Use of Nonmanuals by Adult L2 Signers in Swedish Sign Language – Annotating the Nonmanuals

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Abstract

Nonmanuals serve as important grammatical markers for different syntactic constructions, e.g. marking clause types. To account for the acquisition of syntax by L2 SSL learners, therefore, we need to have the ability to annotate and analyze nonmanual signals. Despite their significance, however, these signals have yet to be the topic of research in the area of SSL as an L2. In this paper, we will provide suggestions for annotating the nonmanuals in L2 SSL learners. Data is based on a new SSL as L2 corpus from our ongoing project entitled "L2 Corpus in Swedish Sign Language." In this paper, the combination of our work in grammatical analysis and in the creation of annotating standards for L2 nonmanuals, as well as preliminary results from the project, will be presented.

Keywords: Swedish Sign Language, L2 signers, nonmanuals

1. Introduction

In SSL, nonmanuals serve as important grammatical markers for different constructions, in particular with respect to the syntax required to mark negation and distinguish between different clause types (e.g. wh-questions and relative clauses). General L2 theories, such as Processability Theory (Pienemann, 1998), normally count syntactic structures as one of the most difficult grammatical stages to acquire for L2 learners of any language. We assume that SSL provides no great exception to this. To account for the acquisition of syntax by L2 SSL learners, therefore, we need to have the ability to annotate and analyze both the nonmanual signals and the manual ones within different syntactic constructions.

For signed languages, use of the nonmanuals by L2 signers has, to some extent, previously been studied in ASL (McIntire & Reilly, 1988; Emmorey, Thompson, and Colvin, 2009). However, these signals have never been the topic of research in the area of SSL as an L2. Nor has research been based on data from any L2 sign language corpus. Thus, a suitable method of annotating nonmanual signals used by adult L2 learners of Swedish Sign Language (SSL) is needed. A first step toward annotating and analyzing some aspects of grammatical errors in SSL as an L2 provides annotation suggestions for other L2 corpora.

In our first study of the data from the "L2 Corpus in Swedish Sign Language" (Mesch & Schönström, forthcoming), we propose to analyze the use of syntactic constructions. The analysis therefore includes the analysis of nonmanuals. So far, longitudinal data from four informants totaling 91 minutes have been analyzed at this stage. This paper presents some suggestions on how to annotate L2 outcomes and on how to combine these with L2 analysis, i.e. grammatical analysis with a focus on nonmanuals.

2. Building L2 Corpus in Swedish Sign Language

The first part of the L2 corpus - dataset collections 1 and 2 - consists of video recordings from 18 (14 female and 4 male) non-native signers, ranging from 18 to 40 years of age (Table 1). These L2 signers are from the central part of Sweden (11), the southern part of Sweden (3), and other countries (4). Of these, ten studied earlier at the university level, while eight had not studied at any university or college before enrolling our sign language and interpretation B.A. program. With respect to their linguistic background at the onset of the project, 11 had studied SSL for only three or four weeks, four had studied for four years, two for two years and one for five years. Only four of the students reported having a deaf friend or family member.

Age group	
18-20	5
21-25	7
26-40	6
Total	18

Table 1: Informants from the two first data recordings of "L2 Corpus in Swedish Sign Language"

We based the starting point for data collection on earlier experiences creating the SSL Corpus (Mesch et al. 2012; Mesch & Wallin, under review). The recording studio at the Department of Linguistics, Stockholm University is already equipped adequately for the SSL Corpus project. Each participant was filmed using five cameras (three cameras on floor and two cameras for a bird's eye view) in Figure 1. We created cut-outs of the face view for analysis of non-manuals and face gestures. However, we adjusted our elicitation method according to the L2 context. The data collected so far consists of:

1) Dialogues through interviews in specific target domains (e.g. family, local environment and interests) linking to appropriate L2 stages according to the Council of Europe's Common European Framework of Reference for Languages (CEFR).

2) Picture descriptions, including a single picture from the story "Frog, Where are you?" and selected pictures from the Volterra picture elicitation task (Volterra et al., 1984).

3) The retelling of a short movie clip from "The Plank".

We later added an imitation task. We propose to continue our data collection with the current group, and to collect additional data as new group of students enroll in our SSL programs.

Figure 1: The five camera views used at the recordings

All of the L2 corpus material from dataset collection 1 (53 video files) and dataset collection 2 (74 video files) has been edited and will be partly annotated using ELAN software (Crasborn & Sloetjes, 2008). A portion of this work will be made accessible online to researchers in the near future. Some video clips have been selected from the corpus as a pilot study for annotation and analysis of nonmanuals. Similar L2 corpus projects with parallel data collection are being conducted on Irish Sign Language at Trinity College Dublin, Ireland, and on American Sign Language in University of Illinois at Urbana-Champaign, USA. Thus the SSL L2 corpus can be used not only for the analysis of Swedish Sign Language, but also for comparison between L2 learners across unrelated signed languages.

3. Combining L2 analysis with annotation of the use of nonmanuals

The analysis components were twofold and linked to the annotation methods. An interlanguage analysis was carried out in combination with an error analysis of nonmanuals. Here we focused on the grammatical use of nonmanuals. In this analysis, we then focused on eyebrow

movement and mouthing particularly. In an L2 research context, an analysis of language production is an important tool to have in order to account for the interlanguage of L2 learners. In our study, we therefore adopted an analysis based on an interlanguage perspective of L2 structures (see e.g. Selinker, 1972) along with error analysis. In our interlanguage analysis we marked the use of the nonmanual markers regardless of whether they were target-like or non-target-like, i.e. correct or error. Then, we used the standard tiers for eyebrow movement and mouthing. These were accompanied by an error tier in which we marked whether errors occurred (in the form tier and type tier, respectively), i.e. we presented the results of error analysis.

In this way we can account for which syntactic structures the learners have acquired and which they have not. From a longitudinal point of view, we are then able to find L2 developmental pattern in later recordings.

4. Building an annotation tool for L2 analysis

During the first analysis of the data, we have been working with the issue of how to annotate nonmanual markers in SSL, i.e. mouthing and eyebrow, gaze and head movements. We have attempted to find methods for annotating the nonmanuals, annotating L2 errors, and annotating both of these together. This will be an important issue with respect to future collaboration, i.e. sharing our L2 corpus with other researchers for cross-linguistic comparisons.

Of crucial importance are an appropriate analysis tool and an annotation standard that enable the sharing, comparing and understanding of data. In our work, we have focused on creating a working standard for annotating these L2 nonmanual markers. However, they need to be linked to the manual ones. We decide to create tiers exclusively for L2 issues for manuals and nonmanuals. (Figure 2)
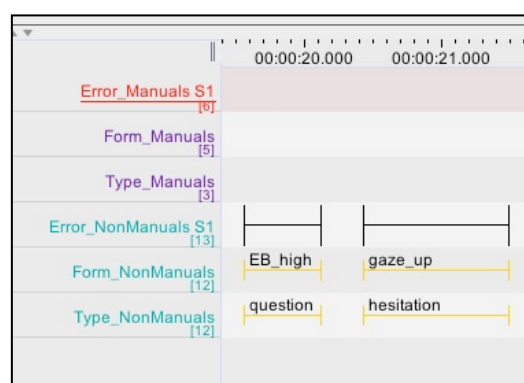

Figure 2: The error tiers for manuals and non-manuals

Each tier (manual and nonmanual) has child tiers in which there are two subcategories: one related to error forms, and another one related to error types. (Figure 3)

Figure 3: The nonmanual error tier

5. Creating tiers and error annotations

The analysis of the nonmanual markers is divided into two parts. The first part is connected to the use of nonmanuals generally. Here we focus on interlanguage analysis, in which we mark all the grammatical use of nonmanuals whether they are correct or not. At this stage, we have focused on use of eyebrows and mouthing. The second part deals with error analysis, in which we mark errors and, at the analyzing stage, possible errors.

5.1 Interlanguage analysis: The eyebrow and mouth tiers

Here the use of eyebrows by learners is annotated. Eyebrows play an important role in the syntactic structure of SSL. Raised eyebrows have several functions, marking, e.g. topic, y/n questions and relative clauses, whereas lowered eyebrows indicate wh-questions (Bergman, 1984).

With respect to mouthing, we decided to not include these movements in the error-form tier. Usually mouth actions are annotated as mouthings (Swedish-borrowed), mouth gestures or other mouth actions (see Crasborn et al. 2008). We expect L1 transfer among L2 learners using Swedish mouthing to a greater extent. But due to the great variability that is possible for different mouth actions, it is in some cases difficult to identify a mouth error on the basis of a single use, except for the most deviated ones, which are mouth gesture errors. These are marked as *mouth_g* in the error-form tier. Principally, this analysis follows the same standards for tiers and annotations that are implemented in the Swedish Sign Language Corpus (Wallin & Mesch, 2014).

5.2 The error analysis

In the area of general L2, error analysis is a commonly used method. At the same time, it has been subject to criticism. Our view is that this analysis provides an understanding of what errors are common among L2 learners, which can contribute to an overall understanding of the L2 learning process, along with the interlanguage analysis. This fits with our aims related to the SSL as L2 corpus project.

At this stage, while annotating the errors or the entities considered to be errors, we use a relatively broad definition of error, i.e. non-target-like constructions that differ from those in the target language. Deviations and errors, including potential errors, were marked in the analysis. These will be subject to future analytical work aimed at refining and differentiating these marked errors depending on the goals and purposes of the user.

5.2.1. Error forms

Error forms refer to L2 errors made by the learner. Here we focus on form, i.e. what is wrong? We mark forms that are errors, for instance, eye gaze, as well as eyebrow, mouthing and head movement, including a marker for non-use of nonmanuals that indicates omission.

5.2.2. Error types

Error types deal with the type of error being made. Here we use terms from the area of L2 acquisition, i.e. those related to L2 strategies, for instance, overgeneralization, overuse, simplifiers, and omissions.

6. Preliminary results

As this project is ongoing, no striking results have been found yet regarding the use of nonmanuals among L2 signers. However, several observations have been made. First, the grammatical use of nonmanuals, i.e. marking syntactic structures, is relatively limited among L2 learners at this stage. Second, most of the nonmanual behavior is related to universal human expressions.

Regarding gaze fixing, our data shows that L2 SSL learners are likely to frequently shift the gaze away from the addressee, as were observed in Emmorey, Thompson and Colvin (2009). Also we found that universal facial expressions are used to a greater extent among L2 learners, as been observed in previous research (McIntire & Reilly, 1998).

Moreover, we observed omissions of raised eyebrow in wh-questions in our data. There were examples in our data in which our subjects (L2 learners) did not raise the eyebrow in order to indicate, e.g. wh-questions non-manually (while using wh-adverbials manually). In the target language, SSL, raised eyebrow movement is required to mark wh-questions together with the use of a wh-adverb.

In our analysis, non-linguistic behavior such as hesitations and focusing are also annotated, in particular when they affect linguistic outcomes. L2 learners largely rely on focusing on how to pronounce some signs or constructions while turning their gaze away from the addressee. Another common behavior includes hesitations performed by raising the eyebrow like a hesitated question, expressing "Am I signing this correctly?" in the middle of the task.

We assume this tier to be a flexible and open one depending on research questions and what one wants to analyze.

7. Discussion and conclusions

In an L2 analysis environment, one can expect greater variability than in L1 texts. This is not only with regard to linguistic signals but also with respect to gestural ones. This pertains to human communication. An L2 learner who does not master the L2 fully produces hesitations, pauses and so on. Nonmanuals serve as channels for linguistic signals as well as gestural expressions. As a researcher, it is a challenge to keep these components apart. Sometimes these non-linguistic signals, in fact,

merely interrupt the flow of utterances, while others in fact contribute to linguistic errors. Over time, increased experience in annotating L2 data will lead to a better overall picture of how to treat these markers and the dynamic variability among L2 learners.

Future comparisons using our control group, which consists of native signers, could also contribute to a better understanding of how L2 learners use nonmanuals and how to annotate them.

In future work, we propose to describe the acquisition of syntactic structures. A description of the use of the nonmanuals, in particular eyebrow movement, is therefore determinant along with the appropriate method of how to segment text in macrosyntagms or an equivalent concept, i.e. t-units, and finally the manuals.

7.1 Limitations
With respect to the accounts regarding the use of nonmanuals by L2 signers, the amount of data analyzed in this study is still relatively small at this stage. More data is needed before substantial results can be presented as well as for the annotations to be standardized.

8. Acknowledgements

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