Towards decoding Classifier function in GSL

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Abstract

Here we will present work based on a corpus specially designed and elicited in order to provide data for the study of classifier function in Greek Sign Language (GSL). Data elicitation was based on presentation to informants of a series of stimuli which lead to utterances entailing the set of classifier functions met in the language. The whole set of video recorded data were annotated in order to provide an appropriate corpus for the investigation of classifier instantiations. Annotation work was complemented by the use of a search tool, external to the ELAN environment, that allows to create a data base of annotated video clips by exploiting the set of classification features used to annotate the video recorded data. Theoretical analysis of the so created linguistic data supported the formulation of a proposal for classifier behaviour which differentiates among three distinguished grammar functions based on the property of classifiers to act as semantic markers that create semantic classes of objects sharing common semantic features.

1. Introduction

Video storage of .linguistic data has allowed for the application of corpus based approaches to linguistic analysis, which are only recently been made possible.

In this paper we propose an analysis of GSL classifiers focusing on the realisation of Classifier Predicates (CP) as distinct pronoun morphemes, albeit attached as clitics to the base morpheme denoting the predicator (the "verb") of the CP. The use of classifiers is predominant in GSL, similar to other known SL systems. In the current study, we focused on identifying all instantiations of classifier function in the GSL system, in order to support a theoretical account covering the spectrum of classifier uses, spanning from their appearance as bound morphemes of semantic class on base signs, up to bounding elements in co-indexing. To serve the theoretical study, a special corpus has been elicited and properly annotated. The current study was triggered by the lack of a systematic definition of classifier use in GSL, and became necessary in the framework of a grammar model for the theoretical analysis of the language.

2. Classifier corpus elicitation & annotation

2.1 Corpus elicitation

In order to collect appropriate data for the reported study, a purpose-driven set of visual stimuli to be presented to natural signers was created (figure 1). The stimuli were divided to three categories. The first category was composed of pictures of a) human beings executing specific actions or having specific body postures, and b) arrangements of objects of varying shapes and sizes, either grouped according to shape similarity or following spatial arrangements of geometrical nature. The second category of stimuli entailed the task of narration of different stories on the basis of sets of pictures triggering the use of classifiers during signing of depicted action. The third category involved cartoon animation, which after been watched, the signers were asked to provide a detailed summary of the displayed action. Each informant was presented with the same complete set of visual stimuli and was video recorded while signing the related tasks. The so elicited data provided a corpus which contains significant instantiations of classifier use in GSL. In order to exploit the material of the corpus, an annotation procedure was applied, as described next.

2.2 Corpus annotation

The content of the video corpus produced through the above mentioned elicitation method was annotated according to the following four annotation tiers (figure 2):

a) "Discourse Unit": in this tier we annotated the content of the video, clustered into ample categories, which correspond to the visual stimuli provided during the elicitation procedure, i.e. "various types of tables", "various types of cups" etc.

b) "CP_MAX": in this tier we have marked the maximal CP signed by the informant. This is a subunit of the "Discourse Unit" tier and refers to the immediate semantic content of classifiers used in signing utterances, i.e. "round tables of different size", "pipes of different dimension" etc.

c) "CP_GLOSS": this is the tier mostly exploited in our study at the current stage of research work. Each sign phrase annotated with a "CP_MAX" value is split into its respective constituents; the latter being values for "CP_GLOSS", which may correspond to either signs or classifiers, including annotation strings such as "table", "round", "SIZE" etc to indicate the related semantic content.

d) "HS": in this tier font symbols indicate the handshape or handshapes involved in the signing of each "CP_GLOSS", i.e. "D", "L", "b" etc.

These four tiers provide the necessary information to group pieces of data as to the different classifiers and classifier functions met in GSL. Our interest focuses on the ability of classifier morphemes to a) create new lexicon items when combined with individual signs, b) add qualitative/quantitative values to entities, and c) serve

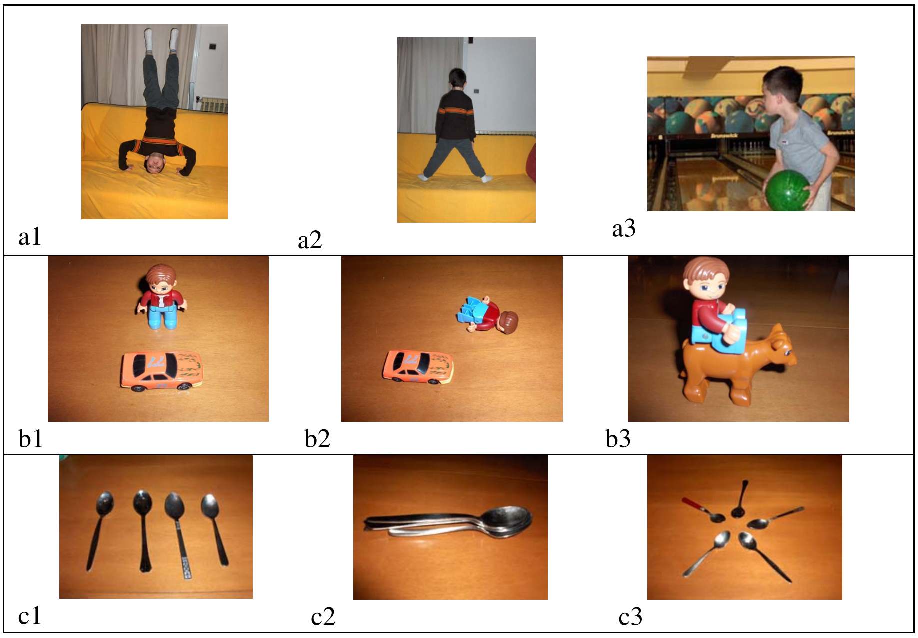

Figure 1: Sample of visual stimuli for the elicitation of the corpus

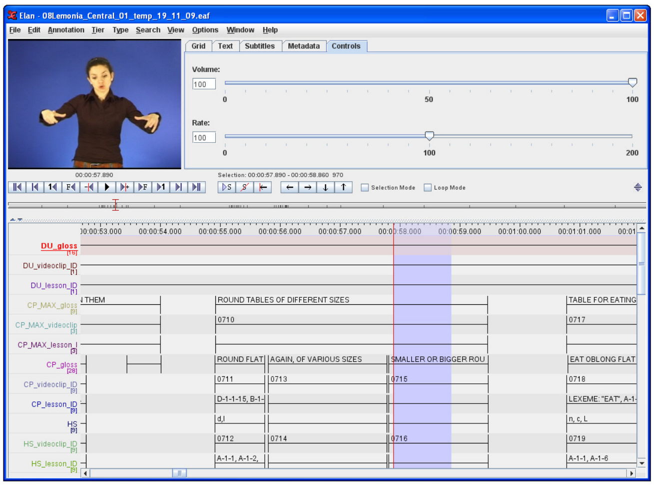

Figure 2: Corpus annotation

co-indexing within phrase utterance.

In order to apply annotation markings which would reveal classifier functions, prior to annotation work, a coding scheme based on four major categories of attributes was adopted. The annotation categories -coded as A, B, C, D followed by 2 up to 4 digits to indicate specific subcategories- were used for the annotation of the "CP_GLOSS" tier, when the latter involved a classifier rather than an independent lexical item. The four annotation categories are sketched below:

A: a rough ontological division was made into human and non-human entities. In this respect, the coded categories A-1 correspond to different kinds of objects, their description relying merely to their shape, while the A-2 categories refer to humans and the respective subcategories to parts of the human body.

B: it describes the relevant position of an entity. Subcategories B-1 describe static relevant positions (in front of something or someone (sth/smn), on top of sth/smn, etc), while subcategories B-2 refer to positions that describe the simultaneous presence of another entity (i.e. lining up behind others, following sth/smn, etc). Subcategories B-2 are used in annotation in those case where the signer makes use of both hands; a condition that is not prerequisite for the B-1 case.

C: it describes the relevant movement of an entity (i.e. downwards, upwards, back and forth, etc.).

D: it entails descriptions of size relative to shape. This category directly relates to category A, as the iconicity properties of the signed entity which incorporates a classifier, are those dictating the way "size" has to be signed in each case.

In the early stage of the research, the total number of quantised subcategories to be used in annotation reached up to 60. In order to fully define each classifier instantiation, several of annotation subcategories were attributed to one classifier entry. This unavoidable option for annotation has proven less efficient as annotation process progressed since it became hard to manage the

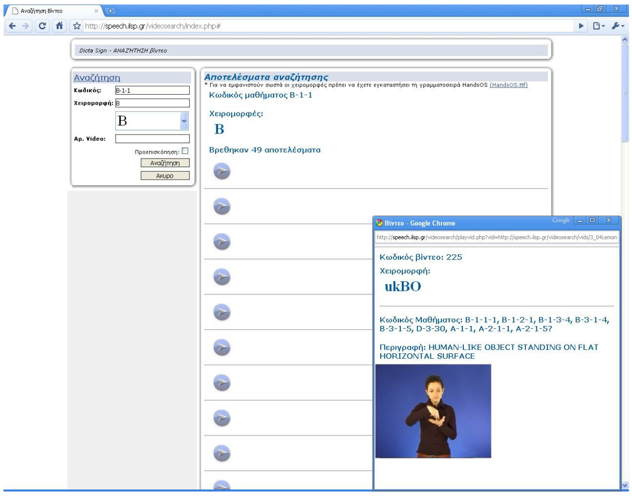

Figure 3: Video Search Tool. Result of a combined search for two annotation codes with retrieved video clips listed. Presentation of a selected item on superimposed window on the right hand side

coded content of the annotated linguistic data.

In order to exploit the patterns of overlapping categories and eventually eliminate redundant ones, we complemented our annotation work with the use of a search tool external to the ELAN environment.

3. Annotated corpus search tool

The annotations search tool is a web based application accessible by http://speech.ilsp.gr/videosearch/index.php. The tool allows extraction of video parts annotated for "CP_GLOSS" values and their storage as individual videos clips. The tool provides for three search options:

a. Code: with this search option the user executes simple or combined searches for videos containing one or more annotation codes (i.e. A-1-1, B-2-2). The search result is a list of the videos annotated for the searched code(s) (figure 3).
b. Handshape: the search tool facilitates combined search of annotation codes and the handshapes used in classifier formation. This is particularly helpful as the information of the handshape of a Classifier can disambiguate seemingly similar videos and indicate errors during the annotation procedure.
c. Video Clip ID: each video clip has a unique identifier number; this search field allows the user to retrieve individual clips that may have caught his/her attention and compare them to one another.

The search tool has proven to be a valuable asset for the present study as it facilitated identification of the characteristics of classifiers, which led to a considerable narrowing down of the initial 60 annotation subcategories, also accelerating the annotation process.

4. Grammatical functions of classifiers

Studies of the syntactic structure of SL utterances reveal systematic patterns. Our corpus-based study of the Greek Sign Language (GSL) in particular (Efthimiou and Fotinea, 2007), which utilises the data of the GSL video corpus of ILSP, indicates that GSL utterances can be analysed as surface realisations of recurrent underlying syntactic structures, in which head morphemes with well defined grammatical function are placed in standard positions in a string-like order (Efthimiou, 2008).

The theoretical linguistic study of classifiers builds upon and expands on previous work (Sutton-Spence and Woll, 1999; Berenz, 2002; Efthimiou et al., 2008), being especially concerned with the satisfactory treatment of the so-called Classifier Predicates (CPs) of SLs within theoretical-linguistic frameworks of analysis (Cogill-Koez, 2000), which have historically evolved in parallel with the study of spoken languages.

A problem posed by the second fundamental Saussurean principle of linguistic analysis is that of the Arbitrariness of the Sign: Classifier Predicates utilise standard handshapes (the so-called "classifiers") to directly denote certain salient geometrical properties of the referents referred to by the nominal arguments of two- and three-place SL predicates. In other words, the signal (the handshape) denoting the signified concept (the geometrical property of the referent) is highly motivated (to a certain degree, non-arbitrary) in terms of physical resemblance. The element of iconicity is very strongly present in the signals realising CPs, and, indeed, far more strongly so than in the signals realising the nominals which refer to the real-world objects and whose relationship is denoted through the semantics of the predicator. This latter fact has led certain linguists to characterise SL signs corresponding to concepts which a spoken language would signify by a concrete noun as "frozen" (Cogill-Koez, 2000).

To complicate matters further, the direction of movement within signing space of classifier-handshapes realising/participating in CPs is a direct spatial metaphor of the physical relation between the referents denoted by the nominals realising the arguments of the predicate. More specifically, the position and the direction of movement of the classifier-handshapes with respect to the position of the signer's body is a direct spatial metaphor denoting the θ-roles (e.g. agent, recipient, location, etc) performed by the nominal arguments.

Theoretical analysis of the linguistic data available in the classifier elicitation corpus (2.1 above), supports formulation of a proposal for classifier behaviour which differentiates among three distinguished major grammar functions (Efthimiou and Fotinea, to appear).

Based on the key role of classifiers to behave as semantic markers which create semantic classes of objects, we propose an analysis of CPs which utilises classifier morphemes in three distinct ways:

i) Classifiers create new lexicon items: Classifier affixation adds specific semantic properties to an entity, making it part of the semantic class this specific classifier identifies. In GSL, lemmas like 'GLASS', 'AIRPLANE', 'WALK', 'TABLE' etc., or handshapes like C, B, etc, may undertake classifier function. This is especially productive in the case of concrete object linguistic representations, e.g. the sign 'PENCIL' utilises classifier Δ (delta), the sign 'BOTTLE' utilises classifier C, the sign 'FIELD' utilises classifier 5, etc.

ii) Classifiers add qualitative/quantitative values: Classifiers function as modifiers adding qualitative/quantitative values to syntactic heads or maximal phrases (i.e. boxes of different volume, pipes of different size, raising objects of different weight).

iii) Classifiers serve co-indexing: In sign utterances, classifiers may be used as pronominal elements, where co-indexing obligatorily involves an expanded set of agreement features which, apart from the standard features "Number" and "Gender", also includes the feature "Semantic Class". Indicative examples of such formations are sign phrases elicited via stimuli as those presented in pictures c1, c2 and c3 of figure 1.

5. Future research perspective

The here reported research work provided a basis for a unified analysis of classifier functions in GSL. Next steps include verification of our hypotheses by elicitation of further related data but also a more concrete classification scheme. With the existing categories and additional signing data we are opting to enrich our coding scheme with more examples and eventually limit the annotation categories to 20, so that each Classifier will be described with no more than 5-7 annotation categories.

This will facilitate the creation of an operational set of annotation categories for the description of classifiers, which will also enable implementation of an educational environment for the use of Classifiers in GSL.

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