. An approach to intonational meaning that incorporates principles such as these will be adopted here, since perceived speaker-assumed listener assumptions, rather than syntactic or semantic properties, are reflected in the intonational patterns (Gussenhoven 1984, Bartels 1999). Pierrehumbert and Hirschberg (1990), and Gussenhoven (1984) also argue that each intonation unit (tone) shows stable basic meanings regardless of intonational, syntactic or lexical environment.

Pierrehumbert and Hirschberg (1990) suggest that various meanings and interpretations ascribed to different intonational tunes are actually deduced from the general mean-