Nominal referential values of semantic classifiers and role shift in signed narratives

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1 Introduction

As natural languages, sign languages are not instantiated through isolated sentences but rather through signed discourses, as larger relevant units of communication. Discourse is considered to be an entity that is constantly being built and updated. Irrespective of the language modality, some referring expressions have the potential of changing and updating the context, whereas some others interconnect the referring expressions vis-à-vis the entities in the discourse context and, in principle, do not update it because they do not contain descriptive material. Therefore, and according to the general view, discourse is constructed by two operations (von Heusinger 2007). The first one is based on the context change potential achieved through the update of the accessibility structure of a discourse and implemented by definite and indefinite noun phrases (NPs). The second one resides in the context-dependent interpretation implemented by anaphoric pronouns. While the first operation updates and manipulates the list of possible referents, the second one implements and evidences the updates through the use of coreferential expressions. These two dynamic operations are essential for the construction and development of any kind of discourse, regardless of the language modality. The knowledge on signed discourse currently available is still very limited and this article aims at enlarging it by offering an innovative description of semantic classifiers and an account for their referential value in signed discourse.

This article investigates the dynamic potential of different types of referring expressions in signed discourse, with a special focus on semantic and limb classifiers and role shift constructions, and how they interact in the accessibility scale. The analysis is framed in terms of dynamic semantics, in particular in von Heusinger's (2007) account of discourse accessibility structure. This investigation is based on naturalistic data and it presents a qualitative analysis of Catalan Sign Language (*llengua de signes catalana*, LSC) narratives, and more concretely of a number of Aesop's fables, signed by two native deaf signers. The proposal of the present contribution is two-fold. On the one hand, we propose that accessibility in signed discourse is structured across semantic relations, where semantic and limb classifiers and role shift constructions are incorporated into the accessibility hierarchy, leading to a more fine-grained analysis. On the other hand, we propose that semantic classifiers are proforms, which involve two dynamic operations: the interpretation of the *classifier handshape* is dependent on the previously established discourse referent (they thus undertake the same function as pronouns). But at the same time, the *classifier construction* has a context change potential, since it includes descriptive content as part of a full predication. As will be shown, the set of all possible denotations for a classifier handshape is defined as a class

determined by its physical and geometrical properties. However, that set is drastically reduced by its anchoring to the most salient antecedent that precedes it and by being combined with the predicational root of the classifier construction. In our fragment of LSC narratives, role shift is an essential mechanism, necessary to associate the classifier handshape to the corresponding discourse referent.

The article is organised as follows. In section 2, the tools to understand dynamic semantics and accessibility theories are offered. Previous work on reference-tracking in signed languages is reviewed and the fine-grained account of accessibility in which this article is based on is presented. In section 3, semantic classifiers found in LSC narratives are presented by focusing mainly on their coarticulation with role shift. The two discourse functions they have, namely the anaphoric and the predicative one, are explained in detail. In section 4, the proposal is extended to role shift constructions serving as link between antecedents and anaphors instantiated by semantic and limb classifiers. In section 5, the main findings of the article are summarised.

2 Background

2.1 Dynamic semantics and salience

It has been generally accepted that sentences within a discourse are interpreted with respect to their truth conditions, but they also need to be interpreted in connection with the context. Every new sentence introduced into a discourse is connected to the preceding ones, but at the same time it adds information and increments the context. The context is thus constantly changing and formal and traditional theories of discourse treat sentences as denoting functions from contexts to contexts (Heim 1982; Kamp and Reyle 1993). What may be called 'dynamic' about dynamic semantics is that it involves a notion of interpretation that contributes some kind of change. In dynamic semantic theories, the meaning of an expression is said to be its 'context-change potential' (Nouwen 2003). The building blocks of discourse are referring expressions, which do not only weave it by interconnecting the various linguistic elements but they also pick up discourse referents of the universe of discourse, i.e. the objects of thought the conversation is about. The different kinds of referring terms display different properties. Full NPs and proper names have reference independently and they select a specific discourse referent from the universe of discourse. In contrast, pronouns and demonstratives do not inherently select a discourse referent from the universe of discourse. Rather, they restrict the entities to which they may refer to. An example of this is the proper name *Joana*, which rigidly picks up the discourse referent for "Joana", which is ontologically connected to the real human being known by that name. Hence, between the proper name and the discourse referent there is a direct reference connection. In contrast, pronouns have some features that allow restricting the amount of potential antecedents. The specific features of English pronouns, for instance, are gender, number and case. For example, the pronoun *she* has the features [+feminine], [+singular], and [+nominative]. *She* does not directly identify the specific discourse referent to which it refers, but it rather selects a subgroup of possible entities from the discourse domain, namely those that are compatible with [+feminine], [+singular], and [+nominative]. Once the selection is done, syntactic and pragmatic constraints allow picking up the corresponding entity among the set of possible discourse referents. In this article we focus on underspecified referring expressions, such as pronominal forms. They are characterised by two main features: (i) they inherently specify some properties of the discourse referent and they act as set restrictor devices among the entities from

the universe of discourse, and (ii) their referential interpretation is dependent on a prominent discourse referent they pick up.

Recently, discourse studies have shown that the degree of prominence of a discourse referent directly affects the referring term that will be chosen to denote such an entity.[1] The form chosen reflects the salience of the entity within a specific fragment and, according to the literature, pronominal and weaker forms are the expressions used when the entity is taken to be actively salient (i.e. prominent) in the consciousness of the addressee (different but related approaches have been proposed, such as the Assumed Familiarity by Prince 1981; the Givenness Hierarchy by Gundel, Hedberg and Zacharski 1993, and the Accessibility Marking Scale by Ariel 1990).[2] Salience theories offer a procedural analysis of referring expressions, as marking varying degrees of mental accessibility. The basic idea is that referring expressions instruct the addressee to retrieve a certain piece of given information from his memory by indicating how accessible this piece of information is to the addressee at the current stage of discourse. This is shown in the following examples, when uttered out of the blue. In a situation where two teachers are discussing about how intelligent are their students, example (1) can only be uttered when the student has been mentioned in preceding discourse or also when the student is present in the physical context. In both cases the discourse referent being talked about is very salient. In contrast, (2) will only be uttered in a context where the discourse referent is not prominent. Therefore, the sender uses a noun and a relative clause to provide more information about the referent being talked about.

(1)   She is very smart.

(2)   The student we met yesterday evening is very smart.

One important contribution of these approaches is that they take into account that natural languages provide senders with the means to *encode* the salience of the discourse referent to the addressee. The general prediction is that when discourse referents are not prominent or distant from the potentially anaphoric expressions, a relatively lower salience marker will be chosen, as shown in (2). When the referent is prominent and/or very recently mentioned in the co-text, it will be coded by a relatively high accessibility marker, as seen in (1). Therefore, the accessibility hierarchy is articulated in a scale where NPs formed by a full noun and a modifier are considered to be low accessibility markers, and verbal person inflections and null arguments, depending on the language, are considered to be high accessibility markers. The present contribution proposes to incorporate classifier handshapes and role shift constructions into the accessibility hierarchy, by dealing with the face-to-face interaction that characterises sign language and the corresponding oral modality, as opposed to the written modality in which accessibility studies have been previously based on.

2.2 Previous work on reference-tracking in signed languages

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[1] This article uses the following terminology: *salience* is used as a generic term to refer to the different degrees of mental prominence when talking about discourse referents; *accessibility* is a linguistic concept to refer to the relation between the degree of salience of a discourse referent and the choice of referring expression; *salience spreading* is a concept taken from von Heusinger (2007) to refer to a function of the discourse that yields different ordered sets corresponding to the descriptive content of the referring expression (see section 2.3).

[2] For overviews of the psycholinguistic literature on discourse referent accessibility and anaphora processing, see Almor (1999) and Arnold (2010), among others.

Research into the mechanisms displayed in sign languages for reference-tracking has been so far rather limited, and it has partly concentrated on their acquisition. In this section a brief overview of the results of previous works will be presented as background for our study.

With a focus on the development of narrative skills in children acquiring British Sign Language (BSL), Morgan (2006) establishes a simple hierarchy of referring expressions in terms of explicitness, that is of how much descriptive content they encode and, consequently, how transparent they are in the identification of its referent or antecedent. His study considers the role of NPs, entity classifiers and role shift in the introduction, reintroduction and maintenance of discourse referents (what Morgan calls referential function), and it follows the view that NPs are the most explicit ones and role shift the least explicit, with entity classifiers somewhere in between in terms of explicitness.

Putting aside the acquisitional pattern, if we concentrate on the results about the distribution of the three types of expressions in the adult control group, it becomes clear that the basic distinctions surface quite neatly. NPs are almost always used for introducing referents, while only half of the time for reintroducing them and almost never for maintaining reference. Role shift is mostly used to maintain reference, followed by entity classifiers, and even less used to reintroduce referents. In this data, role shift never has the introducing function, and there are only some instances of entity classifiers that serve this goal. Morgan and Woll's (2003) study of the acquisition of body classifiers, which we would roughly subsume under role shift, also show that they are mainly employed to maintain a referent in discourse.

One of the few studies addressing the distribution of referring expressions in sign language discourse is Swabey (2002). She relies on the Givenness Hierarchy proposed by Gundel et al. (1993), which is an implicational scale of cognitive statuses that are marked by different forms of referring expressions. Those cognitive statuses refer to memory and attention state of the addressee and range from most to least restrictive as far as the intended sets of entities are concerned. Thus, for instance, referents 'in focus' are at the current center of attention and are conveyed by zero or unstressed pronominals. At the opposite end of the scale, we find referents that are 'type identifiable', that is recoverable from the type conveyed by the description, but the addressee does not need to have any specific referent in mind. In English, NPs with the indefinite article *a* typically encode this type of cognitive status.

In Focus	Activated	Familiar	Uniquely Identifiable	Referential	Type Identifiable
it	*that, this, this* N	*that* N	*the* N	indefinite *this* N	*a* N

Table 1. The Givenness Hierarchy (Gundel et al. 1993)

In her analysis of ASL narrative re-tellings, Swabey found that there were no instances of classifiers used to refer to referents with the status at most 'type identifiable' or at most 'uniquely identifiable'. For referents with the status at most 'referential', classifiers were always accompanied by a preceding noun to specify the referent of the classifier. In these cases the noun and corresponding classifier were counted as one referring expression. The majority of the classifiers used for at most 'familiar' and at most 'activated' referents usually had accompanying specifying nouns. The exception to this was classifiers that were used repeatedly and always to refer to the same referent.

For referents that were in focus the noun for the classifier did not have to be specified. On the other hand, nouns were used for referents that had a familiar or a referential status. These results are in accordance with the shared view that the more salient a referent is, the less descriptive content is used to refer to it. Kibrik and Prozorova's (2007) work on reference-tracking in Russian Sign Language within Accessibility Theory reaches very similar conclusions, but they do not include classifiers or role shift among the referent-tracking mechanisms they examine.

In sign language research, the intuition that classifiers function as proforms, that is as markers that stand for the noun and have some referential properties while combined with a predicate has been present from the early sign language research (Engberg-Pedersen and Pedersen 1985; Friedman 1975; Garcia and Sallandre 2013; Herrero 2004; Kegl 1986; Supalla 1986; Kegl and Wilbur 1976). However, no account has been proposed from this perspective. Some studies have simply assumed that an anaphoric relation between the classifier handshape and an argument of the predication is present (Benedicto and Brentari 2004; Chang, Su and Tai 2005; Cuxac 2000; Glück and Pfau 1998; Zwitserlood 2003, 2012). In these accounts, movement or localisation in the construction is taken to be a verb or root stem. The classifier as well as the locus in space are considered functional elements, such as inflectional affixes.

2.3 A more complex account of salience

The form of a referring expression is standardly taken to be a reflection of the degree of salience of the discourse referent it is linked to. Thus, while an indefinite NP introduces a discourse-new referent, a pronoun anaphorically takes us back to an already introduced one or to a non-introduced, but very salient referent. Definite NPs are also used to refer to introduced referents, but unlike pronouns, they are chosen when the referent is less salient, which explains their richer descriptive content. This general view has been embraced as the basic principle of discourse coherence and it has been developed mostly in different, but related accessibility approaches, as previously presented in section 2.1.

However, according to von Heusinger (2007), "accessibility" of a discourse referent is not the only determining factor for the choice of referential expression. The relation between the antecedent and the discourse anaphor is determined by the accessibility of the discourse, i.e. the access of the anaphoric term to the discourse item, on the one hand, and the ranking of different discourse items, on the other. Different aspects contribute to accessibility:
  i)   activation or accessibility status (depending on lexical type, descriptive content and syntactic function of the anaphor);
  ii) accessibility relation (distance and syntactic structure between the anaphoric expression and its antecedent, unity, context knowledge, encyclopaedic knowledge, inferential knowledge);
  iii) accessibility hierarchy (informativity of the referring expression);
  iv) accessibility structure (syntactic structure, discourse structure, whereby we can assign an ordered set of accessible entities to a discourse domain or segment)
  v)   salience of the objects in some model (salience is a property of a set associated with descriptive material expressed in a referring expression).

For von Heusinger, the accessibility structure of a discourse is formed by listing the salient items of each set associated with some predicate used in that discourse, and the relations between the listed sets (hyponymy, hyperonymy…), thus relying not only on

the degree of context dependency of a referring expression, but also on its potential for changing the context.

Discourse theories like Discourse Representation Theory (DRT, Kamp and Reyle 1993) and Centering Theory (CT, Grosz, Joshi and Weinstein 1995) approach accessibility in different ways, but they are not able to cover all the required mechanisms. In DRT accessibility is not gradable: an anaphoric relation is represented as an identification of the new discourse referent with an accessible one. The discourse referents form a set of accessible antecedents with respect to a discourse domain. Discourse referents are simply listed. In CT, the attentional state represents the availability of discourse referents at any given point in the discourse. It assumes fine-tuning among accessible discourse items, which is mirrored in the ranking of accessible items. It provides strategies to find antecedents for anaphoric pronouns in discourse segments, but cannot account for the antecedent of an NP, which depends on global accessibility.

Von Heusinger (2007) exploits the role of the descriptive content of the expression that introduces the discourse item in order to overcome the pitfalls in other approaches mentioned above. Most theories focus on the use of pronouns, which do not have significant descriptive material, and ignore nominal descriptions, with considerable descriptive content. Definite NPs are typically interpreted as static terms in the general view. However, von Heusinger explores the role of anaphoric expressions with descriptive content like definites, which change the accessibility structure. He establishes that accessibility is not the function of a discourse that yields a single set of accessible elements, but rather a function of the discourse that yields different ordered sets corresponding to the descriptive content of the referring expression. Thus, an expression like "the small bird" in English does not only make the set [Small_Birds: {a}] salient, but also the corresponding supersets [Birds: {a}] and [animate objects: {a}].[3] An expression not only changes the most-accessible element of the set introduced, but also that of some of the relevant supersets of this set, through the process labelled *salience spreading*. By virtue of this, a subsequent expression "the bird" can pick up the same referent by linking to the superset [Birds: {a}]. A pronoun "he" can also pick up on the same referent by being linked to the biggest superset [animate objects: {a}].

From this perspective, accessible discourse items are sets ranked with respect to the predicate by which they are introduced or activated, rather than a single set of ranked elements without further association to the predicate. As already mentioned at the beginning, this article investigates the dynamic potential of different types of referential expressions in signed discourse, with a focus on semantic classifiers and role shift, and how they interact in the process of salience spreading.

3 Referring expressions in signed narratives

3.1 Semantic classifiers
Signed narratives show a rich array of referring expressions, which contribute to building and developing discourse. Besides nouns and index signs directed to signing space, Catalan Sign Language (LSC) makes a great use of semantic classifiers and role shift constructions to refer to the intervening discourse referents. Under the label *semantic classifiers*, both entity and limb classifiers are considered to be included here.

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[3] This notation is taken over from von Heusinger's (2007) paper.

Entity classifiers represent a broad class of noun objects (Supalla 1986). The classification of handshapes is established according to visual and geometrical properties of the entity. The predicate indicates movement or location of the entity denoted. Limb classifiers represent body parts of the entity denoted (Supalla 1986). The predicate is realized as the movement root. Figure 1 shows an instance of an entity classifier. The signer uses the 3-handshape, which denotes a legged animal, with more than two legs. The classifier construction, formed by the nominal and the movement predicate, denotes a lying down event.

Figure 1. Entity classifier handshape

In Figure 2 we observe two different handshapes functioning as entity classifiers. One is expressed through the dominant hand and it is articulated with the thumb-handshape and denotes a long upright entity. The other, expressed through the non-dominant hand, is articulated with a flat-handshape and denotes a flat entity, without much volume. The three entity classifier handshapes shown in Figure 1 and Figure 2 represent a broad class of possible noun denotations. They do not directly refer to a particular discourse referent, but rather inherit the semantic properties of the previously introduced antecedent. In this case, the three-handshape (Figure 1) and the thumb-handshape (Figure 2) stand for the hare. The flat-handshape (Figure 2) stands for the turtle.

Figure 2. Entity classifier handshapes for two discourse referents

Figure 3 shows an example of a limb classifier. The flat-handshape stands for the feet of the turtle. The movement of the classifier is the predicational root and denotes the movement of the feet. Note that the handshape for the entity classifier in Figure 2 and the handshape for the limb classifier in Figure 3 is exactly the same, represented with a flat-handshape. Importantly, the predication (movement) in both classifier constructions disambiguates the kind of classifier and the meaning attributed. Moreover, the limb classifier is coarticulated with the role shift of the entity denoted, as indicated by the facial expression of the signer. As shown in section 4, the combination of limb classifier and role shift restrict the domain of interpretation of the entity referred to.
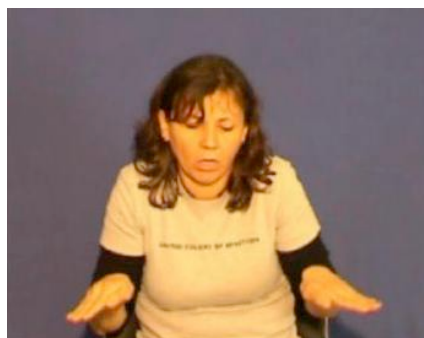
Figure 3. Limb classifier

Interestingly, classifier handshapes include three main nominal features: (i) referentiality, (ii) anaphoric potential, and (iii) definiteness. As for referentiality, we have just seen in the previous examples that classifier handshapes refer to a discourse referent from the domain of interpretation. This dependent referentiality is shown in the inherent anaphoric potential: they are dependent on the antecedent previously introduced, which provides the link with the referent from the domain. Last but not least, they are definite in terms of the familiarity conditions they present. Since they are attached to an antecedent present in the universe of discourse they cannot refer to a new, unknown entity. Classifier handshapes are embedded in classifier constructions, where not only the entity but also the predicate are expressed. These constructions may also sometimes be embedded, at the same time, under role shift constructions. This is precisely the topic of section 3.3.

3.2 Double function of classifiers
Within signed discourse, both entity classifiers and limb classifiers show a double function. First, when considering classifier handshapes, they have an anaphoric function. That is, the handshape is coreferential with a previously introduced discourse referent, as seen in section 3.1. But when considering the classifier construction as a whole, a pure predicative function arises. Let us first focus on the anaphoric function. Semantic classifiers are contextually dependent on the previously introduced discourse referent. As underspecified forms, they need an antecedent introduced earlier in order to receive an interpretation. The corresponding simplified Discourse Representation Structure of (3) is shown in (4). The nouns "rabbit" and "turtle" introduce each a discourse referent and this is represented with a corresponding variable appearing in the discourse domain, that is the upper box. They are respectively represented as x and y. The predicates appearing in the fragment in (3) are represented in (4) as conditions updating the context. A Discourse Representation Structure is true if there is a function that maps the free variables (the upper box) to entities in the world such that the conditions (the lower box) are satisfied (see Nouwen 2003 for a deeper exposition). The classifier handshapes also introduce new variables (z, u, and v), but they need to be equated to a previous discourse referent. In this fragment, for instance, the discourse referent for "rabbit" is referred to through the bare noun, the thumb-handshape entity classifier and the Q-handshape limb classifier.

(3)

RABBIT TURTLE CLe(thumb):entity-standing / CLe(B):entity-standing
_____rs:rabbit   _____rs:rabbit
CLe(thumb):run-forward / CLe(B):move-slow SPEED CLl(Q):legs-moving

'There was a rabbit and a turtle. The rabbit started to run forward fast, very fast, and moving its legs, while the turtle advanced very slowly.'

(4)

x, y, z, u, v
rabbit (x)
turtle (y)
CLe(thumb):run-forward (z)
z = x
CLe(B):move-slow (u)
u = y
CLl(Q):legs-moving (v)
v = x

The three variables (i.e. the logic constructs that are identified with discourse referents) point to the particular entities already introduced in this fragment of discourse. This is why in the simplified Discourse Representation Structure in (4), the variables are identified under the identity equation, which is obtained by means of suitability motivations based on morphosyntacic and also pragmatic criteria. From a morphosyntactic point of view, the equation between the variable introduced by semantic classifiers and the variable introduced by the corresponding noun (i.e. the antecedent) is obtained through matching of geometrical features. Previous research has shown that classifier handshapes may be analysed as agreement markers (Glück and Pfau 1998; Suppalla, 1982; Zwitserlood 2003; Zwitserlood and van Gijn 2006). However, from a semantic-pragmatic point of view, role shift plays a crucial role in the equation between the variables introduced by this kind of referring expressions, as will be discussed in section 4.1.

Interestingly, the antecedent is not always introduced previous to the anaphoric expression. In some contexts, it is also possible that an underspecified classifier handshape appears without previous introduction of the coreferential noun. That is, instances of backwards anaphora (i.e. cataphora) are also felicitous with entity classifiers. However, it is important to note that these contexts are mainly restricted to literary contexts and only possible with classifiers that happen to be quite lexicalised. In the fragment in (5), the underspecified entity classifier denoting a two-legged entity is uttered first. In the subsequent sentence, the coreferential chain is established and the discourse referent attributing meaning to the anaphora is uttered.

(5)   PARC IX SEAT BENCH CLe(N):flat-surface / CLe(2):legged-entity-seated.
       ___br
       MAN NEWSPAPER READ.

       'In a park, there was someone seated on a bench. It was a man reading the newspaper.'

Semantic classifiers, just like pronouns and unlike nouns, do not have rich descriptive content. They do not change the accessibility structure associated to nominal referents. They only do it as part of a full predication; that is, if the whole classifier construction is considered. The second function we propose here is based on the notion of *Context Change Potential*, first presented by Heim (1982). According to Heim, the meaning of a sentence is no longer a set of static truth-conditions. Rather, the meaning of a sentence is best viewed in terms of its context change potential. A sentence meaning is a function from contexts to contexts; that is, it can be uttered in a certain class of contexts, and produces certain possible changes in those contexts as a result. Technically, Heim (1982: 294) defines the context change potential as a function that assigns to every context F the resulting context F', which is brought about by uttering condition Φ in a situation in which F obtains. In the formula below, F' is the value of the context change potential of Φ for the argument F.

(6) $F + \Phi = F'$

Thus, the second function that classifiers have is that of making the context updates evident. However, a context update is only possible if we consider the classifier construction as a whole and include the handshape and the predicate movement in the operation. As shown below, this complex construction introduces a new condition to the common ground, which has the potential of updating the previous context.

To understand this more clearly, let us pick up our previous example (3) and focus on the semantic representation already shown in (4), here repeated as (7) for convenience. As already indicated, the variable that introduced each discourse referent in the discourse domain is instantiated by uttering a noun and also by uttering a semantic classifier. As a matter of fact, the handshape classifier is part of a full predication, which in its turn adds a new condition in the discourse domain. In (7) these conditions are instantiated by the predicates "run-forward", "move-slow" and "legs-moving". In subsequent sentences, new conditions are added and contribute to incrementing the context.

(7)

x, y, z, u, v
rabbit (x)
turtle (y)
CLe(thumb):run-forward (z)
z = x
CLe(B):move-slow (u)
u = y
CLl(Q):legs-moving (v)
v = x

As a matter of interest, semantic classifiers not only update the context but they also have the potential of restricting anaphoric relations. Classifiers are inserted in main clauses, but in some contexts they may be also inserted in relative clauses, as full predications. In the following example, we observe a classifier construction that functions as a main clause predication whose subject features a relative clause containing another classifier construction. The non-manuals are a crucial marking of

relative clauses. In (8) the relative clause is coarticulated with brow raise and squinted eyes denoting a familiar entity already mentioned in the discourse. The classifier construction inserted in the relative clause contributes to the context update, but at the same time restricts the number of possible potential antecedents already present in the common ground.

(8)   [MAN IX3 TREE HIDE CLe(2):seated-entity]$_{rel}$ CLe(2):climb-down

                   br, sq

'The man who was hiding on top of the tree climbed down.'

3.3 Coarticulation of role shift and semantic classifiers

The so-called role shift construction is the genuine means of signed languages used to convey the utterances or thoughts ascribed to a discourse agent. Previous studies have interestingly shown the coarticulation of role shift and classifiers constructions, arguing for a complex interaction in signed utterances (Earis and Cormier 2013; Garcia and Sallandre 2013; Perniss 2007; Quinto-Pozos 2007). The following fragment shows an instance of coarticulation of role shift construction with limb handshape classifiers. The discourse referent is introduced with a noun and it is then referred back to by the body-parts expressed with limb classifier (Q-handshape) coarticulated with role shift, as shown by the horizontal line in the glosses, which represents the scope of the coarticulation.[4]

(9)

                                           rs:rabbit

RABBIT YES AGREE CLl(Q):legs-moving SPEED CLl(Q):legs-moving CLgen:mov

                           rs:rabbit

EFFORT MAXIMUM CLgen:mov CLl(Q):legs-moving

'The rabbit agreed and he started running extremely fast.'

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[4] We follow the usual glossing conventions in the sign language literature, according to which manual signs are represented by the capitalized word corresponding to the translation of the sign. The relevant abbreviations for the purposes of this paper are the following: IX# (index pointing sign; the numbers refer to the grammatical person); #-VERB-# (verb agreeing with subject and object); subindices mark direction towards sign space: l (low), u (up), ip (ipsilateral); cl (contralateral); ce (centre); a (spatial location establishment) and also binding relations (i); CL for classifier constructions indicating classifier type (entity, limb...), handshape in parenthesis and rough meaning description. A line above the glosses indicates the scope of nonmanuals: br (brow raise); sq (squinted eyes), rs (role shift). Reduplication of signs is indicated by +++.
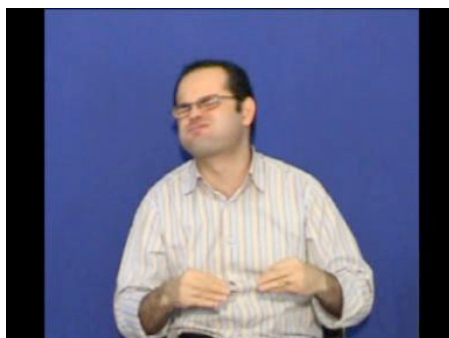
Figure 4. Limb classifier coarticulated with role shift

In our data, role shift is mainly combined with limb classifiers. However, instances of role shift co-occurring with entity classifiers are also possible (Perniss 2007). The following excerpt is an instance of the discourse referent for "rabbit" referred back to by two handshape classifiers denoting the whole entity: the thumb- (Figure 5) and the 3-handshape (Figure 6). As shown in the horizontal line in the glosses, the articulation of the two classifier handshapes co-occurs with particular movements by the body of the signer, identified as role shift. In these fragments, the body of the signer reproduces the movements of the whole rabbit as an entity.

(10)

COINCIDE DAY HEAT STRONG SUN RABBIT FEEL START TIRED
_____rs:rabbit   _____rs:rabbit
CLe(thumb):entity-moving SEARCH SEE TREE SMALL CLe(3):entity-moving
CLe(3):lie-down.

'It was a very hot and sunny day. The rabbit was running and he lay down next to a small tree.'

Figure 5. Entity classifier (thumb-handshape) coarticulated with role shift

Figure 6. Entity classifier (3-handshape) coarticulated with role shift

4 Accessibility in signed anaphoric chains

In the discussion so far it has been pointed out that the set of all possible denotations for a classifier handshape is defined as a class determined by its geometrical properties. However, that set is drastically reduced by its anchoring to the most salient antecedent that precedes it and by being combined with the predicational root of the classifier construction. In this section we will concentrate on the role of yet another type of referring expression, namely limb classifiers, in establishing anaphoric chains in signed discourse and how they combine with the other type of expressions examined so far in von Heusinger's approach to salience spreading, previously presented in section 2.3.

4.1 Licensing the identity equation and associative anaphora
An important property for the interpretation of classifiers in anaphoric chains is the function that role shift plays in the connection between the antecedent and the anaphor. When presenting the anaphoric function of semantic classifiers (section 3.2), we have seen that the link between the classifier and the corresponding antecedent is obtained by means of suitability motivations based on morphosyntacic features. However, as already pointed out, from a semantic-pragmatic point of view, role shift plays a crucial role in resolving the equation between the variables. In fact, role shift licenses the identity equation of the referent linked to the semantic classifier (the variable it contributes) with a previously introduced discourse referent. The data shows that role shift is necessary to associate the semantic classifier handshape with the corresponding discourse referent. Indeed, from a discourse perspective geometrical feature matching is not enough for the interpretation of classifiers. Limb classifiers functioning as such help us illustrate this, for unlike entity classifiers, they are always coarticulated with role shift: otherwise they are interpreted as entity classifiers referring to a limb that is not just part of the animate referent (e.g. turtle vs. a turtle's leg). Even the same handshape is ambiguous with respect to the kind of discourse referent it stands for. For instance, in our LSC fable examples the same Q-handshape is associated to a hare (legs) and to a bear (snout) and can only be disambiguated by the role shift coarticulated with it, which contributes to making the anaphoric chain explicit. Similarly, as already showed in section 3.1, the same flat-handshape may be used as an entity classifier denoting a turtle (Figure 2, repeated here for convenience as Figure 7) and a limb classifier denoting the legs of the turtle (Figure 3, repeated here as Figure 8). As a matter of fact, while only the second case appears compulsorily coarticulated with role shift, this is not obligatory in the entity classifier case.

Figure 7. Flat-handshape instantiating an entity classifier

Figure 8. Flat-handshape instantiating a limb classifier

The mechanism at play with limb classifiers as anaphoric elements is a whole-part relationship, which requires an accommodation operation in order to understand the dependency between the anaphor and the antecedent. It is an instance of bridging or associative anaphora based on encyclopaedic knowledge, that is one of the cases that von Heusinger (2007) mentions as instances of indirect anaphora. Indirect anaphora crucially relies on additional information that is present in the accessibility structure.

When addressees interpret a definite associative NP, they must take into account that all definite NPs carry a presupposition of existential uniqueness. This implies that addressees can access an entity that is presented as the only one of the type expressed by the noun of the definite NP. In the case of associative, NPs that introduce a new entity (NP2), this entity must be easily accessible through, for instance, a definite NP1. Take for instance the sequence "I just listened to a symphony this morning, but the composer escapes me". It is general knowledge that symphonies are composed by a musician and, even if the identity of the author is unknown to the speaker, a referent for it is introduced by a definite description by means of associative anaphora.

Stereotypical part-whole relations are a case in point where indirect coreferentiality exists between the entities designated by NP1 and NP2. In such contexts, the existential uniqueness of the entity referred to by the NP2 is motivated by the introduction of another entity in the prior discourse. In this case, the definite NP2 is felt to be an incomplete description whose referential interpretation calls anaphorically for the linguistic context. Here, referential interpretation implies that the addressee establishes what referent in the model it should be related to. For such uses, in English examples, the definite determiner entails that the entity referred to by the NP serving as a trigger is not only connected coreferentially, but also salient (Charolles 1999). In the

case of LSC, the NP serving as an antecedent to the associative limb classifier does not provide direct access to the referent; it only provides a pointer leading to it following an inferential and accommodation procedure.[5] However, the link is overtly instantiated by the use of role shift scoping with the articulation of the classifier construction.

4.2 Accessibility and semantic relations

As shown in the salience spreading account (section 2.3), previous accessibility studies have been proven to focus only on the use of pronouns, which do not have significant descriptive material, and ignore nominal descriptions, with considerable descriptive content. Definite descriptions do not only contribute to the context with descriptive content but also with the semantic relations established among them, which change the accessibility structure. Let us make a first attempt at understanding how each element of the anaphoric chain contributes to it on the basis of a concrete example like (11). This fragment reproduces the passage of the fable "The bear and the two travellers", where the two friends see the bear approaching them. While the signer is still in the role of the most active discourse referents (the two friends), a new one is lexically introduced with the bare noun BEAR and followed by an entity classifier. This classifier is anchored to the superset of animates that the noun BEAR has triggered through salience spreading. Next, role shift switches to the bear-referent and it gets coarticulated with a limb classifier that represents the bear arms. As a whole, these two expressions are jointly anchored to the same set of animate entities made salient by the first mention of the bear-referent through a noun, as represented in Figure 9.

(11)

```
     ___br _____rs:bear      _____rs:bear
SEE BEAR₁ CLe(1):entity-approaching₂    CLl(Q):bear's-arms₃
```
$SEE\ BEAR_1\ CLe(1){:}entity\text{-}approaching_2\quad CLl(Q){:}bear's\text{-}arms_3$

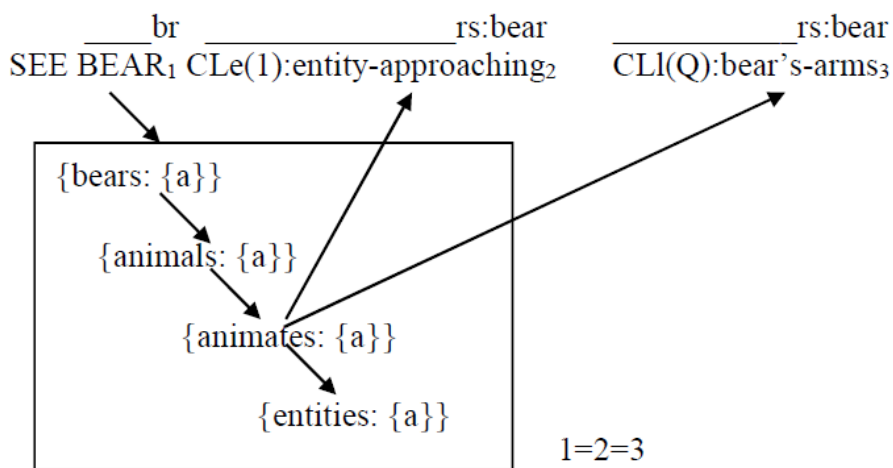'They saw that the bear was approaching, walking in their direction.'

Figure 9. Salience spreading and anaphoric chain of example (11).

---

[5] As pointed out by an anonymous reviewer, the bridging features of the two kinds of semantic classifiers (entity and limb) resemble the weak/strong distinction of definite articles attested cross-linguistically (Schwarz 2013). However, whether a uniqueness or a familiarity analysis applies to each kind of classifier is beyond the scope of this article.

Following Kegl (1986), we include role shift marking as a central part of the anaphoric chain, materializing subject clitics. The way she characterizes it is as follows:

> "Role prominence seems closely tied with first-person point of view and is generally restricted to NPs which are [+human]. Non-human or inanimate role-prominent NPs are possible, but they become personified. (…) The RP-CL [role prominence clitic] serves a dual function. Besides marking role prominence, it functions as a subject clitic. Role prominence is associated with subject positions only. It is also invariably singular."
>
> Kegl (1986: 289)

Rather than [+human], we would argue that role shift is tied to [+animate] arguments: role shift will always place the discourse referent at the level of "animate objects" in the salience spreading proposal in von Heusinger (2007: 141), through a process of personification of animals and objects, as we see in the above examples.

In combination with a classifier, role shift is sufficient to change the salience of discourse referents. This property becomes most evident in cases of role shift in constructed dialogue, where the alternating interlocutors are simply signalled by role shift. In this respect, the dynamic contribution of role shift extends beyond that of adding or activating a discourse referent: it changes the accessibility structure at a given point in discourse.[6] Thus, in example (12), the second friend in the story is reintroduced after a sequence where the bear was the most salient discourse referent. This is achieved by articulating an entity classifier with role shift.

(12)

<u>   rs:bear</u>
pro_{bear} CLl(Q):snout-sniffing "IX3 DEAD ALREADY IX3, BAH!" CLl:bear's arms

                                               <u>   </u>rs:friend2
LEAVE FOREST CLe(1):direction LEAVE CLe(N):lie-down

'The bear sniffed the man and thought "He's already dead, bah!". He walked away and left entering the forest. The man was lying down.'

Given these assumptions and Kegl's analysis, we take role shift as part and parcel of the anaphoric chain in the salience-spreading representation. Its contribution is mediated by an empty subject pronoun that is coreferential with the intended discourse referent. In Figure 10 we adapt the previous representation correspondingly for example (11).

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[6] We thank an anonymous reviewer for highlighting the importance of this property of role shift in the context of our discussion.

$$\text{SEE BEAR}_1 \text{ pro}_2 \text{ CLe(1):entity-approaching}_3 \quad \text{pro}_4 \text{ CLl(Q):bear's-arms}_5$$

{bears: {a}}

{animals: {a}}

{animates: {a}}
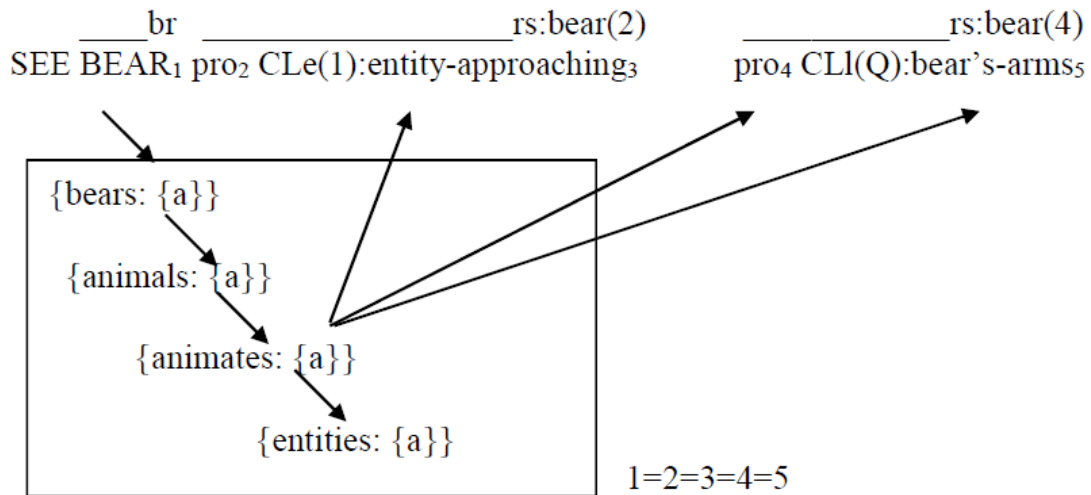
{entities: {a}}

1=2=3=4=5

Figure 10. Modified salience spreading and anaphoric chain of example (11).

Although limb classifiers and role shift tend to be coreferential, this is not always the case, for they can be anchored to different discourse referents, as in the example represented in Figure 11, where the role corresponds to the lying friend and the limb classifier stands for the bear's snout while sniffing him.

Figure 11. Bear sniffing lying friend

This raises the issue of having simultaneous activation of discourse referents and it triggers the question whether a discourse referent is more prominent than the other and, if so, which one. In this specific example, the man is activated by role shift, while the bear is activated by the limb classifier. We would like to argue that role is the most prominent argument by definition and, as just argued above, it turns its associated referent into the most salient one. A concrete possibility for the example at hand in Figure 11 would be to interpret it as a simultaneous passive-like construction, as suggested in one way or another in the few works that address the existence of passive constructions in sign languages (Wilbur 1987, Kegl 1990, Saeed and Leeson 1999, Janzen et al. 2001, Hansen 2007). However, resolving this question is beyond the scope of this study and we leave it for future research.

5 Conclusions

This article has presented a novel account of the interaction between semantic and limb classifiers and role shift in LSC narratives. It has proven that these referring expressions play a crucial role in establishing anaphoric chains in signed discourse, much like pronouns. The set of entities from the discourse domain to which semantic classifiers are linked is importantly reduced by its anchoring to the most salient antecedent that precedes it and by being combined with the predicational root of the classifier construction. Therefore, besides their anaphoric function, semantic classifiers as part of classifier constructions also have the potential of updating and incrementing the context and thus contributing to its dynamic nature.

We have also seen that a static view of accessibility is insufficient to account for the distribution of referring terms in general and that a more complex account including semantic relations among referring expressions provides a fairer analysis of the dynamic coherence in natural discourse production. More concretely, salience spreading accounts naturally for the distribution of intertwined referring expressions and contributes to the accessibility structure update of narrative signed discourse. From an analytical point of view, limb classifiers have been presented here as associative anaphora connected to a previously introduced discourse referent. The link between these highly underspecified anaphoric elements and the corresponding antecedent is licensed by role shift constructions coarticulated with semantic classifiers, and especially with limb classifiers. The data shows that role shift is necessary to associate the semantic classifier handshape with the corresponding discourse referent. Role shift has thus been argued to license the identity equation of the referent linked to the semantic or limb classifier with a previously introduced discourse referent, and to turn it into the most prominent at a given point in discourse.

The proposal presented here is an innovative contribution to the young field of the semantics-pragmatics interface in sign language and more concretely to the study of referring expressions in narrative signed discourse. This study opens up new issues to deepen in the semantics-pragmatics interface, such as the simultaneous activation of different discourse referents and the corresponding salience ranking and definiteness constraints. Moreover, other interesting issues may be also tackled from a prosodic and from a syntactic perspective: do the handshape classifiers belong to the same clause as the antecedent or are they part of different clauses? If they are taken to belong to a different clause as suggested by the non-manuals coarticulated, an analysis of handshape classifiers functioning as resumptive pronouns for a left-dislocated noun phrase (Glück and Pfau 1998) could be pursued. These syntactic-prosodic issues open up a promising avenue of research that should be pursued in future work.

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