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**The emergence of temporality:
from restricted linguistic systems
to early human language**

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The emergence of temporality: from restricted linguistic systems to early human language

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Abstract

Temporality is a fundamental category of human cognition which, in contrast to animal communication, is encoded in elaborate ways in every modern language. Following the windows approach, this paper investigates the development of temporal relations in simple linguistic systems of different natures – early varieties of untutored L2 learners and homesign systems of deaf subjects – and discusses the possible implications for language evolution. The comparison of linguistic systems arising in quite different circumstances allows for the identification of recurrent developmental patterns and thus provides a more robust empirical basis for projections on early language.

1. Introduction: research topic and aims

In the debate on language evolution several studies deal with time in language. Pinker and Bloom (1990), for instance, consider the expressive power of human language in the domain of temporality as one of the features showing its complex adaptative design, while Pinker and Jackendoff (2005) list tense and aspect markers among the devices that make human language special (in addition to syntactic organization), although they do not involve recursion *per se*. In a similar vein, Victorri (2005) highlights how natural languages allow the speaker to talk about dynamic situations anchored in time in a simple and straightforward manner and wonders about the role of narration for the evolution of temporal and aspectual marking. In fact, temporality is a fundamental category of human cognition, which is encoded in elaborate ways in every modern human language. Any language presents a full array of devices (adverbial, verbal or grammatical) to express the aspectual and temporal properties of a situation, i.e. broadly speaking, to comment on its distribution over time (continuous, iterative, habitual, etc.) and to situate its overall time of occurrence. Conversely, it is usually assumed that early forms of human language lacked a certain number of syntactic properties and were initially confined to the immediate perceptual reality of the here&now, most of animal communication being generally considered as situation-specific¹. How is the gap between such extremes to be bridged?

The research topic of this article concerns precisely the development of temporality in a linguistic system: the aim is to gain insight into the primordial temporal relations that may have been expressed in early forms of language and their possible elaboration towards modern full language. The empirical evidence used for this purpose comprises data from untutored second language acquisition – early varieties of adult learners (cf. in particular the ‘Basic Variety’) and from homesigns, i.e. the gestural systems of deaf subjects not exposed to conventional sign languages. Both cases represent spontaneous developmental processes leading to the emergence of communicative systems which are simpler than conventional language and therefore will be used as “windows” onto language evolution. They arise, however, in quite different circumstances and imply a different modality (spoken vs. manual). Their

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¹ According to Johannsson (2005), it is actually an open issue to what extent functionally referential calls in spontaneous animal communication carry symbolic meaning like human words (p.128). Hauser et al. (2002) underline that “unlike the best animal examples of putatively referential signals, most of the words of human language are not associated with specific functions” (p. 1576) and may be “detached from the here & now”.

comparison allows for a distinction to be made between recurrent developmental patterns from process- or modality-specific ones, and thus to provide a more robust basis for projections on language evolution.

The article is organized as follows: after providing some background information on the windows considered (section 2.), the expression of temporal relations in early stages of L2 acquisition and in homesign systems will be dealt with (section 3.). Building on this empirical basis, section 4 addresses early language, proposing a logical sequence of steps for the emergence of temporality, which will then be discussed with respect to some widespread models of protolanguage.

2. Preliminaries on the ‘windows’ considered

The debate concerning language evolution has provoked a renewed interest in forms of linguistic organization as attested in pidgins, homesigns, early child language, early second language varieties, special cases like that of Genie, etc. (cf. Bickerton 1990; Jackendoff 1999, 2002; Comrie 1992, 2000; Goldin-Meadow 2002; Morford 2002, etc.). These correspond to partially different processes - implying language acquisition or disruption in language transmission - but share one common denominator: they give way to linguistic systems that are initially simpler vis-à-vis fully fledged languages. Following Botha (2004), they can be defined as ‘restricted’ both in terms of the formal means they have at their disposal and as regards the expressive power they display², and as such can suggest intermediary steps between primitive forms of language and the complexity of modern ones; in other words they can be used as windows³ onto an evolutionary phenomenon that has left no direct evidence behind. This article follows the windows approach by investigating the expression of temporality in ‘restricted linguistic systems’ resulting from two different processes: early second language varieties developed by adult untutored learners and the communicative systems of deaf subjects who were deprived of linguistic input, i.e. homesigns.

‘Untutored adult language acquisition’ – the process by which adult subjects acquire a second language outside the classroom – would appear to be a promising window onto the process of language evolution (cf. Jackendoff 1999, 2002; Klein 2001; Perdue 2006). Any subject, be it child or adult, faced with the task of acquiring a conventional language, does not purely imitate the input model. Yet the systems developed by children show, from very early on, the specific linguistic features of the target language to which they will conform in the end (cf. Slobin 2005). On the other hand, adults are notoriously bad imitators: in contrast to the child, the adult learner very often ends up with a system which differs considerably from the target language, a phenomenon known as fossilization. This result can be attributed to different causes: the presence of a first language, changes in the learning capacity or input paucity. Moreover, especially in an untutored situation, the learner’s initial goal is not necessarily to adhere to the target language norm but to convey the message: priority is given to the effectiveness of communication rather than its correctness. In fact, adult learners seem to be less able or willing to copy what they hear in comparison to children.

The initial systems developed by adult learners do not seem to be strongly influenced by their L1 either. Research on untutored second language acquisition (the case of immigrant workers studied in the ESF project, cf. Perdue 1993) has shown that learners representing different pairings of source and target languages initially develop a very similar linguistic system, which has been called a ‘Basic Variety’ (Klein and Perdue 1997): a target language-like lexicon is organized on the basis of pragmatic and semantic principles which are largely independent of the source / target language specifics.

² In Botha’s terms: “the concept of *restricted linguistic system* is used to refer to a form of language (a) which – in all cases – uses a limited range of the formal and/or semantic means that characterise fully-fledged languages, and (b) which – in some cases – performs only a limited range of the functions of fully-fledged languages” (2004: 4).

³ As pointed out by Botha (2006), an observable phenomenon X can be a window on an analog but distinct and inaccessible phenomenon Y, so that by studying properties of X one can draw inferences on Y. Here the analogy is based on the emergence of a linguistic system.

Given that early stages of L2 acquisition do not correspond to a relexification process (strong influence of the L1) nor to a piecemeal imitation of the target language (the available model), they have been interpreted as:

- a) reflecting creative processes of the underlying human language faculty (Klein 2001);
- b) representing a linguistic organization that is neutral with respect to the grammaticalized features of a specific language (Perdue 2006);
- c) applying fossil principles from protolanguage, which modern languages often observe and frequently elaborate on (Jackendoff 1999).

The features just mentioned make early L2 varieties a potentially valid window onto language evolution: their study allows the researcher to observe the emergence of a new communicative system with a creative dimension, and the whole process is relatively well described. However, even if a direct influence of the specific languages in contact seems to be rather limited, it is not clear to what extent the experience of language itself affects the developmental process, at least with respect to temporality: after all, the adult learner enters the L2 acquisitional process with a conceptual system fully developed during the process of first language acquisition. The comparison with the communicative systems resulting from another ontogenetic process, namely homesign systems, plays a crucial role at this point.

‘Homesigns’ is the widespread term to designate the gestural communicative systems spontaneously developed by deaf children born into a hearing family, when deprived of contact with a conventional sign language. The work of Goldin-Meadow and colleagues extensively describes the emergence of language-like properties in homesigns: their accounts highlight that it is the deaf subject who creates the gestural system, starting with the minimal input that is represented by the co-speech gestures of the hearing environment, introducing novel gestures and elaborating the organizational properties of this repertoire (caregivers’ gestures do not display the same systematic organization). Note that, despite different gestural input, children around the world seem to develop similar systems, the main notable difference being the emblems typical of their cultural environment (cf. Wang et al. 1995; Goldin-Meadow et al., to appear). This remarkable similarity is likely to be due to the high level of iconicity that deaf subjects must keep in their signs if they want to be understood by their hearing communicative partners; moreover, their structuring points to children’s basic abilities to segment, analyze and recombine gestural elements perceived in a meaningful context. Deaf subjects born to hearing families may still live in environments that do not provide them with exposure to institutional sign languages, even in adulthood. Studies on adult homesigners are few in number (cf. section 3.2), but they suggest that a deaf child’s communicative system may become more complex as a consequence of cognitive maturation and according to social integration with the hearing environment (cf. Cuxac 2005).

The case of homesigns represents a unique situation: they constitute the first language of the deaf subjects (and therefore, in contrast to L2 acquisition, the influence of an antecedent language should be ruled out); in addition, unlike ordinary L1 acquisition, the influence of a specific target language can be excluded as well. The absence of a conventional linguistic model forces the creative features of the process not only at utterance level (grammar to combine items) but also at word level (invention of conventional symbols). On the other hand, their study represents a rather recent field of research: there are only few studies which describe how temporality is expressed in child and adult homesigns.

The remainder of this article therefore describes the progressive expression of temporal relations in early L2 varieties; the developmental pattern thus obtained is then used as a basis for comparison with the available evidence from adult and child homesigns. Language is basically modality-independent and no position will be taken here on the advantage or relative primacy of the manual modality over the spoken one in language evolution (on this subject, cf. Corballis 2003). Rather, the comparison intends to distinguish recurrent developmental patterns from features that could be related to the specific circumstances of the processes in question (presence vs. absence of a previous language and of a model, spoken vs. manual modality). Given the different salient conditions in which such systems arise, if similarities are found between early L2 varieties and homesign systems, (a) an increasingly powerful argument can be made for the non effects of environmental factors on the development of L2 varieties and (b) they would constitute a more robust empirical basis for projections on early language.

3. The expression of temporality: empirical data and analyses

3.1 Temporality in untutored adult SLA

Previous studies using SLA as a window onto early language have focused on the Basic Variety (henceforth BV): its simple grammar, its stable state and its relative independence from the specific features of the languages in contact makes this stage particularly relevant for projections on early language and will therefore occupy a central place in this section. In order to capture the developmental dimension of early stages in L2 acquisition, we include a description of how temporality is expressed in the stages preceding and following the BV (cf. ‘prebasic’ and ‘postbasic’ varieties: Klein and Perdue 1992, 1997; Dietrich et al. 1995). Note that the data having led to the identification of the Basic Variety are based on the oral production of adult untutored learners (typically immigrant workers) representing ten different pairings of languages (cf. Perdue 1993 for details). For practical reasons, most of our examples are given in English and French, but the remarks are also valid for L2 Dutch, German and Swedish.

For the description of temporal relations, three basic operations will be considered: the localization of situations in time, their distribution over time (continuous, accomplished, etc.) and their respective ordering (situation A taking place *before*, *after* or overlapping with situation B). While focussing on how such operations are realized in L2 (and then in homesigns), reference will be made to Klein’s model of temporality (1994). Three time variables are relevant to this end: the time of utterance (TU) or speech time, the time talked about or topic time (TT), and the time of the situation itself (Tsit). The topic time corresponds to the temporal span for which the assertion is claimed to hold. *Tense* is viewed as the relation between TT and the deictic TU: in the present tense the TT overlaps with the TU, in the past tense the TT precedes TU, and in the future tense the TT follows TU. In contrast to the topic time, the Tsit refers to the time span the situation occupies on the temporal axis. Grammatical aspect relates the TT to the time of the situation: for example in the perfective aspect the TT follows the Tsit (the situation is presented as completed before the asserted time interval), while in the imperfective aspect the TT is included in the Tsit (the situation is viewed as ongoing).

3.1.1 Prebasic variety

The initial L2 repertoire consists of some unanalyzed target language expressions and a set of lexemes roughly corresponding to target-language-like nouns, adjectives and adverbs. These items have a sound/meaning correspondence, but no clear grammatical specification. If verb forms are present, they have a rather ‘noun-like’ use or in fact they are difficult to categorize at all (cf. Perdue 1996, 2006): for instance */lemanze/* (literally *the-eating*) in French L2 can mean both ‘food’ and ‘eat’; conversely, in an utterance like *Charlie eingang* (literally *Charlie entrance* in German L2) the nominal expression *eingang* could be reconstructed either as a noun or as a verb, while in *Charlie weg strasse* (literally *Charlie away street*) it is the invariable particle *weg* which conveys the concept of movement. Given the absence of clear verb forms, this stage is defined as based on *nominal* utterance organization, but it could also be called *preverbal* utterance organization (cf. Klein and Perdue 1992). Utterance constituents may seem unconnected, but they are regularly related by a pragmatic principle: constituents having background status precede those having focus status (*‘focus last’*). The following narrative passage, a film retelling, exemplifies some typical features of a prebasic learner’s production⁴:

- (1) petit chien et garçon + à glace
 small dog and boy + to/on ice

⁴ The following conventions are adopted to transcribe learners’ production: + means an unfilled pause; ++ a longer unfilled pause; *...* encloses a sequence in a language other than the target language; NS stands for Native Speaker.

et garçon + boum glace
and boy + boom ice

et chien ++ sos
and dog ++ sos

At this stage learners' personal or fictitious narratives show the regular use of the Principle of Natural Order⁵ like in (1): events are recounted following their chronological order of occurrence. In the absence of any explicit linking device between propositions, this principle allows the inference of consecutivity between events. Thus, although there is no temporal expression in (1), an implicit AFTER relation holds between the events mentioned: a boy and a dog go to a frozen lake, then the boy involuntarily breaks the ice layer, then the dog helps him. In contrast to fully fledged languages, where the principle of natural order also applies, learners do not have any formal means to overrule it.

Prebasic learners' production generally needs the native speaker's scaffolding. The prebasic repertoire, however, always includes some explicit means to express the temporal reference of the situation talked about (its Topic Time). The temporal span for which a situation holds is usually unmarked when it corresponds to the deictic utterance time or to a temporal interval introduced in previous discourse, but noun-like or adverbial-like items – in particular CALENDRIC expressions like *Sunday, tomorrow* or *1970* – are used very early to fix a different time reference⁶. This mechanism is clearly exemplified in (2): the temporal anchoring of the first utterance is maintained as topical information from the native speaker's question, and therefore left implicit (like the topical entity *husband*), while the calendrical expressions *tomorrow* and *Monday* of the following utterances make explicit the temporal shift from the initial deictic *now*.

- (2) (NS: what about your husband?)
 *en el * hospital
 *Sp. *in the* hospital*
- demain ++ permis...
tomorrow permit (=to leave the hospital)
- et lundi à l'hôpital
and Monday to the hospital

As for main constituents, the POSITION of temporal expressions in the utterance mirrors their pragmatic status: *tomorrow* and *Monday* are placed in the utterance-initial position to express the time interval for which the predicate is asserted, while they would occupy an utterance-final position if the temporal information they conveyed were the focal element.

To summarize, the prebasic system is on the whole heavily context-dependent: the interpretation of learner utterances demands strong pragmatic inferences in order to retrieve the relations holding between entities at sentence level (cf. rarity of identifiable verb forms) and between utterances (cf. rarity of connectors). In spite of these expressive limitations, learners quickly develop explicit means to express 'temporal displacement', in other words they find ways to overcome the dependency on the contextual here&now or the native speaker's contribution (cf. also conclusions in Perdue 1993:103).

⁵ This discourse organizational principle is assumed to be the more natural way to recount events (or the unmarked way for linearizing complex information), as it facilitates the retrieval of events from memory by the speaker as well as inferences by the hearer (cf. Levelt 1989: 308).

⁶ In principle any NP referring to a situation having a temporal dimension can be used for this purpose. In *pause film + ausgang mit freund und fraulein* (film break + exit with friend and young lady; Dietrich et al. 1995: 82), it is the NP 'film break' that signals the temporal span for the action 'leaving the cinema'.

3.1.2. Basic Variety

The following stage is marked by the emergence of clearly recognizable verb forms and their arguments, around which the utterance gets structured. The presence of thematic verbs allows the learner to make use of different types of valency: the semantic principle *agent first* is thus added to the still predominant *focus last*. Verb morphology, if present, is not yet functional (hence the label of ‘verbal’ or ‘non finite utterance organization’): learners use either a unique form in different temporal contexts or variable forms in free alternation. In (3), for example, the learner produces a verb form (transcribed in phonetic symbols), which is pronounced like the target language present tense form, while the assertion concerns the past.

- (3) (NS: what are you doing here? Are you working?)
avant je [travaj] / maintenant non
before I work / now no

The system is still very simple: it shows a transparent interplay of semantic and pragmatic principles, while grammatical devices such as case marking, functional verb inflection (marking agreement, tense or aspect) and subordination are still absent (cf. Klein and Perdue 1997). Learners can, however, express a dense web of temporal relations via the following means:

- In addition to their structuring power as for utterance organization, UNINFLECTED VERBS and their arguments make explicit the inherent temporal features of the situation talked about, its **Aktionsart**, making it possible to distinguish between states and activities/events, punctual or durative situations;
- Items of verbal or adverbial nature (verb stems like *start*, *finish* or *stop* in English, but also adverbial forms like *fertig* in German L2), sometimes even unanalyzed chunks (like *çayest* in French L2), are added to the system to mark the left or right **boundary** of a situation (e.g. *work finish* roughly corresponding to *when work is over*);
- An increasing number of **temporal adverb(ial)s** enrich the prebasic repertoire. Following a functional classification they minimally include:
 - temporal adverbials expressing the POSITION of the situation on the time axis in an absolute (*Sunday, 1975*), deictic (*last week*) or anaphoric way (*later, after, before*);
 - a few temporal adverbials expressing the FREQUENCY of situations (*always, often, twice...*) and their DURATION (usually bare nouns as *2 hours, 4 days*).
- Items equivalent to AFTER and BEFORE express relations of order between situations; the presence of an overt marker for two (partially) overlapping situations (*when*) is subject to individual variation (cf. Dietrich et al. 1995). With respect to the previous stage, these items allow the speaker to signal breaks in the chronology of events (*before*) or to provide a complex temporal reference (*when*) for the upcoming predicate.

The contribution of temporal adverbials and boundary markers is highlighted in (4-5), which are typical discourse fragments of this stage:

- (4) nine o'clock in er + work *start*
half past two *finish...*
monday I gone in the hospital and speak doctor

- (5) (about the learner's husband)
el de vacances *el* mois de juillet
Sp. he some holidays *Sp. the* month of July
et moi /fe/ de le cours
and me do the course (=she has to follow a course)
y août moi de vacances *y el* de travail
Sp. and August me holidays and *Sp. he* (some?) work

The sequential ordering of constituents is still mainly determined by principles of information structure (cf. Dimroth et al. 2003): accordingly, temporal adverbials establishing the Topic Time are very often utterance-initial, as they have scope over the entire proposition (as *before* in (3) or *August* in (5)), while temporal adverbs expressing the TSit (as *month of July* in (5)) or quantifying the situation are in non-initial position, because they belong to focus information (cf. also Starren 2001). Linear position thus mirrors semantic influence in a transparent way⁷.

In comparison to the previous stage, the BV displays rich potential for the expressions of temporal relations, *implicitly* via a combination of discursive and pragmatic principles and *explicitly* thanks to essentially lexical means. Time reference is explicitly realized by an increasing repertoire of time adverbials, but spatial expressions can also contribute to its expression: thus *Punjab I do agricultural farm* is to be interpreted as ‘*when I was in Punjab...*’. The temporal anchoring of the utterance is however still left UNMARKED, as in the prebasic stage, (i) when it is topical information maintained from previous discourse, (ii) when it is inferable from discourse organizing principles (like PNO in narratives), or (iii) when it corresponds to the deictic utterance time (*default present reading*), unless contrasted with another temporal span (as in 3). Although this system gives way to frequent misunderstandings during interactions with native speakers, the BV in itself is rather effective for the localizations of situations in time; this said, it presents some severe shortcomings as far as aspectual perspective is concerned: situations can be quantified (if repeated) or marked as ‘completed’, but there are no specific means to give another aspectual viewpoint, nor to mark simultaneity. As pointed out in Dietrich et al. (1995:273) an utterance like *when in Italy I go Rome* can be attributed different readings: a ‘single case’ reading (*when I was in Italy I went to Rome*), an ‘habitual’ reading (*when I was in Italy I used to go to Rome*) or a ‘generic’ one (*whenever I am in Italy I go to Rome*). Despite the above shortcomings, many adult learners stop the acquisitional process here, i.e. they may add other lexical items to their repertoire, but the system as such remains stable (fossilization): its communicative possibilities are apparently rich enough to get along in most everyday situations.

3.1.3. Postbasic varieties

Further development leads to the emergence of the target language specific features for utterance organization (emergence of the subject function, subordination, cleft constructions, etc.) and of grammatical means to encode TENSE and/or ASPECT. Several studies point to the development of an “(inflected) AUX + (ininflected) Vlex” structure before main verbs are inflected (cf. for example Parodi 2000; Perdue et al. 2002) if both are present in the environmental language, but these structures can also be used to convey idiosyncratic meaning far removed from the target (cf. von Stutterheim 1991; Starren 2001). Moreover, some specialized lexical markers may appear to convey special time configurations in a complementary or alternative way with respect to verb morphology⁸.

Learners’ paths thus vary as they approach the target language. The crosslinguistic variation can, however, be captured by some overall regularities. On the *means* level there is an initial preference for analytic forms - i.e. free morphemes (auxiliaries, periphrastic constructions and invariable specialized lexical markers) + a non-finite lexical verb - over synthetic ones, which is related both to reasons of perceptual salience in the input and to a learner-specific tendency to keep semantic transparency. On the *function* level, priority is given to express grammatically the temporal opposition *present/past* (constructions relating two reference points in time, like the past perfect, are late acquisitions) and the

⁷ The same sort of semantic transparency holds for negation: the negator precedes the constituent it has scope over (cf. also de Swart, this volume).

⁸ The continuative meaning of ‘STILL’ may be used to trigger an imperfective reading of the predicate; conversely, items equivalent to ‘ALREADY’ + non-finite verbs can contribute in conveying reference to a completed and/or past situation or to a past in the past (cf. Benazzo 2003, Benazzo & Starren 2007 for L2; Comrie 1985 for fully fledged languages).

aspectual notions of *ongoingness* vs. *accomplishment* (or the imperfective / perfective distinction), which imply a dissociation between the topic time and the Tsit.

We see in this developmental sketch not only the same ‘communicative logic’ at work in earlier stages – ‘develop’ means to express communicatively important functions (= overcoming constraints of the previous system), but also the first traces of some learners’ attempt to approximate the formal organization of a target: here language is no longer being created anew.

3.2 Temporality in Homesign systems

3.2.1. Child homesign systems

The emergence of homesigns (henceforth HS) and their language-like properties have been extensively investigated by Goldin-Meadow and colleagues (Goldin-Meadow and Mylander 1990; Goldin-Meadow 2002, 2003, etc.) in the longitudinal data of children covering an age range from 1;4 to 5;9. The deaf child gradually develops a lexicon of stable gestural forms organized in paradigms: the gesture/meaning relation acquires arbitrary aspects (within an iconic framework) and gestures are progressively differentiated for the grammatical functions they serve (noun, verb/adjective, marker). Utterances grow in size and scope: the child starts with ‘one gesture’ utterances (akin to the one-word stage), which consist either of a pointing gesture or of an iconic one, then combines two gestures, and later builds multipositional sentences. Gestural utterances display underlying predicate frames, whereby word order signals thematic roles. In addition to the (morphological and syntactic) elaboration, the gestural systems are described as serving an increasing range of functions (cf. Goldin-Meadow 2002:347 and 2003:186). Gesturing is used to:

- (a) make requests, comments and queries about the present (Here&Now Talk);
- (b) communicate about the past, future, and hypothetical (Displaced Talk);
- (c) tell stories about self and others (Narrative);
- (d) communicate with oneself (Self-talk);
- (f) refer to one's own and others' gestures (Metalanguage).

In the following, the focus will be on **displaced talk**, i.e. the ability to refer to information that is spatially and temporally displaced from the location of the speaker and the hearer, that is out of their perceptual field. This language property is developed in three main steps (cf. Butcher et al. 1991; Morford and Goldin Meadow 1997):

- (i) After an initial period where pointings and iconic gestures refer to real world objects present in the immediate environment, children start mentioning non present objects, actions, attributes and locations. They can point to a present object that looks very much like the absent one they want to refer to (an empty jar of bubbles as a stand-in for the full one), or at the habitual location of the entity to which they intend to refer: one child for example points to a chair as stand-in for the child's father, who usually sits on it, and then produces a ‘sleep’ gesture to tell that his dad is asleep in another room.

The production of gestures referring to non-present objects and actions seems to correlate with a turning point in the language-like properties of the system. Non-literal pointing (which can be considered as the realization of true *symbolic* function) coincides with the emergence of two levels of structure in the gesture organization: within the sentence (akin to *syntactic* structure) and within each gesture (akin to *morphology*); at this stage the distinction between nouns and predicates starts being expressed via word order and space inflection⁹.

⁹ The basic distinctions between nouns and predicates (verbs/adjectives) is first expressed by the use of different gestures: points for nouns and iconic gestures for predicates; then, the same distinction applies via word order and space inflection (around 3;3). Evidence for a grammatical category arises, however, in a successive stage, where N/V do not exclusively refer respectively to objects and actions (cf. Goldin-Meadow et al. 1994).

- (ii) Later, children make reference to proximal events that are still tied to present context: they either anticipate what will happen or express events that have just taken place. A relevant example is the deaf child gesturing ‘bubble – EXPAND’ after blowing a large bubble.
- (iii) Finally, they refer to distant or non-actual events, i.e. reference to events in the past or in the future, and to potential or fantasy events (starting around 3;5). All of them made reference to past events, only some to future or hypothetical ones.

The explicit devices used to this end are the following ones:

- a **POINTING** gesture (pointing over the shoulder to indicate past reference): for ex. one child points over his shoulder [=past], then points at a flashcard depicting a dog [=dog], then point to the floor [=here]. The past interpretation is confirmed by the child’s mother reaction who says: *yes, we used to have a gray poodle, huh?*
- a gesture glossed **AWAY** (a palm or pointed hand extended or arched away from the body). Thus, David (age 5;3) comments on his father’s car accident by the following utterances: BREAK- away – dad – CAR GOES ONTO TRUCK (flat hand glides onto back of flat left hand) / CRASH - away (= dad’s car broke and went onto a tow truck. It crashed). AWAY is first interpreted as a marker of both spatial and temporal displacement (Morford and Goldin-Meadow 1997), later as a narrative marker (Goldin-Meadow 2003);
- a gesture glossed as **WAIT** (holding up the index finger) that children used to identify their intentions, i.e. to signal immediate future. One child for example gestured WAIT (future) TOYBAG, and then walked over to the toybag to fetch a new toy to play with.

These gestures are either novel (like *away*), “invented” by the child and apparently not repeated by the caregivers, or gestures existing in the cultural environment (like *wait*, conventional gesture to ask a brief delay or time-out) that the child adapts for new functions.

It is not clear to what extent deaf children made use of these markers, in particular if reference to distant or non-actual events was signaled in a more or less systematic way, but the underlying developmental pattern is clearly defined: deaf children start pointing **in** their immediate environment; then the function of ‘displaced reference’ emerges, whereby they can mention non-present entities/actions, but the situations are still linked to the here&now (or closely tied to it); finally, they can talk about situations ‘displaced in time & space’. This cognitive development is accompanied by a first verbalized opposition concerning the temporal anchoring of the situations talked about: present or proximal events are left **unmarked** (it becomes the default reading), while **overt markers** are acquired for temporally (and spatially) displaced events.

The last developmental step relevant for temporality concerns the **relative ordering of events** in narratives (Goldin-Meadow 2003: 144-5): 3 children out of 4 started recounting events in the order in which they actually occurred around the age of 5. Two remarks seem relevant with respect to this point: the first one is that despite the adjective qualifying the chronological order as “natural”, it has to be developed and this seems to happen rather late; the second one is that the child HS system does not include any temporal connectors yet, so that the reconstruction of their relative ordering is totally left to pragmatic inferences.

3.2.1.1 Child Homesigns and L1 acquisition

Morford and Goldin-Meadow (1997) also compare deaf children’s production with that of English-speaking children. They conclude that, at a cognitive level, both groups follow the same developmental pattern, i.e. adding increasingly abstract categories of displaced reference. The main difference lies in the onset time and frequency: deaf children refer to the non-present much less frequently and at later stages than the hearing children. This delay is related to the behavior of the deaf children’s caregivers, who made reference to distant events less frequently than the caregivers of hearing children, and marked temporal displacement only in their speech production (cf. the concept of *unwilling*

communicative partner, Goldin-Meadow 2002). It is useful, however, to underline the fact that contrary to hearing children, only reference to **distant** or **non-actual** events is marked overtly by explicit devices: thus for reference to proximal events the authors compare the hearing child sentence “see, I flipped over” immediately after she has done a flip on the couch, with the deaf child gesturing “bubble-EXPAND” after blowing a large bubble. The conceptual operation (making reference to proximal events) can be defined as similar, but the spoken utterance contains a linguistic marker of past (-ed) which is absent from the gestured one.

The comparison provided by Morford and Goldin-Meadow focuses on the cognitive development of the deaf and hearing subjects rather than on the linguistic means used. This procedure is understandable and justified, given that the grammatical devices of the specific target language (e.g. verb inflection) emerge very early. Moreover, the process of **form/function mappings** seems to go in the opposite direction in the two cases: in normal L1 acquisition *form* often precedes *function*¹⁰, while the lack of a model for the homesigners forces them into the development of new linguistic means once (or after) they have elaborated a given conceptual function and feel the need to express it (in fact, the deaf children initiated more of their communication about non-present than their caregivers).

Despite such differences, some intriguing parallels with L1 acquisition can be set at the linguistic level by looking at the stage preceding the use of finite verbs¹¹. The study of Gretsche (2004) on finiteness and root infinitives points to a developmental pattern very similar to the one observed in child HS: using the metaphor of cell divisions, she explains the first step towards a TAM system as consisting of an initial fission between a *default here&now* vs. *another point in time*; the second fission gives directionality to the TT different from here&now (backward for past and forward for future), while proper aspectual distinctions, where TT and Tsit are dissociated, need a third fission. In tense-oriented languages (like German and Dutch) the first fission is expressed by the morphological opposition between finite forms (= here&now) vs. infinitival ones (not here&now), while in aspectual-oriented languages (like Russian) it is the perfective/imperfective opposition which is used to convey the same basic distinction in temporal reference by implication. Leaving aside differences in age between hearing and deaf children (due to the creative task), the developmental tendency is conceptually the same, but the chosen **option of what is left unmarked** is reversed: the former use morphologically marked verb forms for the here&now while for the latter this is the default unmarked context (like in early stages of L2).

3.2.2. Adult homesign systems

Deaf children born to hearing families may grow up and continue to live in environments which do not provide them with exposure to institutional sign languages. Studies on adult homesigners are few in number, but they all suggest that, with age, the means used to express temporal concepts become more diversified. From the pioneer studies of Yau (1992), Kendon (1980) and McLeod (1973) it can be observed for example that adult home signers have at their disposal some means to express at least the passage of time (deictically based time lines + skyline), to quantify time entities and to contrast situations referring to present context with respect to another time interval (cf. signs for parts of the day and for ‘another day’¹²). Tense inflection is not developed, and the default reading for utterances without any tense marker is the present (or recent past). The focus of such studies, however, was not the expression of temporality.

¹⁰ In L1 acquisition the child’s task is to pick up forms from the environment and find out which function they serve. The order of acquisition (of grammatical morphemes) can be predicted according to (a) the cumulative complexity of semantic distinctions, (b) the formal complexity of how such distinctions are mapped onto forms, and (c) their frequency in the input. However, form usually precedes function in that new forms are often used when the children have not yet worked out exactly what they mean (cf. Clark 2003: 194-195).

¹¹ It would of course be interesting to take into account the development of temporal reference in deaf children acquiring a conventional sign language, but this is still an unexplored domain of research.

¹² Yau (1992) reports for example Miss Pettwiki’s strategy to express *an(other) day* (hence temporal displacement) by a hand movement to the side (cf. *away* in child home signs).

The main source of evidence for temporality in adult HS will be therefore the study of Fusellier-Souza (2004), who describes in detail the expression of temporal relations in the communicative systems of 3 deaf subjects living in Brazil: Jo (aged 26), Ana (aged 20) and Ivaldo (aged 53). Their gestural systems are structurally very similar and consistent with the properties described by Goldin-Meadow for child HS: they consist of a stabilized lexicon of gestural signs (with a quantifier, nominal, verbal/adjectival value), highly iconic gestures and pointing gestures, which are organized to form utterances following predicate frames. Table 1. reports the repertoire of stabilized gestural signs with a specific temporal or aspectual value, which were attested during a 15-minute free conversation between each deaf subject and his/her preferential speaker (the quantification takes into account the production of both speakers).

Table 1. Stabilized gestural signs with a temporal value (adapted from Fusellier-Souza 2004: 278)

<i>Repertoire of gestural signs</i>	<i>Semantic glosses</i>	<i>Ana</i>	<i>Jo</i>	<i>Ivaldo</i>
Gesture of accomplishment with both hands	Finish	5	26	8
Pointing over shoulder or rotational movement of the hand	Before (<i>before x or past</i>)	1	12	5
Pointing or circular movement in the opposite direction	After (<i>after x or coming = future</i>)	13	7	5
Pointing downwards	Now / Here	-	2	4
Repeated sleeping gesture	Every day (<i>generic or habitual reading</i>)	1	-	-
Fingers snapped repeatedly	Long time (<i>indefinite duration</i>) Long time ago (<i>distant past</i>)	3	-	5
Various gestures for calendrical expressions: for ex. gesture of a cross = Sunday	Designation of a specific month (<i>June, December, etc.</i>) and of a specific day of the week (<i>Sunday</i>)	1	-	14/4*
Various gestures for time units: for ex. gesture for sleeping = day; gesture for December = year	<i>x days, x years, x months</i>	1	3	2

*14/4 stands for token/type ratio.

The communicative exchanges recorded are rather rich in temporal expressions. The repertoire includes a wide range of means to localize situations in time:

- gestures to indicate basic 'TIME UNITS', like *day, month or year*, plus their quantification;
- gestures identifying a specific temporal span (CALENDRICAL expressions) like *June, September, December* or a specific day of the week like *Sunday*¹³;
- gestures corresponding to 'AFTER' and 'BEFORE' (the opposition is expressed either by pointing on a time line crossing the subject, over the his/her shoulder or in front of it, or by making a repeated circular movement with the hand in opposite directions), which can be used adverbially to express a 'generic past / future' or in adposition to calendrical expressions to indicate a specific time span (*before + June ; 6 days + after = in 6 days*).
- pointing downwards to the space in front of the speaker to mean either 'HERE' or 'NOW'.

¹³ Different strategies are attested to create a calendrical expression: a specific time span can be associated with the cultural or habitual activity taking place during it (for ex. *cross* meaning *Sunday*, the day when people go to church; the sign for sleeping for 'day') or with one of its perceptually salient details (*December* or Christmas time is represented by gesturing flashing lights by Ana, and by gesturing Santa's beard by Ivaldo).

The above gestures can also be combined with ‘time lines’ to construct complex temporal references. Thus in (6), in order to fix an appointment for the following Wednesday early evening, the speaker first signs ‘Sunday’, whose signing location becomes the starting point of a time line where 3 working days are placed, then ‘sunset’ (movement of the sun) and finally ‘go’.

(6) SUNDAY [starting point of a time line] WORKING-DAY 3 (= 3 days later) SUNSET GO

The temporal properties of situations can be specified by:

- a gesture glossed as ‘FINISH’ (very productive in all subjects), which is a clear marker of accomplishment¹⁴;
- a gesture glossed as ‘LONG TIME’ (apparently the reinterpretation of a Brazilian hearing community’s gesture) which can mark either the ‘indefinite duration’ of activities (e.g. walk for a long time) or a ‘distant past’ (roughly equivalent to *long time ago*)¹⁵;
- a gesture glossed as ‘EVERY DAY’, which corresponds to the repetition of the ‘day’ gesture without specifying a precise quantity. It is the indefinite quantification of days which triggers a generic or habitual reading.

It should also be noted that all subjects produce predicates referring to static (*see, listen, like*) and dynamic, atelic (*eat, sleep*) and telic processes (*die, cut, leave*), whereby the repetition of the movement designating an action is an explicit device to express reiteration or duration of the same activity.

Some discrepancies in the repertoire of the three subjects can be attributed to the different conversational topics they discussed¹⁶, but on the whole the linguistic means they used for temporal relations, while showing a continuity with child HS, are not very different in nature from the ones stated at BV level, at least to the extent that they allow the speaker to cover the same basic functions stated for L2 at this stage. Besides the inherent properties of situations, inferable from the lexical content of the verb (lexical aspect), speakers have at their disposal expressions in order to:

- **locate situations on the time axis** (with deictic, anaphoric and absolute value), making reference to an indefinite future / past or a definite time span (calendrical expression);
- **order situations** with respect of each other;
- quantify minimally the **frequency** of situations (reiteration, habituality) or their **duration**, be it definite (*x days*) or indefinite (*long time*);
- mark the **right boundary** of a situation (*finish*).

The similarities extend to the functioning of these expressions in discourse: the temporal reference for which the predicate holds is very often left unmarked if retrievable in context, i.e. (a) either set in previous discourse or (b) corresponding to utterance time (default present reading); a deictic *now*, however, has to be expressed when it takes a contrastive value (compare ex. 7-8 taken from Fusellier 2004:282, with ex. 3 from L2).

(7) (Ivaldo about his working situation)
before [pointing over shoulder] GOOD
now [pointing downwards] SO SO (more or less)

(8) (about a football team)
before [rotating hand backwards] WIN [sign for win/victory]
now [pointing downwards] FINISH

¹⁴ A gesture equivalent to ‘finish’ (firm clap of the hands) is the most arbitrary sign reported in MacLeod (1973).

¹⁵ Fusellier-Souza reports also a contextual interpretation equivalent to *since long time*, where the gesture would set reference to an activity started in a distant past and going on until utterance time. This interpretation seems, however, to be dependent on the discourse context and on the atelic nature of the verbs.

¹⁶ Reference to the future (the ‘coming’ meaning of *after*) is for example only attested in Ana’s production, who comments on events that have to take place in the village and on things she will do later. In contrast, Jo and Ivaldo refer more to past situations, hence the larger number of references to past or accomplished situations.

The above utterances also show some regularities in **word order**: the speaker builds a time reference before predicating some properties for the constructed time interval. The utterance initial position can be considered iconically motivated as word order matches the semantic scope of the adverb. Conversely, the temporal expression seems to be utterance final when it represents focal information, as in the following utterance (Fusellier-Souza 2004:285):

- (9) (answering a question about a journey : how many nights/days did it take to go there ?)
GO me [pointing at himself] NIGHT [or day: sleeping sign] THREE

The position of temporal expressions thus seems to be determined by the same pragmatic and semantic principles found in early L2. In the list of similarities we can also add the extensive use of the **principle of natural order** in narratives: if events are recounted in their chronological order, the consecutive relation is not marked.

The adult systems show both a structural continuity with child HS and an important development in their expressive power for temporal relations. This complexification can be attributed to the cognitive maturation taking place with age, combined with the presence of favorable conditions for the use of language. Actually, the 3 subjects observed by Fusellier-Souza are isolated from a deaf community, but at least partially integrated into the hearing environment (two of them exert a professional activity). In particular one member of their hearing family functions as a preferential speaker (if necessary interpreter vis-à-vis hearing people), which means that each deaf subject has at least one communicative partner who fully shares the HS system¹⁷.

3.2.1.1 Modality specific features?

In the introduction it was hypothesized that the specifics of the expressive mode could have an impact on the developed system: in contrast to the spoken one, the signed modality potentially offers the simultaneous availability of multiple resources (hands and facial mimicking). In this respect, Fusellier-Souza mentions the use of ‘eye gaze’, which seems to play a role in making the difference between a specific and unspecific time reference, although in an unclear way (an utterance is for ex. interpreted with a generic / habitual reading because the speaker does *not* build a time reference and refer back to it by his gaze). More interestingly, the ‘role shift’ from narrator to protagonist that takes place in narrative stretches, whereby the signer’s own body becomes the referential index of a character, allows the speaker to represent simultaneously two overlapping activities. In Fusellier’s data this is attested on two occasions: during the narration of an accident, Jo represented with the hand his movement towards the hurt person, while his face mimicked that he was meanwhile watching everything; Ivaldo referred to his son noticing a young girl (facial mimick and eye gaze) while he was drinking a coke (one hand keeping a drinking straw). Such a possibility for expressing simultaneity seems however to be exploited only in highly iconic passages, when meaning is constructed by ‘showing’ (Cuxac 2005), and for a limited repertoire of actions. In comparison to the spoken one, the manual modality probably also offers a greater potential to exploit *lexical aspect* (cf. for ex. repetition of the same gesture to express reiteration), thanks to the iconic component of visual representation. On the other hand, it is not clear to what extent beginning L2 learners also resort to gestures because of their limited spoken repertoire in the L2¹⁸.

¹⁷ Notice the difference between the parents of the American deaf children, who insisted on an oral method and did not consider the child’s gesture as language (hence the concept of unwilling partner, Goldin-Meadow 2002), and the families of Fusellier-Souza’s subjects, who had a positive attitude towards HS (cf. also Morford and Kegl 2000 about the parents of Nicaraguan HS children).

¹⁸ Gullberg’s study on gestures in L2 underlines that they do not replace speech but accompany it. Their higher frequency in L2 “suggests a need on the part of the learner to be over-explicit and redundant” (1996:72), but the dominant modality is speech. The analyzed learners of her study, however, are rather advanced and we do not know of any study on gestures in early stages of L2 acquisition.

In sum, from what could be stated in Fusellier-Souza's study, the differences related to the expressive modality seem to be rather marginal for the domain of temporality. Not specific to modality but to the task of inventing items, is: (a) the direct link between gestures and the perceptual experience (for example the sleeping sign meaning both *day / night* and the time unit of 24h) and (b) conversely the difficulty of expressing arbitrary time units (for ex. months) or absolute time spans, which in HS give way to long periphrastic constructions.

3.3 Some final remarks on the windows considered

The developmental sequences sketched in the previous sections show striking similarities and some important differences between L2 varieties and HS systems. In particular, it is not easy to put the **earlier stages** of each process on a par, i.e. prebasic varieties in L2 and child homesigns. The cognitive development that takes place in the deaf child and his/her initially limited communicative needs make child homesigns, if anything, more suitable for a comparison with L1 acquisition. On the other hand, child HS make visible a stage preceding the expression of any temporal relation that adult L2 acquisition cannot show: the progressive use of the symbolic function, i.e. mentioning entities that are out of the immediate perceptual field. For temporal relations, however, there is a first step common to each process (L2, L1, HS): the transition from a system that is initially context-dependent (or limited to contingent situations) to the development of some means to go beyond the here&now. In both cases the deictic speech time is left unmarked, while the first temporal devices explicitly mark the **(spatio)-temporal displacement** of the situations talked about. In doing so, children seem to privilege indefinite markers (clustering ambiguously another time and another space), while definite ones come later.

Further development leads to a **convergence** between the systems involved in the two processes. The formal repertoire and the communicative possibilities that characterize the Basic Variety and adult homesigns are indeed very similar. From what can be attested in the literature, in both cases a repertoire of lexical expressions arises (i) to locate situations in time (in a deictic or absolute way), (ii) to quantify their frequency and duration (be it definite or indefinite), (iii) to signal boundaries (thus overruling the inherent semantic properties of predicates) and (iv) to order situations with respect to each other (in particular *before*, necessary to overrule the PNO). We can also list, as shared features, the organization of temporal information in the utterance (linear position mirroring information status and semantic influence) and in discourse (leaving unmarked the temporal information recoverable from the situational context, from previous discourse or from discourse organizational principles). As a result, there is no obligatory element to identify the time reference of each predication or its aspect. Their main features for temporal relations come close to pidgins and we can subscribe to Labov's remark about time in pidgins when he says:

“This system may seem primitive but it is hard to prove that it is inadequate... the pidgin system may be cumbersome, but in most discourse situations it proves to be quite efficient to designate time relations: specifically when called for, otherwise not” (1990:18)

Yet, the systems described can be considered both ‘simpler’ (as for the means) and ‘restricted’ (as for the temporal notions getting expressed) with respect to their fully-fledged spoken or signed counterparts. L2 postbasic varieties, while approaching the target language, present a wider range of formal means in the temporal–aspectual domain which make it possible to express more sophisticated temporal notions (for ex. simultaneity, past in the past, aspectual viewpoints other than ‘completion’). Sign languages, which can be considered as the natural target of HS (or conversely HS as emergent Sign Languages, cf. Cuxac 2005) seem rarely to inflect for tense, but they always present a rich system of grammaticalized aspectual marking¹⁹. Studies on the emergence of the Nicaraguan Sign Language attest the presence of specific

¹⁹ According to Pfau and Steinbach (2006), signed verbs do not inflect for tense (with some exceptions): temporal information is conveyed by time adverbials (use of the so-called time lines) and lexical tense markers, or it is inferred

means to express iterative, completed and progressive aspect (which are already beyond individual HS) even in what is presented as a peer group pidgin developed by the first cohort of homesigners²⁰. Language diversity implies the unequal grammaticalization of aspectual and/or temporal notions²¹, while the system of adult homesigners and L2 learners at Basic Variety level present the means to express **just a subset** of them.

Various extralinguistic factors can explain the limited amount of formal means stated in BV and HS. In the L2 case, the presence of an L1 can represent a blocking factor to further development: after all the learner already has a language community sharing his/her mother tongue and can be satisfied when basic communication for everyday life takes place in the L2. On the other hand, the adult homesigner only has his/her gestural system with which to communicate, but is exposed to a limited number of exchanges and lacks a community of peer interlocutors to further grammaticize the system. Both processes give way, however, to stable communicative systems which are remarkably similar despite the different circumstances characterizing their emergence and the expressive modality. This statement leads to two important remarks. First, it reconfirms the idea that the simple systems analyzed are not a simplified or reduced version of fully fledged languages, rather the latter are but elaborations of the former, obtained by increasing the formal repertoire with supplementary means, and making their expression possibly obligatory (cf. Corder 1977 and Klein and Perdue 1997)²². Secondly, given their convergence on a functional level, the similarities attested can be attributed to the pressure of similar **communicative needs** (getting more sophisticated in adults) which, in a favorable environment (= interaction with communicative partners) and in presence of basic cognitive capacities (to segment, analyze and recombine elements perceived in a meaningful context²³), push the human language faculty towards the same direction. The projections onto early language start with the assumption that similar driving forces were also at work in language evolution.

4. Implications for temporality in early language

4.1 The logical sequence

In modern languages, temporality crucially involves three basic semantic operations: localize situations in time, express their distribution over time and order them with respect to each other. The development observed in emergent L2 and HS systems suggests a relative hierarchy in their expression: explicit means for ‘localizing situations in time’ are attested *before* specific means to ‘give an aspectual

from the context; conversely, Sign Languages are known to have at their disposal complex systems of aspectual marking. French Sign Language includes for ex. aspectual markers for completion, prospective, recent past, experiential and habituality (cf. Fusellier-Souza and Leix 2005).

²⁰ The study of Kegl, Senghas and Coppola (1999) reports how some signers of the peer group pidgin mark certain aspectual information with mouth gestures often accompanied by vocalizations that are visually detectable: a rapid protrusion and retraction of the tongue while vocalizing /bɪɪɪɪɪ/ for *iterativity* and an unvoiced bilabial trill for *completion* (p. 183). The authors also mention the presence of sign reduplication to mark the *progressive* in the pidgin used between hearing individuals and deaf signers (p. 185). Their main point is to show that aspectual marking is encoded in a more sophisticated way by the following cohorts; nonetheless iterativity, completion and progressive are already expressed, by different means, as of the peer-group pidgin stage.

²¹ On this point, Chinese and German could be mentioned as representing the extremes: the former lacks grammatical tense but presents a set of grammatical aspectual particles, probably combined with assertive functions, while the latter has grammaticalized tense in verb inflection but lacks a grammatical marking of aspect.

²² On the basis of similarities between pidgins, foreigner talk, baby talk and L2 varieties, Corder (1977) prefers to “treat standard languages as ‘complicated’ forms of a ‘basic’ simple language”. The same idea is defended by Klein and Perdue (1997) specifically for the BV. Formal elaboration arises from the broadening range of communicative function within the speech community and the need to reduce the ambiguity inherent in simple systems.

²³ Cf. conclusions given for HS in Goldin-Meadow and Mylander (1990) and Senghas, Kita and Ozyurek (2004), and for early L2 varieties in Perdue (2006).

perspective' on them or to 'order' them. This priority is directly inferable from L2 development – temporally displaced reference is expressed before the emergence of clear verb forms or of any boundary markers – and indirectly in the analyzed HS systems: the most elaborate means deaf adults have at their disposal (deictic, anaphoric and absolute) are specialized for this function, while the deaf children produce signs explicitly marking the (spatio)-temporal displacement but there is no report on the presence of any aspectual markers. The natural sequence thus described involves two main steps in the expression of temporal relations: anchoring situations in time < giving an aspectual viewpoint on them. Both stages must, however, have been preceded by a previous one where symbols were simply disconnected from the presence of their referents.

(i) Mere displaced reference

Displaced reference is considered as an essential function of human language. It is useful here to distinguish between mere 'displaced reference' – making reference to entities in their absence (= the symbolic function of language) - and 'temporally displaced reference', i.e. marking that a situation does not refer to the present temporal span or specify to which temporal span it applies. It seems reasonable to assume a stage where a lexicon of symbols referring to situations or speech acts were combined and interpreted by pragmatic principles before the emergence of any explicit temporal marking (cf. child HS). Utterances would correspond to speech acts related to the here&now or close to it, as in (a).

Sit.A
(a) -----!----->
Speech time

(ii) Anchoring situation in time: from contextual dependency to temporally displaced reference

The conceptual category of temporality would display a first basic partitioning between situations referring to the here&now vs. (spatio)-temporally displaced reference (metaphor of cell divisions, cf. Gretsch 2004). In continuity with the previous stage, the origin of this deictic system - 'speech time' or 'close to speech time' – may be left unmarked as it belongs to situational, contextual and shared knowledge (present default interpretation). An item designating a deictic *now* or *here* must, however, be available in the system in order to mark the contrast to the other temporal (spatial) entities. An initial stage of contextual dependence (absence of explicit temporal reference) would thus be followed by the development of a minimal deictic system, where it is possible to overtly mark speech acts for past, present or up-coming temporal spans. Note that the temporal system at this stage implies a relation between 2 parameters – the Topic Time and the Time of Utterance – which can coincide (b' TT=TU) or be dissociated (b'' TT<TU; b''' TT>TU).

Sit.A
(b') -----[-!-]----->
S
Sit.A
(b'') [---]-----!----->
S
Sit.A
(b''') -----!---[---]----->
S

The expression of directionality in temporal displacement could be preceded by a stage where the opposition concerns only the here&now and its negative counterpart (cf. L1 acquisition and child HS).

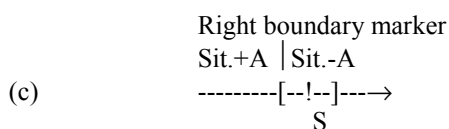
Different scenarios may be envisaged as involved in the process of creating the abstract notion of time. Temporal displacement may first be expressed by spatial specification: mentioning another place is a clear strategy still used to convey the idea of another time (cf. L2 varieties and, for HS, pointings ambiguously meaning 'here' or 'now' and the gesture 'away' implying both another time and another place). The visual perception of space makes it probably less abstract than the concept of time, but also everyday natural events like sunrise/sunfall and the day/night alternation belong to ordinary perceptual experience that can have served as a source to quantify time and express temporal displacement.

Once deictic items identifying an indefinite past (*before now*) and an indefinite future (*after now*) are available, they can also be used anaphorically for **ordering situations** with respect to each other (*before x* or *after X*; cf. adult HS).

(iii) Giving a viewpoint on situations: from lexical aspect to boundary markers

The system just described implies setting a **static** time reference for a situation viewed as a **whole** (such as “at time X holds situation A”), which can probably also be quantified or repeated, but does not enable any distinction of its inner constituency. A further step would be represented by the development of means giving a dynamic/aspectual perspective on the situation talked about, and boundary markers seem to play a crucial role in this process.

As we have seen, in emergent L2 and HS systems a first temporal characterization of situations arises with the emergence of verb forms: the semantics of lexical verbs and argument structure convey properties like punctuality, duration or telicity. The introduction of boundary markers (in particular items for completion equivalent to *finish*) allow the speaker to overrule the natural semantics of the predicate (cf. for ex. the combination of *finish* with atelic processes with no natural endpoint). At the same time, they represent an increase in conceptual structure: putting a right (or left) boundary to a situation (such as “at time span X situation A is over”) implies reference to different phases of the same situation, plus indicating their orientation on a temporal scale: for *finish* the transition goes from a positive (+A) to a negative phase (-A), whereby only the latter is expressed.



The use of items meaning completion (like *finish* or *over*), inchoativity (like *start*) or continuation (like *keep on*), give a dynamic perspective to temporal reference and lead to the introduction of a third temporal span: the time of the situation itself (in contrast to the asserted one). The data of L2 acquisition and HS constitute evidence on the primacy of right boundary markers (cf. also Bickerton on pidgins²⁴), even if any of them could potentially start the mechanism of aspectual perspective. Once the system includes lexical means for such notions, aspectual categories like ongoingness or perfectivity – where TT and Tsit do not exactly coincide - can develop by ordinary processes of grammaticalization (cf. for ex. Bybee, Perkins and Pagliuca 1994 for a crosslinguistic study on lexical sources of tense/aspect markers).

In the logical sequence just sketched, we can see how a system made of non-situation-specific symbols designating entities, actions and properties, can acquire more abstract meaning and be progressively used to express the basic semantic operations involved in temporality.

4.2 Projection on existing models of ‘protolanguage’

The developmental sequences observed in emergent L2 varieties and HS systems have enabled us to extrapolate a logical sequence of operations concerning the expression of temporal relations in early language. How does such a sequence fit existing models of language evolution? Which prerequisites in

²⁴As Bickerton puts it: “Pidgins usually have two expressions that mean, respectively, ‘earlier/completed’ and ‘later’ (*pau* and *baimbai* in Hawaiian Pidgin, *pinis* and *bai* in Melanesian Pidgin). Reflexes of what were probably expressions meaning ‘earlier/completed’ in their antecedent pidgins (*don* in English creoles, and *fin* in French creoles, *kaba* in Portuguese creoles) are found in almost all creoles and are all, like the Hawaiian and Melanesian examples, derived from verbs with the meaning ‘finish’” (1990: 183).

the complexity of the system (and which specific means) are required to express temporal relations? In other words, which features of the system must co-evolve?

The described sequence is adequate with scenarios whereby language evolution takes place progressively by incremental steps. Since Bickerton (1990), ‘Protolanguage’ has become the recurrent term to define a precursor of modern language (cf. Comrie 2000, Jackendoff 1999, Arbib 2003, Wray 1998, etc.): such a form of early language is assumed to have been by definition ‘simpler’ than modern language (lacking for example morpho-syntactic structure), but other features and/or intermediary steps vary according to the authors. A first contrast opposes **synthetic** models to **analytic** ones: the former (for ex. Wray 1998) assume that early language would have emerged from entirely arbitrary strings of sounds with an holistic meaning, that were later fragmented into meaningful components, while the latter (for ex. Bickerton 1990 and Jackendoff 1999, 2002) posit the emergence of single symbols that were afterwards combined. On this point, our data are more compatible with the analytic models.

Besides its analytic structure, Bickerton and Jackendoff end up with different conclusions about other features of protolanguage, although both authors ground their speculations on similar sources of empirical evidence (i.e. trained primates, pidgins, child speech under 2, Genie, late L2 acquisition, speech of agrammatic aphasics). **Bickerton** (1990) proposes two main steps in the evolution of the human capacity for language: protolanguage and language. As repeated more recently, protolanguage would almost exclusively consist of: “nouns and verbs, without modifiers – if adverbs appear, they are usually whole-utterance modifiers, not modifiers of single words. If adjectives appear, they are a few of the more common ones, probably acquired with nouns as unanalyzed chunks [...]. All units are of equal value” (Calvin and Bickerton 2000:41). In negative terms, protolanguage is very often defined as *structureless*. As a first approximation, it is language minus syntax: it lacks function words, utterances do not show any consistent word order, arguments can be missing and syntactic embedding is absent. The transition towards syntax takes place via argument structure: the regular pattern introduced by the obligatory presence of arguments would constitute a template for hierarchical phrase structure and syntactic embedding (Calvin and Bickerton 2000). The author is rather laconic about temporality: inflections expressing tense, mood and aspect are unlikely candidates for protolanguage, but he speculates on the possible presence of expressions meaning *earlier/completed* (regularly attested in pidgins, cf. note 24) derived from verbs meaning *finish*, which would represent “an analysis of time more primitive than the tense analysis of true language” (1990:183).

If we consider the repertoire involved for the expressions of the 3 temporal functions described in 4.1, it is fully compatible with Bickerton’s protolanguage: it just requires nouns, verbs and adverbs. A protolanguage with such a ‘simple repertoire’ of lexical means is therefore not necessarily confined to the here&now or highly context-dependent, it actually allows the speaker to express a dense web of temporal relations. The analysis of L2 and HS also leads to a criticism of the idea that the lack of syntactic organization equals a random word order: the position of utterance constituents (and temporal expressions) can be determined by their information status and can mirror their semantic scope. Moreover, the development of argument structure *may* function as a template for syntactic embedding, but it seems implausible that it immediately triggers it, as assumed by Bickerton: both BV and HS apply argument structure but lack formal means for subordination.

Jackendoff (1999, 2002) elaborates on Bickerton’s model, proposing several incremental steps instead of one main leap. In his view, the repertoire of Protolanguage is made up of ‘symbols’ used in a non-situation specific way and combined by pragmatic/semantic principles (Agent first, Topic first, Grouping); grammatical categories and symbols for abstract semantic relations – prepositions expressing spatial relations, temporal terms like *now*, *yesterday*, *before*, *after*, *until*, as well as markers of illocutionary force and modality – emerge rather late, after the sentence shows the presence of Hierarchical Phrase Structure, i.e. in an intermediary stage between protolanguage and modern language. The evolutionary schema presented by Heine and Kuteva (this volume) also suggest that temporal-spatial displacement is realized only after the elaboration of phrase structure and the emergence of several grammatical entities.

Once again the means involved in the development sketched for temporal relations are compatible with a stage that would precede modern language in Jackendoff’s model, but the *timing* of their co-evolution with respect to grammatical categories is less straightforward. If we focus on the first

temporal operation attested – the displacement of temporal reference from the here&now or the localization of situations in time - child HS produce items expressing temporal displacement after their system has developed the distinction between Nouns (for entities) and Verbs (for actions), even though such a distinction is still semantically based (= symbols for abstract semantic relations follow or co-evolve with grammatical categories); L2 adult learners, on the other hand, realize such a temporal operation even before the production of relational items equivalent to verbs (= symbols for abstract semantic relations precede a clearcut distinction of grammatical categories).

The mismatch just pointed out has been attributed to the specifics of each ontogenetic process: contrary to the child, a cognitively mature and socially integrated subject cannot be confined to utterances limited to the *here&now*. The divergence in the empirical sources can thus be accounted for in terms of speakers' unequal cognitive-social development and communicative needs, but it also raises a fundamental question for projections on language evolution:

what degree of cognitive development and what kind of communicative needs are attributed to human beings creating early language? Are children or adults the initial language-makers?

A closely related question has been formulated about **language innovation**. Contra Bickerton's Bioprogram Hypothesis, Slobin (2002) underlines the child's lack of true creativity in normal language acquisition, whereas "much of linguistic innovation is due to individuals who are advanced in cognitive and social development"; he recognizes that children can create a communicative system with language-like properties in the absence of a conventional model (HS), although its grammaticization implies the intensive language use induced by the presence of a peer group community²⁵. In sum, despite age-related differences, both adult and children have the capacities to innovate/create language to a certain extent. Notice however that, when it comes to the advantage represented by the emergence of language in evolution, most of the functional reasons adduced – be it planning joint ventures like sea-crossings (Coupé and Hombert 2005), foraging (Bickerton 2002) or regulating social behavior (via grooming for Dunbar 1996, via narrating for Victorri 2002) – suggest adult-like needs and cognitive capacities.

If our windows on language evolution leave open the initial question about the emergence of grammatical categories with respect to the expression of temporal displacement (and the subsequent one on the initial language-makers), they unambiguously indicate that 'complex functions' can be expressed by 'simple means'. In particular:

(1) it is not necessary to presume a high level of syntactic development as a pre-requisite for the expression of (complex) temporal relations. The basic semantic operations in temporality are compatible with a protolanguage repertoire still lacking many of the syntactic features displayed by modern language. This observation clearly goes against conclusions drawn in several studies which attribute fully syntactic language on the grounds of evidence for symbolic behavior, like burial rituals or personal decoration (cf. Henshilwood et al. 2004 on shell beads²⁶);

(2) what seems crucial for temporality in early language is not the complexity of syntactic development, but rather the pre-existing conceptual structure for its representation (cf. Wilkins and Wakefield 1995) and the need to express it in a linguistic way. This statement reconfirms, to a certain extent, that the big step in language evolution is the emergence of a lexicon for symbolic function (cf. Deacon 1997) – in particular the ability to disconnect the symbol from the presence of its referent – preceded by or combined with the development of pragmatic capacities, by which other individuals are

²⁵ It is actually subject to debate how far language development can go over the ontogenetic lifespan in the absence of a conventional model. Morford (2002) distinguishes convincingly between 'innovation' (individual deaf subjects developing linguistic structure out of inconsistent gestural input) and 'grammaticization', requiring structured linguistic input and intensive language use (for ex. Nicaraguan signers having the first cohort's HS as input). Fusellier's data seem to confirm this statement: even if the oldest subject, with more diversified social contacts (hence wider practice of language) displays a richer production in comparison to the other two, his repertoire seems to be larger in terms of lexicalized signs, not in terms of grammar.

²⁶ The authors report on the discovery of personal ornaments (perforated shell beads) from Middle Stone Age and conclude "fully syntactic language is arguably an essential requisite to share and transmit the symbolic meaning of beadworks and abstract engravings such as those from Blombos cave" (2004:404).

recognized as intentional agents (cf. the concept of joint attention in Tomasello 2003, as well as the pre-adaptations listed in Hurford 2003).

5. Conclusions

The goal of this article was to gain insight into temporality in early language, using the indirect evidence offered by some present-day spontaneous developmental processes. To this end we have compared how temporal relations are progressively expressed in early stages of adult untutored L2 acquisition and in (child and adult) homesign systems.

The first question was whether there are common developmental patterns despite the different circumstances of emergence and expressive mode. The answer is affirmative: the comparison highlighted some process-specific features, but also many striking similarities, such as a remarkable convergence between BV and adult HS, both in terms of the formal repertoire and their expressive power for temporal relations. The presence of a similar sequence of developmental steps suggests a relatively low impact of environmental factors (like previous experience of language and expressive mode, the main difference being cognitive development); it conversely highlights the communicative logic underlying both processes, e.g. a hierarchy in the expression of temporal notions, which was used as an empirical basis to propose a logical sequence of conceptual operations in early language.

Another question concerned the means necessary to express the fundamental operations identified. By contrasting some models of protolanguage with the simple systems analyzed it was possible to refine the potential expressive power of a protolanguage repertoire. The expression of basic relations, like temporal displacement (which is already far beyond primates communication), does not demand syntactic complexity *per se*, but rather the previous development of the conceptual structure necessary for its representation. Projections on early language always have a speculative flavor, but the study of modern-day developmental processes can help in constraining the hypotheses.

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