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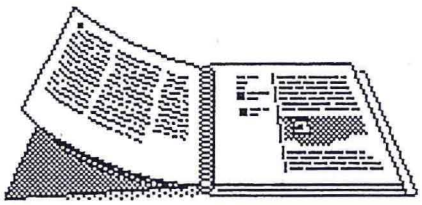

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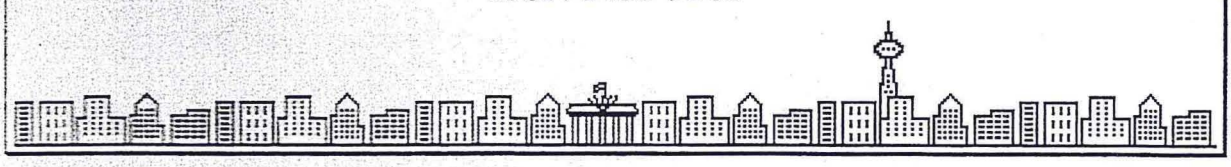

Acquisition of Aspect

Edited by
Dagmar Bittner & Natalia Gagarina

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Aspectual interpretation of early verb forms in German

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Abstract

In the present paper, I will argue that even in a language like German, where the verb system does not contain a grammaticized aspect distinction, aspectual features do underlie the early form-function-mapping of verb forms in L1-acquisition. Furthermore, it will be argued that it is not only past tense forms that may receive an aspectual interpretation in early child language but also other forms of the verbal input. In the case of German, these are the forms of the present tense paradigm and the past participle. Showing and discussing various pieces of evidence for this assumption should strengthen the "aspect before tense" or "primacy of aspect" hypothesis. In general, the paper aims at a deeper understanding of the hierarchical relation between tense and aspect whereby aspect is the basic category and, therefore, aspectual features are the inevitable starting point of the acquisition of grammar.

1 Theoretical starting points

Proponents of usage-based concepts previously emphasized a strong dependence of both early child language as well as the course of acquisition on the target language (cf. Tomasello & Bates 2001). Despite the fact that many new insights into the course of language acquisition have reawakened our interest in questions such as that of the prerequisites for language acquisition as well as that of cognitive and developmental sources of the acquisition process, it would be pouring out the baby with the bath water if we were to reject a universal base of grammaticalization which is reflected in the course of acquisition from early on. It is assumed here that the observed distinctions in the early phases of language acquisition are of a more formal, rather than of a conceptual-grammatical, nature. Moreover, it will be argued that the basic features underlying the form-function mapping for grammatical elements are strongly and inevitably universal.

1.1 Slobin's concept of early grammaticizable notions

That language-specific differences in the early phases of language acquisition are of a more formal rather than of a conceptual-grammatical nature has already been proposed in the 1970s and 1980s. Most explicitly by Slobin (1985), cf.:

> The central claim … is that LMC (i.e. Language Making Capacity, D.B.) constructs similar early grammars from all input languages. The surface forms generated by these grammars will, of course, vary, since the materiel provided by the input languages vary. What is constant are the basic notions that first receive grammatical expression, … ." (ibid.: 1161)

Slobin proposed that early form-function mapping to grammatical elements is based on "a residue of perceptually salient segments" (ibid.: 1189) which the child (or the LMC) extracts from the semantic space. Underpinning this process, Slobin assumed certain types of prototypical scenes including elements which are preferably grammaticized, i.e. grammaticizable notions. He discussed the manipulative activity scene and the figure-ground

scene including early grammaticizable notions such as change of state, result, process, and aspect. It will be argued here that the degree of abstraction from concrete semantic features is higher than Slobin explicitly assumed. However, it is worth noting that this higher degree of abstraction is implicitly entailed in his discussion of linguistically relevant properties. All the properties extracted from the various types of semantic space entail, or take part in, the opposition of a feature such as result, end-state, completion, punctual, figured, or contoured and a feature such as activity, ongoing, incomplete, non-punctual, or uncontoured. Through consideration of the terms Slobin actually employed – and one can add telic vs. atelic, non-homogenous vs. homogenous and so on – the common character of these properties comes to light. All of them describe the difference between complete and incomplete pictures of a whole scene or certain parts of a scene. In terms of theoretical semantics, the basic opposition is that between the features unbounded and bounded or cumulative and quantized. The differences expressed by the various terms lie in the specificity of the domain they are assigned to, i.e. verb grammar, noun grammar, utterance structure and so on, but not in the basic character of the opposition.

The principles and mechanisms of perception allow, and the constraints on language as a means of communication demand, the extraction of very general and abstract features from the semantic space. Direct grammaticization of explicit semantic concepts such as animacy or location in space or colour and so on would lead to a quantityof grammatical distinctions that could hardly be coped with, and it would undermine or at least overburden the systematicity and effectiveness of language. The meaning of grammatical concepts is organized in parallel to the meaning of lexical concepts. To put it simply, they encode just basic conceptual notions. The concrete meaning in a certain act of communication arises from the interrelation with the domain to which they are applied and from further contextual elements.

The early (or basic) grammaticizations appearing in the patterned use of input forms can be viewed as based on general and abstract features which have their source in the common nature of human perception. These features originate from the inevitable determination of the human's cognition of the dimensions of space and time. Considering the feature 'time', we observe a basic opposition, *now* and *not now*, which immediately leads to three points on the time axis: *now – before now – after now*. Regarding the dimension of 'space', we can observe a parallel differentiation: The basic opposition is *here* vs. *not here* with *not here* covering the oppositions of *left* vs. *right*, *top* vs. *bottom*, *in front* vs. *behind*, i.e. there are also three spatial dimensions. Adding the third, the source of perception level, which is person according to Bühler's origo (Bühler 1965), once again a parallel oppositional structure arises: *me* vs. *not me* where *not me* covers the opposition between *addressee* and *element dealt with (or spoken about)*.

Whether one assumes that these general perceptual distinctions result from innate or from cognitively acquired knowledge does not affect their status as language independent and universal prerequisites for the acquisition of grammar. Irrespective of the theoretical axioms with respect to innateness, "general perceptual-cognitive capabilities" are assumed to underlie the acquisition of grammatical structures and the organisation of grammar in general (cf. the discussion of Bickerton's assumptions on the perceptual capabilities underlying Creole TAM-systems by Givon (1982: 155)).

1.2 Jakobson's concept of the system of verbal categories

The non-target use of past forms in early language acquisition observed in different types of languages yielded an intensive debate on whether or not there is a universal conceptual base for the first form-function-mappings. In the beginning, many if not most authors proposed an aspectual interpretation of past forms by children, cf. among others Brown (1973), Bronkart

and Sinclair (1973), Antinucci and Miller (1976). Later on, the notion of aspectuality was replaced (and seemingly specified) by terms such as resultativity, telicity, punctuality and others. This led to the impression that different grammatical domains or oppositions are included in early form-function-mapping with verbs and that language-specificity is more important for the acquisition process than had previously been noticed. As true as this might be, it has also weakened the universal perspective on grammatic(izable) features.

As mentioned above, the hypothesis for which it shall be argued here is in line with the aspect before tense hypothesis. Support for this stance is based not only on empirical findings which will be discussed in the next section, but also on the application of a theoretical concept of language and grammar which (as far as I can see) has been overlooked in the discussion on, and explanation of, the order of tense and aspect acquisition.

In fact, aspect and tense realisations are fused in many languages and interact in various ways. However, Jakobson (1957) showed that the two categories display a clear hierarchical relation with aspect as the underlying or basic category and tense as the more complex, more specific category developed on the top of the features of the aspect category. Following the ideas of Peirce (cf. Peirce 2000) on the constitutive elements of a speech event, Jakobson identifiedtwo constitutive parts for each speech act: the event (E) and the participants (P) of the event. This dichotomy has to be realised twice because each speech event involves two dimensions: the narrated event (E^n) with the narrated participants (P^n), and the speech event (act of speaking, E^s) with its participants (speaker and hearer, P^s). Grammatical categories have the function of informing about the properties of these elements and their relations, i.e. how they are to be perceived. Thus, the established symbols can be used to describe these functions in general, cf.[1]:

Table 1. The function of the verbal categories according to Jakobson (1957)

category	symbol	information about:
number	P^n	the narrated participants
person	P^n/P^s	the narrated participants from the perspective of the speech participants
aspect	E^n	the narrated event
tense	E^nE^s	the relation of the narrated event to the event of speaking
voice	P^nE^n	the relation of the narrated participants to the narrated event
mood	P^nE^n/P^s	the relation of the narrated participants to the narrated event from the perspective of the speech participants

The two categories discussed in this paper, aspect and tense, only provide information about the event (E). The function of aspect is to inform about the quantity of the narrated event (E^n), nothing else. The function of tense is to inform about the (temporal) relation between the narrated event and the speech event (E^nE^s). As can easily be seen, there is a clear increase in the complexity of information provided by the tense category compared to the aspect category. Furthermore, the tense category contains the constituting features of the aspect category (E^n). Categories which relate narrated elements to (elements of) the speech event are called shifters by Jakobson, i.e. they are deictic categories.

Leiss (1992) emphasised that, strongly taken, there is no non-deictic grammatical category in language. The speaker position is always the very starting point of reference and each grammatical category assigns a certain relation to this inevitable point in reference space. However, with respect to tense and aspect, this does not affect the complexity and the nature

[1] Only the central verbal categories are listed here. For a complete description see Jakobson (1957: 136) and e.g. Nurminen (2002: 121, 132).

of the hierarchy between the two categories. When aspect is viewed as weakly deictic because of the involved relation between E^n and the inevitably given point E^s, tense is constituted by adding a third point in time/space, the point from which E^n is to observe, i.e. the reference time according to Klein (1994) or the time of observation as Leiss called it.

Consequently, a first argument in favour of the aspect before tense hypothesis is the common assumption that less complex categories are acquired prior to more complex categories. However, the hierarchical relations between the verb categories described by Jakobson provide further systematic arguments. Since the properties of the tense category involve the properties of the aspect category, aspect necessarily emerges before tense. Aspect is of a more basic nature in the hierarchy of verb categories than is tense.[2]

1.3 Hypotheses on early form-function mapping in first language acquisition

The category of aspect provides a grammaticized opposition which relates the above mentioned features of boundedness/unboundedness (cf. section 1.1) to the quality of the described state of affairs. Properties concerning the proposition as a whole are expected to be assigned at its central element, the verb. However, there are languages which lack an overt aspect category at the verb. These languages employ other linguistic means to express aspectual properties of the proposition (cf. Leiss 2000). Nevertheless, because of the basic nature of aspectual distinctions and the affinity for expressing them at the verb (cf. Bybee's criterion of relevance, Bybee 1991), the following hypothesis on the onset of grammaticalization in first language acquisition can be formulated:

> *General Hypothesis on the onset of grammaticalization:*
>
> *There is a universal starting point in the grammaticalization of the input. The first steps in form-function mapping in whatever domain of grammar concern the opposition of the perceptual features boundedness vs. unboundedness.*

Consequently, it will be argued here that aspectual properties occur as the first categorization of event properties.

> *Hypothesis on grammaticalization of the verb domain:*
>
> *When a language expresses grammatical distinctions at the verb, form-function mapping of verb forms will start with an aspectual interpretation.*

The latter hypothesis includes the assumption that forms other than past tense or perfect can also undergo an aspectual interpretation by the child and, furthermore, that even in languages without a grammaticized category of aspect, early form-function-mappings concern aspectual interpretations of input forms.

In the following, the latter hypothesis in particular will be explored on the basis of an analysis of the acquisition of the present tense forms in German (section 4). The focus is placed on the discussion of pieces of evidence for the nature of the first form-function mappings for three forms (section 5), i.e. the *–en* form which is typically called the 'infinitive' form, the *–t* form which is the target form of the 3rd s, and the stem or *-Æ* form which is the target form of the 1st s. In advance, a brief summary of recent knowledge and discussions of the acquisition of German verb inflection will be provided (section 2).

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[2] The emergence of tense can be traced back to the division of E^s into E^s and E^r (reference time).

2 Previous research on L1-acquisition of German verb inflection

From previous studies (cf. Clahsen 1988; Bittner 2003; Ingram, Welti & Priem forthcoming), it is well-known that German children gain command of verb morphology in the following order: *-en* forms > *-t* forms (>) *-Æ* forms; past participles > *-st* forms … (cf. the verb *machen* 'to do': *mach-en – mach-t – mach – ge-mach-t – mach-st*). With the exception of the past participle, all of these forms belong to the present tense paradigm and are assumed to assign person-number categories in adult German, cf.

Table 2. Person/number-inflection of lexical verbs (example: machen 'to do')

	singular	plural
1. person	mach-**Æ**/(e)	mach-**en**
2. person	mach-**st**	mach-**t**
3. person	mach-**t**	mach-**en**

Whereas children seem to use the *–st* form and, more or less, also the stem form (-∅) in an adult-like function from early on, the use of *–en* and *–t* forms is not adult-like in the beginning. The respective overgeneralizations gave rise to some debate concerning the underlying form-function-mapping. Considering *–en* forms, two oppositional hypotheses have been proposed: the optional infinitive hypothesis (Wexler 1999) and the modal hypothesis (Ingram and Thompson 1996). As is well known, the optional infinitive hypothesis explains the extended use of *–en* forms by a "defect" in the parameter setting for functional categories of the verb. Either tense (Wexler 1999) or agreement (Meisel 1994) features are assumed to be not yet set as obligatory in the child's grammar. Beside the description of the child's grammar as defective, one problem of these analyses lies in the classification of *–en* forms as adult-like infinitives from the very beginning. Because of the absence of productive finite structures (cf. among others Ingram and Thompson 1996, Jordens 2002), no adult-like opposition of finite vs. non-finite exists in early child language. Consequently, the functional specification of the *–en* form should be different at the beginning rather than later on. The changes in use, distribution, and in the functional interpretation of the *–en* form are not taken into consideration and, thus, remain unexplained by the optional infinitive hypothesis. It will be shown here that, even in the period which is considered the optional infinitive stage, developments can be observed that suggest changes in the functional specification of *–en* forms.

The modal hypothesis suggests that *–en* forms are mainly used in utterances which can receive a modal interpretation. In target language, the predicate of these utterances consists of a finite modal verb and the infinitive form of a main verb (*er will spielen* ' he wants to play'). The non-target use of the *–en* form in child language results from the ommission of the modal part of the construction. It is debatable whether this claim is verifiable. How sure can one be about the intention of the child in uttering something like *wasser gehen* 'go into the water' while looking at another child that is in a lake or a bath. Does the child comment on the situation or does s/he express a wish or intention (cf. Ingham 1998: 60)? The child has still not learned to linguistically distinguish these two possibilities, both are covered by the *–en* form. Furthermore, a certain amount of utterances not classifiable as modal remain unexplained in the given analyses. The question arises of whether the *–en* form has a more general function in the child's grammar than is assumed by the modal hypothesis.

Clahsen (1988) presented an extensive analysis of the acquisition of the present tense paradigm and discussed the steps and developmental phases of this acquisition process in the frame of Pinker's (1984) model of lexical learning and the assumed learning mechanisms.

Nothing substantially new can be added to Clahsen's description of the order of acquisition by the present study. Also, there are parallels in the explanation of the observed development. This will be mentioned in particular in the respective sections of the paper. However, there is a strong difference with respect to the linguistic model of Clahsen and the present attempt. Following Pinker, Clahsen assumes that the content of form-function mapping and paradigm construction is adequately described by the cover terms of grammatical categories, i.e. person, number, transitivity and so on. To the contrary, the present paper follows the assumptions of Jakobson and other functional concepts of language, such as, for instance, the concept of natural grammar (Coseriu 1987; Leiss 1992, 2000, Dressler 1997). According to these concepts, grammatical forms are not only of a structural nature but also contain a semantic meaning.[3] They are signs which inform the hearer how to perceive the single referents and the whole situation provided by an utterance. It is claimed that a small amount of perceptual features exist which build the basic level of the category system of each language. The cover terms of linguistic categories describe with respect to which semantic-cognitive and structural domains these perceptual features are relevant. The category systems of the languages are the result of a certain technique of realization of these features. Language specificity results from the difference in the means of realisation and from a difference in the further subclassification of the categorical domains. Consequently, the proposed aim of the paper correlates with the attempt to find out what types of perceptual features are assigned by early verb forms in German, what domains they are relevant for, and how they constitute the verbal paradigm in child grammar.

3 Method of analysis

3.1 The data

The present analysis is based on the data of one German child, the girl Anna, in the age range of 1;8 – 2;3.

Table 3. Data of Anna used in the present analysis

age	analysed utterances[4]	utterances with verbs:	
		numbers	%
1;8.10	293	52	17,7
1;8.29	218	76	34,8
1;9.14	237	65	27,4
1;10.0	266	86	32,3
1;11.6	313	165	52,7
1;11.20	284	147	51,8
1;11.30	248	132	53,2
2;0.5	292	150	51,4
2;0.29	525	288	54,9
2;1.13	345	209	60,6
2;1.27	498	340	68,3
2;2.17	315	183	58,1
2;3.8	514	366	71,2
2;3.29	441	297	67,6

[3] The acquisition concept of Slobin (cf. section 1.1) partly correlates with these considerations.

[4] Utterances not containing at least one meaningful lexical unit resembling a German word in form and meaning as well as bare yes/no utterances were excluded from the analysis.

Recordings took place at the girl's home. They mainly cover playing situations; occasionally, kitchen work, dinner and other home situations are included. Anna is growing up in Berlin and can be described as an early talker and a rather segmental child. Formulaics, frozen forms and imitations are less attested in her data.

3.2 Demarcation of phases in the acquisition of verb forms

Three phases can be distinguished with respect to the acquisition of verb inflection within the investigated period. In a first phase lasting up to the age of 1;10, Anna predominantly uses the *–en* form (*kaufen* 'to buy', *malen* 'to draw', *machen* 'to do'). More than 50% of the attested verb tokens end in *–en*. Nearly no contrasting inflectional forms of one and the same verb are produced in this first phase, verb lemmas occur in one morphological form only. In addition to the *–en* forms, a smaller amount of verbs ending in *–t* and a few verb stems are attested. In a second phase which lasts up to the end of age 2;0, the *–t* form becomes more frequent and an increasing number of verbs are produced as *–en* and *–t* forms, i.e. the first inflectional contrast develops. Finally, in a third phase covering the age period of 2;1 to at least 2;3, the bare stems which are the appropriate forms in 1st's contexts and in 2nd's imperative become productive. Thus, a threefold inflectional contrast starts to develop.

The demarcation of phases and their main properties can be summarized as follows:

(1) phase I 1;8-1;10 → -en forms
phase II 1;11-2;0 → -t forms → -en/-t contrast
phase III 2;1-2;3 → -Ø forms → -en/-t/-Ø contrast

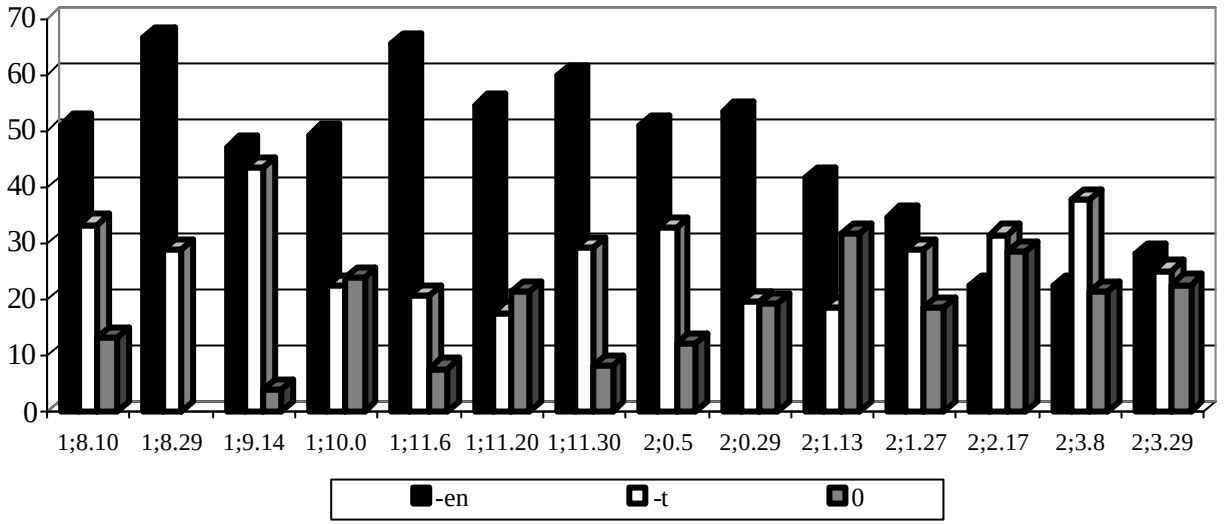
4 Analysis of early verb use

In this section, I will present certain observations on Anna's use of the above mentioned three verbal forms: the *-en* form, the *–t* form, and the stem form (-Ø). Although the respective forms are present tense but not past tense forms, the child's use of each of these forms, especially the non-target uses, suggests that aspectual features underlie the first form-function-mappings. This will be discussed in more detail in section 5.

4.1 Early use of –en forms

Figure 1 presents a quantitative analysis of the token frequency of the three forms under discussion. Up to the age of 2;1, the *–en* form clearly dominates in token frequency. The peak in dominance of *–en* tokens appears at age 1;10–1;11.

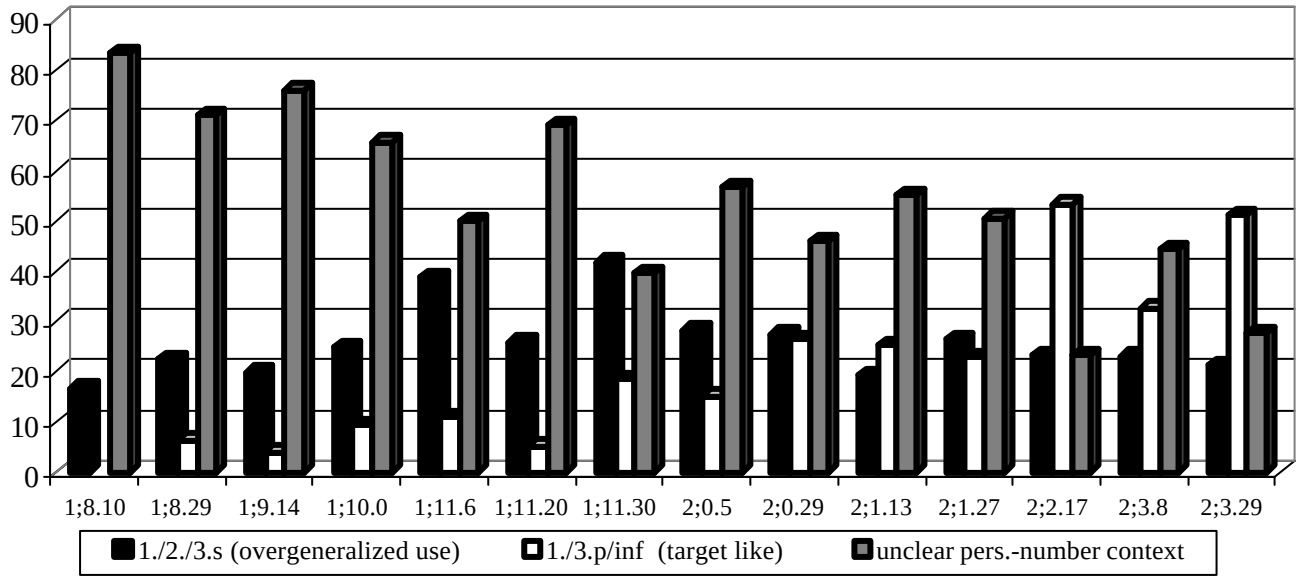
Figure 1: token frequency of *-en* , *-t* , and *stem* (*-Ø*) forms



The use of an *–en* form is target-like if the subject phrase requires the 1st or 3rd person plural form of the verb or if the verb is used as the infinitival part of an analytic construction. However, target use is hardly observable in the early periods. Analytic constructions only start to become productively used at the age of 2;1. Additionally, the subject phrase is realised in less than 20% of the verb utterances in the beginning. Only around the age of 2;0, does an increase in overt subject phrases occur. The mark of 50% of overtly realised subjects is reached only around the age of 2;1. However, considering the verb utterances where the context provides clear evidence about the intended subject plus the utterances containing an overt subject phrase, target use of *–en* forms, i.e. use in correlation with a plural subject or in infinitive position, amounts to only a small part of the attested *–en* tokens.

Figure 2 presents an analysis of the use of *–en* forms according to target and non-target subject-verb agreement.

Figure 2 : use of -en forms



Not taking into account utterances with no detectable subject (grey bars), *-en* forms predominantly appear in utterances associated with a subject in singular (dark bars) up to the age of 2;0. Target use in plural contexts starts to increase around the age of 2;1 but reaches clear preponderance only after the age of 2;2.

The examples in (4) show that non-target use of *–en* forms is attested for all types of person-number contexts in the singular.

(2)	1st s:	*hausschuh ausziehen*	'(I) take off my slippers'
		runtergehen	'(I) go off'
	2nd s:	*ausschlafen?*	'(have you) slept off?
		au(ch) spitzen	'(you) also sharpen (it)'
	3rd s:	*puppe essen*	'the doll is eating'
		haare waschen	'(mama) is washing her hair'

The use of *–en* forms in singular contexts exceeds target use in plural contexts to the greatest degree at age 1;11. This peak in overgeneralized use of *–en* forms does not only correlate in time with the peak in the use of *–en* tokens (figure 1) but also with the development of verb types produced in only one inflectional form (cf. table 4 below). The proportion between the number of verb types only attested by an *-en* form and the number of verb types only attested by a *–t* form shows an increase in *-en* types right at the age of 1;10–1;11. At 1;10, this increase results from the appearance of *–en* forms with verbs formerly exclusively attested as a *-t* form. With this development, the amount of verb lemmas only attested by a *–t* form diminishes. However, at age 1;11.6, 35 new verb lemmas are attested. 20 of these 35 lemmas are produced in their *-en* form exclusively. By contrast, only 5 of the 35 new lemmas are produced in their *–t* form exclusively. The higher frequency of *–en* types with new lemmas continues at 1;11.20 (8 *–en* types vs. 3 *–t* types) but disappears at 1;11.30 (8 *–en* types vs. 9 *–t* types). Table 4 gives the calculation for all verb lemmas exclusively attested as *–en* or *–t* form up to the respective point in time.

Table 4. number of verb lemmas attested by only one inflectional form

age	1;8.10	1;8.29	1;9.14	1;10.0	1;11.6	1;11.20	1;11.30	2;0.5	2;0.29
-en	11	10	10	10	**27**	12	12	12	37*
-t	5	8	8	3	6	5	10	4	8
new lemmas	(25)	15	21	11	**35**	19	22	15	43

(*spurt in target like infinitives)

For the time being, it can be summarized that three pieces of evidence – a) development of token frequency (figure 1), b) non-target use of *–en* forms (figure 2), and c) development in lemmas exclusively used as *–en* types (table 4) – have been found in the data which suggest that the *–en* form is chosen as the preferred form in Anna's verb production around the age of 1;11. It is used irrespective of the person-number features of the (potential) subject phrase. Rather, the child seems to interpret the *–en* form as the prototypical form of the verb which is appropriate for all types of utterances. In section 5.1.1, I will argue that the described processes indicate that the *-en* form has been established as the default form of the verb in the child's grammar.

4.2 Early use of *–t* forms

Figure 1 shows that there is a relatively high token frequency for *-t* forms at the onset of verb production. In accordance with Ingram and Thompson (1996) (and also Jordans 2002 for

Dutch), I assume that the acquisition of these early *–t* forms is based on rote learning of highly frequent verb types. They are holistic, i.e. unanalysed forms.

The increase in the use of *–en* forms at age 1;10–1;11 causes a (proportional) decrease in the use of *–t* forms. Only around the age of 2;0, does token frequency of *–t* forms rise again (cf. figure 1). This spurt is accompanied by an increase in verb lemmas attested with two inflectional forms. Comparing phase I and phase II, the highest rise in numbers of lemmas emerges with contrasts involving an *–en* and a *–t* form, cf. table 5.

Table 5. total number of verb lemmas with contrasting inflectional forms[5]

age	number of VU	-en/-t	-en/-∅	-t/-∅	-en/-t/-∅	-en/-t/(-X[6])
1;8–1;10	279	4		3	3	
1;11–2;0[7]	882	18	5	1	10	4

Verbs attested as *–en* and *–t* forms are, for instance:

(3) *machen – macht* 'to do'
bauen – baut 'to build'
malen – malt – mal 'to draw'

Target use of *–t* forms occurs in 3rds and 2ndp position (cf. table 1).[8] In German child language, non-target use of *–t* forms is rare in comparison to that of *–en* forms. However, certain instances are usually attested. The most frequent is the production of *–t* forms instead of full (i.e. prefixed) forms of the past participle (i.e. *macht* ← gemacht 'to do - done'). Anna starts producing prefix *ge-* after the age of 2;1.13. However, before and after that point in time, *–t* forms used in contexts other than 3rds very likely replace target past participles (27 tokens), cf. (4).[9] Additionally, more than 50% (43 tokens) of the *–t* forms occurring in utterances where the (intended) subject remains unclear would be a past participle in adult language, cf. (5).

(4) *auch ein geld gebt* [← gegeben] '(I) also (have) given money'
du weint? [← geweint] 'you (were) crying?'
essen einkauft [← eingekauft] '(we have) bought food'

[5] Each verb lemma was counted only once. Thus, the numbers of verb lemmas for the columns –en/-t, -en/-t/-∅ and so on does not include the same verb lemmas.

[6] The position of X can be filled by past participles or forms ending in *–e* or *–st*.

[7] For a more appropriate base of comparison in terms of analysed verb utterances (VU), the following intervals in the period of 1;11–2;0 can be distinguished:

age	number of VU	-en/-t	-en/-∅	-t/-∅	-en/-t/-∅	-en/-t/(-X)
1;11.6–1;11.20	312	10	1	1	4	2
1;11.30–2;0.5	282	5	2		5	
2;0.29	288	7	3		4	2

[8] In line with other investigations on the acquisition of German verb inflection, no utterances containing a subject in 2ndp are attested in the data of Anna.

[9] There are only 3 instances of a *–t* form which clearly do not replace a past participle. All of them occur at the age of 2;3 in 2nds contexts.

(5) *schon auspackt* [← ausgepackt] 'unwrapped already'
runtermacht papier [← runtergemacht] 'put away the paper'
hier malt [← gemalt] 'drawn here'

Reduced forms of past participles are also attested in analytic constructions which emerge at age 2;0. Development in the command of analytic constructions does not immediately lead to the use of prefixed past participles.[10] 53% (50 tokens) of the respective past participles lack the prefix. 34 of these tokens are forms ending in *–t*. Past participles ending in *–en* can compensate the lack of the prefix by stem vowel change. Thus, only 17% (3 tokens) of the respective past participles ending in *–en* remain without any target perfect marking (i.e. prefix or stem vowel change). Conversely, about 45% (31 tokens) of the hypothetical past participles ending in *–t* remain without a target marking for perfectivity, cf. (6).

(6) *lange spielt* [← gespielt] *haben* '(we) have played a lot'
(ge)schichte malt [← gemalt] *haben* '(we) have drawn a picture story'
gestern hab ich zuguckt [← zugeguckt] 'I watched (it) yesterday'

A further observation is that past participles which end in *–en* in adult German are sometimes replaced by a *–t* form (*gebt* ← gegeben 'to give') whereas no vice versa tendency (*–en* forms replacing past participles ending in *–t*) is attested.[11] In the investigated data, 13 unprefixed forms which very likely replace an adult past participle in *–en* are produced as a *–t* form, cf. (7). Among the prefixed forms are 23 which end in *–en* in adult German, 6 of them are overgeneralized by a *–t* form, cf. (8).

(7) *Opa gebt* [← gegeben] 'grandfather (has) given'
meine (st)rumpfhose aufresst [← aufgefressen] '(crocodile has) eaten up my tights'
runderfallt [← runtergefallen] '(it has) fallen down'

(8) *wieder umefallt* [← umgefallen] *bin* 'fallen down again'
wieder ei(n)fach wieder auserisst [← herausgerissen] 'torn out again'
die hat das aufgefresst [← aufgefressen] 'it (the giraffe) has eaten it up'

It has been argued that the emergence of *–t* forms in positions of target past participles results from restrictions in production capacities of the child, especially phonological restrictions for unstressed syllables (cf. Weyerts and Clahsen 1994; Clahsen and Rothweiler 1993). However, a clear distribution in the omission of the prefix is worth noting. In the data of Anna, the prefix almost only occurs with complex verb forms. i.e. verbs composed of a stem and a verb particle, cf. *abmachen* 'to put away', *umfallen* 'to fall over', *wegwerfen* 'to throw away' but hardly ever with simple verbs, cf. *machen* 'to do', *fallen* 'to fall', *werfen* '*to throw*'. Table 6 presents a calculation about all verb forms in analytical constructions attested in the recordings from 2;1.27 onwards, i.e. the point in time when the prefix became frequently produced.

[10] Note, that of the two target structures of perfect tense, sein 'be' + past participle and haben 'have' + past participle, only the latter becomes productive. The auxiliary sein 'be' is only frequent as a simple predicate.

[11] Jordens (2002) found the same for the acquisition of Dutch.

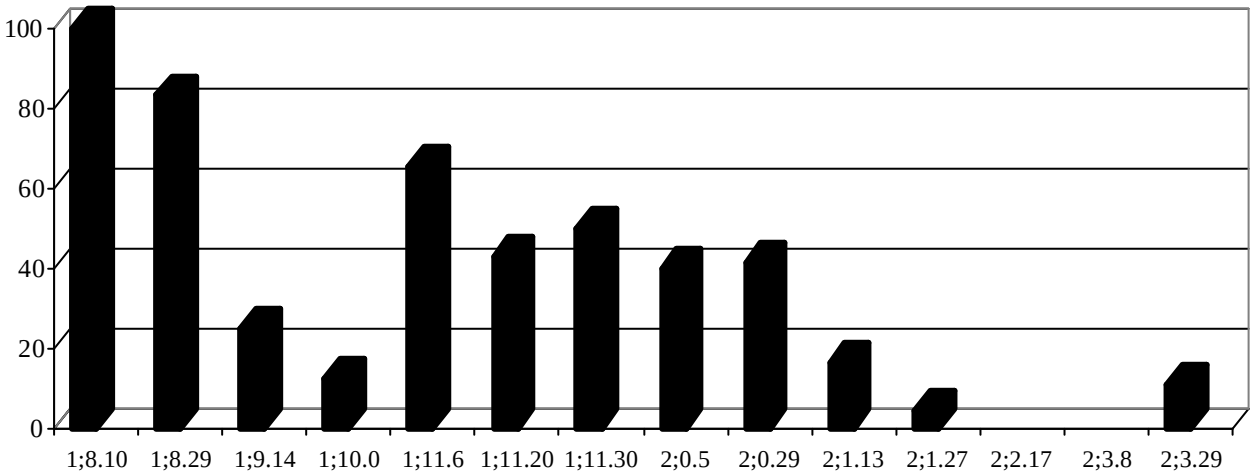
Table 6. distribution of the past participle prefix *ge-* over verbs with/without a particle attested in analytic constructions since 2;1.27 (token numbers)

	+verb particle	-verb particle
+past participle prefix	40	4[12]
-past participle prefix	5	40

The distribution within analytical constructions is confirmed by verb forms showing prefix *ge-* but lacking the auxiliary, cf. *um(g)efallt wieder* 'fallen over again', *mir zucker reinemacht* '(I) put in sugar'. Among the 23 attested forms there are only 3 simple verbs. Obviously, the use of prefix *ge-* is related to the structural complexity of the verb. Its appearance improves the prosodic pattern of a complex verb by inserting an unstressed syllable: primary accent syllable – unstressed syllable – secondary accent syllable. Its omission avoids a prosodic structure which is dispreferred in German, i.e. the iambic structure 'unstressed syllable – primary accent syllable'. After all, a grammatical specification for prefix *ge-* is quite questionable.

Coming back to the use of *–t* forms, figure 3 shows that in parallel to the development described so far, overgeneralization of *–en* forms disappears from 3rd*s* contexts, i.e. from the target context of *–t* forms. It is worth noting that the reduction of *–en* overgeneralizations starts shortly after the first increase in *–t* tokens around age 2;0 and proceeds up to their next increase between age 2;1.27 and 2;3.8 (figure 1) which is also the period of frequent use of *–t* forms for all types of potential past participles.

Figure 3: overgeneralization of *-en* forms in 3rd*s* position (%)
(100% = total number of overgeneralized *-en* tokens)



Summing up the observations on the acquisition of *–t* forms, it can be assumed that their use becomes restricted to a certain type of utterance around the age of 2;0. From the very beginning, *-t* forms are preferably used in utterances with a (potential) 3rd*s* subject, i.e. in its target agreement position. However, the early functional interpretation of *–t* forms seems to allow its overgeneralization to contexts other than 3rd*s* when the verb refers to a situation or state of affairs which is of perfective (completed) nature, i.e. to contexts where adults would

[12] All these four forms are attested in the last recording at 2;3.29. It is highly likely that they mark the onset of the extension of the past participle prefix to verb forms without a verbal prefix.

use a past participle. In section 5.1.2, I will argue that 3rd-s references and references to perfective/completed states share common features which allow a unified form-function mapping for *–t* forms in this early phase of language acquisition.

4.3 Early use of stem forms (-Æ)

Starting with figure 1 again, one finds that the token frequency of stem forms rises later than that of *–en* and *–t* forms. Only at the age of 2;1 does the use of stem forms reach the stable amount of 20% of all verb tokens. This observation is confirmed by the development of inflectional contrasts. In phase I, only 8 verb lemmas contain a stem form among their contrasting inflectional forms. In phase II, this is already the case for 22 verb lemmas, and in phase III, an increase up to 34 verb lemmas is attested. As table 7 highlights, this development mainly proceeds within binary form contrasts.

Table 7. Number of verb lemmas with contrasting inflectional forms

	number of VU	-en/-t	-en/–t/–X	-en/-∅	-t/-∅	-st/–∅	-en/-t/-∅/{+X}
1;11-2;1[13]	1091	19	5	8			12
2;2-2;3	1186	6	3	10	3	2	11

Under (9) some examples for verb lemmas attested with a stem form among its contrasting inflectional forms are given.

(9) *holen – hol* ‘to fetch’
reingeht – reingeh ‘to go in’
abwaschen – abwascht – wasch ab ‘to wash off’

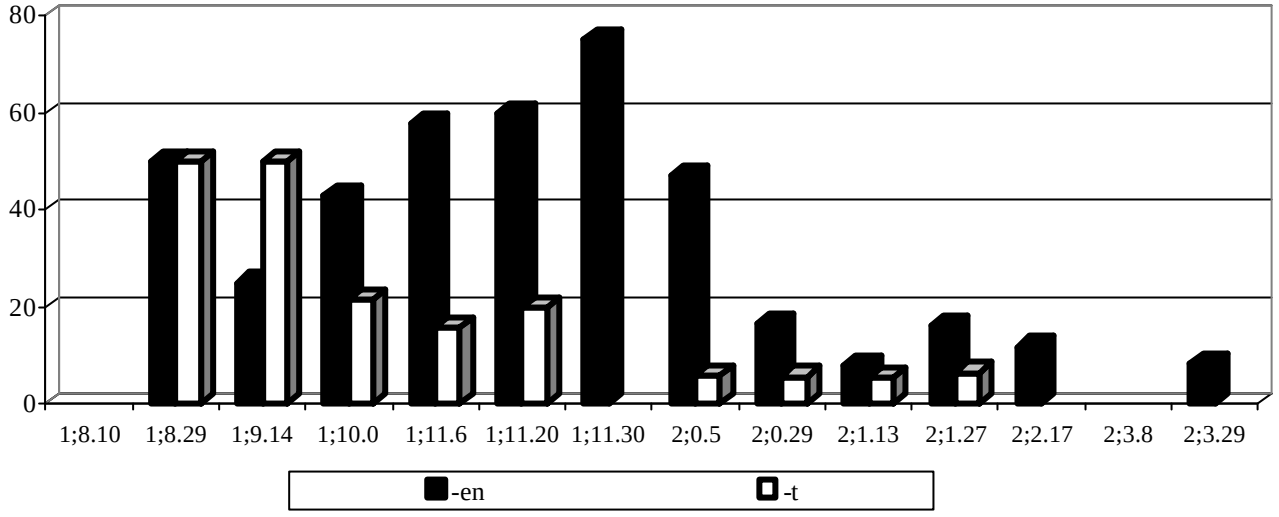
Table 7 reveals that the number of verb lemmas with a binary contrast of *-en* vs. *–t* forms decreases from phase II to phase III. On the one hand, this logically follows from the acquisition of other inflectional forms for verb lemmas previously exhibiting these two forms only. On the other hand, it indicates that the child in general gains command of a more complex repertoire of inflectional forms.

Stem forms are target like in contexts which requires the 1st-s.pres.ind. or the 2nd-s.imperative. These contexts are affected by the overgeneralization of *–en* forms discussed in section 4.1. Additionally, 1st-s contexts are affected by the overgeneralization of *–t* forms discussed in section 4.2. Figure 4 shows the development of overgeneralization of both forms in the context of 1st-s.pres.ind. over time.

[13] The recording of age 2;1.27 was analysed as part of the time period 2;2-2;3 in order to reach a more balanced proportion of data between the two periods.

Figure 4 : *-en* and *-t* forms in 1 sts contexts (%)

(100% = total number of 1 sts contexts)



At age 1;8.29, only two utterances with an intended subject in 1sts are produced – one *–en* form and one *–t* form. At age 1;9.14, 9 productions are attested (2x *–en*, 5x *–t*). From the recording at age 1;10.0 onwards, a more considerable number of productions emerges. In accordance with the picture sketched in figure 1 and with the described development in the use of *–en* forms, an increasing amount of *–en* overgeneralizations can be observed up to the age of 1;11.30. Overgeneralization of *–t* forms is less frequent but is stable up to the age of 1;11.20. Its disappearance from 1sts contexts starts right at the point in time when the first increase in token frequency of *–t* forms is observed (figure 1). However, a small amount of *–t* overgeneralizations remains up to the age of 2;1.27 but completely disappears in the next recordings. This disappearance coincides with the second spurt in token frequency of *–t* forms (figure 1).

Overgeneralization of *-en* forms is much more frequent and lasts longer than that of *–t* forms. This is in line with the discussed development in the use of *–en* forms. However, decrease of this type of overgeneralization also starts around the age of 2;0. The rapid decrease between age 2;0.5 and 2;0.29 correlates with the first increase in token frequency of stem forms (figure 1).

Finally, an observation concerning the acquisition of the target imperative form shall be mentioned. Anna, in general, prefers *-en* forms to utter requests and wishes. Thus, in phase I, only one target imperative form is attested (*guck* 'look'). This form is frequent in use and can be interpreted as rote learned. In the three recordings of age 1;11, three further imperative types appear in the data (*ess* 'eat', *halt* 'stop', *komm* 'come'). However, the increase of stem form tokens and of stem forms in inflectional contrasts around age 2;1 is accompanied by an increase in target imperative forms too. In the three recordings between 2;0.29 and 2;1.27, a further 8 lemmas with the target imperative form are attested, cf. table 8.

Table 8. number of new lemmas with target 2nds.imp. form (i.e. stem form)

phase	I:	II:			III:		
age	1;8-1;10	1;11	2;0.5	2;0.29	2;1	2;2	2;3
number of VU	279	845	292	288	842	315	955
new lemmas	1	3	/	3	5	/	4

It can be summarized that the stem form becomes regularly used slightly later than *–en* and *–t* forms. In contrast to these forms, it does not occur in overgeneralizations but merely in the target contexts of 1st s.pres.ind. and 2nd s.imp. Its rise in token frequency drives out *–t* and *-en* forms from overgeneralizations to 1st s contexts. In section 8.3, I will argue that the use of the stem form suggests a clear specification to speaker related and uncompleted states.

5 Discussion

5.1 Hypotheses on early form-function mapping

The observations in the use of the *–en*, *-t* and stem forms (*-Æ*) described in section 4 suggest a stepwise development in form-function mapping for the resepctive forms. The order and the surface content of the observed processes are:

(10) a) around age 1;11 - general preference for verbs ending in *–en*,
b) around age 2;0 - correlation of *–t* forms with 3rd s contexts and completed state of affairs,
c) around age 2;1 - correlation of stem forms with 1st s contexts and imperatives.

In the following sections, hypotheses on form-function-mapping for each of the three forms will be discussed. Furthermore, I will show in which respect the early form-function mapping is based on an aspectual interpretation of input forms.

5.1.1 Form-function-mapping for the *–en* form: Selecting a DEFAULT form

As has been found in the data analysed in this study as well as in other studies on the acquisition of verb inflection in German, the *–en* form is not restricted to a certain type of person-number context in early child language. It is a highly frequent form appropriate to all types of context. Obviously, agreement constraints are not productive in the child's early grammar. The optional infinitive hypothesis suggests that the unconstrained use goes back to a lack of obligatoriness for the assignment of tense or agreement features. Child grammar is viewed as incomplete or defective in this respect. Under this perspective *-en* forms lack any functional mapping. They merely occur because of their frequency in the input but remain functionally unspecified. I will argue for the opposite view.

There is a clear difference in the use of verb forms at the onset of verb production and that which emerges by the developments described in section 4.1. In the beginning, both *–en* and *-t* forms are used relatively frequently. Then, a spurt in the frequency of *–en* forms accompanied by a decrease in the frequency of *–t* forms arises. This change occurs at the time when the mark of 100 attested verb lemmas has been reached (cf. table 4), i.e. at a level which can be considered a critical mass causing a reorganization of relevant domain(s). By choosing the *-en* form as the preferred form in the production of verbs, the domain of the verb becomes separated from other domains of the lexicon. I hypothesize that this is the content of the first mapping process with respect to verbs in the child's grammar: The *–en* form is mapped to the function of assigning a verb or a verbal concept. Nothing less and nothing more. Thus, the hypothesis with respect to the first step in form-function mapping in verb inflection is:

> *Hypothesis I:*
> *The first step in form-function mapping in the acquisition of German verb inflection is the interpretation of the suffix –en as an assignment of [+V], i.e. –en symbolizes that the actual referent of the lexical item is to be perceived as a state of affairs existing in time and carried out by an individual.*

The emerging generalization is: Words ending in *–en* assign a verb or a verbal concept, in short /-en/ → [+V]. This involves the recursion that [+V] is to be assigned by suffix *-en*. The learning mechanism is not based on rote learning alone anymore but is, at least partially, based on a generalization about the function of "verb-being" and a certain word shape. That only "verb-being" is specified and nothing more explains the appropriateness of the *–en* form for all types of context, i.e. the observed overgeneralizations. The *–en* form becomes established as the DEFAULT-form of the verb in the child's grammar.[14]

5.1.2 Form-function mapping for the *–t* form: Selecting a DISTANCE marker

Clahsen (1990) proposed that *-t* is interpreted as symbolising intransitivity or low transitivity in early child German. This has been a matter of some debate, cf. Weissenborn (1990), Jordens (2002). However, *-t* forms are partly used in a different way than in adult language and, thus, the question remains in which respect *-t* forms are of a different nature in this early period than in adult language. It will be shown that an answer to this question is related to the aspectual nature of early grammaticalization in child language.

The change in verb use which follows the selection of the default form is the increase in token frequency of *–t* forms. In contrast to the *–en* form, the *–t* form is used in particular types of utterance. These are utterances with an (intended) subject phrase in 3rd's, and utterances which refer to the completion of an event. The *–t* forms in 3rd's contexts are target like. With completed events, simple *–t* forms like *sag-t* 'says', *schläf-t* 'sleeps' are not target-like but, rather, they replace the target perfect tense construction consisting of a finite auxiliary and the past participle of the verb. These analytic constructions, i.e. the structure haben 'have' + past participle, -become considerably more frequent only at age 2;2. Finally, the phonologically conditioned distribution (cf. section 4.2) of the past participle prefix *ge-* suggests that this marker is still not mapped to the assignment of perfectivity. This leaves us with the question as to whether perfectivity, i.e. the completion of an event, is regularly marked in the child's early grammar.

Besides prefix *ge-*, the following markers occur (in simple and analytic constructions) within perfective contexts: *–en* and *-t* suffix and stem vowel change (SVC). According to hypothesis I (cf. section 5.1.1) and also according to other hypotheses such as, for instance, the optional infinitive hypothesis, the *–en* ending of irregular past participles cannot be considered a perfectivity assignment. Stem vowel change is restricted to irregular verbs, i.e. verbs of which the past participle form ends in *–en*. With these verbs, the concrete type of vowel alternation has to be learned by heart. Thus, the respective forms are very likely objects of rote learning. There remains just the suffix *–t* which is the regular ending of the past participle and which is overgeneralised to irregular past participles (cf. section 4.2). Overgeneralisation of *–t* has been observed in analytic constructions (cf. (8)) as well as in the single use of lexical verbs describing completed events (cf. (9)). From the observed pattern, one can conclude that overgeneralisation of *-t* shows an affinity with the assignment of perfectivity.

Does this contradict the use of *–t* in 3rd's contexts? Here, we come back to the perceptual base of grammatical features described in section 1.1. 3rd person is the term for a narrated participant which does not belong to the speech participants. Referents of the 3rd person are necessarily perceived from a distance (i.e. from an outside perspective, Leiss 1992). Referents of the 3rd's are perceived as complete objects, i.e. as contoured or bounded wholes. This is the property the category of 3rd's shares with perfectivity. The referents of perfective constructions

[14] Clahsen (1988) also proposed a default status of the *–en* form in this early phase, however, without an emphasis of an underlying form-function mapping which separates the early rote learned *–en* forms from the later forms with default status.

are complete(d) events as well. Consequently, both the categories 3rd's and perfect tense assign the perception of the referent from a distance, as contoured or bounded wholes. Thus, a unified interpretation for their common marker *–t* is available to the child.

The resulting hypothesis on form-function mapping for the *–t* form is:

> *Hypothesis II:*
>
> *The second step in form-function mapping in the acquisition of German verb inflection is the interpretation of the inflectional suffix –t as an assignment of [+distance]. Suffix –t symbolises that the referent is to be perceived as at a distance from the speaker or the situation of speaking; i.e. as a completed or bounded whole.*

The proposed hypothesis suggests that the child unifies the function of two categories which seem to be clearly distinguished in the common analyses of the adult language. Two things are worth noting. First, it has been shown that the two categories, 3rd person and perfect tense (or in a broader sense perfective aspect) share common features if they are considered and analysed from a perceptual point of view. That they share a structural morphological means, the *–t* suffix, is an iconic representation of this commonality. Under the assumption that the child starts form-function mapping from the available cognitive space, i.e. from cognitive-semantic categories, rather than from a language internal structural analysis (cf. section 1.1) an early detection of the assumed commonalities is plausible. However, the second point to note concerns the acquisition of categories. There is only evidence for the acquisition of a category or the activity of a category in the child's grammar when a structural opposition (i.e. subcategories) is productively established. In the present case, the target categories person and tense are involved.

With respect to tense, the shifting from the time of speaking to a fictive time of observation of the reported state of affairs is requested. In other words, a structural means which indicates that the time of observation is different from the speech time has to be used productively. The analyses show that no such opposition is involved in the use of the verb forms of the investigated period. This is in accordance with the pragmatic scope of the child's utterances of this period. Typically, they report states of affairs which are either (i) hypothetical (questions, requests etc), (ii) proceed simultaneously to the time of speaking, or (iii) are still becoming completed or having visible results at the time of speaking.

The results of the analyses suggest that the category of person is also not established as a relevant category of verb use at the very early phases. The form-function mapping for the *–en* and the *–t* form do not include the distinction of participants. With *–en* this should be of no controversy, but it might be a surprising suggestion for *–t*. However, should *–t* assign [+distance], as the above hypothesis II suggests, no clear evidence is given that the child distinguishes linguistically between an assignment of the quality of the event and the quality of the subject referent. The perception of the subject referent as at a distance to the speech participant(s) goes along with the perception of the performed action from a distance. At least, this is the typical coincidence with verbs which are non-ergative and in active voice. A further argument for an event-oriented interpretation of the *–t* form is the emergence and frequent use of personal and demonstrative pronouns in subject position at age 2;0. By those means, the distinctions between the person categories are assigned and the child presumably does not expect repeated assignment at the verb itself.

The above considerations lead to the conclusion that the only distinction which is made by the *–t* form is whether the situation of speaking is perceived as included in the reported state of affairs or excluded from it, i.e. whether an inside or an outside perspective is given. More precisely, the opposition consists in the relevance of an outside perspective on the reported state of affairs (*-t* suffixation) vs. no relevance (no *–t* suffixation). More or less, this

opposition assigns what Jakobson called the quality of the reported event and the content of the aspect category. The characterisation of the feature [+distance] as connected to a perspective from which the referent appears as completed or bounded reveals the aspectual value of the form-function mapping for *-t*. After the discrimination of verbs from other types of lemmas by the first step in form-function mapping, the second step establishes an aspectual distinction in the child's verb grammar. By this step, a certain functional opposition and, consequently, a certain functional (sub)domain within the domain of verb grammar is opened. The latter is the subdomain of verb forms referring to completed or bounded referents. The former is the opposition of the assignment of the perceptual feature [+distance] (in addition to [+V]) vs. non assignment of this feature. The use of the default form for verbs in general becomes less appropriate in the more specific subdomain. This explains the observed decrease in the use of *–en* forms in 3rd s contexts (figure 3) and the overgeneralisation of suffix *–t* with verbs assigning states of affairs which are to be perceived from a distance. In analogy to Antinucci and Miller (1976), it can be stated that the use of the *–t* form has more of an aspectual than of a temporal or person related value.

5.1.3 Form-function mapping for the *stem* form: Specifying a NON-DISTANCE form

The emergence of the feature [+distance] as a relevant feature in the domain of verb grammar causes the expectation that the remaining areas in this domain are related to the opposite feature, i.e. non-distance. However, Jakobson (1936, 1941) has shown that grammatical oppositions do not have the character of bi-directional exclusions but, rather, of privative oppositions. A grammatical form not specified for the feature [+distance] does not highlight whether or not [+distance] or [-distance] is one of the perceptual features of the referent. The feature is simply of no relevance in such cases. That the *–en* form becomes prototypically (but not exclusively!) used with referents to be perceived as non-distant is merely because of the established sign relation whereby relevance of [+distance] is symbolised by suffixation of *–t*. The former is an unavoidable consequence of the latter. At the actual stage of development (described as phase II in section 3.2), this holds for all non-*t* forms: their correlation with [-distance] becomes prototypical although the feature (still) does not constitute a functional specification of the respective forms.[15]

Nevertheless, according to the principle of maximal opposition in the emergence of categorical systems (Jakobson 1941), the next step in form-function mapping concerns the domain of non-distance. Perceptual non-distance is maximal in the case of perspectivisation of the speaker or the situation of speaking. The speaker cannot perceive itself or the situation s/he is performing from a distance, i.e. from an outside perspective as a contoured or bounded whole. The central and unmarked position of the speaker within the situation of speaking and among the speech participants is iconically marked by the less complex form within the verbal paradigm of the adult system. The observations presented in section 4.3 verify that the stem form becomes associated with this type of perception around age 2;1. Stem forms are mainly used in the target contexts of 1st s and 2nd s.imp. The formal identity and the observed parallels in the development from the use of the default form to the use of the stem form in both contexts again suggest a unified functional interpretation. The stem form becomes mapped not to the symbolisation of 1st s in particular but, more generally, to the feature [-distance] which is a perceptual feature of both of the target categories. The 1st s and the imperative include that the object of reference is the speaker or the speaker-related verbal action. In the case of 1st s, this is of no controversy. In the case of 2nd s. imp, the verbal event affects and relates the ultimate participants of the situation of speaking; the speaker as the one

[15] It is worth noting that a privative opposition may change towards a bi-directional opposition by grammaticalization processes in language history.

who demands an action and the hearer as the one who should act it out. Additionally, this event is not completed at the moment of speaking.

The resulting hypothesis on form-function mapping for the stem form is:

> *Hypothesis III:*
> *The third step in form-function mapping in the acquisition of verb inflection in German is the interpretation of the stem or -Æ form as an assignment of [-distance]. The stem form assigns that the actual referent is not to be perceived as at a distance from the speaker or the situation of speaking, i.e. as incomplete or unbounded.*

The verbal paradigm in the child's grammar now consists of:

(11) a) a base form which only specifies that a verbal action is assigned,
b) a specific form additionally assigning that the referent is to be perceived as a complete or bounded whole, i.e. as at a distance to the situation of speaking and its participants, and
c) a specific form additionally assigning that the referent is to be perceived as incomplete or unbounded, i.e. as at no distance to the situation of speaking or its participants.

In terms of grammatical features, this can be summarised as follows:

(12)

-en	:	[+V]	
-t	:	[+V]	[+distant]
stem	:	[+V]	[-distant]

Assuming that these forms do not assign person, because this category is clearly symbolised by the obligatory subject, their functional focus lies in the quality of the verbal action.[16] Thus, the third step in form-function mapping completes the aspectual specification of verbal states of affairs initiated by the aspectual interpretation of the *–t* form.

5.1.4 Excursus on the acquisition of the present tense paradigm

Summing up the hypotheses on form-function mapping presented in the previous sections, the paradigm of the present tense forms is build up by the following steps:

(13) a)

+V
-en

b)

	+ V
	[+distance]
-en	*-t*

c)

		+ V
		[+distance]
	-en	*-t*
[-distance]	*-Æ*	

Two things are interesting to note. First, the presentation shows that the *–en* form remains a default form in the sense that it undergoes no further specification but assigns only the general

[16] The person categories are merely implicitly assigned by the verbal forms.

feature [+V]. This means that the symbolisation of the 1st and 3rd plural is given by the subject phrase only, without any support of the respective verb forms which end in *-en*. Second, one cell remains empty in the last version of the paradigm (cf. (13c)). This cell becomes filled by the *–st* form in the next step of acquisition of the present tense forms. At first glance, the functional specification of this form looks contradictory. The empty cell lies in the domain of both of the features [+distance] and [-distance]. However, this is what the complexity of the *-st* form (which is iconically reflected by the complexity and heaviness of the suffix) consists of. The second person is located at the same time inside the situation of speaking ([-distance]) but outside of its central participant, the speaker, ([+distance]). Consequently, the final paradigm of the present tense forms in terms of the relevant perceptual features is as follows:

(13) d)

		+ V
		[+distance]
	-en	*-t*
[-distance]	*-Æ*	*-st*

The question remains of whether this paradigm can also provide an adequate analysis of (the acquisition of) the 2nd plural form which also ends in *–t*. In keeping with what has been reported for other corpora of German child data, this form is not attested in the data of Anna either. However, it can be assumed that the form-function mapping for this form does not contradict the structure of this paradigm but, rather, it is already grasped by it. Typologically, there are languages which clearly distinguish all person-number forms[17] in addition to languages which show some syncretism in the verbal paradigm. Syncretisms are caused by ignoring or underspecifying categorial distinctions which are represented somewhere else in the categorial system. The presence of the two different values of [±distance] in the perceptional features of the hearer and the verbal actions performed by the hearer gives rise to two possibilities for underspecification: formal identity of the forms of 1st + 2nd person on the basis of the common feature [-distance], or formal identity of the forms of 2nd + 3rd person on the basis of the common feature [+distance]. German exhibits the latter opposition by assigning *–t* to the forms correlating with the 2nd person, cf.[18]

(14)

[-distance]	1st pers	**mach-Æ**	mach-en
[+distance]	2nd pers	**mach-st**	**mach-t**
	3rd pers	**mach-t**	mach-en

In line with the highest perceptual complexity of the category of 2nd person, the form of the 2ndp is the only verb form correlating with plural subjects which is different from the default form, i.e. which bears a specification with respect to the perspectivisation of the verbal event.

6 Conclusions

The present paper aimed to show that early form-function mapping of verb forms in German is based on perceptual features which inform the hearer how to imagine the referents of the

[17] These are the languages typically show pro-drop properties. Here, the verb forms bear the symbolisation of the person and number categories.

[18] It is interesting to note that non-target forms in 2nds position are initially only *–en* forms. However, at age 2;0.29, stem and *–t* forms also occur. None of the three forms disappears from this context during the investigated period.

reported state of affairs. The investigated data motivate the hypothesis that the present tense forms are first mapped to perceptual features which are aspectual in nature. The first opposition assigned by the present tense forms is the perception of the verbal event and its central participant as distant vs. non-distant from the situation of speaking and its central participant. The perception of something from a distance allows it to be perceived as a contoured and bounded whole, i.e. with respect to verbal events, as complete(d). On the contrary, the perception of something as included or involved in the situation from which perception starts, i.e. as non-distant, does not allow it to be perceived as bounded whole; it can only be perceived as uncontoured, i.e. with respect to verbal events, as incomplete(d).

Traditionally, the present tense forms of the German verb are regarded as agreement markings, i.e. as assignments of the person-number categories of the subject. It has been argued here that this is only a secondary function of the verb forms. Evidence comes first from the target system: a) there is no unambiguous correlation between the partly syncretistic verb forms and the person categories; b) the obligatory subject phrase provides a fully explicit assignment of each person category. Second, this assumption is supported by the acquisition data, especially by the parallel developments in the use of the *–t* form in 3rd's and in perfective contexts and the parallel developments in the use of the stem form in 1st's and imperative contexts. The unified functional interpretation of these forms preconditions an abstraction from the category of person. However, in section 5.1.4, it has also been shown that not only the quality of the verbal event but also the person categories are basically distinguished by the feature opposition +/-distance. And this is not only because of the necessary connection of these two domains. Moreover, the opposition of +/-distance or +/-bounded or +/-complete seems to be based on a very general perceptual distinction. Grammatical and typological research has shown that there are further domains in grammar that are basically built up on a distinction of this nature, cf. the difference between mass and count nouns, singulars and plurals, accusative and partitive/genitive case (Krifka 1989; Leiss 1992; Bittner 2002). A lot of evidence has been accumulated that supports the hypothesis that the categorial system of each language is hierarchically organised and contains a basic level of general oppositions shared by the different categorial domains. Under the assumption that this basic level is derived from general perceptual features, it provides the universal starting point in the construction of grammar.

These considerations lead back to both Jakobson's model of grammar in general and of the system of verb categories in particular as well as to the language acquisition model of Slobin briefly described in section 1. The present results are in accordance with Jakobson's argument that aspect is the basic grammatical category of the verb. Although there is no aspect category in the German verb system, in the sense that a certain structural distinction exclusively related to assignment of aspect exists, children nevertheless interpret the verbal distinctions provided by the input in an aspectual manner. According to the above considerations on the general perceptual character of the first grammaticalized oppositions, there is no other possibility. Furthermore, Jakobson's thoughts on meaning in language and on the semiotic nature of grammatical structure (cf. Jakobson 1965) meet Slobin's hypothesis that the first form-function mappings in language acquisition start from universal cognitive-semantic features. The present findings on form-function mapping in the early acquisition of verbs in German support this hypothesis by showing that it is very likely that universal perceptual distinctions constitute the starting point of grammaticalization in first language acquisition.

Finally, it should be emphasised that the point of view taken in this analysis and especially the conclusions drawn here do not completely contradict other hypotheses on the issue of verb form acquisition. On the contrary, the varying findings in the literature are to a great deal compatible. For instance, Jordens (2002) reported a correlation in the use of finite forms

which are mainly 3rd's with states and change of states, and a correlation of infinitive forms with intended states of affairs in early Dutch. This seems to be largely compatible with the original assumption of Clahsen (1988, 1990) that the *–t* suffix is mapped to low transitivity in German child language. As discussed by Jordens, on the one hand, the features of transitivity and of intention correlate, and on the other hand, the features of state/change of state and intransitivity correlate. Moreover, it can be added that intentions typically concern the speech participants (especially the speaker) and their acting upon a certain object whereas what is reported about a 3rd person referent is typically a state or a change of state the referent undergoes. Clahsen's notion of 'transitivity' and Jordens' notion of 'intention' thus correlate with particular person categories. However, given the correlation between person and [±distance] that has been argued for here, their respective notions thus also correlate with the perceptual features which have been claimed in the present paper to build the starting point of grammaticalization in language acquisition.

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As said above, the target structure for expressing perfectivity is the analytic construction. In (12), examples for the four main types of analytic construction in the child's grammar are listed.

(12) a) regular verbs with a particle: aux + ge- + -t

hast *das* *(ka)putt(g)emacht*
have-2S.PRES.IND it break-PP
'(you) have broken it'

b) regular verbs with no particle: aux + -t

die *hat* *schubst*
she have-3S.PRES.IND push-PP
'she has pushed (me)'

c) irregular verbs with a particle: aux + ge- + SVC[19] + -en

die hab ich weggeschmissen
it have-1S.PRES.IND. I throw away-PP
'I have thrown it away'

d) irregular verbs with no particle: aux + SVC + -en

hab auch ein tee trunken
have-1S.PRES.IND also a tea drink-PP
(I) have drunk a tea too/I had a tea too'

[1] For a more appropriate base of comparison in terms of analysed verb utterances (VU), the following intervals in the period of 1;11–2;0 can be distinguished:

age	number of VU	-en/-t	-en/-∅	-t/-∅	-en/-t/-∅	-en/-t/(-X)
1;11.6–1;11.20	312	10	1	1	4	2
1;11.30–2;0.5	282	5	2		5	
2;0.29	288	7	3		4	2
2;1.13	209	4	3	1	5	1

[19] SVC = stem vowel change.

Marked uses of tense/aspect morphology and situation type

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Abstract

In this study explanations are sought for the often reported associations in child language between tense/aspect morphology and situation type. The study is done on the basis of adult-adult data, child language and input language to the children. First of all it is shown that the associations are natural, since they are strong in adult-adult English as well. Only in the early stages does child language differ from this distribution, in that the associations are either stronger or different. Input data appear to account to a large extent for these differing patterns. An additional explanation is found in the discourse topics: within the context of talking about the here-and-now, the combinations of morphology and situation type that can be seen as unmarked suffice. In the context of talking about past events and of giving general comments about the world, marked combinations are necessary. It is shown that children in and their parents at the early ages mainly talk about the here-and-now, whereas adults among themselves hardly ever do so. Later, describing past events and commenting on the world becomes more frequent in child language and input, and, as a consequence, marked combinations of tense/aspect morphology and situation types increase in use.

1 Introduction

There are strong associations in child language between tense and aspect morphology on the one hand and situation type[1] on the other hand. The following associations are reported for different languages:

- Imperfective or Progressive and activity [+dynamic, -telic] verbs
- Perfective or Past and [+dynamic, +telic] verbs[2]
- Imperfective or Present and state [-dynamic] verbs

Associations in first language acquisition between tense/aspect morphology and situation type appear to hold across languages, e.g. in Mandarin (Erbaugh 1978), Turkish (Aksu 1978), Japanese (Shirai 1998), Greek (Stephany 1981, 1997) and English (Shirai & Andersen 1995), but they are not as strong in every language. The associations have also been shown to hold in the input (e.g. Aksu-Koç 1998, Stephany 1981, Andersen & Shirai 1996). The distribution in adult-adult interaction however is in most studies not examined.

Various explanations have been proposed for the correlations found in child language, for example that the grammatical markers encode situation type rather than grammatical aspect or tense (e.g. Bloom, Lifter and Hafitz 1980, Bronckart and Sinclair 1973, Antinucci & Miller

[1] In the literature one can find labels as lexical aspect, Aktionsart or situation type to refer to the *internal structure of a situation*. In this article I will use the term *situation type* in order to avoid confusion with the term (grammatical) aspect. I will use the term *situation* as the neutral term for any possible situation type.

[2] Some studies report that the association holds for *punctual* telic verbs (e.g. Shirai & Anderson 1995), while others report an association with telic verbs in general (e.g. Tomasello 1992, Clark 1996).

1976). This deviating use of morphemes would stem from a cognitive limitation to mark temporal deixis. Weist et al. (1984) have labeled this claim the Defective Tense Hypothesis.

Another explanation is the Prototype Account (Shirai 1991, 1994, Shirai & Andersen 1995, Li & Shirai 2000). On the basis of distributional analysis, children create semantic representations of tense/aspect morphology that are restricted to the prototypical situation type of the morphological category. The semantic representation excludes the combination of morphology with non-prototypical members.

The above explanations are studied in the light of data from adult-adult interaction, child language and input. The linguistic contexts in which the associations do and do not occur will be analyzed in order to explore the influence of discourse topic. An alternative explanation, the Discourse Topic Hypothesis will be presented in section 5. This approach includes the cognitive and communicative development of children and can account for the patterns found in adult-adult language, input **and** child language

2 Study I: Distribution in adult-adult language

In most studies on the acquisition of aspect, there are no data presented on the association between tense/aspect morphology and situation type of that specific language in adult-adult conversation (an exception is Stephany's study on Greek (1981) who found close similarities between patterns in adults and children). It is however necessary to know how 'natural' the association is between tense/aspect encoding and situation type, to make sure that the association is specific for child language, in other words that there is indeed a phenomenon to explain. The first question to be addressed here is: What is the distribution of tense/aspect morphology and situation type in adult English?

2.1 Data

This study used data from the Santa Barbara Corpus of Spoken American English (DuBois 2000). The data consist of transcribed spontaneous conversations of eight speakers: four male and four female native monolingual speakers of American English, between the ages of 19 and 50. The total sample consists of 2895 utterances. The selected files were recorded in the private home environment (except one, which was recorded in the office where the speaker works) and all consist of face-to-face conversation between two or more (maximum 5) acquainted adults.

2.2 Coding

All finite verbs with Simple Present, Progressive or Simple Past (regular and irregular) inflection were coded for form and situation type. The coding of situation types in this study is restricted to the oppositions between [-dynamic] and [+dynamic] situations and then, within the category of [+dynamic] situations, between [-telic] and [+telic] situations. The term state is used for all [-dynamic] situations. The term activity is used for all [+dynamic/-telic] situations, thus including the category of semelfactives that Smith (1991) introduced[3]. Finally, the term telic situation is used for all telic situations, including both the accomplishments and achievements of Vendler's verb classification (1967). Consider Table 1:

[3] Semelfactives are activities that consist of an iteration of punctual events, like *cough* or *knock*

STATE	- dynamic	
ACTIVITY	+ dynamic	- telic
TELIC SITUATIONS		+ telic

Table 1: Classification of situation types

Since the internal structure of a situation does not depend on the verb alone (Verkuyl 1972), the analysis of situation types is based on the situation described by the bare verb (without tense and aspect marking), its arguments and adjuncts. Note that the classification of situations is a classification of the inherent semantics of a verb and its arguments and not a classification of "real" situations. Real situations can be viewed in various ways, even within one language: *John was very scared of the dog* or *The dog scared John enormously* both express that John was very much afraid of the dog (Dik 1997:125), but in the first example this is described by a state and in the second example by a telic situation. It is a language specific characteristic in what way linguistic forms are mapped onto the real world and it is dependent on the speaker how he chooses to describe a real world situation with the available means.

A situation is classified as a state, when it is static and stable, when it lacks 'shifts in variation' and 'consist of an undifferentiated period' (Smith 1991:37). Moreover, the criterion of input of energy is used:

> With a state, unless something happens to change that state, then the state will continue (...). With a dynamic situation, on the other hand, the situation will only continue if it is continually subject to a new input of energy (…). (Comrie 1976:49)

Although there is considerable agreement in the literature on the definitions of states and non-states, no linguistic test is available that unequivocally distinguishes states from non-states. Clear examples of activities are *run in the park*, *take pictures*, *cry*, and *read* and clear examples of states are *know John*, *feel sorry*, *own a house* and *live in Florida*. The former situations have internal dynamics and require input of energy to last in time. The latter situations, in contrast, have no internal variation and do not require an input of energy to continue. Although most situations are not so difficult to classify, there are problematic situations such as *wear (a sweater)*, *hold (a basket)*, *wait (for the train)*, *sleep*, *dream,* and position verbs like *stand* and *sit*, all rather common verbs in child language. For these situations it is disputable whether they have internal dynamics and whether they require an input of energy. Shirai & Andersen (1995) in their research on English classify each verb that yields a habitual reading in the Simple Present as an activity verb, thus including position verbs. I, however, agree with Smith (1991:250) and Comrie (1976:37) that position verbs like *stand*, *sit* and *lie* describe a state even though they often occur in the Progressive. With Progressive marking, these verbs refer to a state that is temporary, whereas in the Simple Present they refer to a permanent state. It is however in both cases a state, and not an activity. Only when verbs refer to a particular stance - for example *Mary was sitting up as straight as she could* (from Smith 1991:250) - is the situation classified as an activity. Other verbs that occur in the Progressive but seem to lack any internal variation are *wait*, *hold*, *live (somewhere)* and *wear (clothes)*. They are all classified as states. Two other problematic cases are *sleep* and *dream*. In this study they are both analyzed as an activity, as opposed to *be asleep*, or *have a dream* that are analyzed as states.

Dynamic situation types can be divided into atelic and telic: a telic situation involves a certain change of state, from a 'Source State' to a 'Target State' (Klein 1994). It describes 'a process

that leads up to a well-defined terminal point, beyond which the process cannot continue.' (Comrie 1976: 45) There are several criteria to determine the telicity of a situation. If a situation is telic, one can add a specification of the duration until the endpoint is reached, such as '(with)in an hour':

(1) She ran in the park *in an hour. atelic

(2) She drank five bottles of beer in an hour. telic

Another possible criterion is the *almost*-test. If *almost* is added to the description of an atelic situation, it only implies that the activity has never started, whereas with a telic situation, it implies either that the event never started or that it was started but not finished. Compare (3) and (4):

(3) I almost sang but I didn't start/* but I didn't finish it atelic

(4) I almost sang the song but I didn't start/but I didn't finish it telic

Finally, the question: 'If X is interrupted in the course of VERB-ing, has she then VERB-ed?' is answered with 'yes' if the situation is atelic and with 'no' if the situation is telic, consider (5) and (6):

(5) If John is interrupted in the course of searching for a stamp, has he then searched for a stamp? Answer: Yes. atelic

(6) If John is interrupted in the course of writing a letter, has he then written a letter? Answer: No. telic

The encoding was always based on the interpretation of the specific utterance within the discourse.

2.3 Results

In the adult conversations, there were in total 995 tokens of a Simple Present, Progressive or Simple Past that were all coded for situation type. The distribution of situation type over tense/aspect morphology was analyzed at first for each adult individually. The distribution presented in Figure 1 is the weighted mean of these distributions.

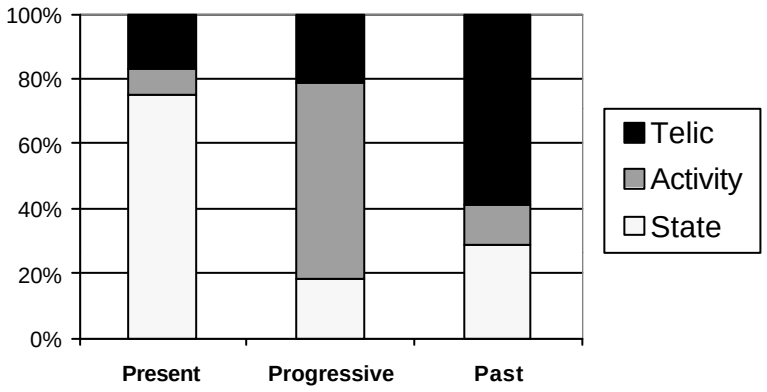

Figure 1: Proportion of situation types for Simple Present (n=569), Progressive (n=121), and Simple Past (n=305) morphology in English adult-adult conversation.

The conversational data of adults show a strong association between Simple Present and states (mean 75%), between Progressive and activities (mean 60%) and between Simple Past and telic situations (mean 59%). Hereafter, these combinations will be referred to as 'unmarked'. Of all the Simple Present tokens only 8% combines with activities and 17% with telic situations. The Progressive combines with states in 19% of all cases and with telic situations in 21% of all cases. Of all the Past tokens 29% combines with states and 12% with activities. These combinations will be referred to as 'marked'.

2.4 Conclusion

There is a level of association between tense/aspect morphology and situation type that is perfectly natural in conversational English: about 60% association between Progressive and activities and Past and telic situations and 75% between Present and states. The question is whether children differ from this pattern of associations in their production. Only insofar as the associations in English child language or input are stronger or weaker than the adult-adult level or different altogether, is there a phenomenon specific for child language that needs explaining.

3 Study II: Child language

The second question addressed in this study is whether the association between tense/aspect morphology and situation type in child language differs from adult language. In study I it was shown that a certain level of association is standard or natural for English conversation. Only if children behave differently from this pattern, it is meaningful to investigate the factors that influence the distributional patterns in child language. Therefore, in the second study, the development in child language will be investigated.

In the literature on the acquisition of tense/aspect morphology in English (Bloom, Lifter & Hafitz 1980, Clark 1996, Shirai 1991, Shirai & Andersen 1995, Tomasello 1992) there is agreement that the Progressive is overwhelmingly used with activities and the Past with telic situations, figures running up to 90 or 100%. The study of the Simple Present is restricted to the acquisition of third person singular *–s* and here the results are not very consistent or not reported at all. These studies suggest that there is indeed a difference between adults and children, but since analyses differ from study to study, the reports from the literature cannot be compared to the adult data of study I. Child language has to be coded in the same way as the adult data in order to be able to compare the results.

3.1 Data

The transcribed spontaneous speech of three monolingual American English children was used from CHILDES (MacWhinney & Snow 1985, 1990, MacWhinney 1995). The first child, Naomi, was studied at 1;6, 1;9, 2;0, 2;3, 2;6 and 3;0 (Sachs 1983); the second child, Nina, was studied at 2;0, 2;3, 2;6 and 3;0 (Suppes 1973); and the third child, Abe, was studied at 2;6, 3;0, 3;6, 4;0, 4;6, 5;0 (Kuczaj 1977). Each sample consisted of the first 750 child utterances that were available of that particular age. If there were not enough utterances available of the specific month, then utterances of the preceding or following month were used.

3.2 Coding

The data were encoded in the same way as the adult conversations (see section 2.2). Every adult-like combination of a Subject and a Present form, such as *I want, he has, it looks like …*

etcetera, was encoded as Simple Present. For the Progressive and the Simple Past, only the inflection (not the presence of a Subject) was taken as a criterion for inclusion.

The chi-squared test was applied in order to find out whether the distribution in the child samples is significantly different from the adult sample. The significance level was set at $\alpha = 0.05$. Whenever the chi-squared test could not be applied because the expected value in one of the cells was lower than 5, the two categories that form a marked combination with the morphology were combined for the analysis: this is always described in the text.

3.3 Results

3.3.1 Progressive

Figures 2-4 display the proportion of situation types in the Progressive. The rightmost column presents the distribution in the adult conversations, which was also presented in Figure 1.

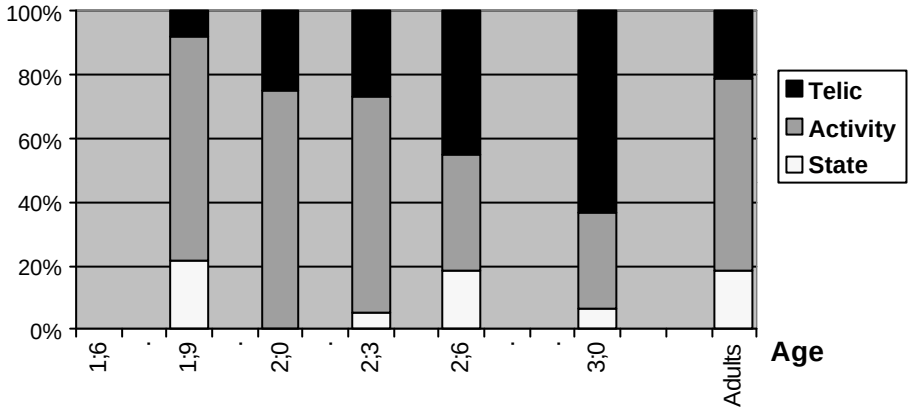

Figure 2: Naomi's use of Progressive compared to adult sample: proportion of situation types.

Naomi's distribution of situation types in the Progressive (Figure 2) is at 1;9 and 2;3 not different from what adults do. At 2;0, the marked combinations (states and telic situations) had to be added up in order to apply the chi-squared test. Although this yielded a non-significant difference, it is remarkable that there are no states in Naomi's data. The samples at ages 2;6 and 3;0 are significantly different from the adult sample, mainly due to a far greater proportion of telic situations in the Progressive.

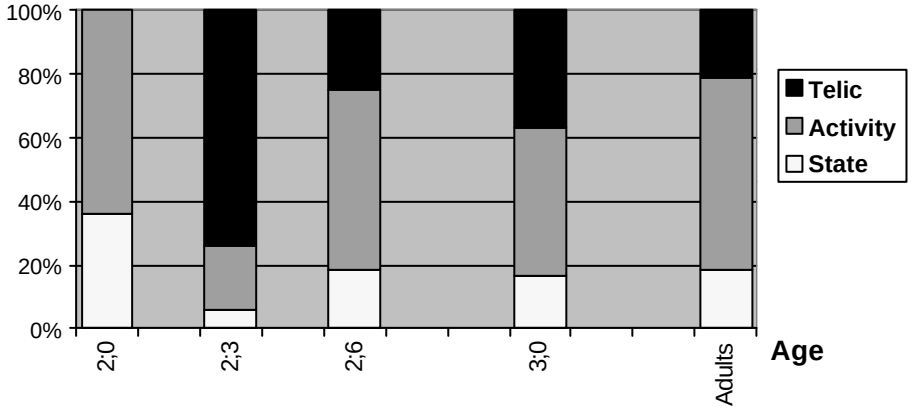

Figure 3: Nina's use of Progressive compared to adult sample: proportion of situation types

The results for Nina are presented in Figure 3. At age 2;0 the marked combinations (with states and telic situations) had to be combined for applying the chi-squared test: there was no

significant difference with the adults (X^2=0,81 n.s.). It is however remarkable that Nina does not use the Progressive with telic situations at all.

Nina at 2;3 is significantly different from the adult sample (X^2=3,41.10^{-8}) in that her proportion of telic situations is larger and of activities and states smaller. At 2;6 the chi-squared test could only be applied when states and telic situations were taken as one category. Then, there was no significant difference (X^2=0,77 n.s.) with the adult-adult distribution. At 3;0 there was no significant difference either (X^2=0,20 n.s.).

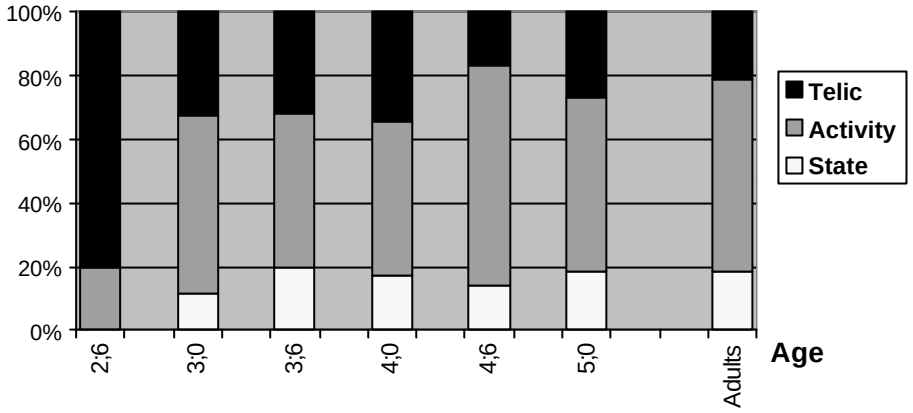

Figure 4: Abe's use of Progressive compared to adult sample: proportion of situation types.

The results for Abe are presented in Figure 4. At 2;6 the unmarked categories had to be combined which yielded a significant difference from what adults do (X^2=0,000262): the proportion of telic situations is larger and there are fewer states (none at all) and activities. From age 3;0 the proportions of situation types in Abe's Progressives are similar to adults.

To summarize, contrary to findings in the literature, these data show that the association between activities and the Progressive in child language is never stronger than in adult language. Where children, however, do differ from adult language is that there is at least one sample for each child in which the proportion of telic situations is the largest. Furthermore, the samples Naomi at 2;0, Nina at 2;3 and Abe at 2;6 contain no or hardly any states and the language of Nina at 2;0 does not contain a single telic situation.

3.3.2 Simple Past

In Figure 5-7 the proportion of situation types in the Past are presented. The column on the right presents the distribution in the adults' conversations, already presented in Figure 1.

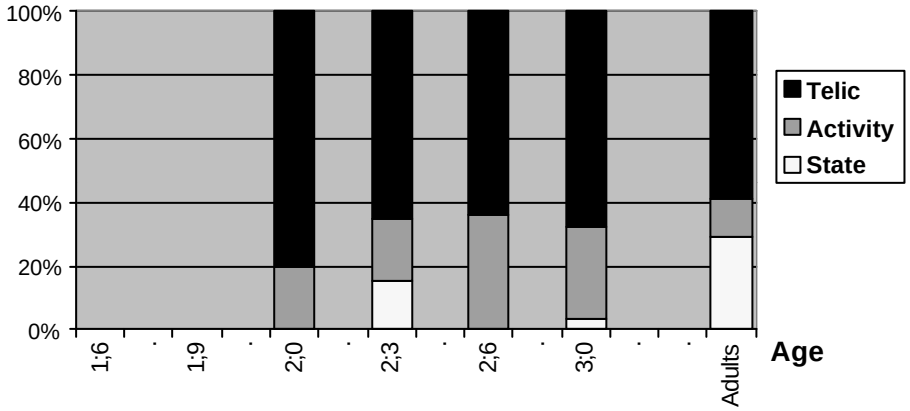

Figure 5: Naomi's use of Simple Past compared to adult sample: proportion of situation types.

Naomi's use of the Simple Past is presented in Figure 5. At 2;0 the chi-squared test could not be used at all, but the proportion of telic situations is large (80%, n=10). For all the other samples the test could only be applied when the marked situation types (states and activities) were taken as one category. Contrary to expectations based on the literature, there were no significant differences found: the association between Past tense and telic situations was as strong as in the adult sample. However, within the group of marked combinations, the proportion of states of Naomi's Past Tense forms is always low and consequently, the proportion of activities is high.

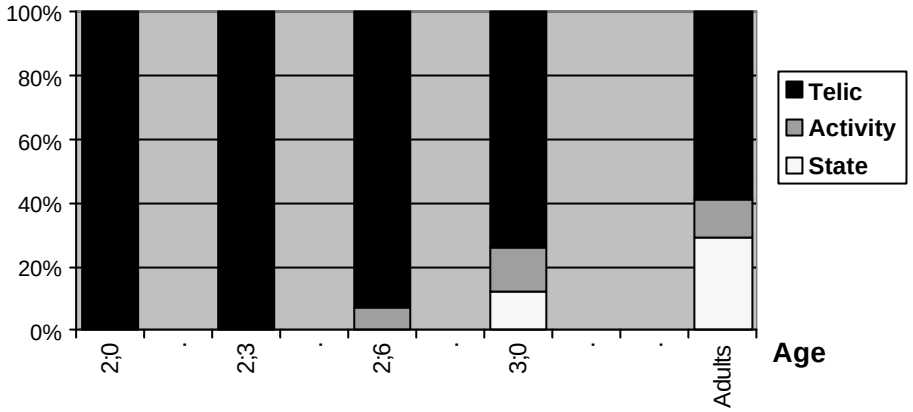

Figure 6: Nina's use of Simple Past compared to adult sample: proportion of situation types.

Nina's use of the Past is presented in Figure 6. At age 2;0 and 2;3 the chi-squared test could not be used, since there were no states and activities at all. The association between Past and telic situations is here thus 100%, which is in accordance with results reported in the literature. It should be noted, however, that at 2;0, the only past forms that Nina used was eleven times *gave*; at 2;3 Nina uses only two tokens: *mashed* (1x) en *fell down* (1x). This suggests that the Past Tense is by no means productive at these ages. At 2;6, states and activities had to be combined in order to apply the chi-squared test. This yields a significant difference (X^2=0,01057): the proportion of telic situations in Nina's language is larger than in the adult sample. At age 3;0 there is no longer a significant difference.

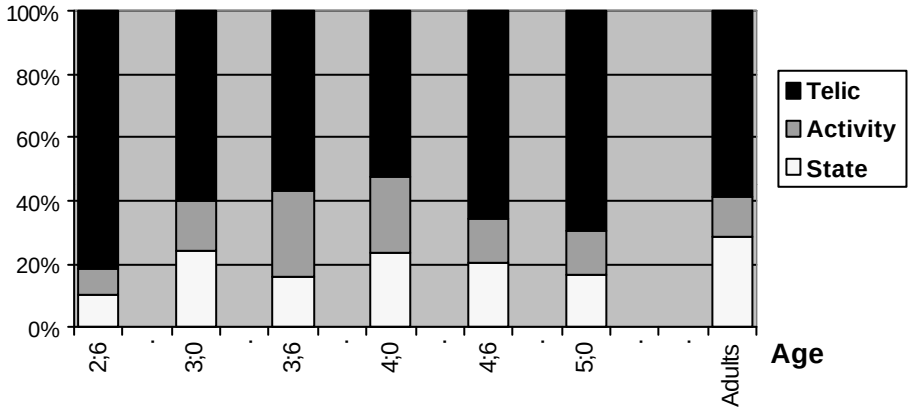

Figure 7: Abe's use of Simple Past compared to adult sample: proportion of situation types.

Abe's use of the Past is presented in Figure 7. At 2;6 the proportion of states is smaller and of telic situations larger than in the adult sample (X^2=0,007), which is in accordance with the literature. At 3;0 there is no significant difference. At 3;6 the proportion of activities is larger and of telic situations smaller than in the adult sample (X^2=0,000182) and also at 4;0, the proportion of activities is larger than in the adult sample (X^2=0,009535). This was not

expected on the basis of the literature. At 4;6 and 5;0 there are no differences between Abe and the adult sample.

In summary, the data show that the associations between Past tense and telic situations is not specific for child language, but the association in child language seems to be stronger for all children up to age 2;6. This confirms earlier findings. Note, however, that the number of tokens and types is small which suggests that the inflection is not yet productively used. Finally, there are a few samples (Abe at 3;6 and 4;0 and the samples of Naomi) in which the proportion of activities is remarkably large. In all child samples the proportion of states is smaller than in the adult sample.

3.3.3 Simple Present

In Figures 8-10 the proportions of situation type for the Simple Present are presented. The column on the right presents the distribution in the adult sample (as presented in Figure 1).

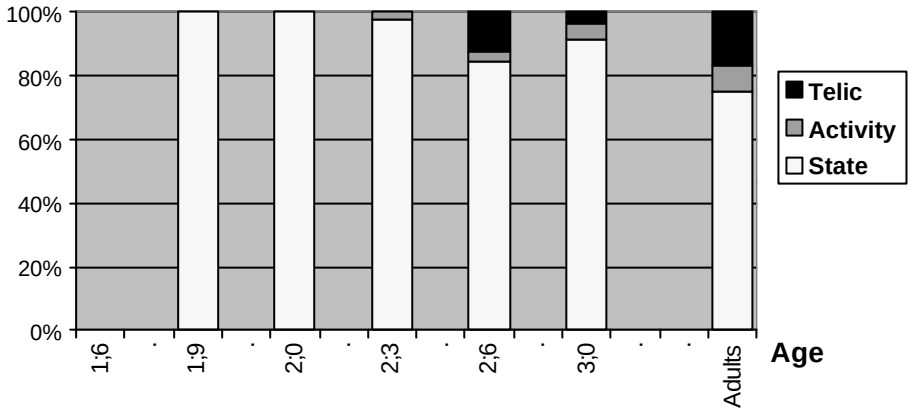

Figure 8: Naomi's use of Simple Present compared to adult sample: proportion of situation types.

For Naomi's data at 1;9 and 2;0 (Figure 8) the chi-squared test could not be applied, since there are no activities and telic situations at all. At 2;3, when marked situation types are combined, the difference is significant (X^2=0,000207): the proportion of states is larger than in the adult sample. At 2;6 there is no significant difference. At 3;0 the difference is significant (X^2=0,002414) in that Naomi's proportion of states is larger and of telic situations smaller.

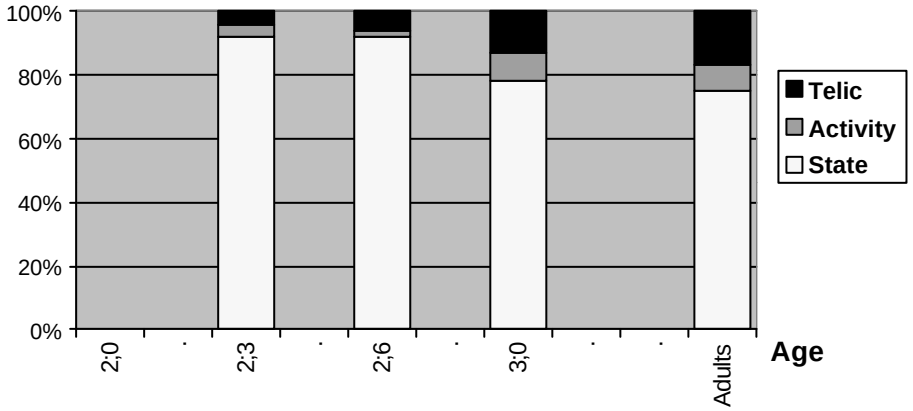

Figure 9: Nina's use of Simple Present compared to adult sample: proportion of situation types.

At age 2;0, Nina does not use a single form of the Simple Present (Figure 9). At 2;3, activities and telic situations have to be combined in order to apply the chi-squared test: there is no

significant difference between Nina and the adult sample (X^2=0,051143 n.s.). At age 2;6 Nina's language differs significantly (X^2=0,006606) from the adult sample in that her proportions of activities and telic situations are smaller. At 3;0, there is no significant difference.

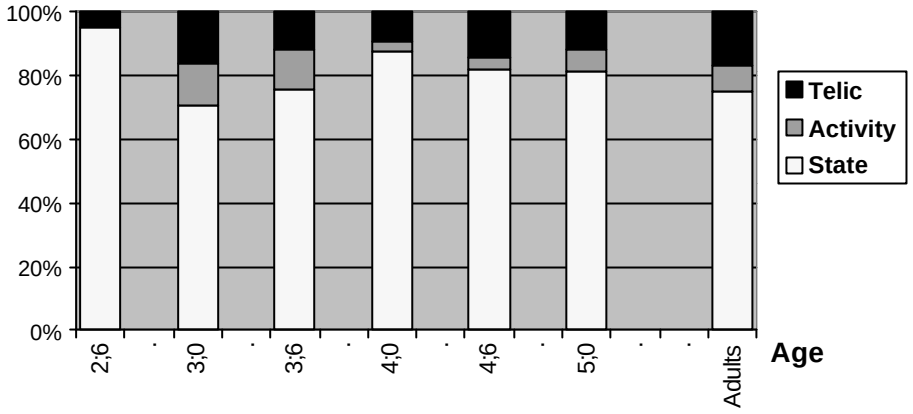

Figure 10: Abe's use of Simple Present compared to adult sample: proportion of situation types.

At 2;6, Abe's data (Figure 10) are significantly different from the adult sample (X^2=7,39.10^{-5}): Abe's proportion of states is larger and of activities and telic situations smaller. There is also a significant difference between Abe 4;0 and the adult sample (X^2=0,00725): once more Abe uses more states and fewer activities and telic situations than the adults. The other samples (3;0, 3;6, 4;6, 5;0) do not differ from the adults.

In summary, the data show that the association between Simple Present and states is in general stronger in early child language than in adult language. Between the ages of 2;6 and 4;0 the association gets weaker and reaches the adult level.

3.4 Conclusion

The results from the children's data show that there is a difference between the associations of morphology and situation types in adult and child English. Firstly, although from the earliest samples on the association between Progressive and activities is not significantly stronger than in adult-adult language, the children's usage differs on one count: in at least one sample of each child the association between the Progressive and telic situations is strongest. Furthermore the association between Progressive and states is very weak in at least one sample of each child. Secondly, the association in early child language between Past and telic situations is stronger in child language than in adult English, which is in accordance with the literature. Furthermore, the proportion of states in the Simple Past is remarkably small and the proportion of activities is sometimes larger than for adults. Thirdly, the association between Present and states is stronger in child than in adult language and only gradually weakens. The question thus arises why children differ from adults on these points: how can we explain the differences in distribution?

4 Study III: Input

Why do the associations between tense/aspect morphology and situation type in child language differ from adult-adult language? A possible explanation is the input. Language directed to children differs from what adults do when they converse among themselves and it might be the case that the distribution of situation types over morphology in child directed

speech differs from adult-adult interaction. The patterns found in child language might just be a reflection of the distribution in the input. So we pose the questions: Can the input account for the different patterns in child language, more specifically: a strong association between telic situations and Progressive in a few samples, a strong association between Past and telic situations and between Present and states?

4.1 Data

In order to find out whether the input is different from adult-adult conversation and whether the distribution in child language and input is comparable, the input to two of the three children, Nina and Abe, is studied. The same CHILDES samples are used as for the child samples. The input to Nina is investigated at 2;0, 2;6, and 3;0 and for the Progressive also at 2;3. In Nina's samples the input is only from her mother. The input to Abe is investigated at 2;6, 3;0, 3;6 and 4;6 and consists of utterances from both parents and a few utterances from his grandmother.

4.2 Coding

All the adult utterances addressed to the child in the specific sample are coded in the same way as the child and adult samples (see section 2.2).

4.3 Results

4.3.1 Progressive

Figures 11-12 present the results for the Progressive. The results for the child and the input in one sample are presented in columns next to each other at each age. The rightmost column displays the distribution in the adult-adult conversations.

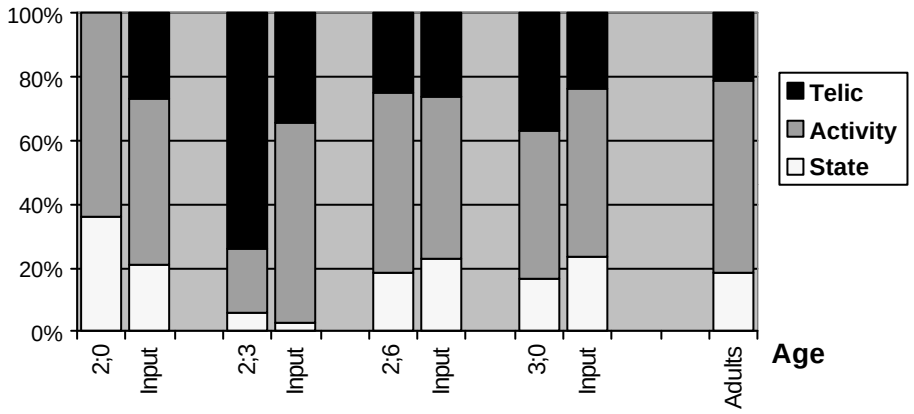

Figure 11: Input to Nina: proportion of situation types in Progressive

The input to Nina at age 2;0 is similar to the distribution in the adult sample (Figure 11). At 2;3 the input is significantly different from the adult sample (X^2=4,394.10^{-4}) in that the proportion of telic situations is larger and of states smaller. In the other samples the input is comparable to the adult sample.

The difference between the input and Nina's language at 2;0 and at 2;3 could only be calculated when the marked combinations (states and telic situations) are added up. At 2;0 there is no significant difference, although it is remarkable that there are no telic situations at all in Nina's data. At 2;3 there is a significant difference (X^2=1,26.10^{-5}), in that the proportion of activities in the input is larger and of telic situations smaller than in Nina's speech. This

difference is the result of the frequent use of the mother of the question: *What are you doing?* and *Who are you hammering?* In the other samples, input and child language are comparable.

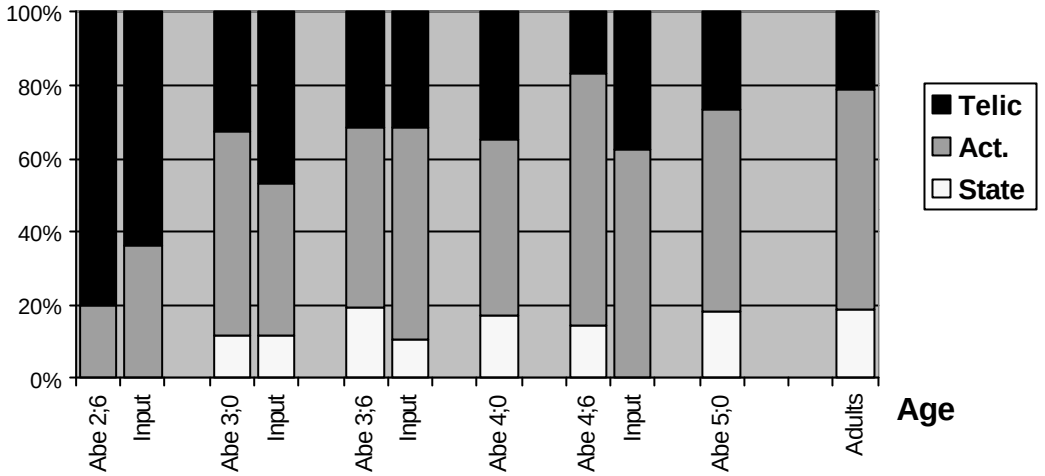

Figure 12: Input to Abe: proportion of situation types in Progressive.

The input to Abe (Figure 12) differs significantly from the adult sample (X^2=5,806.10^{-6}) at 2;6 in that the proportion of telic situations is larger in the input than in the adult sample and there are no states at all. The input at 3;0 is also significantly different from the adult sample (X^2=0,011) because the proportion of telic situations in the input is large. There are no significant differences between Abe's language and the input.

In summary, the distribution in the input can to a large extent account for the patterns in the child samples. The input differs in similar ways from the adult-adult conversation as the child language does: the association between telic situations and the Progressive is stronger in the input than in adult-adult language and the association between states and Progressive is in a few samples weaker. The correlation between input and child language is high: for Abe there are no differences at all and for Nina only in the beginning. At 2;3 the proportion of telic situations in Nina's language is larger and of activities smaller than in the input, but this can be explained by the repeated questions of the mother. The only pattern that cannot be explained by the input is that there are no telic situations in Nina's data at 2;0, whereas they are present in the input.

4.3.2 Simple Past

Figures 13-14 present the results for the Simple Past.

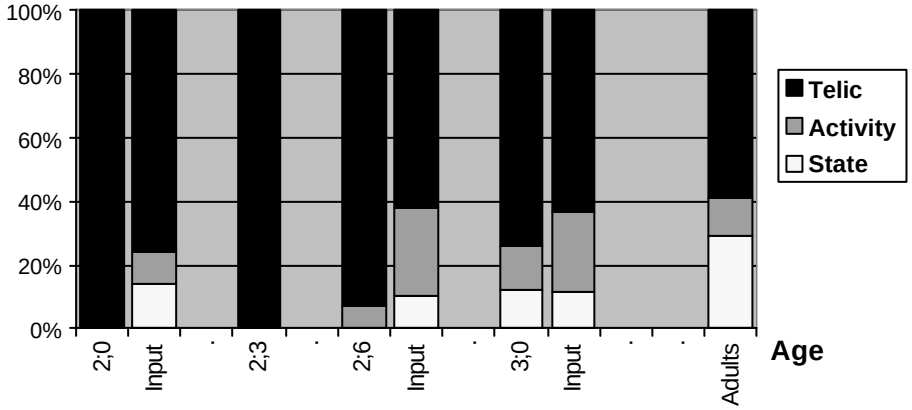

Figure 13: Input to Nina: proportion of situation types in Simple Past.

For Nina (Figure 13) all the input samples are significantly different from the adult sample. At age 2;0 (X^2=0,01522) the proportion of telic situations in the input is larger and of states smaller than in the adult sample. At age 2;6 (X^2=3,85.10^{-5}) and 3;0 (X^2=1,27.10^{-6}) the proportion of activities is larger and of states smaller than in the adult sample.

The chi-squared test could not be applied to calculate the difference between the input and Nina's language at 2;0 and 2;6: the expected values were too low. It is however remarkable that the proportion of telic situations in Nina's speech is so high, compared to the input. At 3;0, when the state and activities were combined, there appeared to be no significant difference between input and child language.

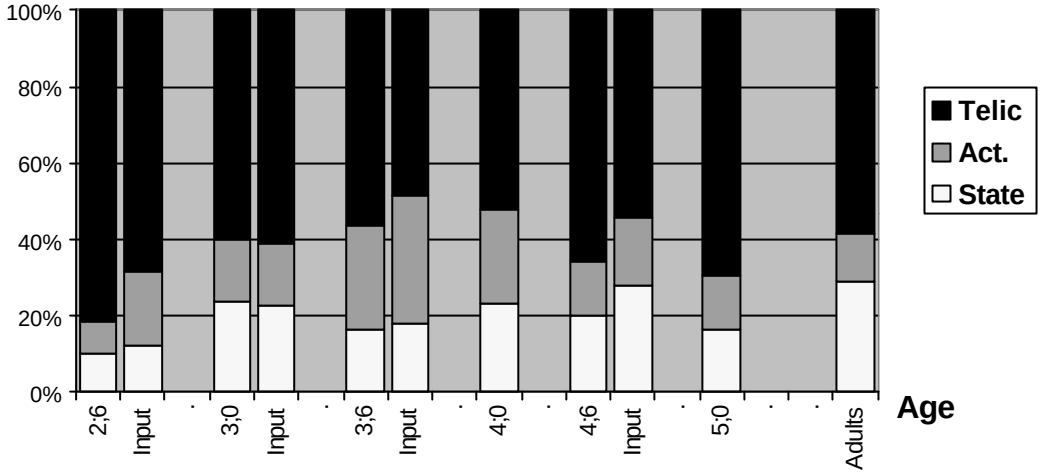

Figure 14: Input to Abe: proportion of situation types in Simple Past.

In the input to Abe at 2;6 (X^2=0,0247) the proportion of states in the input is significantly smaller than in the adult sample. In the input at 3;6 (X^2=8,09.10^{-5}) the proportion of activities is larger than in the adult sample. The other samples show no differences. There are no significant differences between Abe's language and the input language.

In summary, the distribution in the input can account partly for the distribution in child language. The association between Past tense and telic situations is stronger in the early input (Nina at 2;0). In many input samples the proportion of states is smaller and/or the proportion of activities larger than in the adult sample (Nina at 2;6 and 3;0, Abe at 2;6 and 3;6), which was also the case in child language (although not always in the same samples). The correlation between input and child language is high: there are no differences between Abe's language and the input. Nina's speech seems to differ from the input at 2;0 and 2;6: the proportion of telic situations in Nina's speech is larger than the input.

4.3.3 Simple Present

The results for the simple present are presented in Figures 15 and 16.

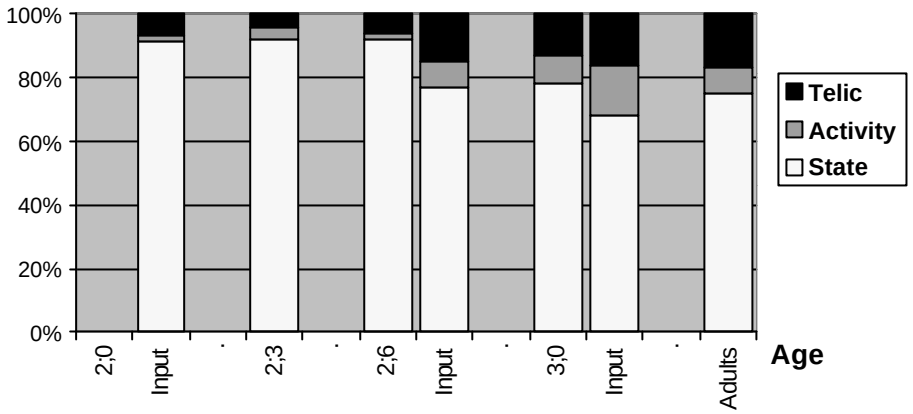

Figure 15: Input to Nina: proportion of situation types in Present.

In the input sample at 2;0 the proportions of activities and telic situations are smaller than in the adult sample (X^2=0,002534). At 2;6 there is no significant difference but at age 3;0 the difference with the adult sample is significant due to a large proportion of activities in the input (X^2=0,021121).

At 2;6, the language of Nina is significantly different from the input (X^2=0,00747) because the proportion of states in Nina's speech is larger than in the input. At 3;0 there is no difference between input and child.

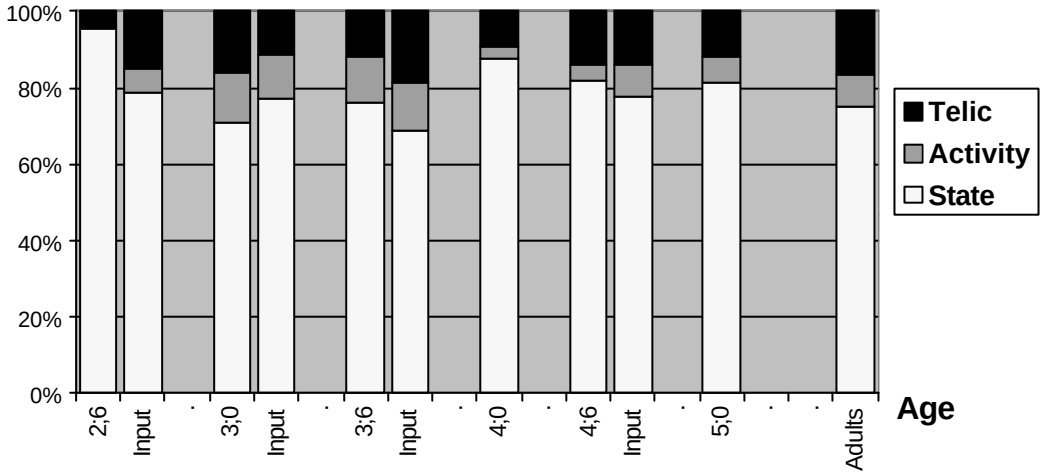

Figure 16: input to Abe: proportion of situation types in Present.

In the input samples, there are no significant differences with the adult sample. The language of Abe and of the input only differ at 2;6 (activities and telic situations have to be combined) (X^2=0,000761): there are no activities in Abe's language and the proportion of telic situations seems to be smaller than in the input.

In summary, the distribution in the input partly accounts for the distribution in the child language. In the early sample (Nina at 2;0) the association between states and Simple Present is stronger in the input than in the adult sample. From age 2;6, both in the input to Nina and to Abe, the association between states and Simple Present is equal to the adult sample. However, in the input to Nina at 3;0, the proportion of activities is large.

Child language and input differ for both children at 2;6: the association between states and Simple Present is stronger in child language than in the input. From 3;0 years of age onwards, there is no longer a difference between input and child language.

4.4 Conclusion

The results of Study III show that parents adapt their speech when talking to young children. The associations between tense/aspect morphology and situation type differ from what adults do when they speak to adults. There is a stronger association between Progressive and telic situations, a stronger association between telic situations and Past and a stronger association between Present and states. The association between Progressive and states and between Past and states is weaker and the association between Past and activities is stronger than in adult-adult language.

This different distribution is the language addressed to children. It is the basis on which they build up their own language. The fact that the distribution in child language is skewed is thus not remarkable insofar as it is similar to the distribution in the input. Study III has shown that the correlation between input and child language is strong, and that the distribution in the input can account to a large extent for the distribution in child language: the strong association between Progressive and telic situations in a few samples, the strong association between telic situations and Past, and the small proportion of states in the Past and relatively large proportion of activities in the Past. There are, however, a few differences that cannot be accounted for by the input: although the association in the input to young children between Past and telic situations and between Present and states is stronger than in adult-adult language, these associations are even stronger in child language. Finally, the lack of telic situations in the Progressive in Nina 2;0 is not accounted for by the input.

It seems a logical consequence that the distribution in child language will differ from adult language when the language children hear is also different. Nevertheless, the questions remain why parents adjust their language directed to children and why the patterns in child language are not completely accounted for by the input.

5 Explanations

Several hypotheses have been posed for explaining the strong associations in child language between tense/aspect morphology and situation type. One of the explanations is the distribution in the input. As shown in section 4, the input can indeed account for the greater part for the distribution in child language. However, although the association between situations types and morphology in child directed speech is skewed compared to adult-adult speech, the association in child language is skewed even more. An explanation needs therefore to account for the differences between child-directed and adult-directed speech and between input and child language. First, the Defective Tense Hypothesis and the Prototype Account will be discussed. In section 5.3 an alternative hypothesis is proposed, the Discourse topic Hypothesis.

5.1 Defective Tense Hypothesis

The Defective Tense Hypothesis (e.g. Bloom, Lifter and Hafitz 1980, Bronckart and Sinclair 1973, Antinucci & Miller 1976) claims that tense/aspect morphology at the early stages does not encode tense or aspect, but rather situation type. The observed patterns are then a consequence of cognitive limitations of the child who does not yet have a concept of temporal relations. Inflection is thus redundant in the early stage: it marks what is already inherently present in the semantics of the verb and its arguments. The first problem with this hypothesis is the question how and why a child would start to reanalyze the morphemes as tense/aspect markers instead of situation type markers. Furthermore, why would children grammatically

encode situation type, although adult languages across the world in general lack grammatical encoding of situation type.

Shirai & Andersen (1995:746) state that the Defective Tense Hypothesis could be viewed as an absolute statement - only telic verbs receive past inflections - or as a tendency - Past inflection is predominantly used with telic verbs. The less stringent version, however, entails that the child would apply different strategies at the same stage: whenever Past inflection is used with telic verbs, the child encodes resultant state or telicity, but what does the child do whenever the inflection is used with atelic verbs? Would the child then apply a different strategy, for example: encode tense or encode nothing? So in other words, if we accept a less stringent version of the Defective Tense Hypothesis, we would also have to accept that a child might have different semantic representations for the same morpheme: the one representation would hold with the one class of verbs and the other representation with another class of verbs. This is in fact what Bloom et al. seem to propose:

> Although strongly influenced at the beginning by event-aspect, children are no doubt learning tense relations at the same time; they do not learn tense only after they learn aspect. (Bloom et al. 1980:407)

However, if inflection indeed functions as a marker for situation type, we would expect a regular system in the child language: one type of inflection for one class of situation types, one form for one function. However, as the child data show, the Progressive is from the start used for different situation types and the same holds for the Past in Naomi's and Abe's speech and the Present in Nina's and Abe's speech. Also during development, there is never complete regularity. So the same inflection can occur with different situation types and the same situation type can occur with different inflections. The findings go against an absolute version of the Defective Tense Hypothesis but a less stringent version would also assume regularity.

What is more, the findings are consistent with alternative explanations: the inflection could be part of an unanalyzed item, or, even though it occurs predominantly with one situation type, the inflection could nevertheless mark tense and aspect. There is no independent motivation that favors the encoding of situation type.

A final disadvantage of the Defective Tense Hypothesis is that it cannot account for the patterns we find in the input. The distribution in the input is also skewed and supposedly not because of a non-normative use of the inflections so why would parents change their language in this way?

5.2 Prototype Account

The Prototype Account (Shirai 1991, 1994; Shirai & Andersen 1995) claims that children on the basis of distributional analysis create semantic representations of tense-aspect morphology that are restricted to the prototype of the morphological category. According to Li & Shirai (2000:62-63) children acquire unanalyzed verbs during the first stage of language learning, on a verb-by-verb basis. Lexical representations during this stage consist of memories of past experiences. During the second stage, children notice repeated similarities in the form-function mapping. They become aware of the fact that there are ontologically distinct types of situations. In the third stage children learn to map linguistic forms to these different situations: since parents for the majority use *–ing* to comment on ongoing activities, the child will create a prototypical semantic representation for the morpheme *–ing*, that is restricted to activities and semelfactive verbs, or in other words, to verbs that are characterized by the features [+dynamic, -telic]. The general meaning that *-ing* denotes would be 'Action in Progress' (Li & Shirai 2000:66). Li & Shirai assume that

> (…) children, on the basis of the comprehension of verb forms prior to active production, have already created a restricted semantic representation of morphological forms, even though their early morphology may appear as if it were entirely driven by lexical learning. (Li & Shirai 2000: 64)

The Prototype Account is, however, not in every respect compatible with the data. According to Li & Shirai's prototype of the Progressive it is to be expected that children would not or hardly use *-ing* for telic situations, neither with durative (accomplishment) nor with punctual (achievement) situations. The proportion of telic situations is, however, high in Nina at 2;3, Abe at 2;6, Naomi at 2;6 and 3;0 and also in the input to Nina at 2;3, and to Abe at 2;6 and 3;0.

Moreover, from a prototype view, the first inflected verbs heard in the input or the first inflected verbs used by the child must be prototypical examples of the situation types. However, the verbs in the input that are used with the Progressive are not all prototypical activities. Of all the Progressives used in the input, 54% of all tokens is classified as [+dynamic, -telic], but 46% does not have one or both features. Besides, of all the types used with a Progressive, only 11 are classified as [+dynamic, -telic] and 13 miss one of the features. Furthermore, the first verbs that are produced with the Progressive do not all refer to 'prototypical' activities, that is to events with clear internal variation that need a constant input of energy. The first verbs that Nina uses with Progressive inflection (at 2;0) are *hold sth.* (n=4), *sleep* (n=4), *move sth.* (n=1), *cry* (n=1) and *walk* (n=1). Only *move* and *walk* would count as prototypical examples of activities. It is implausible that the child works from a (restricted) semantic representation 'action in progress' for the Progressive when the first examples in her own production are not prototypically dynamic.

The main objection to the Prototype Account lies however in the following assumption:

> If children's semantic representation is restricted to this characterization, then *whatever does not fit this characterization will not be given progressive marking at the early stage.* (Li & Shirai 2000:67, italics AB)

And, with respect to the Prototype of the Past, which is [+telic, +punctual, +result] according to Shirai and Andersen (1995):

> As is typical of the prototype to non-prototype development, *the restriction to prototype past* (…) *was gradually relaxed* and at a later stage children started using the past tense for verbs lacking one of these features. (Li & Shirai 2000: 68, italics AB)

Both citations suggest that the child might want to encode a certain verb with the Progressive or the Past, but does not do so because its semantic representation excludes the possibility of that specific combination. This implies that the semantic representations of children are rigid, and that the boundaries are strong. Nevertheless, the Prototype Account does explicitly not claim that the prototypical semantic representation leads to absolute skewing, but only to tendencies. The question then remains why children use non-prototypical combinations from early on.

A final problem of the Prototype Account is that it does not explain why parents would adjust their association between morphology and situation type when talking to children.

5.3 Discourse Topic Hypothesis

5.3.1 Introduction

Neither the Defective Tense Hypothesis nor the Prototype Account explains why parents change the way they talk when they talk to their children. Nor can they account for the

findings in child language, that is that associations between morphology and situation type appear to be less regular or prototypical than would be expected on the basis of either hypothesis.

I propose an alternative approach, the Discourse Topic Hypothesis, that relies on the communicative and cognitive development of children. It can account for both the distribution in the adult language and the distribution in the child language and the differences between them.

First of all I assume that the acquisition of verbs and its inflection develops in a lexically based way, on a verb-by-verb basis, by learning which constructions are appropriate for which contexts (cf. Tomasello 1992, Lieven, Pine & Baldwin 1997, Pine, Lieven & Rowland 1998). Children will acquire first what are prototypical *uses* of specific verb-morpheme combinations. The more experience they have with certain forms in certain contexts, either in production or in comprehension, the earlier they will be acquired. What children will gradually grasp is the effect one creates when adding an inflection to a verb-stem, thus for the ending *-ing* the situation is understood as ongoing, without its boundaries being entailed. So, the Progressive does not *mean* 'action in progress'; it effectuates the presentation of a situation as in progress.

There are no prototypical *meanings* of a morpheme (such as there are prototypical members of classes), but there are prototypical or unmarked *uses* of morphemes. The prototypical uses are the most relevant combinations. It is for example relevant to present a dynamic situation or a temporary state as ongoing, whereas this is not relevant for a state, since a state is inherently ongoing and without boundaries.[4] Furthermore, it is relevant to mark a telic situation by a Simple Past, since it not only indicates that the situation was actual at a period in time prior to utterance time, but it also entails that the end-state has been reached and that a certain change in the real world has taken place. If states and activities are marked by a Past, it only indicates that the specific state or activity held at a moment in the past, but no resultant effect is implied.

Certain combinations of morphology and situation type are thus relevant, while others are less relevant or even semantically odd. This is determined on the one hand by the conceptual representation of the real world situation that a verb and its arguments refer to and on the other hand by the conceptual representation of the effect produced by grammatical elements. The relevance of particular combinations between morphology and situation type is however dependent on the discourse topic. I will argue that for the discourse topics that young children talk about, especially the unmarked combinations of tense/aspect morphology and situation type are most relevant.

5.3.2 Relevant combinations

Which combinations of tense/aspect and situation type are relevant for which discourse topics? There are at least three general discourse topics in which English speakers make use of Progressives, Simple Past, or Simple Present[5]:

- Talking about the here-and-now
- Describing past events

[4] It is only relevant to present a state as ongoing when the speaker wants to stress that the state is temporary and controlled (for example 'being mean' vs. 'be mean') (Smith 1991).

[5] This analysis is a simplification of the facts, but it suffices for the point I want to make in this section.

- Giving general comments on the world, such as generic statements, habituals, social rules, laws etcetera.

5.3.2.1 Talking about the here-and-now

First of all, when speakers of English wish to talk about the here-and-now, to describe observable events or states, whether visible, audible or sensible, they need the following combinations:

- for describing a state (except temporary states): Simple Present
- for describing temporary states (position verbs, *hold*, *wait*, etc.): Progressive
- for describing an activity: Progressive
- for describing a telic situation that has not yet ended: Progressive
- for describing a situation that has just ended (immediate past): Simple Past

With respect to the last point: situations that have just ended are mostly relevant to the here-and-now when they have created a change in the world: these are described by telic situations. Furthermore, situations that take just a moment in time to happen, are already ended before one can talk about it. They can only be referred to by a Past. So when talking about the here-and-now, the combination between Past and telic situations that have just ended (in particular punctual telic situations) is highly relevant.

5.3.2.2 Describing past events

When a speaker of English wants to describe an event from the past, the following combinations are relevant:

- Simple Past for states (except temporary States)
- Simple Past for temporary states (position verbs, *wear*, *hold* etc.), activities and telic situations that are anterior to Topic Time[6]
- Past Progressive for temporary states (position verbs, *wear*, *hold* etc.), activities and telic situations that overlap Topic Time

The speaker needs a sophisticated use of perfective and imperfective forms in order to construct the order of events that he wants, to indicate simultaneity, anteriority or posteriority between different (parts of) events of the past.[7]

5.3.2.3 Commenting on the world as it is

When a speaker of English wants to give general comments on the world as it is, he needs:

- Simple Present for states, activities and telic situations

Furthermore, conditional clauses are an important means to formulate a general statement about the world.

In summary, in the setting of talking about the here-and-now, a speaker of English needs the unmarked combinations of tense/aspect morphology and situation type and the Progressive for telic situations that have not yet ended. In the settings of talking about past events and

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6 Topic Time is the notion introduced by Klein (1994) that refers to the time span about which the speaker asserts something.

7 Of course other forms, like the Present, Past or Future Perfect play a part in describing past events, but they do not form part of this study. The use of Present tense forms for describing past events which creates a vivid narrative style is also left out of consideration.

talking about the world as it is, a speaker of English not only needs the unmarked, but also the marked combinations of tense/aspect morphology and situation type, although even in those settings the unmarked combinations prevail.

5.3.3 Children's Development

Assuming that children at first either mainly wish or are able to communicate about the here-and-now (cf. Brown & Bellugi 1964), then they will at first only or mainly make use of unmarked combinations of tense/aspect morphology and situation type. Those are the only forms they need for this type of communication and therefore the only forms they acquire. Depending on their general cognitive development children will increasingly be able, need or wish to talk about past events that they remember[8] and they will increasingly contemplate about and comment on the world. It is a chicken and egg question whether cognitive development is responsible for the topics about which the children talk with their parents or whether the experience with and communication about different topics influences the cognitive development. These are probably strongly intertwined (cf. Johnston 1985, Bowerman & Levinson 2001).

Children do not exclude 'marked' combinations on semantic grounds or because of grammatical rules. Because of the discourse topics children talk about - which is related to their cognitive development - children less often need to use marked combinations. Since parents adapt the topics they talk about to the cognitive level of their children, the input language will show similar distributions as the child language: only the unmarked combinations are used. However, the communicative wishes of parents may be slightly ahead of the child's capacities: they start to talk about past events, to make statements about the world as it is, before the child is actively doing so, hence using more marked combinations than the child.

6 Study IV: Discourse topics

In order to find out whether the discourse topics of children indeed develop from only talking about the here-and-now to talking about past events and talking about the world as it is, a qualitative analysis is carried out on the data of Nina and Abe and the input to them. Besides that, the data of Sachs (1983) on the use of Past inflection by Naomi and her parents is used. It is investigated for what discourse topics children use their Progressives, Present and Past forms. What do the parents do in the input? And what happens in the adult-adult conversations?

6.1 Progressive

Speakers of English need the Progressive when they want to talk about the here-and-now, about observable events that are temporary states, activities or not-ended telic situations. They also need the Progressive when they want to describe past events; the Past Progressive in combination with a temporary state, activity or telic situation yields the reading that the situation overlaps Topic Time.

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[8] Talking about objects or events not in the here-and-now is labeled „displacement" by Hockett (1960). The tendency of children to rely less and less on the here-and-now in speaking and understanding is called decontextualization by Bates (1979).

6.1.1 Progressive for talking about the here-and-now

The children and their parents very frequently use the Progressive for talking the here-and-now: they continuously describe what the child is doing itself or what a sibling, a pat, a toy figure, or a figure on a picture is doing. In the beginning, the Progressive in the input is only used for talking about the here-and-now. It is used with all the appropriate situation types, depending on the activities the child is involved in:

*MOT: he's holding something in his hand (state)
*MOT: what is the king wearing on his head? (state)
*MOT: who's sleeping? (activity)
*MOT: you're drawing with your finger? (activity)
*MOT: are you closing the door? (telic)
*MOT: you're turning his head around? (telic)
*MOT: what are you drawing? (telic)
*MOT: are you putting the stethoscope on your ear? (telic) (Nina, 2;0)

Also the children use the Progressive for talking about the here-and-now from the start. They use the Progressive spontaneously in all relevant combinations, with temporary states, activities and telic situations that have not yet ended, depending on their activities:

*CHI: Little girl waiting (state: picture)
*CHI: Her not eating (activity: picture)
*CHI: Her drinking (activity: picture)
*CHI: I making train for you (telic: own action)
*CHI: bear going San Francisco. (telic: playing)
*CHI: I putting it in the plate (telic: own action)
*CHI: climbing up on the tree (telic: picture) (Nina, 2;3)

Note that the main functional difference between the input and the child's speech is that Nina uses declarative utterances, whereas the mother mainly uses interrogatives.

As often as children and their parents use the Progressive for talking about observable events, as rarely adults among themselves use the Progressive for this purpose. In the adult corpus[9], examples in which the Progressive is used for talking about the here-and-now are hard to find:

*LYN: but she must only -- ... < What is m- ... blowing out of there >.
*MAR: What's everybody waiting for. You guys are supposed to go home now.
*LEN: Oh, you're kidding . (SBCSAE)

As opposed to children and their parents, describing their own or other's activities is something adults among themselves hardly ever do. The Present Progressives that adults use are mainly used for situations that are ongoing but not observable (not in the here).

6.1.2 Progressive for describing Past events

After the stage in which the Progressive is only used for describing observable events in the here-and-now, the Progressive is used for describing past events by using a past copula. It does not only indicate that the situation took place prior to utterance time, but also that it

[9] Examples taken from the SBCSAE are presented in a simplified way for matters of readibility.

overlaps with Topic Time. This use of the Progressive only comes in gradually. It occurs first in the input, but very infrequently, and only in the later samples the children start using it themselves, on their own initiative. The first use of a Progressive for describing a Past event occurs in the input. Nina responds to it in a proper way but looses interest quickly:

*MOT: you saw a big fish there?

*CHI: on me [//] on the water.

*MOT: in the water?

*CHI: yup [= yes].

*MOT: what were they doing?

%com: Nina looses interest in talking about the aquarium. she goes over and looks in her box of doll house furnishings. she is looking for some pots and other equipment to cook and eat with.

*MOT: what were the fish doing?

*CHI: where's my pot? (Nina, 2;3)

So, in the input, the Progressive is already used for describing past events, while in the child speech it is not. Only at age 3;0 Nina uses a Progressive for describing a past event. Twice, the mother takes the initiative and twice Nina describes a past event by using the Progressive on her own initiative. One example of each is presented below:

Situation: Looking at photographs

*MOT: what's this on the floor?

*CHI: a mat.

*MOT: oh # what were we doing on that mat?

*CHI: eating?

*MOT: oh

*MOT: the grownups were eating on the table or on the floor?

*CHI: on the floor.

*CHI: and kids were eating on the table.

*MOT: I see. (Nina, 3;0)

*CHI: the doggie’s sharing it.

*CHI: he bite his tongue while he was eating.

*CHI: and so he's gonna have a little rest with his blanket on. (Nina, 3;0)

The same pattern occurs in Abe’s data. In the input at 2;6, the Progressive is (infrequently) used for describing past events, while Abe does not yet use it for this purpose:

*CHI: Mama # what happen?

*MOT: I was showing Dad my owie. (Abe, 2;6)

*CHI: don't go please please don't go.

*FAT: I was just teasing. We're not going anywhere. (Abe, 2;6)

Although Abe uses the Progressive from the beginning to talk about observable events, the first time that he uses the Progressive for talking about past events is at 3;0:

*FAT: what did you say?

*CHI: nothing, I was talking by myself. (Abe, 3;0)

*CHI: pretty soon a big spaceship will crash on your head.

*FAT: on my head?

*FAT: I hope not. Oh # I'm so scared help!

*CHI: I was teasing. It will not crash on your head.

*FAT: oh what a relief. (Abe, 3;0)

In the same sample, Abe uses the Progressive and Simple Past in a sophisticated way for describing the sequence of different past events:

*CHI: Remember when a long time ago (...) while you were playing ball with a striped ball mommy maked ... cutted a hole out of that trash thing then then I was playing basketball and then the basketball got brokened. (Abe, 3;0)

Adults among themselves rather often use the Progressive for describing a past event. Of all the Progressives in the adult sample, 28% is a Past Progressive. Of all the Progressives that the children use and that are used in the input, the percentage of Progressives used for describing a past event is in the beginning very low or even absent, as shown in Table 2:

Age	Naomi	Nina	Input	Abe	Input
1;6	0				
1;9	0				
2;0	0	0	0		
2;3	5	0	5		
2;6	0	0	2	0	6
3;0	0	9	13	15	9
3;6				32	53
4;0				17	n.a.
4;6				24	13
5;0				29	n.a.

Table 2: Percentage of Past Progressive (of all the Progressives).

6.1.3 Summary

In summary, Progressives are mainly used for describing observable events in child language and in input to children. In adult-adult conversation on the contrary the Progressive is hardly ever uses for describing observable events. The distribution of situation types over the Progressive in the early child samples and the input can be accounted for by the combinations that are needed for talking about the here-and-now. The favourite activities of children and their parents determine what they will speak about most. The large proportion of telic situations in the child language and input is simply a matter of coincidence: in the particular samples the child or a third person is involved in many telic situations, such as drawing, writing, building or making something, going somewhere, putting something somewhere, opening or closing things, climbing up on things etcetera. Since everything the child does is mentioned in the early stages, many telic situations are used with the Progressive. Adults may

also be involved in those type of activities, but they simply do not describe what they are doing.

When children grow older, they gradually use the Progressive less to talk about the here-and-now and more to describe past events. This development is first noticeable in the input and is followed by the child. Adults use the Progressive for describing past events rather often (28%).

6.2 Simple Past

A speaker of English needs the Simple Past for talking about the here-and-now, i.e. events that have just happened in the immediate past, and for describing past events. For the first purpose, the Past is most relevant in combinations with telic situations that have just been completed. In particular telic, punctual situations happen so quickly that one can only talk about it when they have already ended. For the second purpose, the Past can be combined with all situation types, but also prevails with telic situations.

6.2.1 Simple Past for talking about the here-and-now

Like the Progressive, the Past is in the beginning mainly used by children and their parents for talking about observable events. In the input, from the very beginning, the Past forms are used for describing observable events of the immediate past. The below examples are all from Nina 2;0:

%com: Nina bumps into her mother
*CHI: sorry.
*MOT: did you bump into me? (Nina, 2;0)

%com: noise of toys falling off Nina's chair
*CHI: a toys down.
*MOT: all the toys fell off the chair # didn't they? (Nina, 2;0)

%com: elastic string of Nina's birthday hat snaps and hurts her. Nina cries.
*MOT: oh # did the elastic hurt you?
*CHI: yeah [= yes]. (Nina, 2;0)

According to Sachs (1983), Naomi started using past markings at 22 months. Until 26 months, they were only used to refer to observable events of the immediate past. The Past forms are used spontaneously. Examples are:

*CHI: I throwed it (Naomi, 2;0)
*CHI: Georgie fell down ? (Naomi, 2;0)

Also Abe uses the Past spontaneously for describing observable events from the first sample onwards:

*FAT: ok # hold on.
*CHI: I falled@n down.
*FAT: you sure did. You sure are a ticklish Batman. (Abe, 2;6)

*CHI: uhhuh Momma # come see this ladder # I made. (Abe, 2;6)

*CHI: oh Mom # my daddy doesn't want to!
*CHI: he said no. (Abe, 2;6)

*MOT: Abe # do you want to help me do dishes?
*FAT: ok # hold on.
*CHI: uhhuh # I'll put it in
*CHI: I got a thing in there
*CHI: it dropped!
*MOT: uhhuh it fell into the water now I'll be able to wash it. (Abe, 2;6)

Nina's use of Past forms starts unexpectedly. In the sample at 2;0, she uses *gave* eleven times. It is the only Past form she uses. It is only used in the context of talking about who gave which present to her at her birthday, the day before the recording. Mother and child talk about this a lot in this fragment looking at or playing with the presents:

*MOT: who sent the picture of the lion to Nina?
*CHI: miss # miss gave it.
*CHI: Mrs. Wood.
*MOT: not Mrs. Wood # nonna.
*CHI: Nonna gave it.
%com: Nina is looking at the picture of the horse.
*CHI: Betta # Betta gave it.
*MOT: Betta gave you the picture of the horse.
*CHI: Nonna gave a horse.
*MOT: no # Nonna gave the picture of the lion to Nina.
*CHI: yeah [= yes]. (Nina, 2;0)

Although the 'giving' happened in the earlier past, the presents are in the here-and-now. This instances can neither be classified as clear examples of talking about past events, nor as examples of talking about the here-and-now.

Despite the unexpected use of the Past in the first sample, the other samples show that Nina uses the Past for describing here-and-now more often than for describing past events. In the sample at 2;3, both forms Nina uses describe events that have just happened. At 2;6, of all the past forms (n=14), eight describe an observable event (mainly 'falling'), four are used for describing a past event and two are unclear. At 3;0, the distribution is the other way around: of all the past forms (n=43), only 12 are used for describing an observable event, while 27 are used for describing a past event and 4 are unclear.

As opposed to children and their parents, adults talking to adults hardly ever use Past tenses for talking about observable events. There are some examples in the data, but they are scarce:

*MRL: ... Oops, sorry. ... Did I get you?
*KVN: Did you notice the room got deathly silent when Kendie mentioned marriage?
*DAR: Bit your teeth, hunh? (SBCSAE)

According to Sachs (1983:17), adults mainly report something that has just happened to another adult because the addressee has not noticed the event – like *you dropped your scarf* - whereas in child directed speech the Past is often used for commenting on or asking about an activity the child has just performed. The examples in the adult data of this study show that adults also use the past in order to check what has just happened.

6.2.2 Simple Past for describing past events

From the beginning the Past in the input is frequently used for talking about the here-and-now. However, from early on, parents use the Simple Past now and then for talking about past events. At first, the children often do not respond in a pragmatically adequate way:

*CHI: oh # poor lamb.
*MOT: what happened to the lamb?
*CHI: uh # take him.
%act: hands the lamb to her mother (Nina, 2;0)

Sometimes children do respond in a pragmatically adequate way, but not in a formally adequate way:

*MOT: and what happened to your dolly?
*CHI: bite that.
%com: Slurred
*CHI: that.
*MOT: did the dog bite your dolly?
*CHI: yeah [= yes].
*MOT: and what happened to the dress?
*CHI: here.
*MOT: did the dress get torn by the dog?
*CHI: yeah [= yes].
*MOT: bad dog.
*CHI: bad dog. (Nina, 2;0)

These findings are in accordance with Sachs (1983:18-20) who also reports talking about past events by Naomi's parents as early as 22 months. Often, Naomi responded to these initiatives with unrelated responses or with imitations.

According to Sachs (1983), Naomi starts using the Past to refer to events that had happened on the same day at 26 months. At 32 months Naomi begins to make spontaneous reference to past experiences. Until then Naomi hardly ever expressed the meaning Earlier Past on her own initiative (Sachs 1983:19). Of the 253 past references in Naomi's speech up till 29 months of age, only twice, at 26 and at 29 months, Naomi spontaneously mentions an event of the past.

The same patterns can be found in Nina's and Abe's speech. Although they use past forms for describing past events from quite early on, they use it less infrequently, only in short fragments, and mainly as response to their parents:

*CHI: I have a band aid.
*MOT: why # what happened?
*CHI: a hurt # hurt me.
*MOT: when did you hurt yourself?
*CHI: when me hurt meself
*MOT: when did you hurt yourself? yesterday?
*CHI: yup
*MOT: who put the band aid on?
*CHI: Gail did. (Nina, 2;6)

Only in a few examples, the children talk about past events on their own initiative:

*MOT: oh # Gail has a swimming pool # doesn't she?

%com: Gail is a baby-sitter of Nina's. Nina had fallen into her large swimming pool several months ago.

*CHI: I fell in it.

*MOT: did you fall in Gail's swimming pool?

*CHI: yup [= yes]. (Nina, 2;6)

*FAT: you're the one who burned yourself last time # Abe I warned you not to touch the hot pan.

*CHI: I cried # right?

*FAT: you sure did. (Abe, 2;6)

*CHI: remember a long time ago when Mommy was also at school? We played with this and it got brokeded and then the top came and then the marble comed out and then we played with it right? (Abe, 3;0)

As opposed to children and their parents, adults among themselves mainly use the Past forms for communicating about past events. They talk about it frequently and extensively as the next example shows:

*KVN: You guys won't believe what happened to us in the parking lot of the mall the other day.

*WEN: Oh. by the Goodwill store.

*KVN: ... Some guy came out and he_ he was, he was trying to sell us cologne

*WEN: No, he wasn't trying to sell us cologne,

*KVN: Well it_ __ No=, I guess he was trying to like, lure us to a .. place where they would sell, like, .. imitation cologne, but he said, it's not imitation, because,

*KVN: because it's= made by the same people, but it's put in different bottles? (SBCSAE)

6.2.3 Summary

At first, both in the input and in child language, Past inflection is mainly used for talking about the here-and-now, for describing events that have just ended. In this setting, the most relevant combinations is with telic situations. Rather early parents also start using the Past for describing past events but the responses of the children are often not yet pragmatically or formally appropriate. Gradually, children start using the Past inflection spontaneously for describing past events. The distribution of the two functions is however not equal to adult-adult conversation. In adult-adult conversation the Past is for the greater part used to talk about past events, whereas in child language and in the input the Past is in the beginning for the greater part used for describing observable events.

The development of discourse topics can indeed account for the distribution of Past tense morphology and situation type. Since it is most relevant to mark telic situations that have just been completed in the setting of talking about the here-and-now, this combination highly prevails in the younger samples of children. Only when talking about past events does become more frequent, there is more opportunity to use the unmarked combinations. Since parents already start mentioning past events before the children do so regularly, the skewing in the input data is less strong than in the child data.

One point to note is that the proportion of Past in combination with states in both child and input language was small compared to the adults. This could be explained by the fact that the

fragments about past event in child language and input are not as elaborated as they are in adult-adult conversations. Since states often function as background information in describing past events, they might just be less relevant for the communication between children and their parents. In the beginning the past events are often shared memories about dynamic situations the child has participated in or state-changes that have taken place. In contrast, adults also describe the mental states they were in.

6.3 Simple Present

Speakers of English need the Simple Present when they want to describe a state that holds in the here-and-now and when they want to give general comments on the world as it is.

6.3.1 Simple Present for talking about the here-and-now

In the input, the Simple Present is from the beginning used for talking about the here-and-now:

*MOT: he's a nice little lamb.
*CHI: got one ear.
*CHI: got one ear.
*MOT: he has one ear? (Nina, 2;0)
*MOT: you want Mommy to have the chair on her hand? (Nina, 2;0)

*MOT: I think he's a dog. (Nina, 2;0)

*MOT: that looks like cereal to me. (Nina, 2;0)

In the first sample in which Nina uses Simple Present forms, they are always used for talking about the here-and-now. Nina uses them on her own initiative.

*CHI: I want applesauce
*CHI: You want more?
*CHI: I need the bottle
*CHI: I think dolly's thirsty.
*CHI: I 've a honey book. (Nina, 2;3)

The same pattern holds for Abe and his parents.

Adults talking to adults also use the Simple Present for describing the here-and-now, but less frequent than children and their parents:

*DAR: No I I don't want to hear anything out of a book with, .. chapter called heaven and hell.

*MRL: I have ... the ideal ... makings .. for garlic bread. Right here, right.... Well actually I have Trader Joe's, <VOX whipped ... garlic bread .. spread VOX>.

*MRL: ... I got .. fishy hands. (SBCSAE)

6.3.2 Simple Present for commenting on the world

The Simple Present can also be used for making general statements about the world. For this purpose, besides the combinations with states, combinations with activities and telic situations are relevant. In the input the Simple Present is used for making general statements about the

world from the beginning, but infrequently. The child does not respond to it in a pragmatically adequate way:

*MOT: want me to make the nurse sit down?
*CHI: yeah [= yes].
*MOT: how do I make the nurse sit down?
%com: Nina looking at the book "sleeping beauty". she calls sleeping beauty "goldy."
*CHI: goldy. (Nina, 2;0)

It is at 2;6, in the context of scaffolding, that Nina produces a Simple Present for the first time that is used for making a general statement about the world:

*MOT: What do you do when you swim? Do you splash a lot?
*CHI: Yeah
*MOT: You do? Do you get wet?
*CHI: yup, I get ... I don't. (Nina, 2;6)

It is only at 3;0 that Nina herself takes the initiative to make a general statement about the world as it is by using a Simple Present.

*CHI: don't you make the dog fall down.
*MOT: I didn't mean to knock him over.
*CHI: cause he cries every day when you push him down. (Nina, 3;0)

Abe also uses the Simple present for the first time for making a general statement in the sample at 3;0.

*CHI: I didn't know grandmas smoke cigarettes. (Abe, 3;0)

In the later samples there are many examples in which the Present is used for making general statements about the world:

*CHI: How do bees grow their babies? (Abe, 3;6)

*CHI: Mommy # I have a good thing to catch mosquitoes. You get a pin, a sharp pin and then you put it in the mosquitoes then you kill the mosquitoes. (Abe, 3;6)

Adults as opposed to young children and parents talking to young children, frequently use the Simple Present to make claims about the world as it is. Therefore, they need the marked combinations more often than children and their parents. These remarks are often constructed in a conditional clause.

*LYN: .. sometimes if you get one that's been thawed out a little bit, .. they start really stinking and stuff. Oh, it's the grossest thing.

*MAR: .. Why do these ca=ns, .. get so warped. Only the --.. Only the Sam's Club cans .. get so warped.

*DAR: you know, you ask someone why they're interested in electronics, and they can probably tell you. (SBCSAE)

6.3.3 Summary

At first, the Present is only used for talking about the here-and-now and only later on, children start commenting on the world. Only in the latter context, the marked combinations are needed. Since the parents start commenting about the world in the input before their children do so, the skewing in the input is less strong than in child language.

6.4 Conclusion

The qualitative analysis of the discourse topics in child language, input and adult-adult data supports the Discourse Topic Hypothesis. At first, children and their parents mainly converse about the here-and-now, about observable events and events that have just happened. As a consequence they only need to use unmarked combinations of tense/aspect morphology and situation types. The activities the children are involved in determine which combinations are used.

Talking about past events develops later on. Although a few Past forms in the early samples are already used by the child for describing Past events, the frequency is low and in most cases it is the parent who takes the initiative and helps the child to talk about the earlier past by way of scaffolding. Only later on, the child starts talking about past events more frequently and spontaneously. The description of past events is often short and concerns shared memories. This makes the use of states in the Past for presenting background information less relevant. Furthermore, the sophisticated sequencing of (parts of) events in the past is not yet mastered by young children. This might account for the late appearance of the Past Progressive: activities and temporary states in the Past Progressive are mainly used for describing simultaneity between different situations in the past. Children's descriptions of past events, however, are in the beginning not yet so elaborate.

Finally, children start making general statements about the world as it is. Only then, the marked combinations of Present inflection with activities and telic situations are needed. In the beginning it is the parent who takes the initiative to talk about the world and by way of scaffolding, the child is able to respond adequately. Around age 3;0 children start commenting on the world spontaneously.

As opposed to children and their parents, adults among themselves mainly converse about past events or the world as it is; they rarely talk about the here-and-now.

7 Conclusion

On the basis of a comparison between adult-adult language, child language and input to the children it was established that in general the association between Past and telic situations and between Present and states was stronger in the input and even stronger in child language than in adult English. For the Progressive it was found that the association between Progressive and activities was not stronger in the input and in child language than in adult-adult language but the association between Progressive and telic situations was remarkably high in input and child language at certain points.

To a large extent the input can explain the distribution of tense/aspect morphology and situation type. There is no need to assume that children work from a semantic representation or a rule for the tense/aspect morphology they use. Both the Defective Tense Hypothesis (rule-based learning) and the Prototype Account (semantic representation) predict that children would have a regular system in the beginning, but the findings are not compatible with this expectation. A lexically-based development in the beginning can explain best the irregularities found in the combinations of tense-aspect morphology and situation type in child language.

Furthermore, neither the Defective Tense Hypothesis nor the Prototype Account explains why the distribution in the input is different from adult-adult conversation but not so different as the distribution in child language.

The Discourse Topic Hypothesis claims that the discourse topic is of influence to the distribution of tense/aspect morphology and situation type. When talking about observable events, the unmarked combinations - Progressive and temporal states, activities and not ended telic situations, Present and states and Past and telic situations - are most relevant. When talking about Past events or when commenting on the world, marked combinations are also relevant, although the unmarked combinations still prevail. Assuming that children at first mainly talk about the here-and-now and their parents as well, they at first only need the unmarked combinations.

Independent evidence for the Discourse Topic Hypothesis was collected by a qualitative analysis of what children talk about on their own initiative, what parents talk about to their children and what adults talk about among themselves. It was shown that children in the early samples mainly or only talk about the here-and-now, about observable events. Their parents do so equally, but they also talk about past events now and then and sometimes about the world as it is. By contrast, adults in interaction with adults, hardly ever talk about observable events: they mainly talk about past events or about the world as it is. Accordingly, different distributions of tense/aspect morphology and situation types are needed and used by children, parents talking to their children and adults talking to adults. Due to cognitive and communicative development, children and their parents increasingly talk about past events and about the world as it is. As a consequence, they need more marked combinations and the patterns of association between tense-aspect morphology and situation type gradually become adult-like.

This study shows the importance of investigating not only child language or input, but also the final stage (adult-adult conversation). It appears to be useful to investigate which linguistic constructions and combinations are needed for what discourse topics. On the basis of the development of discourse topics of children and their parents, the distributional patterns in child language and input could be accounted for.

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On the Acquisition of Statives in Child Russian

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Abstract

It has been previously reported that in languages demonstrating the Root Infinitive (RI) Stage the use of RIs is characterized by two properties: these forms are overwhelmingly eventive and have, in the majority of instances, a modal interpretation. Hoekstra and Hyams (1998, 1999) have proposed a theory stating that these two properties of RIs are co-dependent in that the application of the modal reference restriction limits the use of the aspectual verbal classes to eventive predicates. Furthermore, this theory assumed that the described mutual dependency of these constraints was valid cross-linguistically.

In this paper, we investigate the application of this theory to the case of RIs in Russian, one of the languages exhibiting the RI Stage. Using new longitudinal data from two monolingual Russian-speaking children, we demonstrate that the predictions of Hoekstra and Hyams' approach are not realized for Russian child speech. While the constraint requiring that RIs have a modal reference does not seem to apply in Russian since the infinitival forms do receive past and present tense interpretation, these predicates are still overwhelmingly eventive and stative predicates appear mostly as finite verbs. Having shown that a theory connecting the application of the two restrictions on RIs does not account for the Russian data, we examine several alternative analyses of Russian RIs. We arrive at a conclusion that an explanation based on the lack of the event variable in stative predicates (Kratzer 1989) necessary for the interpretation of RIs in discourse (Avrutin 1997) succeeds in handling the Russian data presented in this article.

1 Goals

This paper explores certain semantic properties of root infinitives (RIs) in the speech of children acquiring Russian. In particular, it determines whether the use of RIs in this language is restricted to eventive predicates, similarly to the behavior of these forms in many other languages demonstrating the RI Stage (e.g., Wijnen 1996 for Dutch, Ferdinand 1996 for French, among others.) It further examines whether the explanations existing in the linguistic literature so far can account for the reported distribution. Finally, it (re)introduces an alternative analysis for the apparent asymmetry in the occurrence of the eventive versus stative RIs in Russian child speech.

2 Background

2.1 Root Infinitives

Root Infinitive (also referred to as Optional Infinitive, or OI) Stage is a period when young children between approximately 18 and 30 months of age produce a significant number of matrix clauses with untensed verb forms, so-called RIs, in contexts where this is not allowed by adult grammars (Wexler 1994). Consider the following examples:

(1) a. *Child language*: Mommy sleep. English
(Cf. the adult version: *Mommy sleep**s**.*)

b. *Child language*: Maman dormir. French
mommy sleep-INF
(Cf. the adult version: *Maman dor**t**.*)

c. *Child language*: Mama spa**t'**. Russian
mommy sleep-INF
(Cf. the adult version: *Mama spi**t.***)

The availability of the Root Infinitive (or Optional Infinitive) Stage has been previously reported for many languages including English (Radford 1990), German (Poeppel and Wexler 1993; Becker 1999), Faroese (Jonas 1995), French (Pierce 1989). Russian is one of the languages demonstrating this stage in the linguistic development of their speakers as has been shown by Bar-Shalom, Snyder, and Boro (1996), Stepanov (1998), Brun, Avrutin, and Babyonyshev (1999), and Gagarina (2002) among others.[1] In this paper, we discuss the aspectual nature and the (lack of) modality in the interpreation of RIs in the speech of Russian children.

2.2 Lexical Aspect

It has been previously observed that children passing through the RI Stage limit their infinitival forms to the members of a certain aspectual class, the eventive verbs. In this section, we provide an overview of the analyses of the lexical aspect employed in our paper. The starting point for this discussion may be provided by the well-known Vendler's aspectual taxonomy of verbs (*Aktionsart*: 1957, 1967). As argued by Vendler, all verbs could be classified in terms of their inherent temporal properties and grouped into four basic classes. The following definitions, cited here from Van Valin and LaPolla (1997) are used to distinguish among these groups:

(2) a. *States*: non-dynamic and temporally unbounded predicates, e.g., *be sick, resemble, be tall, be dead, love, know, believe, have.*

b. *Achievements*: predicates that encode instantaneous changes, usually changes of state but also changes in activities, e.g., *pop, explode, collapse, shatter.*

c. *Accomplishments*: predicates that encode temporally extended (not instantaneous) changes of state leading to a terminal point, e.g., *melt, freeze, dry (intransitive versions), recover from illness, learn.*

d. *Activities*: dynamic and temporally unbounded predicates, e.g., *march, walk, roll (intransitive versions), swim, think, rain, read, eat.*

These four classes of verbs can be categorized in terms of three features: [± static], [± telic], and [± punctual]. The feature [± static] distinguishes between the verbs denoting an event

[1] The percentage of occurrence of RIs in Russian child speech is comparable to that of the children acquiring other languages with the RI stage. For example, Varvara (CHILDES, MacWhinney and Snow 1985) produces 24.3 % of RIs at 1;7 as reported in Bar-Shalom, Snyder and Boro (1996). Children in Brun et al. (1999) demonstarte the occurrence of 33.2% of infinitival forms at the peak age of 1;8 (the data are averaged for the four children discussed in the paper).

from those which are non-event-denoting. Telicity refers to whether the verb has an inherent end point or not. Finally, the feature [± punctual] distinguishes telic events with internal duration from those which lack such duration. From this classification, the following featural distribution can be derived:

(3) Featural distribution of verb types

States	[+ static], [– telic], [– punctual]
Achievements	[– static], [+ telic], [+ punctual]
Accomplishments	[– static], [+ telic], [– punctual]
Activities	[– static], [– telic], [– punctual]

More recently, in their analysis of the aspectual distribution of RIs in child speech, Hoekstra and Hyams (1998, 1999) used the dual class system classifying all predicates as eventive and stative. The same classification was also employed by de Haan (1986), Jordens (1991), among others:

(4) a. *Stative verbs*: predicates that denote situations that tend to persist in time and lack causal structure, e.g., *being-crazy, know, etc.*

b. *Eventive verbs*: predicates that denote complex changes that are temporally bounded by their cause-effect relations, e.g., *building a house, running, breaking,* etc.

According to this system, the distinctive feature is [± static] (in Vendler's terms) or [± event] (as formulated by Hoekstra and Hyams). Stative predicates in this theory do not denote an event and are, therefore, limited to Vendler's 'state verbs'. Eventive predicates, in turn, are event-denoting and include activities, achievements and accomplishments.

In this paper, we follow Hoekstra and Hyams among others in distinguishing between the two classes of predicates, stative and eventive. The reason behind this choice is the apparent sensitivity to the difference between these two groups exhibited by young children passing through the Root Infinitive Stage (c.f., Antinucci and Miller 1976, Shirai and Anderson 1995 among others.)

3 Aspectual Classes and Finiteness

In this section, we discuss the fact that in languages with Root Infinitive Stage children limit their production of RIs to the eventive predicates and use stative predicates exclusively with finite forms. We first provide a summary of Hoekstra and Hyams' account of this generalization and then examine the predictions this theory would make for the appearance of non-finite forms in Russian.

3.1 The Constraints on Root Infinitives

As proposed by Hoekstra and Hyams (henceforth, H&H) (1998, 1999), there are two cross-linguistically operational constraints on RIs: The Eventivity Constraint (H&H 1999:241) and the Modal Reference Effect (H&H 1999: 242). According to H&H, the application of these constraints is interdependent. Let us consider each constraint and describe H&H's account of the mechanism of their application.

3.1.1 The Eventivity Constraint

The first constraint we address is the so-called Eventivity Constraint (EC). The effect of this constraint has already been mentioned in this paper. Its rule limits the occurrence of the RIs in child speech to the eventive predicates:

(5) *The Eventivity Constraint*

RIs are restricted to event denoting predicates.

The relevant data supporting this claim can be found in a number of languages. H&H cite Wijnen's (1996) analysis of Dutch. For four children acquiring Dutch, the author provides the following distribution of eventive vs. stative RIs and in finite verb forms:

Table 1. Distribution of eventive and stative verbs in child Dutch (based on Wijnen 1996)

Type of Verb	RIs		Finite	
Eventive	1790	95%	350	50%
Non-eventive	93	5%	349	50%

As can be seen in Table 1, Dutch children use overwhelmingly more eventive RIs than non-eventive ones: 95% of all RIs are eventive. This pattern does not apply to finite verbs in the speech of Dutch children. The distribution of aspectual classes here is even: exactly half of all finite forms are stative.

In their discussion of the eventivity restriction, H&H mention its application in child Russian based on Van Gelderen and Van der Meulen (1998). They state that 98% of all RIs are eventive for one child (Varvara, CHILDES, MacWhinney and Snow 1985). There is no information on the corresponding data with respect to the finite forms. We provide additional data concerning Russian acqusition later in this paper.

3.2 The Modal Reference Effect

Another property of RIs that has been reported before is that non-finite forms used by children often have some sort of modal interpretation. Throughout the literature on the Root Infinitive Stage, researchers make various observations regarding the presence of modal reference in root infinitives (e.g., Ferdinand 1996, Ingram and Thompson 1996, Wijnen 1996, Stepanov 1999, among others). Based on these observations, H&H formulate the following constraint referred to as the Modal Reference Effect (MRE):

(6) *The Modal Reference Effect*

With overwhelming frequency, RIs have modal interpretation.

This constraint indicates that, in the majority of instances, RIs express volition, intention, or need. As proposed by H&H, the RIs in child speech cross-linguistically refer to eventualities that are not yet realized (i.e., have irrealis meaning), a restriction achieved through the presence of an inherent aspectual feature [– realized] associated with all infinitives. The authors support their proposal by Wijnen's data on Dutch RIs which show that RIs receive primarily future or modal interpretation:

(7) Temporal reference of RIs for four Dutch children (adapted from Wijnen 1996):

Present tense interpretation: 10%
Past tense interpretation: 3%
Future/modal interpretation: 86%

The distribution of RIs provided in (7) above suggests that infinitival forms are rarely used by children acquiring Dutch with past or present temporal reference, or with a *realis* interpretation, in H&H's terms. Some examples from Wijnen (1996) discussed in H&H (1999: 243) are presented below:

(8) a. Eerst kaartje kopen!
first ticket buy-INF
'We must first buy a ticket!'

b. Niekje buiten spleen.
Niekje outside play-INF
'Niek wants to play outside.'

c. Papa ook boot maken.
Papa also boat make-INF
'Papa must also build a boat.' or 'I want Papa to also build a boat.'

It is apparent from the translations of the children's utterances in (8a-c) that the interpretation of these predicates is modal, indicating the necessity (8a), desire (8b), or the possibility of both meanings (8c).[2] We shall follow H&H in assuming that the intended interpretation is indeed modal in these three examples in particular and in the majority of Dutch child utterances with RIs in general.

3.2.1 Types of Modality

The next step in the theory put forward by H&H (1998, 1999) is to demonstrate the connection between the two proposed constraints on the use of RIs in child speech, the Modal Reference Effect and the Eventivity Constraint. In order to provide this connection, the authors invoke the distinction between the two types of modality, the epistemic and deontic uses of modals. The distinction has to do with the difference in the interpretation of modals. In particular, epistemic modals have to do with knowledge and belief regarding the possibility of the actions expressed by the modifying predicates, while deontic modals denote obligation and volition with respect to the actions expressed by their predicates. Furthermore, the authors observe that modals are generally ambiguous between epistemic and deontic readings. The following examples illustrate the point:

(9) a. Mary may leave tomorrow.
b. Epistemic reading: *It is possible that Mary leaves tomorrow.*
c. Deontic reading: *Mary is permitted to leave tomorrow.*

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[2] We must note, however, that the interpretation of these sentences, as provided in the source, is rather unsupported. In particular, the examples lack any linguistic, physical, or epistemic context surrounding the utterances which could have indicated the modal interpretation. The glosses by themselves do not require such a reading and may very well have present-tense interpretation in all three cases. While the utterance in (8a) is intonationally marked and, therefore, can receive a modal reading as one of the possible interpretations, there is nothing in the second or third utterance which can be viewed as a modal marker. In addition, as can be seen from the translations of the last example in (8c), no conclusive interpretation can be given. However, the interpreter only provides the two possible modal readings and does not even consider the possibility of non-modal interpretation.

The problem of contextual support arises very frequently during the interpretation and transcription of child speech (c.f., Becker 1999). While this topic is directly relevant to our research, an extended discussion of the methodological issues relevant to the analysis of child utterances is beyond the scope of this paper.

(10) a. John should be at work.
b. Epistemic reading: *It is probable that John is at work.*
c. Deontic reading: *John is obligated to be at work.*

The ambiguity is not caused by the lexical properties of modals but rather is resolved by the properties of the complements with which the modal appears. In particular, the authors claim, following Barbiers (1995), that in order for an ambiguous modal to receive a deontic interpretation, it must be combined with an eventive predicate and for a modal to receive an epistemic interpretation it must be combined with a stative predicate. They use the example of the modal verb *must* showing that, when it is used with an eventive predicate, e.g., 'read a book', it denotes an obligation for the event of reading to take place. When *must* is modified by a stative predicate, e.g., 'be British', it expresses the belief of the speaker with respect to the subject's nationality (adapted from H&H 1999:247)[3]:

(11) a. John must read a book.
b. John must be British.

Having made the conclusion regarding the association between the aspectual classes and modal interpretations, H&H bring up a relevant result that has been previously reported in the language acquisition literature: epistemic use of modality is not available to children under three years of age (Wells 1979, Stephany 1986, among others). The availability of such data allows the authors to conclude that stative predicates associated with epistemic modality should not be found in non-finite child utterances.

3.3 Interim Summary

Let us recap our discussion of the analysis proposed by H&H (1998, 1999). The authors claim that the two observations that have been widely discussed in the literature devoted to the RI Stage, namely, the lack of stative RIs and the modal interpretation of RIs in child speech are connected. In particular, they argue that the eventivity restriction may be derived from the modal reference requirement in the following way. First, we have to assume that eventive predicates are responsible for the deontic interpretation of modals and stative predicates provide for the epistemic interpretation of modals. Secondly, we invoke the fact that children before the age of three, the relevant age for the RI Stage, have not yet mastered the epistemic use of modality. Hence, only the deontic modal interpretation of RIs should be available to the children during the RI Stage and this modality is restricted to eventive predicates. Such a connection explains the lack of stative RIs in child speech.

In conclusion, the authors claim that the dependence of the eventivity restriction on the modal reference constraint is cross-linguistic. Put differently, if a language has the MRE it should

[3] Consider, however, another pair of examples involing the same modal *must* and very similar predicates:

(i) Judging by how smart John is, he must read a lot of books.

(ii) John must be smart in order to solve this puzzle.

In the sentences above, *must* expresses the belief, i.e. has the epistemic interpretation, in conjunction with an eventive predicate (i), and means the necessity of a certain property associated with deontic interpretation in conjunction with a stative predicate (ii). In addition, the examples in (9-10) illustrate the same point: the interpretation of the modal does not depend directly on the aspectuality of its complement predicate but on the contextual properties of the entire utterance. Hence, the claim limiting the occurrence of epistemic modals exclusively with stative predicates and the occurrence of deontic modals only with eventive predicates should be weakened. Instead, it should suggest that such a distribution refers to the easier accessible interpretations; however the ambiguity is still present in most cases.

also have the EC, and, consequently, a language that does not exhibit the effects of the modal reference restriction should not limit its RIs to eventive predicates. In what follows, we investigate the application of this theory to RIs in child Russian.

4 Eventivity Constraint and Modal Reference Effect in Russian

4.1 Predictions for Russian RIs

Previous research on the RI stage in Russian has shown that Russian-learning children allow modal ('irrealis') as well as non-modal ('realis') interpretations of RIs (Snyder and Bar-Shalom 1998, Brun, Avrutin, and Babyonyshev 1999, Brun 1999; but see also Gagarina 2002 for a different observation):

(12) Temporal reference of RIs for four Russian children (adapted from Brun 1999):

Present tense interpretation:	48.3%
Past tense interpretation:	26.1%
Future/modal interpretation:	25.6%

Some typical examples appearing in the transcripts examined in Brun et al (1999) and Brun (1999) are presented below:

(13) <u>*Present tense interpretation*</u>

Sasha P. (1;9)
Adult (pointing to a TV set with a concert program on):
È to tetya delaet?
what woman do-IMP-3RD-SING-PRES
'What is the woman doing?'
Child: Tetya pet'
woman sing-IMP-INF
'The woman is singing.'

(14) <u>*Past tense interpretation*</u>

Sasha J. (2;5)
Adult (while pointing to the child's wet clothes):
Saša, ty nyryal v rakovinu?
Sasha you dive-IMP-3RD-SING-PST in sink
'Sasha, were you diving into the sink?'
Child: Eto odež ka nyrnut'!
it clothes dive-PERF-INF
'It was the clothes that have dived.'

(15) Sasha J (2;4)
a. <u>*Present tense interpretation*</u>
(While describing the actions of his sister who is turning the lights on and off)
naž imat', naž imat'
push-IMP-INF push-IMP-INF
'(She) is pushing, (she) is pushing.'

b. *Past tense interpretation*

Adult: *Èto papa sdelal?*
what daddy do-PERF-3RD-SING-PST
'What has daddy done?'

Child: naž at'
push-PERF-INF
'(He) has pushed.'

c. *Future/modal interpretation*

(The child is addressing his mother while simultaneously pointing to his shirt)
Rubašku snimat'.
shirt take-off-INF
'I want to take off the shirt.'

These data indicate that RIs in Russian child speech do receive temporal interpretation and are not limited to the predicates marked with [– realized] (i.e., *irrealis*) feature. They are used to refer to the past and present, as well as the future/modal events as may be seen from the examples above. Temporal reference in the *realis* cases is achieved through grammatical aspect: present or ongoing events are expressed by imperfective verbs, while past or completed events are expressed by perfective verbs (Brun et al 1999).[4] Thus, the MRE, which is responsible for limiting the interpretation of RIs to modal readings, can be seen not to apply to Russian RIs and, therefore, the EC is not expected to apply in this language either, at least to the temporally bound forms. We conclude that, since the Eventivity Constraint is predicted not to affect Russian RIs with non-modal interpretation, we should observe both eventive and stative infinitival predicates in the speech of Russian-learning children.

4.2 Materials and Results

Previous research investigating properties of RIs in Russian child speech has been conducted using the production data of one child, Varvara (CHILDES, MacWhinney and Snow 1985, 1990; collected by Protassova). As has been reported by Van Gelderen and Van der Meulen (1998), 98% of all RIs produced by this child were eventive.

In this paper, we present additional data from a new study dealing with the issue of the occurrence of verbal aspectual classes with non-finite forms during the RI Stage. This study

[4] In a later paper, Hyams proposes that Russian infinitival morpheme *-t'* carries a modal meaning, for both children and adults. The claim regarding the adult Russian is based on De Bode's report (p.c., in Hyams 2001, fn. 22) where she states that adult RIs in Russian are also limited to a modal interpretation. Such a description of Russian RIs is not valid. It has been argued before that adult Russian sentences with RI predicates do not have a modal interpretation (Avrutin 1999). Consider the following example:

(i) Princessa xoxotat'.
princess laugh-inf
'The princess started to laugh.'

In this sentence, the predicate refers to an activity of laughing that follows some particular completed event (e.g., somebody telling a joke). The laughing undoubtedly has a property of [+ realized] in Hyams' terms since its occurrence is not being projected but instead is being stated by the speaker. Hence, this interpretation is incompatible with a modal reading which requires the [- realized] feature on the predicate. Thus we conclude that the modality of Russian infinitive is not an inherent lexical feature but is contributed to the interpretation of the predicate when an infinitive is used in a future or modal construction with the copula *byt*' 'to be' or with other modal elements.

investigates the spontaneous speech of two monolingual Russian children collected in 1995 in Moscow, Russia:

(16) *Subjects*

a. Sasha P. (age at the moment of recording: between 1;6 and 2;5)

b. Sasha J. (physical age at the moment of recording: between 2;4 and 2;8).[5]

The speech of these children was recorded in sessions of various lengths, between half-hour up to a full hour, with various intervals between the recordings. For this study, we have analyzed a total of seven transcripts for Sasha P. and the total of five transcripts for Sasha J. In these data, we observed the following distribution of RIs with respect to the aspectual classes of stative vs. eventive predicates in non-modal contexts:

Table 2. Distribution of lexical aspect in the speech of two Russian children

Child	Root Infinitives		Finite Verbs	
	Eventive	Stative	Eventive	Stative
Sasha J	44	3	98	26
Sasha P.	85	4	167	41
TOTAL	129 (94.9%)	7 (5.1%)	265 (79.1%)	67 (20.9%)

Let us consider the results summarized in Table 2. Out of the total of 136 non-modal RIs found in the transcripts, the two children in our study only produced 7 stative verbs accounting for the mere 5.1% of all RIs. The picture is quite different for finite verbs: stative predicates occurred in 67 utterances out of the total of 332 finite forms representing 20.9% of all finite verb forms.[6] The proportion of stative verbs in infinitival contexts is significantly lower than the proportion of stative verbs in finite contexts: $\div^2(1) = 16.380$, p 0.001. Below, we present some examples of utterances with RIs with both types of predicates found in our transcripts:

(17) *Stative RIs (5.1%)*

a. Sasha J (2;6)
(Uttered while pointing to a fish tank)
Videt' rybku
see-IMP-INF fish-DIM-ACC
'I see a fish.'

b. Sasha P. (1;10)
Košku lyubit'
cat-ACC like-IMP-INF
'I like the cat.'

[5] Sasha J. can be considered a late speaker. His physical age in the beginning of recording is 2;4. He demonstrates, however, the linguistic abilities comparable to other children around 1;6. For instance, his MLUword at 2;4 is 2.59 (cf. Varvara's (1;6) MLUw is 2.60 (CHILDES, MacWhinney and Snow 1985, 1990); Zhenya Gvozdev's (1;6) MLUw is 2.64 (Gvozdev 1961.)) The occurrences of RIs disappear from his speech after the session at 2;8, the last session analyzed for the study presented in this paper.

[6] Note that the number of stative verbs is lower than the number of eventive verbs not only with root infinitives but also with finite verb forms. The same difference in the occurrence of aspectual classes was also documented by Gagarina (2002), among others. Gagarina reports that "the amount of event-denoting predicates is higher not only among OIs, but generally, among all verbs produced by children." (1999: 4). Importantly, however, the proportion of statives in RI contexts is significantly different from the proportion of the statives in finite forms (see text for statistical analysis).

(18) *Eventive RIs (94.9%)*

a. Sasha J. (2;4)
(The child himself is sitting in the stroller while his sister is rocking it.)
Kaèat' kolyasoèku.
rock-IMP-INF stroller-DIM-ACC
'(She) is rocking a stroller.'

b. Sasha P. (2;1)
(Crying, complains about the cat who has just scratched his hand.)
Ona pocarapat' menya!
she-NOM scratch-PERF-INF me-ACC
'She scratched me!'

Based on the data presented above, we may conclude that in non-modal (i.e., the *realis*) contexts the Eventivity Constraint still applies. In other words, when stative predicates are used in the early child speech, they occur within finite verbal forms while root infinitives are used with overwhelming frequency in conjunction with eventive predicates.

4.3 Discussion

Let us review the analysis of the restrictions universally imposed on root infinitives in child speech as proposed by H&H (1998, 1999). Under this theory, the application of the two constraints on the appearance of RIs is mutually dependent. If a language exhibits the Modal Reference Effect, i.e. if the RIs in child speech are restricted to modal interpretation, only the eventive predicates should be used with these infinitival forms. Such a restriction is due to the fact that children only have the deontic use of modality at their disposal at RI age and this modality is associated with the use of eventive predicates. Conversely, if a language does not demonstrate the MRE, i.e. its RIs appear with both modal and non-modal interpretation, the application of the EC should be prevented, at least in the non-modal occurrences of RIs. The application of these constraints is predicted to be universal.

Considering the data reported in this article, Russian presents a serious challenge to this theory. This language does not undergo the restrictions of the MRE since temporal interpretation is possible for its RIs. Hence, the EC should also not apply and both stative and eventive RIs should be observed in the data with at least equal proportional frequency as they are observed in finite utterances.

This prediction is not borne out since the data on Russian indicate that the majority of RIs is eventive in the speech of Russian-speaking children. The proportion of stative verbs in infinitival contexts is significantly lower than the proportion of stative verbs in finite contexts as was statistically demonstrated earlier.

We conclude that H&H's account of the lack of stative RIs in child speech does not account for the Russian data. Some other mechanism should be invoked to explain the asymmetry in the distribution of stative vs. eventive RIs in the speech of Russian children and, possibly, cross-linguistically.

5 Alternative Analyses

As we have demonstrated in the previous section, an analysis where the application of the eventivity restriction on RIs relies on the application of the modal reference restriction does not work for Russian. In this section, we consider three alternative approaches attempting to

provide an explanation for the lack of stative RIs in non-modal contexts in Russian child speech.

5.1 File Change Semantics Analysis

File Change Semantics has been initially developed by Heim (1982) as a model of discourse representation of NPs. It has been later extended by Avrutin (1994, 1999) to account for the discourse representation of events. Under this approach, two types of discourse entities exist in the world: individual file cards and event file cards. Introduction of discourse entities in this model is related to the presence of indices on such syntactic elements as DPs, the event argument and the TP, which in turn is related to the presence of various features. Indices in the syntactic tree correspond to the expression of the presence of certain formal features that mark the referential potential, i.e. the ability to introduce a discourse referent (see Avrutin 1999 for a more detailed discussion.) In particular, presence of an index on T^0 means that it has the referential potential to refer to, or to denote, a time interval.

Let us now turn to the mechanism of interpretation of RIs under the File Change Semantics approach. In this theory, non-finite predicates are represented by event file cards introduced through presupposition, not from syntactic indices. RIs are introduced into discourse as descriptions of events. Let us consider a particular example. Uttering a sentence 'Boy eat apple', a child introduces an event file card as a presupposed discourse entity. Such introduction allows the child to omit T and D specifications because these are needed for introducing corresponding discourse entities from syntax. If the child opts for an alternative way of introducing discourse reference, the specification of these elements may be omitted. Thus, the child's utterance 'Boy eat apple' should be viewed as a description of an event of eating with two participants, *boy* and *apple*, that takes place at some period of time.

According to Avrutin (1999), the proposed procedure of interpreting RIs explains the lack of stative predicates in a non-finite form. When discourse introduction proceeds as described above, the subject of an RI predicate does not bear an index; it does not have its own file card and is "interpreted indirectly as a participant in the event represented by the presupposed file card." Since "the subject of an eventive verb is a more prominent entity (i.e., an animate agent) than the subject of a stative verb (e.g., a theme, animate or inanimate), it is easier accessible in the discourse." (Avrutin 1999:168, based on Ariel 1990).

An explanation based on discourse prominence may run into certain empirical problems. For example, in many occasions, the RIs used by children are unaccusative predicates with non-agent inanimate subjects. An example of such usage is presented below:

(19) Sasha P. (1;11)
Mašinka polomat'sya
car-DIM-NOM brake-PERF-INF
'The car broke.'

On the other hand, among stative verbs children use most frequently are such predicates as 'to like', 'to know', 'to see'. Usually, the subjects of these predicates are pronouns 'I', 'he/she', nouns like 'Mommy', 'Daddy', etc. Undoubtedly, all these subjects have referents that are highly prominent in discourse and, therefore, they should not be problematic for the children to access as they are the "better accessible individuals" in terms of Avrutin (1999: 151). However, we still do not see a high percentage of constructions involving these stative predicates as RIs. Instead, they occur rather frequently as finite verb forms. Therefore, although this approach may seem attractive as a model of discourse introduction of RIs, it still fails to account properly for the asymmetry in the lexical aspectuality of RIs.

5.2 Event Semantics Analysis

Another approach to the interpretation of RIs in child speech was proposed by Brun et al. (1999). We refer to this account as the Event Semantics Analysis. As discussed by the authors, Russian children employ the system of grammatical aspect to denote Tense in the absence of syntactic means for expressing this feature: in the cases of root infinitives, Tense is unspecified, hence has no index necessary for the appropriate formal temporal interpretation (Avrutin 1999; cf. also Dowty 1979; Enç 1987). Therefore, children rely on alternative, non-syntactic mechanisms of providing temporal specification for the RI predicates. Within the event semantics framework (Parsons 1990), completed events are referred to by perfective verbs while ongoing events are denoted by imperfective verbs. Under this approach, all events are anchored in the 'here and now' situation (Giorgi and Pianesi 1998, Avrutin 1999). Ongoing events achieve this result through their connection with the moment of speech. Completed events, in turn, are linked to the 'here and now' situation (Hyams 1996) by virtue of introducing the right boundary of the event that is "anchored" in the present tense (Enç 1987).

We can now divide the task of accounting for the low rate of stative verbs in root contexts into two parts: past tense reference and present tense reference. Since the completed or past tense events are referred to by Russian children with perfective verb forms, these verbs can only be eventive. In fact, perfective aspect assumes the presence of a right boundary, i.e. the completion of an event. However, stative predicates, by definition, should be unbounded. Thus, only the eventive predicates can be used in such contexts. On the other hand, notice that no such restriction is placed on the ongoing events expressed by imperfective verbs. Hence, the event semantics analysis fails to provide a reason for the low percentage of stative verbs in all non-modal utterances with RIs. While incompatibility of perfective aspect and stative predicates may account for the fact that Russian children do not use stative RIs in past tense contexts, there is still no explanation for the lack of stative RIs in present tense contexts.

5.3 Event Variable Analysis

The final explanation for the asymmetry in production of stative vs. eventive RIs that we would like to discuss was originally proposed by Avrutin (1997). The theory is based on the File Change Semantics (Heim 1982, Avrutin 1994, 1999) approach to RIs which was examined above in details. This analysis is driven by the idea that stative (or Individual Level) predicates do not contribute an event variable (see Kratzer 1989 for discussion). Therefore, stative RIs cannot be represented in the discourse by an Event file card. The sentence with an RI predicate becomes uninterpretable since the only way of interpreting an RI is through a presupposed Event file card.[7]

This simple solution accounts elegantly for the lack of stative RIs in Russian child speech. It does not have to rely on the modal reference characteristic of RIs which seems to be absent in Russian and, therefore, avoids the potential empirical problems.

[7] This solution has been dismissed by Avrutin (1999) since it failed to satisfy certain aspects of the modified theory of the introduction of RIs into discourse in adult registers. For adults, the RIs are introduced through the file cards projected by the Resultant State component of the Culminated Events which should precede the introduction of RIs (recall our discussion of Russian adult RI sentences which had to follow some completed event in order to be temporally anchored.) However, we can avoid this problem by adapting the Event Semantics Analysis described in section 5.2 in which the temporal anchoring occurred through the link to the 'here and now' situation.

6 Conclusions

Contrary to previously proposed theories under which the applicability of the eventivity restriction on RIs in child speech depended universally on the modal reference restriction (Hoekstra and Hyams 1998, 1999), these two constraints are independent.

In particular, the Modal Reference Effect does not apply in Russian child speech since both the *realis* and *irrealis* uses of RIs occur in this language. Nevertheless, Russian still exhibits the effects of the Eventivity Constraint since RIs in this language are overwhelmingly eventive. Hence, a theory connecting the application of the MRE and the EC does not predict Russian facts and should be reconsidered.

The theory that provides the best explanation for the Russian data is based on the event variable association with the eventive predicates and its role in the interpretation of RIs. It avoids referring to the Modal Reference Effect absent in Russian and may be applied to other languages without jeopardizing the empirical facts.

Finally, another important question raised in connection with this topic was concerned with such methodological issues as the interpretation of spontaneous speech with respect to the child-intended interpretation. While a detailed discussion of this problem is definitely beyond the scope of this article, it is worth pointing out that contexts are crucial in determining the appropriate reading and should be paid attention both during data analysis and, importantly, in the discussion of results.

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Testing the Aspect First Hypothesis: A preliminary investigation into the comprehension of tense in child Greek

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Abstract

Crosslinguistic research on the production of tense morphology in child language has shown that young children use past or perfective forms mainly with telic predicates and present or imperfective forms mainly with atelic predicates. However, this pattern, which has come to be known as the Aspect First Hypothesis, has been challenged in a number of comprehension studies. These studies suggest that children do not rely on aspectual information for their interpretation of tense morphology. The present paper tests the validity of the Aspect First Hypothesis in child Greek by investigating Greek-speaking children's early comprehension of present, past and future tense morphology as well as the role that lexical aspect plays in the early use of tense morphology. It is suggested that although Greek-speaking children have not yet fully mapped the tense concepts to the correct tense morphology, tense acquisition does not seem to be significantly affected by the aspectual characteristics (i.e. the telicity) of the verb.

1 Introduction

Research on the acquisition of tense in the past thirty years has shown that young children (under the age of 2;6) use their tense and aspect forms in certain restricted patterns: Past or perfective forms are used mainly with telic predicates while present or imperfective forms are used primarily with atelic predicates. This pattern has come to be known as the *Aspect First Hypothesis* and has mainly been based on production data that have been observed in a number of languages, including English (Bloom, Lifter & Hafitz 1980; Shirai & Andersen 1995), French (Bronckart & Sinclair 1973), Greek (Stephany 1981), Hebrew (Berman 1983), Italian (Antinucci & Miller 1976), and Turkish (Aksu-Koç1988), among others.

However, research on the comprehension of tense morphology has casted some doubt on the Aspect First Hypothesis, in particular on the role of lexical aspect in the interpretation of tense morphology. In a series of comprehension studies, Richard Weist and his colleagues (Weist 1991; Weist, Lyytinen, Wysocka & Atanassova 1997; Weist, Atanassova, Wysocka & Pawlak 1984) have shown that by the age of 2;6 children understand the tense semantics associated with tense morphology. This finding suggests that children's interpretation of tense morphology is not driven by aspectual information. More recently, Wagner (1999) has shown that English-speaking children as young as 2;9 understand present, past and future tense in an adult-like way and that their comprehension of tense morphology does not seem to depend on lexical aspect information.

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In this paper we investigate the validity of the Aspect First Hypothesis in child Greek by testing Greek-speaking three-year old children's comprehension of tense. The basic goals of our study were: a) to test children's comprehension of tense morphology, in particular their comprehension of present, past and future tense; b) to explore the role that lexical aspect plays in children's early use of tense; c) to examine the role that linguistic cues, such as time adverbials, may have to the comprehension of tense morphology.

2 Children's early production and comprehension of tense morphology

Production studies on the acquisition of tense in the past thirty years have revealed the following pattern: Tense morphology in early child language expresses aspectual rather than deictic relations. More specifically, the claim maintained by a number of researchers is that in the initial stages of acquisition children (under the age of 2;6) use their tense and aspect forms in certain restricted patterns: Past or perfective forms are used mainly with telic predicates (that is, predicates that have an inherent end-point in their meaning, e.g. *break*) while present or imperfective forms are used primarily with atelic predicates (that is, predicates that lack such an inherent end-point, e.g. *ride*). This pattern, known as the *Aspect First Hypothesis*, has been observed in a number of languages, including English (Bloom, Lifter & Hafitz 1980; Shirai & Andersen 1995), French (Bronckart & Sinclair 1973), Greek (Stephany 1981), Hebrew (Berman 1983), Italian (Antinucci & Miller 1976), and Turkish (Aksu-Koç 1988), among others. Stephany (1981), in particular, suggests that there is evidence for the Aspect First Hypothesis in the acquisition of Greek. She observes that between the ages of 1;8 and 1;11 children learning Greek never use imperfective past forms; instead, children's past tense forms have always perfective morphology. Stephany (1981) further points out a correlation between the semantic class of the verbs used by children and the classes of expressions in which these verbs are most characteristically used: Past perfective expressions only occur with dynamic verbs, most of which describe situations with a clear end-point. Present tense expressions, on the other hand, occur almost exclusively with stative verbs. Thus, Stephany (1981: 4) concludes that the desription of situations in early child language is non-deictic.

However, the Aspect First Hypothesis has been challenged in a series of comprehension studies. Richard Weist and his colleagues (Weist 1991; Weist, Lyytinen, Wysocka & Atanassova 1997; Weist, Atanassova, Wysocke & Pawlak 1984) have used a sentence-picture-matching task to assess children's comprehension of tense morphology. In this task children were presented with two pictures, for example one depicting a future (yet to come) situation (e.g. a girl about to throw a snowball) and the other depicting a completed situation (e.g. someone getting hit by a snowball that a girl threw) and had to match these pictures to two sentences (e.g. *The girl will throw a snowball* and *The girl threw a snowball*). Children acquiring English were found to perform better than chance on this task by the age of 2;6. This evidence is taken to indicate that the initial tense system is not as defective as the Aspect First Hypothesis assumes and that children do not mis-assign aspectual information to tense morphology.[1]

The results reported by Weist and his colleagues have been criticised by Wagner (1999) on the basis of the fact that their tense comparisons always involved the future tense, that is children always had to choose between a future/present contrast or a future/past contrast.

[1] Further evidence for this conclusion is drawn from Polish child language (Weist, Wysocka, Witkowska-Stadnik, Buczowska & Konieczna 1984; Weist, Wysocka & Lyytinen 1991).

Given that the future tense has modal properties too, the success that children had in this task could easily be attributed to their knowledge of a realis vs. irrealis distinction. A further shortcoming of Weist's research that Wagner (1999) points out is the lack of a telic vs. atelic distinction in the test predicates used. The fact that all the test sentences used were telic made it difficult to determine the extend to which the predicate's lexical aspect influenced the interpretation of tense morphology.

In an attempt to address these shortcomings, Wagner (1999) designed a new study which tested the comprehension of past, present and future tense in 46 English-speaking children aged 1;11 to 4;4. In her experiment, children were presented with an illustration of a road and were introduced to a toy kitty that was performing the same event in three distinct locations along the road (initial, middle/ongoing and final/untouched location). While the kitty was in the middle of performing the event for the second time (i.e. in the middle location), the experimenter asked the child three questions which corresponded to one of the three locations in which the kitty was performing the event: *Where was the kitty V+ing?* (past tense question corresponding to the initial location), *Where is the kitty V+ing?* (present tense question corresponding to the middle location) and *Where's the kitty gonna V?* (future tense question corresponding to the final location). In order to test the role that lexical aspect plays in the interpretation of tense morphology, Wagner used three telic (*fill in a puzzle, empty out a cup, draw a face*) and three atelic predicates (*rest, play with a friend, hop around*). The results showed that children did have some problems with past tense, but overall they had a preference to match each tense to the correct location, without being influenced by the lexical aspect (i.e. the telicity) of the verb.

3 Greek aspect and tense

The present paper investigates the validity of the Aspect First Hypothesis in child Greek. Greek is a language that encodes not only lexical aspect (information about the completeness of an event, i.e. telic vs. atelic events) but grammatical aspect too (information about the presence or absence of initial and final points in the description of a situation). Thus, Greek makes an aspectual distinction between perfective and imperfective aspect marked on the verb stem. Perfective aspect views a situation in its entirety, whereas imperfective aspect views a situation from within (Comrie 1976). Grammatical aspect is independent of lexical aspect. Thus both telic and atelic predicates may appear with either perfective or imperfective aspect. Grammatical aspect is also marked distinctly from tense. Thus, the aspectual distinction perfective vs. imperfective shows up in the past and future tense. The present tense, however, makes no aspectual distinction; only the imperfective stem is used. The interplay of grammatical aspect and tense with telic and atelic verbs is shown in Table 1.

Table 1. Interplay of grammatical aspect and tense with telic and atelic verbs in Greek

	Perfective	*Imperfective*
Present	n.a.	pe**z**-o (I play) [ATELIC] xti**z**-o (I build) [TELIC]
Past	epe**ks**-a (I played) [ATELIC] exti**s**-a (I built) [TELIC]	epe**z**-a (I was playing) [ATELIC] exti**z**-a (I was building) [TELIC]
Future	tha pe**ks**-o (I will play) [ATELIC] tha xti**s**-o (I will build) [TELIC]	tha pe**z**-o (I will be playing) [ATELIC] tha xti**z**-o (I will be building) [TELIC]

4 Our study: Greek tense comprehension

4.1 Design and procedures

Our experiment tested children's comprehension of three tenses in Greek, present, past and future, following the basic design of Wagner's (1999) experiment. Each child was presented with an illustration of a road drawn on a piece of paper and was introduced to a rabbit-doll that enjoyed performing various events on the road. The rabbit performed an event three times in three separate locations along the road, the initial, the middle/ongoing and the final/untouched location.[2] While the rabbit was in the middle of performing the event for the second time (i.e. in the middle location), the experimenter asked the child about the event in either the past, the present or the future tense.

In order to check the interaction of lexical aspect with tense morphology, six events, three of which were telic and three atelic, were acted out with the rabbit and the relevant toys. The telic events were: *xtizo ena spiti* 'build a house', *aäiazo mia kupa* 'empty out a cup' and *zoãrafizo ena prosopo* 'draw a face'. The atelic events were: *pezo me enan filo* 'play with a friend', *ksekurazome* 'rest' and *agaliazo ena alogo* 'hug a horse'. In order to check the role of grammatical aspect, the questions were formed with both perfective and imperfective aspect for the past tense. Consequently, the six events were performed in two phases: in the first one the past question was formed with perfective past and in the second one it was formed with imperfective past. Therefore, a total of 12 test sentenses were administerd to the subjects (phases 1 and 2). In addition, the six events were performed a third time as well, using time adverbials in the questions (phase 3). As in Wagner's (1999) study, linguistic cues such as time adverbs were expected to help children significantly. The adverbs used were: *prin* 'before' for the past, *tora* 'now' for the present and *meta* 'next' for the future tense control questions.

The three phases are illustrated in Table 2 for the atelic verb *ksekurazome* 'rest':

Table 2. Test and control questions for the atelic verb *ksekurazome* 'rest'

Phase 1 (test sentences - perfective past form)	
Past	Pu ksekurastike o laãos? where rest-3sg/past/perf. the rabbit 'Where did the rabbit rest?'
Present	Pu ksekurazete o laãos? where rest-3sg the rabbit 'Where is the rabbit resting?'
Future	Pu èa ksekurasti o laãos? where will rest-3sg the rabbit 'Where will the rabbit rest?'

[2] As the rabbit proceeded from location to location, it left footprints on the road. This was done with the help of ink placed on the rabbit's feet. The footprints helped the children to understand the procedure and to keep visual contact with the rabbit's path. As a result, the road had to be changed for each event that was taking place, in order for a new path to be created.

continuing table 2.

Phase 2 (test sentences - imperfective past form)	
Past	Pu ksekurazotan o laãos? where rest-3sg/past/imperf. the rabbit 'Where was the rabbit resting?'
Present	Pu ksekurazete o laãos? where rest-3sg the rabbit 'Where is the rabbit resting?'
Future	Pu èa ksekurasti o laãos? where will rest-3sg the rabbit 'Where will the rabbit rest?'

Phase 3 (control sentences with time adverbials)	
Past	Pu ksekurastike o laãos prin? where rest-3sg/past/perf. the rabbit before 'Where did the rabbit rest before?'
Present	Pu ksekurazete o laãos tora? where rest-3sg the rabbit now 'Where is the rabbit resting now?'
Future	Pu èa ksekurasti o laãos meta? where will rest-3sg the rabbit next 'Where will the rabbit rest next?'

Within each phase, the past, present and future questions were uttered in a different order to avoid any sequencing effect. The right answer for the past question was the initial location, where the action had already been completed or just performed. For the present question, the child should point at the middle location, where the action was still taking place. Finally, the correct answer for the future question was the last (not yet touched by the rabbit) location. However, as also pointed out by Wagner (1999), at least within phase 2 (imperfective past) of our experiment, the middle (ongoing) location was in principle a potential correct answer for each of these questions. Since the test question is asked after the second event has begun, a past tense description is possible for the imperfective past form since this form does not entail completion of the event. Also, since the test question is asked before the second event has culminated, a future tense description of the event is possible since the event will continue for at least a few seconds into the future. Nonetheless, as it will become evident in section 4.3, the proportion of the initial and the untouched location for the past and future tense questions respectively was high enough to suggest that this task is not invalid.

4.2 Subjects

Eighteen Greek-speaking monolingual children from the Athens area, eight boys and ten girls, participated in the experiment. Their age was between 2;7 and 4;0 years old, with a general mean age of 3;2 years. In our analysis we divided the children in two smaller age groups: the younger group consists of nine children with mean age 2;8 (2;7 to 3;1) and the older one of nine children whose mean age is 3;6 (3;2 to 4;0). Since no pre-test was used as in Wagner's (1999) study, an additional five subjects were excluded from the final calculations: three children failed to complete the test, a fourth child was pointing always to the future location and a fifth child did not demonstrate willingness to point.

4.3 Results and discussion

In our experiment, as in Wagner's (1999), children were given three possible answers to each question: the initial location –which is the correct one for the past tense question–, the middle/ ongoing location –which is the correct one for the present tense question– and the final/not yet touched location –which is the correct one for the future tense question. Consequently, children had a chance level performance of 33% to indicate one of the three locations on the road. Thus, we will need a percentage of above 50% in order to consider the answer provided as a significantly important one.

In Figure 1 we present the mean percentage of correct answers for test (phases 1 and 2) and control (phase 3) conditions for each type of question (past, present, future) and for each age group (old and young).

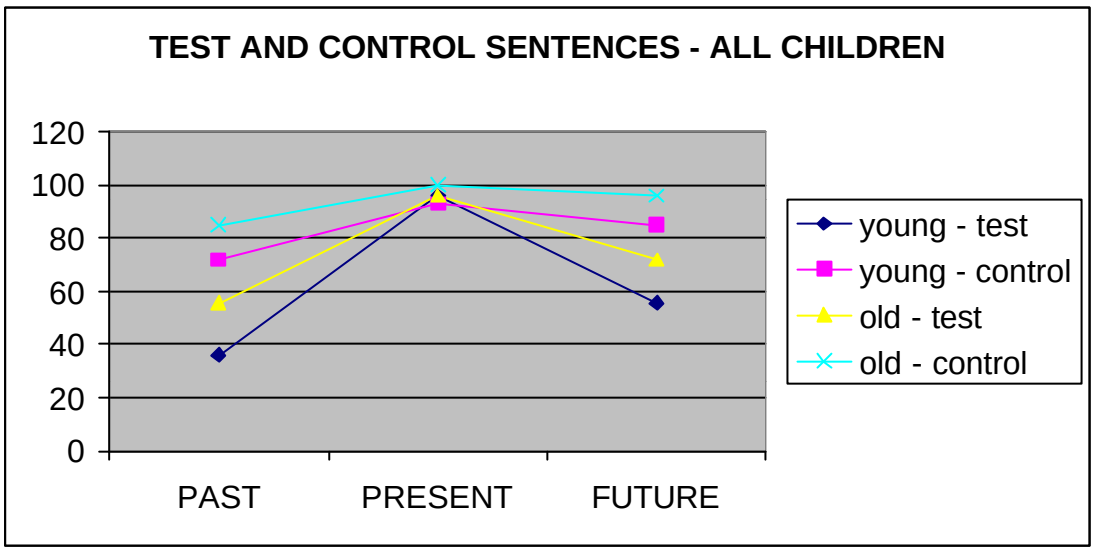

Figure 1. Mean percentage of correct responses for test and control sentences for each age group

There are two main observations regarding Figure 1. First, the presence of time adverbials in the control questions (for past and future questions) improved children's performance in each age group. A two proportions test was performed and the results indicated a highly significant difference ($p < .001$). This observation is in accordance with Wagner's (1999) results for English. Second, past tense seems to be the most problematic category for both age groups, although the older children did better than the younger ones. Furthermore, the interpretation of future tense in the test sentences seems to cause some difficulties particularly to the younger group, whereas present tense seems to be have been acquired by both groups.

However, in order to evaluate how the subjects did with respect to the three different tenses, we need to analyze the data further. Figure 2 presents the response patterns of all children (i.e. both age groups) on the three tenses, past, present and future. Perfective and imprefective past forms are analysed together in Figure 2.

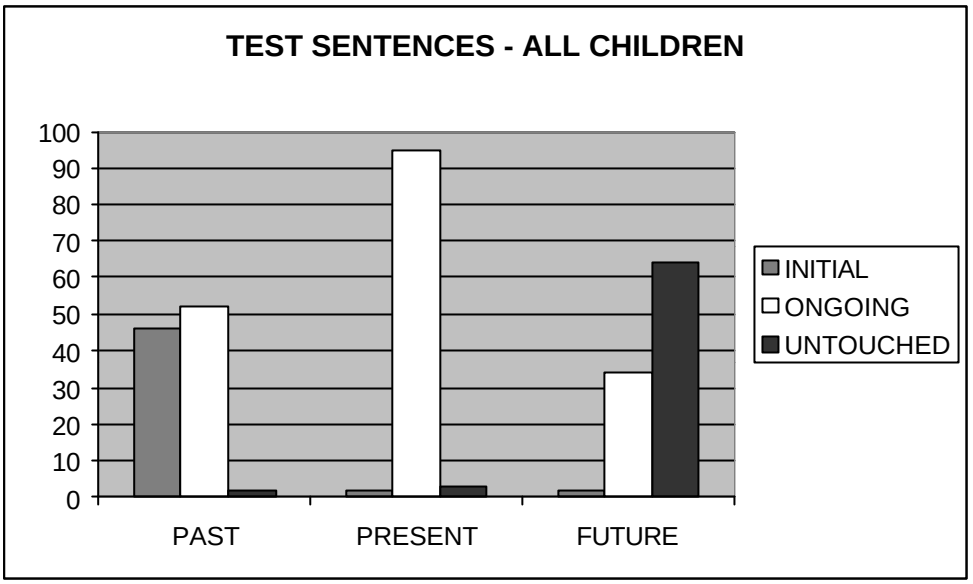

Figure 2. Response patterns on test sentences for all children

We can see that the ongoing location is the most common answer used by children when asked a past tense question. The ongoing location is selected 52% of the time, the initial location –which is the correct one– in 46% of the cases (which is not significantly above chance), while the untouched one only in 2% of the cases. We also observe that performance on present tense questions was almost always correct (95%). The initial location was selected only 2% of the time and the untouched one only 3% of the time. In the case of future tense questions, although the untouched location –which is the correct one– was selected in 64% of the cases (which is significantly above chance), the ongoing location was also selected at a proportion of 34%, while the initial one was selected only infrequently (2% of the time).

We will now examine if there is any difference regarding the understanding of the three time notions –past, present, future– in the two different age groups. We divided the 18 subjects in two groups. The younger group consists of 9 children aged 2;7 to 3;1 (mean age 2;8) and the older group consists of 9 children aged 3;2 to 4;0 (mean age 3;6). The response patterns for the younger group are illustrated in Figure 3, while the response patterns for the older group are presented in Figure 4.

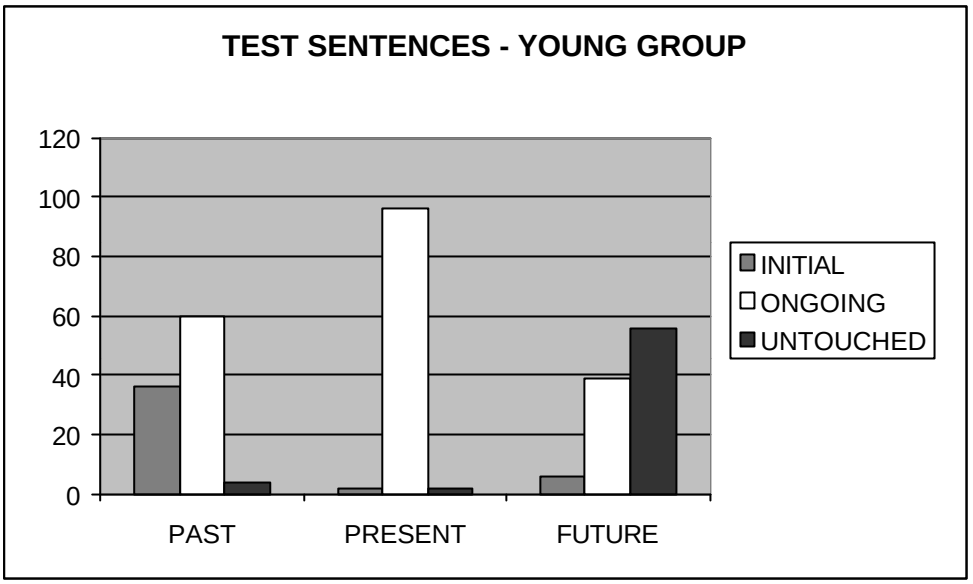

Figure 3. Interpretation of the three tenses for the younger group

Figure 3 shows that the past tense questions are the ones that mostly trouble the younger group. The initial location –which is the correct one– is selected in 36% of the cases (which is not significantly above chance) while the ongoing one in 60% of the cases; the untouched location is marginally selected (4%). As far as present tense questions, the young group of subjects selects the correct location, the ongoing one, almost all the times. The percentage of correct answers is extremely high and reaches 96%, while the initial location and the untouched location are selected only in 2% of the cases each. This is different from Wagner's (1999) results. In her experiment, the ongoing location was selected with present tense questions only 60% of the time. Finally, young children provide correct responses in the future questions in 55% of the cases (which is significantly above chance), although present is selected approximately 39% of the time.

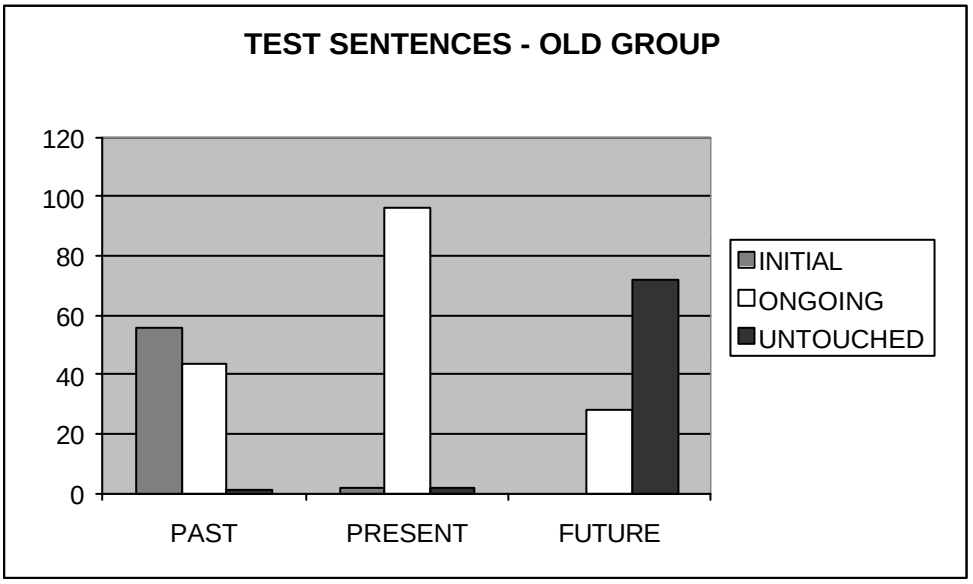

Figure 4. Interpretation of the three tenses for the older group

Figure 4 shows that the older children provide correct answers which are significantly above chance level performance for all types of questions. In the past tense questions, children use

the initial location –which is the correct one– at a proportion significantly above chance (55.5%), although present tense is also used (43.5%). It is obvious that older children have a good grasp of the present tense as they select the ongoing location in 96% of the cases. Finally, in the future tense questions the subjects select the untouched location –which is the correct one– at a greater percentage than any other location (72%), but they sometimes (28% of the time) select the ongoing location instead of the untouched. It is worth mentioning that they never confuse past for future, that is they never select the initial location for future tense questions.

If we compare figures 3 and 4, it is evident that there was no difference in the interpretation of present tense between the two age groups. However, there is a difference in the interpretation of past and future tense. In order to find out whether this difference is significant, we performed a chi-square test. Our results indicated that the interpretation of past tense ($p = .004$) as well as the interpretation of future tense ($p = .011$) improve significantly with age.

The results in Figures 2, 3 and 4 present the overall interpretation of past tense questions regardless of grammatical aspect. However, recall that our experiment contained two test conditions regarding past tense, one with perfective forms and one with imperfective forms. A difference was observed in the performance of the older children when the grammatical aspect of the past question changed. More specifically, as illustrated in Figure 5, the older group performed a bit better in the past tense when the form was imperfective rather than perfective. However, the results of an one proportion test showed that the difference in performance between perfective and imperfective forms was highly not significant ($p = .366$).

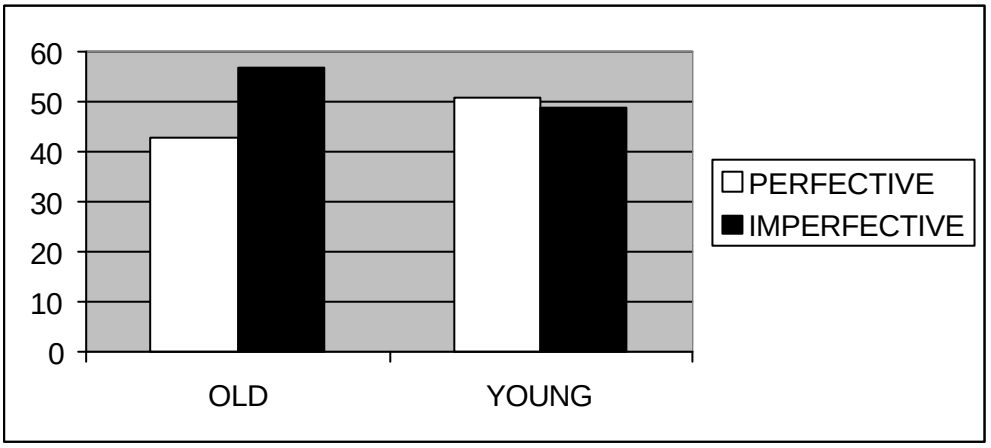

Figure 5. The effect of grammatical aspect on the comprehension of past tense questions

The role of lexical aspect in children's selection of location was also examined in the past tense queries. Figure 6 shows that the proportion of telic and atelic verbs in children's (both age groups) use of past tense (both perfective and imperfective) is about the same (52.5% for telic and 47.5% for atelic).

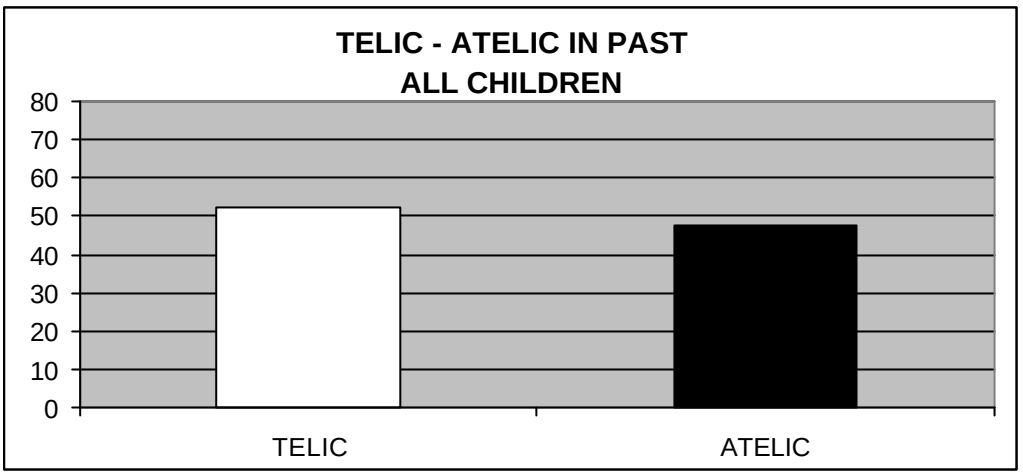

Figure 6. Percentage of telic and atelic verbs in past tense questions for both age groups

We also examined if there is a difference between the two age groups in their use of telic and atelic verbs in the production of past tense. Figure 7 illustrates that the proportion of the two types of predicates is exactly the same in the older group. Although the proportion of telic verbs in the younger group is a bit higher (56%) that the proportion of the atelic predicates (44%), a chi-square test indicated that the difference is highly not significant ($p = .533$).

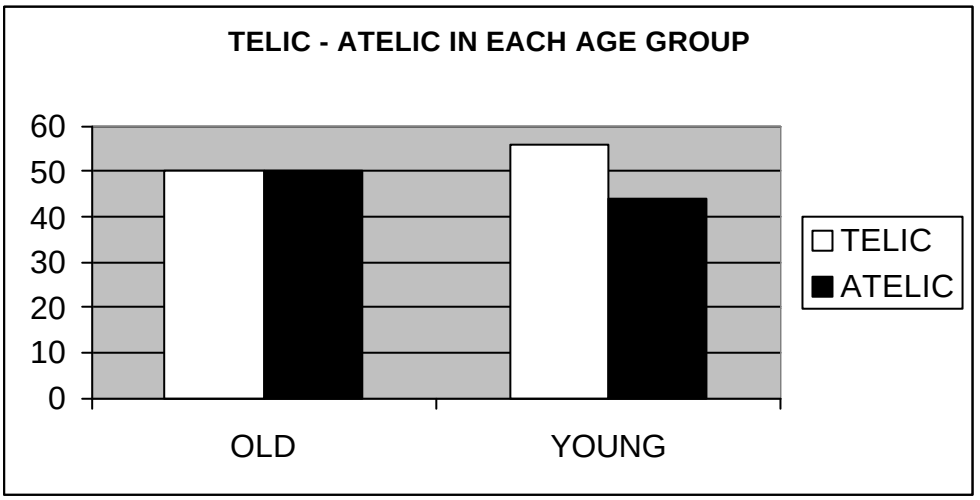

Figure 7. Percentage of telic and verbs in past tense questions for each age group

In order to see whether grammatical aspect plays a role in the choice of telic or atelic predicates, we calculated the use of telic and atelic predicates for each group according to grammatical aspect. Figure 8 illustrates that for the perfective past tense, the old group provides more correct answers with telic (61%) than with atelic predicates (39%), while there is no difference between the two in the younger group. A chi-sqare test indicated that the difference in the use of telic and atelic verbs is highly not significant ($p = .434$). Figure 9 presents the use of telic and atelic verbs in the imperfective past tense queries for each group. Although the younger group provides more correct answers with telic predicates (63%) while the older group with atelic verbs (59%), a chi-sqaure test indicated that the difference is not significant ($p = .125$).

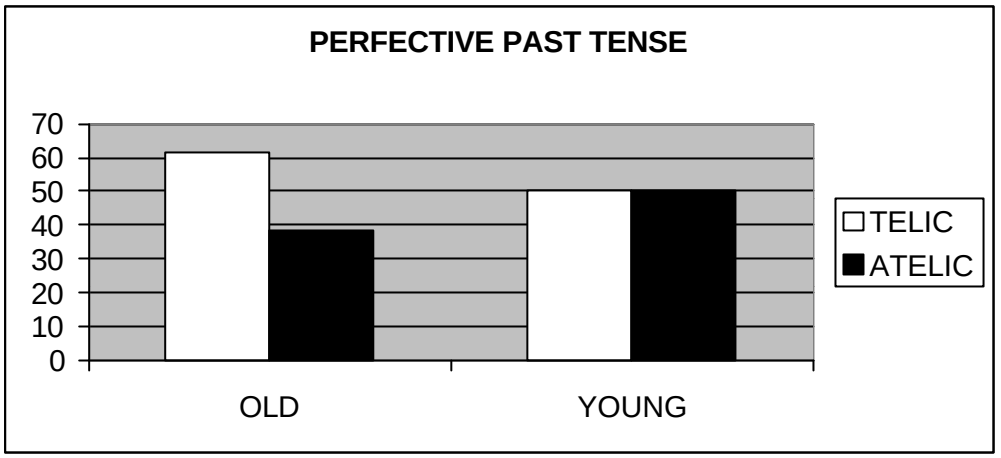

Figure 8. Percentage of telic and atelic verbs in the perfective past tense questions for each age group

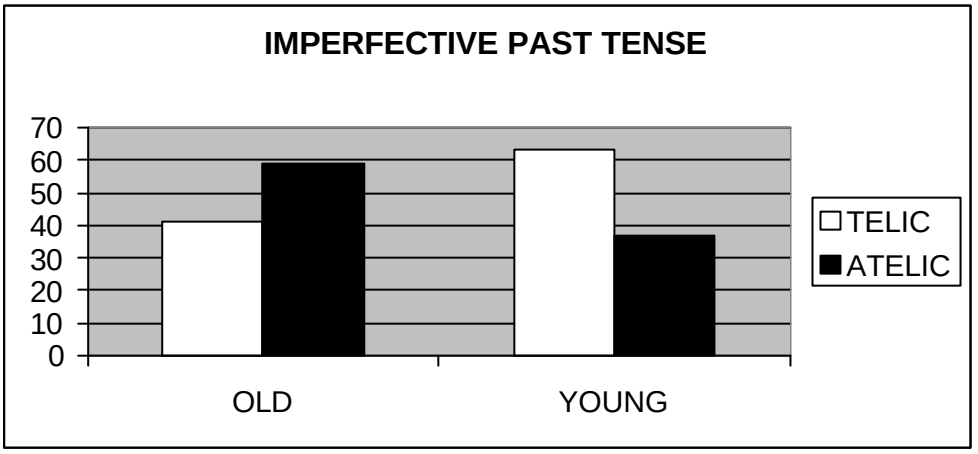

Figure 9. Percentage of telic and atelic verbs in imperfective past tense questions for each age group

5 Conclusion

The present study investigated the validity of the Aspect First Hypothesis in child Greek by testing Greek-speaking children's early comprehension of present, past and future tense morphology as well as the role of lexical aspect in the use of children's tense morphology. The main results of our study can be summarized as follows: a) Older Greek-speaking children (3;2 to 4;0 years old) understand tense better than younger ones (2;7 – 3;1 years old). Although present tense does not pose any problem, past and future tense seem to be problematic particularly for the younger group. b) Lexical aspect (i.e. telicity) of the predicate does not seem to play a significant role in the interpretation of the tense morphology in child Greek; there was no significant difference in the use of telic and atelic predicates with past forms for both age groups. c) Both age groups seem to be facilitated in their interpretation of tense morphology by the presence of linguistic cues such as time adverbials.

Based on our findings, we can conclude that Greek-speaking children aged 2;7 to 4;0 have not yet fully mapped the tense concepts to the correct tense morphology. However, the development of the tense system has already started at the age of 2;7 and after the age of 3;2

all tenses but the past tense are almost fully mapped. Moreover, lexical aspect does not seem to affect significantly the acquisition of tense. According to the Aspect First Hypothesis, we would expect to find a strong correlation between the use of past tense forms and the telicity of the verb. However, the difference between telic and atelic verbs used with past tense forms in our experiment was not significant. We can conclude that tense acquisition does not seem to be significantly affected by the aspectual characteristics of the verb and in that respect the Aspect First Hypothesis does not seem to be confirmed by child Greek comprehension data.

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Why *swimming* is just as difficult as *dying* for Japanese learners of English

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Abstract

While both Japanese and English have a grammatical form denoting the progressive, the two forms (*te-iru* & *be+ing*) interact differently with the inherent semantics of the verb to which they attach (Kindaichi, 1950; McClure, 1995; Shirai, 2000). Japanese change of state verbs are incompatible with a progressive interpretation, allowing only a resultative interpretation of V+ *te-iru*, while a progressive interpretation is preferred for activity predicates. English *be+ing* denotes a progressive interpretation regardless of the lexical semantics of the verb. The question that arises is how we can account for the fact that change of state verbs like *dying* can denote a progressive interpretation in English, but not in Japanese. While researchers such as Kageyama (1996) and Ogihara (1998, 1999) propose that the difference lies in the lexical semantics of the verbs themselves, others such as McClure (1995) have argued that the difference lies in the semantics of the grammatical forms, *be+ing* and *te-iru*. We present results from an experimental study of Japanese learners' interpretation of the English progressive which provide support for McClure's proposal. Results indicate that independent of verb type, learners had significantly more difficulty with the past progressive. We argue that knowledge of L2 semantics-syntax correspondences proceeds not on the basis of L1 lexical semantic knowledge, but on the basis of grammatical forms.

1 Introduction

In the past decade, research in generative second language (L2) acquisition has focused primarily on issues of syntactic representation, investigating to what extent the principles and parameters of Universal Grammar constrain L2 acquisition. This body of research has closely examined the acquisition of the morphological and syntactic reflexes of L2 functional categories. Specifically, researchers have examined learners' comprehension and usage of L2 inflectional morphology as well as L2 learners' knowledge of feature strength, which is closely tied to constraints on syntactic movement (Epstein, Flynn & Martohardjono, 1996; Haznedar and Schwartz, 1997; Lardiere, 1998, 2000; Prevost and White, 2000; Schwartz and Sprouse, 1996; Vainikka and Young-Scholten, 1996, among others).

More recently, this focus has broadened to include questions of how knowledge at interface levels is acquired, and how knowledge of peripheral mechanisms interacting with, but outside of UG proper, are deployed to instantiate this knowledge (cf. Juffs, 1996, Juffs and Harrington, 1995; Klein and Martohardjono, 1999). This recent body of research has begun to explore the semantic aspects of L2 acquisition, investigating the *interpretations* that learners assign to grammatical constructions in a second language (Dekydtspotter, Sprouse and Anderson, 1997; Montrul and Slabakova, 2002; Slabakova and Montrul, 2002). L2 researchers have taken particular interest in the acquisition of lexical semantics and its interaction with argument structure (Juffs, 1996; Hirakawa, 1999, 2001; Inagaki, 1997,

Montrul, 1997, 1999; Sorace, 1995, 2000) as well as its interaction with grammatical morphology (Montrul and Slabakova, 2002; Slabakova and Montrul, 2002).

Research on the acquisition of aspect falls within this recent L2 research program. Aspect refers to the internal temporal properties of an event (Chung and Timberlake, 1985; Comrie, 1976; Smith, 1991). The aspectual properties of a phrase indicate whether an event is ongoing or whether it is complete. Aspect may be encoded in the lexical class of the verb phrase (lexical aspect) or in particular grammatical forms such as the progressive or simple past morphemes in English (grammatical aspect).

Lexical aspect usually refers to Vendler's (1967) well-established four-way classification of verb phrases. This classification distinguishes statives such as *know*, which are ongoing in time but generally incompatible with the progressive tense (**John is knowing French*), activities such as *paint*, which are also ongoing in time but unlike states, are usually compatible with the adverbial *for an hour*-phrase as in *John painted for an hour*, accomplishments such as *run a mile*, which unlike activities have a definite terminus and are generally more compatible with the adverbial *in an hour* phrase as in *John ran a mile in an hour*, and achievements such as *die*, which also have a definite terminus but unlike accomplishment verbs, happen instantaneously, with little or no duration.

Aspect can also be encoded in verbal inflectional morphology, for example by perfective and imperfective or progressive and non-progressive grammatical morphemes. The past tense in English encodes perfective aspect as in (1).

(1) *John ran a mile.*

Perfective aspect looks at the event as whole, disregarding the internal structure of the event; the verb phrase denotes a completed event. In (1), it is the case that John has run the entire mile. In contrast, English employs the progressive as in (2) to encode imperfective aspect.

(2) *John was running a mile.*

Imperfective aspect does not specify either the beginning or endpoint of an event. In (2) the event of John running a mile was in progress at some point in time, but there is no indication of whether the action was actually completed. It is possible that John never in fact ran the entire mile.

It is well known that there is an interaction between lexical aspect and grammatical aspect so that particular grammatical forms yield different interpretations depending on the lexical class of the verb. This particular fact is of central interest to the present study and will be explained further in our discussion of aspectual markers in Japanese. Particular lexical classes of verbs are also incompatible with certain aspectual forms such as stative verbs in English, which are generally considered incompatible with the progressive.

2 The L2 Acquisition of Aspect

The interpretation of markers of grammatical aspect is notoriously difficult for second language learners. This observation was pointed out in an early study by Coppietiers (1987) who investigated the ability of near native speakers of French, from varying L1 backgrounds, to distinguish between the French *imparfait* and *passé composé*. While the advanced L2 learners were indistinguishable from native speakers on various measures of grammatical knowledge, they deviated from the native speakers to the greatest extent in their knowledge of this aspectual contrast. Although this study has been widely criticized on methodological

grounds (cf. Birdsong, 1992), it nonetheless drew researchers' attention to the fact that even extremely advanced learners, who have seemingly mastered the L2 syntax, have difficulty with subtle semantic differences between grammatical forms in the second language.

A large body of research has examined the L2 acquisition of aspect from varying theoretical perspectives (Andersen and Shirai, 1996; Bardovi-Harlig, 1992; 1995; Dietrich, Klein and Noyan, 1995; Klein and Perdue, 1992, 1997; Li and Shirai, 2000, Salaberry, 1997, among many others), however it is a relatively new topic within the framework of generative L2 research. Among this growing body of research (Koslowska-MacGregor, 2002; Montrul and Slabakova, 2002; Slabakova, 1997), results from recent studies by Montrul and Slabakova (2002) and Slabakova and Montrul (2002) are particularly relevant to the present study.

Slabakova and Montrul (2002) investigated the acquisition of the perfective-imperfective distinction in Spanish by native speakers of English. Spanish encodes grammatical aspect morphologically: the preterite as in (3a) is used to mark perfective aspect and denotes complete or bounded events. On the other hand, the imperfect as in (3b) is used to mark imperfective aspect and denotes unbounded or incomplete events. English does not have a simplex past form equivalent to the Spanish imperfect. However, with event predicates (activities, accomplishments, achievements), the preterite in Spanish is roughly equivalent to the simple past in English and the imperfect can usually be translated into English with the past progressive. (The interpretation is heavily dependent on context.)

(3a) *Julieta practicó tenis.*
Julia practice-PRET tennis.
Julia practiced tennis.

(3b) *Julieta practicaba tenis.*
Julia practice-IMP tennis.
Julia was practicing tennis.

(Slabakova and Montrul, 2002)

Stative verbs are incompatible in the progressive in both Spanish and English. However, Spanish morphologically distinguishes the perfective-imperfective contrast with stative verbs as in the examples in (4) whereas English does not, as is shown in the English glosses. The same form, *was*, is used in both cases.

(4) a. *Pedro dijo que María estaba embarazada*. (imperfective)
Pedro said that Maria is-IMP pregnant
'Pedro said that Maria was pregnant.' (She was pregnant at that time and she still might be pregnant.)

b. *Pedro dijo que María estuvo embarazada*. (preterite)
Pedro said that Maria is PRET pregnant
'Pedro said that Maria was pregnant.' (Maria was pregnant and is no longer pregnant.)

(Slabakova and Montrul, 2002 cf. (13))

Slabakova and Montrul predicted that this mismatch in the morphology would cause difficulty for learners of Spanish. L2 learners would have to realize that while English neutralizes the bounded-unbounded distinction with stative verbs, Spanish does not.

Following the theoretical framework of Giorgi and Pianesi (1997), Montrul and Slabakova assume a parametric difference between English and Spanish in the feature composition of the functional category AspP. In English all event predicates (not states) are marked with the feature [+perfective], which encodes boundedness. All event predicates in English must check

this feature in AspP. In Spanish, on the other hand, verbs are not inherently associated with semantic features. Instead the features [+/–perfective] are associated with overt tense morphology and must also be checked in AspP. Montrul and Slabakova assume that in Spanish, the features (+) and (–) perfective are checked overtly in AspP through imperfective and preterite tense morphology. In this framework, the successful acquisition of aspectual contrasts such as the perfective-imperfective distinction, is evidence of semantic feature assignment under the functional category, AspP.

Slabakova and Montrul found that advanced learners were in fact sensitive to the preterite-imperfect contrast across all verb types, including statives. Contrary to their predictions, statives were not more difficult than event predicates. Their results point to the interesting possibility that learners do not directly transfer the aspectual properties of lexical classes from their L1. This is a result that we will return to in our discussion. In general, Slabakova and Montrul conclude that the L2 learners' ability to distinguish the semantic differences of the aspectual markers in the L2 provides evidence that L2 acquisition is constrained by Universal Grammar and that L2 learners can acquire features of functional categories that are not instantiated in their L1.

2.1 Present Study

The present study, like those of Slabakova and Montrul, focuses on how knowledge at the interface between syntax and semantics and syntax and the lexicon is acquired. We are interested in the interaction between lexical and grammatical aspect. However, we have framed our research questions from a different perspective. While it is true that aspectual differences across languages can be explained in terms of the semantic features of syntactic functional categories, as in the theoretical framework of Giorgi and Pianesi (1997), we propose these differences can also be viewed from a purely lexical semantic perspective.

Crosslinguistic aspectual differences may be the result of differences in the semantics of the verbs or in the grammatical forms themselves. Our study investigates how Japanese learners acquire the aspectual properties of the English *verb+inflectional morphology* complex. We want to know whether existing knowledge of the L1 plays a role through transfer and specifically we investigate *what* in the semantic representation is transferred when learners acquire language specific interpretations for the *V+inflectional morphology* complex.

3 The Progressive in Japanese and English

Our study focuses on a specific difference in the interpretation of the aspectual marker denoting the progressive in Japanese and English. While both languages have a grammatical form denoting the progressive, the two forms, *be+ing* in English and *te-iru* in Japanese, interact differently with the lexical semantics of the verb to which they attach. For the purposes of the present study, we will focus on the interaction with activity and change of state verbs. Change of state verbs fall into the class of achievement verbs in Vendler's (1967) classification.

3.1 Japanese *te-iru*

Te-iru is an aspectual marker, composed of the gerund *te* plus the verb of animate existence, or auxiliary *iru*. The construction has been widely discussed in the literature on Japanese aspect because it allows contradictory interpretations: progressive and perfective (Kindaichi, 1950; Fujii, 1966; Okuda, 1978; Jacobsen, 1992; McClure, 1993, 1995; Uesaka, 1995;

Ogihara, 1998, 1999; Shirai, 2000). The particular interpretation that *te-iru* denotes is heavily dependent on the lexical semantics of the verb to which it attaches.

The preferred interpretation for activity verbs under *te-iru* is progressive as is shown in the example in (5).

(5) *Tarô-ga hasit-te-iru*.

Tarô-topic run-te-iru PRES

Tarô is running.

There are other interpretations available for activity verbs under *te-iru* that we will return to later in our discussion.

Change of state verbs behave differently under *te-iru* as is shown in the example in (6); the interpretation of a change of state verb under *te-iru* is always perfective.

(6) *Hikôki-ga kûkô –ni tsuite-iru.*

plane-nom airport at arrive te-iru PRES

The plane (arrived and) is at the airport.

(Hirakawa, 2001)

The example in (6) crucially does not allow the progressive reading, *The plane is arriving at the airport*.

3.2 English *be+ing*

Unlike Japanese, both activity and change of state verbs behave similarly under the English progressive form, *be+ing* (Vendler, 1967; Dowty, 1979; Landman, 1992). In both cases, the verbs denote ongoing, progressive interpretations as can be see in (7) and (8).

(7) *Adrian is running.*

(8) *The plane is arriving at the airport*.

However, unlike activity verbs, change of state verbs in the progressive do not entail the perfective, so *The plane is arriving* does not entail *The plane has arrived* while *Adrian is running* does entail that *Adrian has run* at least a step or two (cf. Dowty, 1979 and Landman, 1992 on the Imperfective Paradox).

3.3 What is the locus of difference between Japanese and English?

When we compare the grammatical forms denoting the progressive in Japanese and English, we see that Japanese *te-iru* allows both progressive and perfective interpretations depending on the lexical semantics of the verb whereas English *be+ing* always denotes a progressive interpretation, regardless of the verb stem. The main difference is that change of state verbs under Japanese *te-iru* must focus on the *resulting state* of the event. In (6) above, for example, the focus is on the endpoint of the plane's arrival at the airport. In English, on the other hand, the focus in (8) is on the *process* leading up to the change of state, the events leading up to the plane's actual arrival.

This contrast has been of particular interest to researchers working on aspect in Japanese. The question that arises is how we can account for the fact that change of state verbs, like *dying*,

can denote a progressive interpretation in English, but not in Japanese. There are at least two ways of accounting for this contrast: either by placing the difference in the lexical semantics of the verb or in the semantics of the grammatical form itself.

3.3.1 The difference is in the verb

Proponents of the first hypothesis have posited a lexical semantic difference between change of state verbs in Japanese and English (Kageyama, 1996; Ogihara, 1998, 1999). According the Ogihara (1999), "achievements in English can describe preparatory stages but not result stages of events, whereas instantaneous sentences in Japanese are exactly the opposite" (Ogihara, 1999, p. 338-339).

Kageyama (1996) proposes that a Japanese change of state verb such as '*sinu*' (die) in (9) has the semantic operator BECOME while the English equivalent in (10) has the semantic operator MOVE.

(9) [y BECOME [y BE DEAD]] 'sinu' Japanese

(10) [y MOVE [y TO DEAD]] 'die' English

Both structures imply a resulting state, however BECOME in (9) is telic (meaning that specifies an inherent endpoint) while MOVE in (10) is atelic, and thus allows a progressive interpretation. Activity verbs, on the other hand, will have the same lexical semantic representation in both languages.

3.3.2 The difference is in the progressive operator

Under the second hypothesis, McClure (1995) has argued that change of state verbs are semantically equivalent in Japanese and English. McClure's proposal shifts the focus to the semantics of the grammatical form as the locus of crosslinguistic differences. McClure's (1995) work expands upon traditional analyses of the progressive form in English, such as Landman (1992), which analyze *be+ing* as a semantic operator PROG which interacts with the verb stem to which it attaches as in (11).

(11) PROG (verb)

In McClure's analysis, the differences in the interpretation between the English and Japanese progressive forms lie in the formal semantic properties of *be+ing* and *te-iru* as you can see in (12) and (13).

(12) ***Be+ing***

PROG(P)=1 during the interval i iff

[1] $\exists$å s.t. å $\circ$ P & τ (å) < i &

[2] $\neg$[$\forall$å* s.t. å* $\circ$ P, τ (å*) $\leq$ τ (å)] &

[3] $\forall$å' [[$\forall$å* s.t. å* $\circ$ P, τ (å*) $\leq$ τ (å')] $\rightarrow$ τ (å') > i]

Be+ing is true during the interval i if [1] there is a segment å of a predicate P which is manifested before i, the interval of evaluation; [2] it is not the case that this segment is later than all other segments of the predicate (i.e. å is not a final segment) and [3] any segment which is a final segment is manifested after the interval of evaluation. The progressive is true

for a particular interval of time if during that interval the eventuality has begun but is not yet complete.

(13) ***Te-iru***

PROG(P)=1 during the interval i iff

[1] $\exists$å s.t. å ⚬ P & τ (å) < i &

[2] ¬[$\forall$å* s.t. å* ⚬ P, τ (å*) ≤ τ (å)] &

[3] $\forall$å’ [[$\forall$å* s.t. å* ⚬ P, τ (å*) ≤ τ (å’)] → ¬[τ (å’) > i]]

The *te-iru* construction is true during the interval i if [1] there is a segment å of a predicate P which is manifested before i, the interval of evaluation; [2] it is not the case that this segment is later than all other segments of the predicate (i.e. å is not a final segment) and [3] all segments which are final are also manifested at the time of evaluation or in the past. The progressive is true for a particular interval of time if during that interval the eventuality has begun and if possible, is also complete. All possible final segments must be realized during that interval.

The basic difference in (12) and (13) can be summed up as follows: The semantics of *be+ing* require that *no final segment* of an eventuality is realized whereas the semantics of *te-iru* require that *all final segments* of an eventuality are realized (McClure, 1995).

3.4 L2 Predictions for the Progressive

If we assume that there will be transfer of L1 semantics, then we can outline different predictions for the L2 acquisition of change of state verbs under the English progressive *be+ing* based on the two semantic models presented above. Under the first hypothesis, where crosslinguistic differences lie in the verbs themselves, the goal of the L2 learner is to assign the correct lexical semantics of the corresponding verb in English. Change of state verbs might present difficulty for the Japanese learner or English because the lexical semantic representations differ in the two languages. Activity verbs, on the other hand, have equivalent lexical semantic representations in both languages and therefore, should not present any difficulty. We will refer to this hypothesis as the “Transfer of Lexical Semantics” hypothesis. In summary, this model predicts that Japanese learners will perform better on activity verbs than on change of state verbs.

Under the second hypothesis, the verbs themselves are equivalent in Japanese and English. The goal of the L2 learner in this case is to assign the formal semantic properties on the English progressive operator. This model, which we will refer to as the “Transfer of Grammatical Form” hypothesis, predicts equivalent performance across activity and change of state verbs. It further predicts that learners will have difficulty with the English progressive in general because the L1 formal semantic properties are different.

4 Experimental Study

4.1 Target Structures

In our experimental study we tested the past progressive as our target structure. This choice was essentially required by our design. Ideally we would have targeted the present

progressive and contrasted learners' performance on the simple present. However, the simple present in English denotes a wide array of interpretations, such as the habitual or narrative interpretation, which made it an unsatisfactory option for our contrast structures; the various interpretations of the English simple present tense are very difficult for L2 learners. Therefore we decided to target progressive aspect in the past tense and contrast learners' performance on the simple past.

The simple past forms, *–ed* in English and *–ta* in Japanese, denote basically equivalent perfective interpretations regardless of the lexical semantics of the verb stem to which they attach, as the examples in (14) and (15) demonstrate.

(14) *Adrian studied English.*

(15) *Akiko-wa eigo-o benkyo-shita.*
Akiko-NOM English-ACC study-PAST
Akiko studied English.

4.2 Research Questions

We investigated whether L2 learners can assign target like interpretations to inflectional morphology such as *be+ing* in English. We were especially interested in whether existing knowledge of the semantics of the first language, Japanese, would play a role through transfer. Specifically, we wished to investigate *what* transfers in the aspectual domain: the lexical semantic properties of the verbs or the semantic properties of the grammatical forms.

4.3 Participants

We tested 83 native speakers of Japanese who were studying English as a foreign language. Based on responses given on a language background questionnaire that we administered, participants were placed in either the Intermediate (n= 38) or the Advanced (n= 45) group. Participants in the intermediate group were mainly adults who were studying English at conversation schools in rural areas of Japan. All participants in this group had studied English for the mandatory six years in junior and senior high school, but they had not continued their study of English at the university level. The mean age of the intermediate group is 41.

Participants in the advanced group were mainly junior and senior high school English teachers in rural areas of Japan. All Advanced participants had studied English for the mandatory six years in junior and senior high school and they had continued to study English at the university level for 2-4 years. The mean age of the advanced group is 44. For participants in both groups, contact with native speakers of English is limited to contact with foreign teachers (mostly from the U.S. and England) who are employed by the conversation schools and the public junior and senior high schools.

We also tested 20 native speakers of English, who were undergraduate students at a large public university in New York City.

4.4 Design: Interpretation Task

Learners were tested on their interpretation of activity and change of state verbs in both past progressive and simple past contexts. They were tested on ten verbs: four activity verbs (*swim, dance, wash, sing*) and six change of state verbs (*fall, die, arrive, buy, borrow, lend*).

Learners were asked to judge pairs of sentences such as the ones in (16) and (17) and were instructed to decide whether or not the second sentence presented a possible continuation of the first sentence. The task was designed to evaluate how learners interpreted the simple past and the past progressive forms.

(16) My niece sang 2 Christmas songs at church. She left church after the first song. **X**

(17) My niece was singing 2 Christmas songs at church. She left church after the first song.

Given the first sentence in (16) *My niece sang 2 Christmas songs at chuch*, participants had to decide whether it was possible that *She left church after the first song*. We expected that native speakers would say that the sentence pair in (16) is not possible. In this case, the simple past tense encodes perfective aspect and therefore the event of the niece singing 2 songs must have been completed in entirety.

However, given the first sentence in the pair in (17), *My niece was singing 2 Christmas songs at church*, we expected that native speakers would say it *is* possible that *She left church after the first song*. In this example, the progressive aspect does not entail completion of the event. It is possible that the niece did not finish singing the two songs that she intended to sing, and in fact, left the church after singing only one.

There were thirty test items in total. Each of the ten verbs appeared in three contexts: in a simple past context, in a past progressive context and in a filler sentence. There were nine sentence types in total; examples are given in (18)- (26). Sentence types were balanced across four test batteries. The judgements we expected from native speakers of English are given in parentheses following each sentence pair.

Our discussion, from this point forward, will focus only on the four target sentence types, given in (18)- (21). The sentence types in (22)-(26) were included to insure that the participants understood the task and to balance the number of items that were expected to be accepted and rejected.

Examples of sentence types

(18) **Activity Verb/ Past Progressive/ Contradictory** (accept)
The Olympic athlete was swimming the whole race. She stopped half way through.

(19) **Change of state Verb/ Past Progressive/ Contradictory** (accept)
The plane was arriving in Hartford at 3:00. The plane exploded in midair.

(20) **Activity Verb/ Simple Past/ Contradictory** (reject)
The Olympic athlete swam the whole race. She won the race very easily.

(21) **Change of state Verb/ Simple Past/ Contradictory** (reject)
The plane arrived in Hartford at 3:00. The plane exploded in midair.

(22) **Activity Verb/ Past Progressive/ Neutral** (accept)
The Olympic athlete was swimming the whole race. She won the race very easily.

(23) **Change of state Verb / Past Progressive/ Neutral** (accept)
The plane was arriving in Hartford at 3:00. That day the plane had many passengers.

(24) **Activity Verb/ Simple Past/ Neutral** (accept)
The Olympic athlete swam the whole race. She won the race very easily.

(25) **Change of state Verb / Simple Past/ Neutral** (accept)

The plane arrived in Hartford at 3:00. That day the plane had many passengers.

(26) **Filler** (reject)

Henry is lending a CD to his friend. Henry has no friends.

4.5 Predictions: Target Test Sentences

Our first target sentence type in (18) includes an activity verb in a past progressive context. We expected that native speakers would accept this pair of sentences. Next we will outline the predictions for the Japanese learners based on the two models we presented earlier.

Given that the lexical semantic representation of activity verbs is equivalent in Japanese and English, the Lexical Semantic Transfer hypothesis predicts that Japanese learners will also accept this pair of sentences.

However, if the Transfer of Grammatical Form model is correct, then learners will have difficulty with the progressive form, regardless of the lexical semantics of the verb. This hypothesis then predicts that learners will incorrectly reject this pair.

The second target sentence type in (19) includes a change of state verb in a past progressive context. We expected that native speakers would accept this pair of sentences. However, in this case, both semantic models predict that Japanese learners will incorrectly reject this pair. According to the predictions of the Lexical Semantic Transfer, learners may transfer the L1 lexical semantic representation for change of state verbs. Therefore they will interpret the first sentence in (19) as *The plane arrived in Hartford at 3:00*. *The plane exploding in midair* is then not possible.

The Transfer of Grammatical Form hypothesis also predicts difficulty with the pair in (19) simply because the verb is in the past progressive form.

In order to contrast learners' performance on the past progressive, we also included activity and change of state verbs in the simple past. We expected that native speakers would reject the sentence pairs in (20) and (21). Because the L1 interpretation is basically equivalent, both models predict that Japanese learners will not have difficulty rejecting them as well.

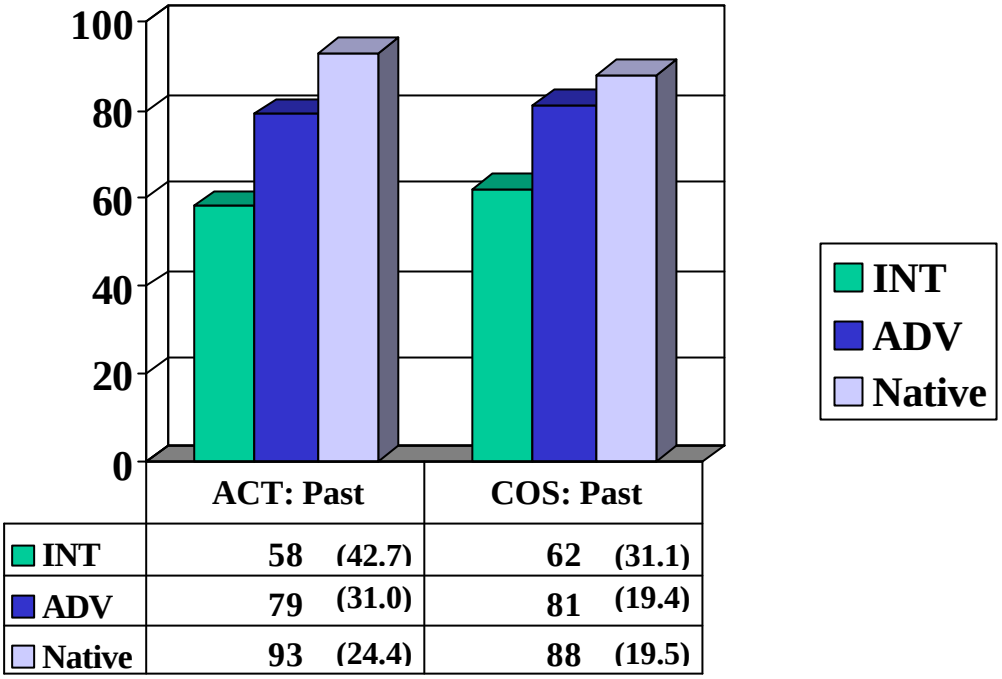
To sum up, we will briefly revisit the predictions of the two models for the past progressive and simple past In the past progressive, the Lexical Semantic Transfer Model predicts facilitation with activity verbs but difficulty with change of state verbs. The Transfer of Grammatical Form model predicts equivalent performance on both classes of verbs.

In the simple past, both models predict equivalent performance across verb types. However, the Transfer of Grammatical Form model predicts that learners will have more difficulty with the past progressive than with the simple past. This is due to the fact that the semantics of the past forms are generally equivalent in the L1 and L2 while the semantics of the progressive form is different.

5 Results

Only learners and native speakers who were accurate on at least 70% (7 out of 10) of the filler sentences were retained for the analyses of performance on the four target sentence types outlined above. Overall results are reported in terms of mean percent correct. Standard deviations are given in parentheses.

5.1 Comparing Activity and Change of State Verbs



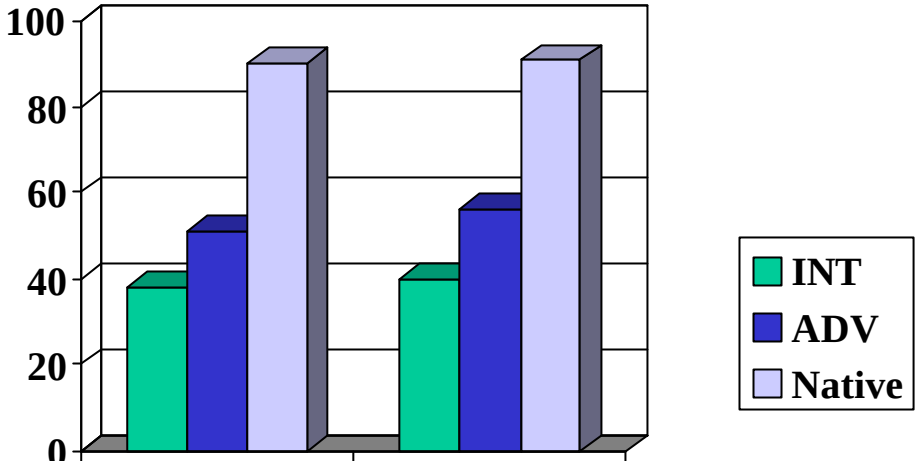
	ACT: Past	COS: Past
INT	58 (42.7)	62 (31.1)
ADV	79 (31.0)	81 (19.4)
Native	93 (24.4)	88 (19.5)

Figure 1. Mean percent correct on activity and change of state verbs in the simple past

Figure 1 summarizes the results of performance on activity and change of state verbs in the simple past. A repeated measures analysis of variance revealed that performance on activity verbs was not significantly different from performance on change of state verbs in the simple past, $F(1, 102)=.023$, $p=.879$. Learners treated change of state verbs the same way they treated the activity verbs.

Furthermore, a single-factor analysis of variance indicated that learners in the advanced group did not perform significantly differently from the group of native speakers with either activity verbs ($p=.318$) or change of state verbs ($p=.483$) in the simple past. Advanced learners performed quite well on the simple past.

Figure 2 summarizes the results of performance on activity and change of state verbs in the past progressive.



	ACT: Prog.	COS: Prog.
INT	38 (40.9)	40 (29.1)
ADV	51 (40.5)	56 (37.4)
Native	90 (30.7)	91 (16.6)

Figure 2. Mean percent correct on activity and change of state verbs in the past progressive

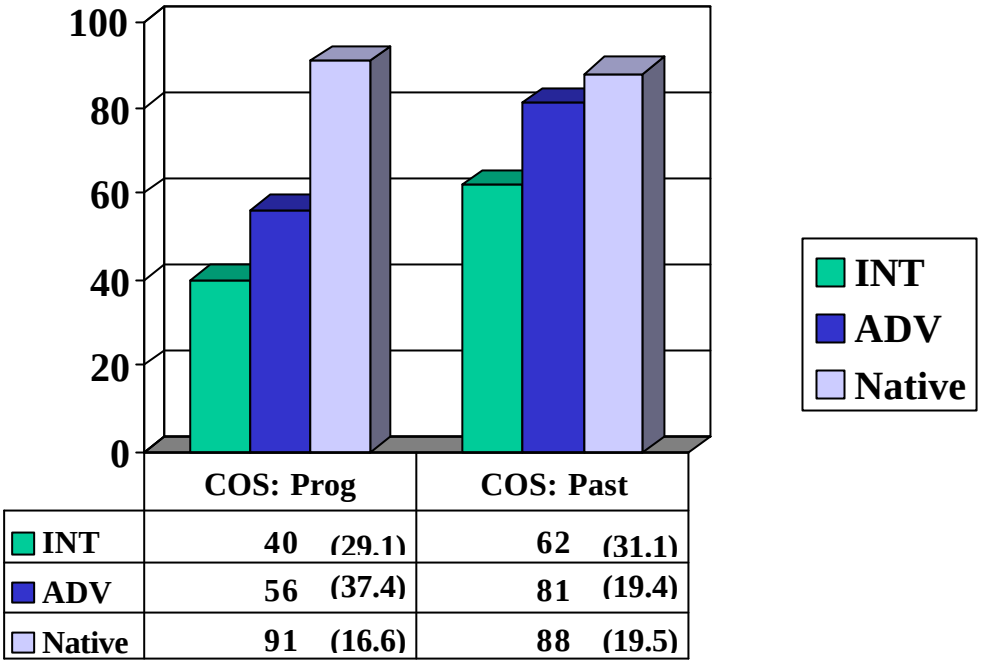
The results in Figure 2 show the same pattern of results as Figure 1. A repeated measures ANOVA revealed that learners again treated activity verbs the same way they treated the change of state verbs. The difference in performance on the two verb classes was not statistically significant, F(1, 102)=.261, p=.611.

However, while the pattern of results is similar, learners' accuracy rates were much lower in the past progressive. A single-factor ANOVA revealed that advanced learners performed significantly differently from the native speakers on both activity (p=.001) and change of state verbs (p= .000) in the past progressive.

5.2 Comparing the Past Progressive and Simple Past

The results presented in Figures 1 and 2 strongly suggest that the past progressive was significantly more difficult that the simple past for the Japanese learners. However, we wanted to run further statistical analyses, looking at each verb class individually, to compare learners' performance on the past progressive and simple past.

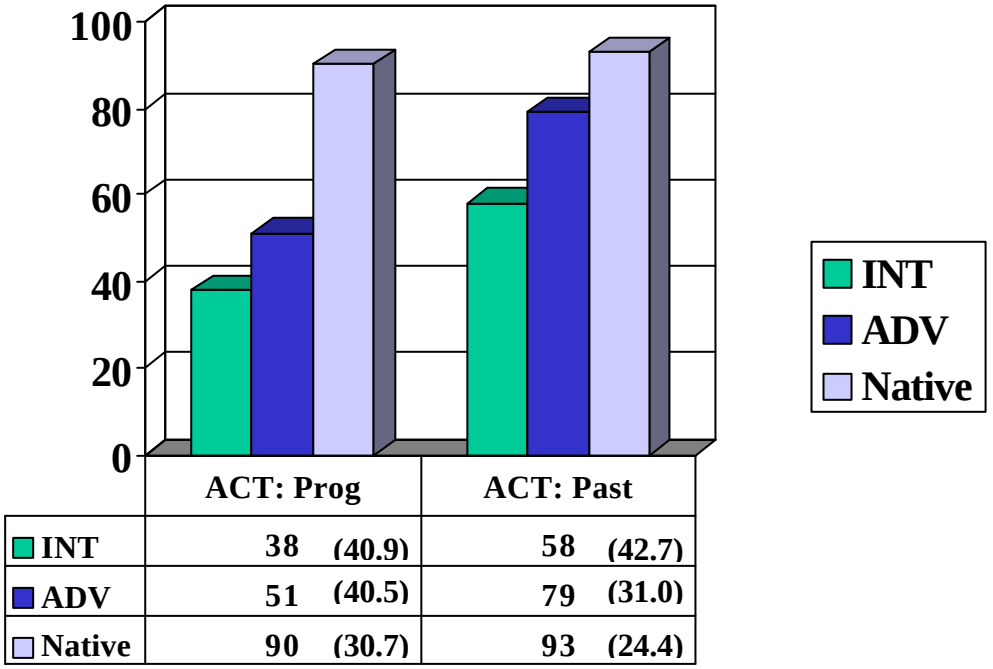
Figure 3 summarizes the results of performance on change of state verbs in the two tenses. A repeated measures analysis of variance revealed that performance on change of state verbs in the simple past was significantly better that performance on change of state verbs in the past progressive, F(1, 102)=14.813, p=.000. Learners had significantly more difficulty with change of state verbs in the past progressive.



	COS: Prog	COS: Past
INT	40 (29.1)	62 (31.1)
ADV	56 (37.4)	81 (19.4)
Native	91 (16.6)	88 (19.5)

Figure 3. Mean percent correct on change of state verbs in the past progressive and past

The results presented in Figure 4 indicate that the same is true of activity verbs as well. A repeated measures ANOVA revealed that learners' performance on the simple past was significantly better than their performance on the past progressive, $F(1, 102)=9.658$, $p=.002$. In summary, for both activity and change of state verbs, the past progressive was more difficult than the simple past.



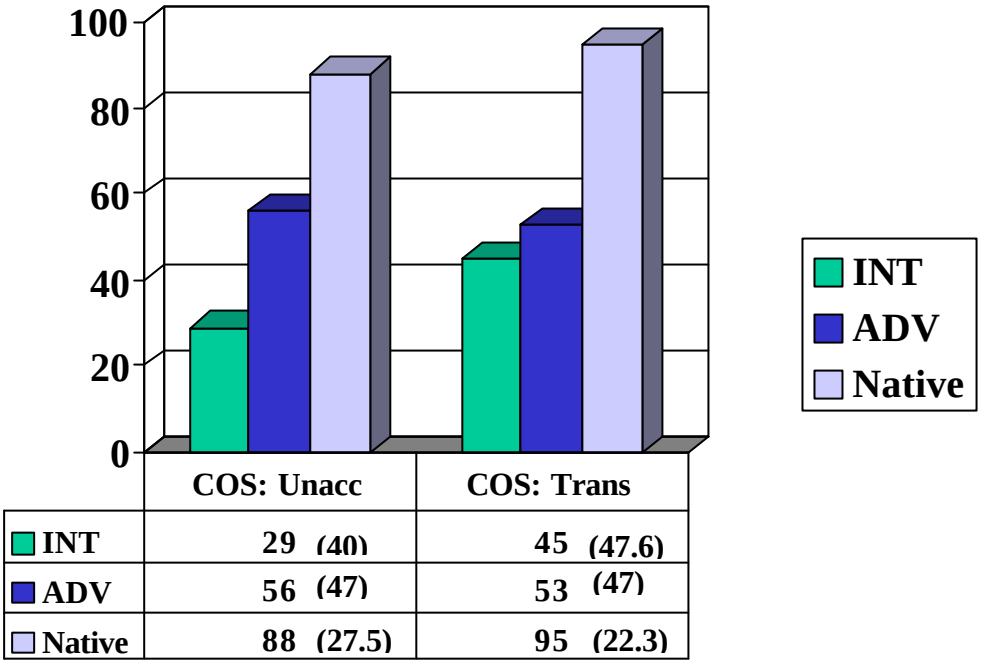
	ACT: Prog	ACT: Past
INT	38 (40.9)	58 (42.7)
ADV	51 (40.5)	79 (31.0)
Native	90 (30.7)	93 (24.4)

Figure 4. Mean percent correct on activity verbs in the past progressive and past

The above results suggest that contrary to the Lexical Semantic Transfer Model, the difficulty seems to lie not in the particular verb class, but in the progressive form itself. As we would

expect, performance on the simple past overall was significantly better than performance on the past progressive overall, F(1, 102)=17.644, p=.000. Preliminary results lend support to the second hypothesis; transfer seems to proceed on the basis of grammatical forms.

5.3 Further Analyses: Investigating Argument Structure



	COS: Unacc	COS: Trans
INT	29 (40)	45 (47.6)
ADV	56 (47)	53 (47)
Native	88 (27.5)	95 (22.3)

Figure 5. Mean percent correct on unaccusative change of state verbs and transitive change of state verbs in the past progressive

Although our preliminary results provided support for the Transfer of Grammatical Form model, we conducted further analyses that could potentially show support for the first hypothesis, Transfer of Lexical Semantics. Within the class of change of state verbs, we tested three unaccusative verbs (*fall, die, arrive*) and three transitive verbs (*buy, borrow, lend*). Unaccusative verbs are intransitive verbs whose single argument is argued to have originated as an underlying object.

In the literature on Japanese aspect, researchers such as Okuda (1977) and Jacobsen (1992) have argued that there is a correlation between transitivity and the meaning that verbs take on under Japanese *te-iru*. In the example in (27) the interpretation of the unaccusative verb '*sinu*' (die) under te-iru is strongly perfective and actually prohibits a progressive interpretation.

(27) *Akiko-ga* *shinde-iru*
Akiko-TOPIC die te-iru PRES
Akiko has died.

However, the transitive verb in (28) is not as strongly perfective. While the *preferred* interpretation is perfective, a progressive or habitual interpretation may also be available, depending on the context.

(28) *Akiko-ga* *hon-o* *katte-iru*
Akiko-TOP book-ACC buy te-iru PRES
Akiko bought a book.

Given the above differences between intransitive and transitive verbs, if there is an effect of transfer of the L1 lexical representation, then we would expect to see a difference between the two classes of change of state verbs that we tested.

However, the results in Figure 5 suggest that there was not a significant difference between unaccusative verbs and transitive verbs in the past progressive. A repeated measures ANOVA revealed that performance on transitive change of state verbs was not significantly better than performance on unaccusative change of state verbs (p=.236). These results further suggest that learners are not in fact transferring lexical properties from the L1.

6 Discussion and Conclusion

Our results indicates that independent of verb class and argument structure, the past progressive was significantly more difficult than the simple past. We believe that our main finding lends support to Transfer of the Grammatical Form hypothesis. It seems that transfer does not proceed on the basis of L1 lexical semantics, but rather on the basis of grammatical forms. When there is a match between form and meaning in the L1 and L2, as in the simple past, acquisition proceeds with relative ease. However, when there is a mismatch between form and meaning in the L1 and L2, as in the past progressive, even advanced learners have difficulty.

When our learners were given the sentence *My niece was singing two Christmas songs at church*, they rejected the possibility that *She left church after the first song*. Learners had difficulty assigning the correct interpretation to the progressive inflectional morphology. Their error strongly suggests that the learners actually interpreted the first sentence as perfective: *My niece sang two songs at church*. We propose that this error can be explained by transfer of the semantics of the L1 grammatical form.

First let us revisit the interpretation of the Japanese form *te-iru*. The sentence in (29) repeats example (5).

(29) *Tarô-ga* *hasit-te-iru.*
Tarô-topic run-te-iru PRES
Tarô <u>is running</u>.

As we mentioned earlier, the preferred interpretation for activity verbs plus *te-iru* as in (5) is progressive. However, in (30) we see that with an implied direct object such as the marathon, a perfective interpretation is also available.

(30) *Tarô-ga* *hasit-te-iru.*
Tarô-topic run-te-iru PRES
Tarô ran/ has run (the marathon).

Taro-ga hasit-te-iru is ambiguous between a progressive reading as in (29) and a perfective or result state reading as in (30). The interpretation is dependent on context. Furthermore, an additional perfective reading such as the one in (31) is also available.

(31) *Tarô-ga* marason-o *hasit-te-iru.*
Tarô-topic marathon-ACC run-te-iru PRES
Tarô has had the experience of running a marathon.

(31) is an example of what is called the experiential reading. The sentence can best be interpreted as *Taro has had the experience of running a marathon*. The examples in (30) and (31) show that while a progressive reading is preferred for activity verbs under *te-iru*, perfective readings are also available. Change of state verbs under *te-iru* generally only have a perfective reading available.

Given the availability of the perfective interpretations in (30) and (31), we propose that the Japanese learners overgeneralized the perfective interpretation of the L1 form *te-iru* onto its nearest equivalent in the L2, English *be+ing*. Therefore Japanese learners allow a perfective reading for the English progressive regardless of the lexical semantics of the verb and even in cases where the dominant L1 interpretation is progressive, as is the case with activity verbs. For example, they interpret *was arriving* as *arrived* but also *was running* as *ran*. Our proposal predicts that learners performance on the present progressive will not be significantly different from their performance on the past progressive. If our proposal is correct, the learners would transfer the perfective *te-iru* to English *be+ing* in both cases. This makes the very strong prediction that learners will interpret "is running" as ran. Future research on the present progressive is required.

Our proposal has implications beyond the realm of L2 acquisition. First we must investigate why the perfective interpretation of *te-iru* would transfer across all verb classes. If the above proposal is correct, it would suggest that the perfective is actually a default interpretation in the mental representation of *te-iru* for Japanese speakers. As we mentioned, future research including a test of the present progressive will shed light on this issue.

While we have argued up until this point that the Transfer of Grammatical Form hypothesis is supported by our findings, it is also possible that there is a developmental explanation for our results. Based on data from studies of child L1 acquisition, Wagner (2002) and Valian (submitted) have independently concluded that children assume that the past is inherently perfective. In Wagner's study, children watch a cat walk down a road and perform activities at different spots on the road. In half of the test sentences, the cat starts to do something at the first X but doesn't complete the activity and then moves to the second X, where the cat begins the activity again. In the other half of the test sentences, the cat completely finishes an action at the first X and them moves on the second X where the cat begins the activity again. In the middle of the cat performing the activity at the second X, the child is asked *Where is Kitty X-ing?* or *Where was Kitty X-ing*?

Children performed better on the test sentences in the past progressive (*Where was Kitty X-ing?*) in the second half of the test sentences where the first or past event referred to a completed action. Wagner suggests that children may be conflating tense and aspect; therefore they interpret any occurrence of a past marker including the auxiliary *was* as referring to completed action. Valian also reports depressed performance on the past progressive in her study.

The past progressive may be particularly challenging for both L1 and L2 learners because tense and aspect do not cohere, as they do in the present progressive. Unlike the previous proposal, based on transfer, this developmental model suggests that learners would perform better on the present progressive, than the past progressive. We have begun testing the present

progressive on a second group of L2 learners. Results of the second experiment will help decide between the competing analyses presented above.

In conclusion, we argue that transfer does not seem to proceed by verb class. While lexical semantics may in fact play a role, transfer of the semantics of grammatical forms may override transfer of lexical semantics. We believe our results are compatible with the unexpected findings of Slabakova and Montrul's study, which we discussed earlier. In their study learners were expected to have more difficulty with statives because English does not distinguish the preterite and imperfect morphologically with stative verbs. However, this particular verb class did not cause increased difficulty for their learners. These results provide further evidence that L2 learners do not transfer the lexical properties of particular verb classes. The L2 learners of Spanish were able to identify the semantic differences in the preterite and imperfect forms, and through positive evidence found that both grammatical forms are permissible with stative verbs.

Furthermore, we believe our results can help decide between competing theoretical accounts of aspectual differences between Japanese and English. Differences do not seem to lie in the lexical semantics of the verb, as has been suggested by Kageyama (1996) and Ogihara (1998, 1999), but rather, in the semantics of the progressive operator.

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The Acquisition of Spanish Perfective Aspect: a study on children's production and comprehension*

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Abstract

This paper presents the acquisition of Spanish perfective aspect in production and comprehension. It argues that, although young children use perfective aspect to talk about completed events, young children have difficulty in assessing perfective meaning from perfective morphology. This paper proposes that in the process of acquiring aspectual meaning, children use local strategies to decode aspectual meaning from form: when analyzing a completed situation, young children depend on certain learnability factors to correctly assess the entailment of completion of the perfective, namely, their ability to determine if the object of the event measures out the event as a whole or not, and their ability to read the agent's intentions. When those factors are removed from the situation, young children had difficulty determining the entailment of completion of perfective aspect. This study also suggests that the manner in which aspectual information is conveyed in a language, may play a role on the readiness of the acquisition of the semantic morphology of the language (e.g., verb+object vs. verb+affixes). The results of this study indicate that successful performance on the semantics of Spanish perfective aspect develops around the age of 5-6.

1 Introduction

Aspect expresses the internal compositional meaning of a sentence. According to the literature, aspectual meaning is conveyed by two independent components, lexical aspect, which is determined by the lexical properties of the whole verb phrase, and grammatical aspect, which is determined by the verbal system of the language, which includes tense and aspect morphology[1].

Lexical aspect refers to the inherent semantic properties displayed by the verb and its arguments in a sentence. These properties are defined as contrasting sets, telic/atelic, stative/ dynamic, and instantaneous/durative. Vendler's (1957)[2] verb classification distinguishes verbs

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1 The terms lexical and grammatical aspect have been identified in the literature as inner and outer aspect, Verkuyl (1987); situation time and point of view, Smith (1991/1997); and, (a)telicity and (un)boundedness, Depraetere (1995)respectively.

2 Vendler's classification of events was inspired by the old Aristotelian tripartition of situational types.

according to their lexical inherent properties: States (e.g., love, think), Activities (e.g., run, play), Accomplishments (e.g., eat, write), Achievements (e.g., win, climb). The lexical property that concerns us in this study is the property of telicity[3]. A predicate is telic when the event that it denotes reaches its point of culmination, in other words, when it entails the completion of an event as in *build the house, play basketball for an hour, write a letter*. The entailment of completion obtained in a telic predicate is determined by the theme argument of the verb, which must be realized as a direct object of quantized reference and therefore, must appear in a transitive verb frame. A predicate is atelic when the event that it denotes does not reach its point of culmination, instead, it denotes an arbitrary ending as in, *build houses, play basketball, write letters*. Notice that these predicates although in a transitive verb frame, do not entail the completion of the event, this is due to the direct object's non-quantized reference. Grammatical aspect refers to aspectual distinctions of the language, which specify the boundaries of an event. Grammatical aspect is usually marked by auxiliaries, and by the inflectional or derivational morphology of the language. For example, in English, a perfective reading is obtained by the use of the morpheme *–ed* as in *he played basketball*. A progressive imperfective reading is obtained by using the auxiliary *be* and *–ing* as in *he is playing basketball*. While the perfective focuses on the initial and final boundary of the event, the progressive imperfective, on the other hand, focuses on an ongoing action without indicating the initial or final boundary of the event. The aspectual meaning of a sentence is, therefore, construed on the interaction of the two types of aspect, lexical and grammatical. However, analysis on the interaction of the two components indicates that imperfective grammatical aspect overrides lexical aspect, a phenomenon known as the imperfective paradox, Dowty (1979). For example, the use of imperfective aspect in either telic or atelic verb phrase entails an event in progress (e.g., *John was building the house; John was playing basketball*). By contrast, the use of perfective aspect in a telic verb phrase entails the completion of the event (e.g., *John built the house*), whereas in an atelic predicate, entails an arbitrary end, i.e., an event that has terminated (e.g, *John played basketball*).

The interaction of grammatical aspect and lexical aspect has been the center of much interest in the field of language acquisition—both, first and second language acquisition—because it stands at the interface between the lexicon and the grammar. Therefore, it provides researchers with information in the manner which semantic meaning assists on the acquisition of grammatical categories. The ability to distinguish between the aspectual classes, and to talk about time is of vital importance. Research on the acquisition of aspect has shown that children begin producing aspectual morphology as early as 2;6 years of age, and that they restrict grammatical aspect according to lexical aspect. In other words, young children use imperfective morphology with atelic verbs, and perfective morphology with telic verbs. Thus, young learners of English, for example, produce forms like *playing* and *running* (atelic + imperfective), and, *made* and *broke* (telic + perfective) in their early sentences, and not *played* and *ran*, or *making* and *breaking*. The distribution of grammatical aspect according to lexical aspect has been reported in several languages, among them, French, Bronckart and Sinclair (1973); Italian, Antinucci and Miller (1976); English, Bloom, Lifter and Hafitz (1980); Portuguese, DeLemos (1981); Japanese, Rispoli (1981); Hebrew, Berman (1983); Polish, Weist et al (1984); Turkish, Aksu-Koc (1988); Mandarin, Li (1990); German, Behrens (1993).

Although studies have shown that children's production of aspectual morphology is acquired at an early age, children's comprehension of aspect, on the other hand, has presented contradictory results as to the age of acquisition of aspectual semantic morphology. Studies in Polish, Weist et al (1984/1991), and in Russian, Stoll (1998), Vinnitskaya and Wexler (2001),

[3] The term 'telic' used to describe a property of telicity, was first introduced by Garey (1957), and it is derived from the Ancient Greek *télos* which means end.

young subjects performed well. Yet, studies in English, Wagner (1997/2002), and in Dutch, van Hout (1998/ in press), young children had difficulties in assessing meaning from form. It appears then, that perfective morphology is acquired at an early age, and in some languages like Polish and Russian, the comprehension of perfective aspectual semantics reflects the production. However in other languages like English and Dutch it does not, that is, the comprehension of aspectual meaning appears to develop at a later age than aspectual morphology.

This article discusses children's acquiring ability of Spanish perfective aspect in production as well as in comprehension. The research questions leading this study are, if children's aspectual semantics of the Perfective develops at a later age than aspectual morphology, what linguistic and cognitive principles are involved to cause the apparent mismatch between comprehension and production? What do children know about Spanish Perfective aspect of telic verbs? What do children need to know to correctly assess Spanish Perfective meaning from form? And finally, is the acquisition of semantic morphology in one language easier to acquire than in another language because its morphology is more readily attainable? And if that is the case, what language particular morphological elements are involved that foster the acquisition of aspectual semantics? According to the findings of this study, I will argue that, although young children are able to produce perfective morphology to describe telic predicates, they lack the semantic knowledge necessary to decode the meaning from the form. Young children rely on strategies such as checking if the direct object totally meted out the event, and reading the agent's intentions. These strategies play a role on the discovery of Spanish semantic meaning.

Section 2 presents how perfective aspect is marked in Spanish. Section 3 describes the experiment and presents the results from the production and comprehension studies on Spanish perfective aspect. Section 4 discusses the results and proposes learnability issues that resulted from the experiment.

2 Background on Spanish Perfective Grammatical Aspect

Grammatical aspect is a concept that expresses the temporal contour of a situation. Perfective grammatical aspect focuses on the initial and final boundaries of an event, and as such, it describes an event as a single whole. Spanish grammatical aspect is expressed through tense. The notions of tense and aspect become at times confused by the fact that many languages have the verb forms include specification of both aspect and tense, Spanish is one of such language. While grammatical aspect expresses the boundaries of a situation, tense informs the receiver of the time line on which a situation occurred, both aspect and tense are fused in the same morpheme and configure the verb-inflectional system of the language. For example, in the sentence *Ana construyó un robot* 'Ana built a robot', the morpheme *–ó* carries within, the temporal line, which is this case is past time, and the aspectual temporal contour –initial and final, indicating that the robot building event was completed. The perfective tenses most commonly used are *Pretérito Indefinido,* simple past, and, *Pretérito Perfecto,* present perfect[4].

Following Vendler's (1957) verb classification, the interaction of Spanish perfective grammatical aspect in the preterite with lexical aspect is as follows:

(1) a. Don Gustavo pensó en ella. (State)
'Don Gustavo thought of her.'

[4] Other tenses in the perfective are the perfects. Past: *pretérito anterior, pretérito pluscuamperfecto.* Futures: *futuro,* and *futuro perfecto.* Conditional: *Potencial.*

b. Liam caminó por el parque. (Activity)
'Liam walked in the park.'

c. Liam tropezó con una piedra. (Achievement)
'Liam stumbled on a rock'

d. Don Gustavo le escribió una carta. (Accomplishment)
'Don Gustavo wrote her a letter.'

The use of the perfective in a sentence that denotes a state as in (1a), expresses that the event came to an end, i.e., the Spanish perfective expresses the endpoint of a stative sentence. The property of the perfective containing the endpoint of a sentence that expresses a state, departs from the norm in Universal Grammar. Prototypically, perfective aspect does not include the endpoint of a stative situation, i.e., in most languages, the use of perfective aspect in states does not indicate that the event reached an end, in that sense, the Spanish perfective departs from the norm and it becomes available in stative situations[5]. In (1b), the combination of perfective aspect with an activity verb phrase, yields an atelic predicate and therefore, a terminated event, i.e., an incomplete event. In (1c), the use of the perfective in an achievement verb phrase focuses on the endpoint of the situation, yielding a telic predicate. Sentence (1d) also describes a telic predicate because it denotes the entailment of completion: when the letter is written, the event is completed. When a perfective tense such as the preterite is used in such predicates, the perfective emphasizes the entailment of completion by presenting the situation as a single whole. This is due to the perfective's ability to mark the initial and final endpoint of a situation that contains a direct object of incremental theme such is 'write a letter.'

3 The Acquisition of Spanish Perfective Aspect

In a study of grammatical aspect, I have tested the production and comprehension of perfective aspect in accomplishment situations of 77 native Spanish children and 15 adults. The production task was based on Bronckart and Sinclair's (1973) experiment and investigates children's distribution of grammatical aspect morphology. This experiment was presented in digital video format in the computer's CD-ROM. Children were presented with a short movie, which they had to describe when the movie was over. Therefore, the selection of grammatical aspect (e.g, perfective or imperfective) was the subject's choice. The goal of the comprehension tasks was to investigate if the presence or absence of the agent and theme (object) plays a role on children's acquisition of semantic meaning. In both comprehension tasks, the subjects were presented with a context, a story that described the context, and a question stated in the perfective relevant to only one of the outcomes of the context. The first comprehension task was also a digital video presentation and it consisted of two events, in which the agents of each event are seen involved in the action of the event. In one of the events, the outcome of the event is completely shown, i.e., the change of the state of the object is shown, in the other event, it is partially shown. The second comprehension task was not presented in digital video format, instead, it consisted of toys and pictures. In this task, the agents were never seen involved in the action of the event, neither were they present in the outcome of the event. The change of state of the object was completely shown to the participants.

[5] Other Romance language in which the perfective is also available for states is French, Smith (1997).

3.1 Experimental Design of the Production Task

Subjects

Fifteen native adult speakers and thirty-three children participated in the study: eleven 3-4 year-olds; eleven 5-6 year-olds; eleven 7-8 year-olds. The adults were tested at their homes, and the children were tested at school and at home in Barcelona, Spain.

Materials

The materials consisted of silent digital video actions presented to the subject in a computer screen that described three telic verbs alternated with three atelic verbs. The three actions that represented telic verbs were: a cow crosses a river, a horse jumps an obstacle bar, and a girl stacks two blocks. The actions that represented the atelic verbs were: a girl rides a scooter, a dog plays with a ball, and a boat sails in the river. The HORSE JUMPS AN OBSTACLE BAR event, for example, described a telic verb phrase and consisted of a hand-guided horse toy that runs towards two obstacles, jumps each one at a time, turns around, and jumps another obstacle. The GIRL RIDES A SCOOTER event described an atelic predicate and consisted of a hand-guided toy that rides a scooter on the background of a park. All the other events were acted out in a similar way on a table that had a background of a park and a small river. Within each event, the actions were repeated, for example, in the jumping event, the horse jumps over three obstacles; in the riding event, the girl rides around making several turns. The objective of having the toys repeat the same action more than once, was to help the children remember the action so they could describe the event more vividly. Each event was filmed individually with a digital camera, imported to a computer where it was copied onto a CD-ROM.

Procedure

Before the experiment was carried out, the subjects were presented with a trial test. The objective of this test was to see if the child was ready for the task, and to help the child to be familiar to what he was going to watch. The child's task, for both the trial test and the actual experiment, was to describe the situation when it was over. In describing the situation, the participant would have to select how he wants to convey the information. The subject has two choices, he can express himself by using perfective morphology or by using imperfective morphology. The children were presented with the actual toys acting out an event, for example a horse playing with a toy, a dog crossing the river, etc., and were asked to describe the event. Once the child was familiar with the procedure, the subject was told the following: we are going to watch a short movie on the computer screen about these toys. I need you to pay a lot of attention, because when the movie is over, you are going to tell me what you saw. Each individual participant was then presented with the movie. At the end of the movie, he or she was told 'tell me'. At that point, the subject described the event. Each participant was tested individually in a quiet place in all six events. The adult participants were presented with the same procedure except for the trial test. The children that did not perform well on the trial test did not take part in the experiment. These were, either children that couldn't communicate very much because of their age (some 2-2;5 yr-olds), or children that were too timid to express themselves.

Results

Tables 1 and 2 represent the percentages of tenses used to describe telic aspectual type situations and atelic aspectual type situations for each age group of children and for adults[6].

[6] As a clarification of some of the abbreviations used on the tables, in Spanish, the imperfect progressive is formed by the auxiliary *estar* in the imperfect form, and a present participle, just like the English be + ing (e.g., *estaba saltando*, 'was jumping'). The imperfect is the simple past but in the imperfective, English does not have this tense (e.g., *saltaba*, 'was jumping'). The term Progressive refers to the present participle,

Table 1. Telic Aspectual Type in %

Age	Preterite	Perfect	Present	Imp. Prog.	Imperfect	Progres.	Pres. Prog	RIs
Adults	**62**	**20**	11	0	4	0	2	0
3-4	**42**	**24**	0	15	6	3	0	6
5-6	**27**	**21**	0	9	18	0	9	15
7-8	**36**	**48**	6	0	6	3	0	0

Table 2. Atelic Aspectual Type in %

Age	Present	Imp. Prog.	Imperfect	Progres.	Pres. Prog	Preterite	Perfect	Pre.Pf.Pro	RIs
Adults	**18**	**9**	**24**	**18**	**18**	6	2	4	0
3-4	**6**	**33**	**21**	**3**	**12**	6	0	0	15
5-6	**3**	**36**	**36**	**9**	**3**	3	0	0	12
7-8	**0**	**45**	**15**	**15**	**0**	0	12	0	6

Adults used perfective tenses, namely, the preterite and the present perfect 82% of the time to describe completed situations, and use imperfective tenses to express incomplete situations 87%, which accounts for the following tenses: the present, the imperfect progressive, the imperfect, the progressive, and the present progressive. The youngest group, the 3-4 yr-olds used perfective tenses 66%, which is above average, but non-target like performance in describing completed situations, however, they performed at the 75% rate in expressing incomplete situations with imperfective tenses, which is considered within target like behavior. The 5-6 yr-olds used the imperfect tense and the imperfect progressive tense 36%, used root infinitives 15%, and only produced perfective tenses 48% when talking about completed situations. These children performed below chance. However, they performed at the 87% ratio when relating incomplete events, which is well within target. The 7-8 year-olds' performance followed the adult's performance, they produced 84% perfective tenses in their description of completed situations, while they used imperfective tenses in incompleted events 75% of the time.

Interpretation of the results of the production task

Adult's results indicate that adults distributed grammatical morphology according to lexical type. Young children followed similar pattern, however, their performance was just below target in the use of perfective tenses in situations that described telic predicates. Children 5-6 overused imperfectives in completed situations. The question arises as to why the 5-6 year-olds overextended the imperfective to express telic situations? A possible explanation is that since the Spanish imperfect tense and the imperfect progressive tenses are used as narratives to describe the past, children at the age of 5-6 are using the tenses as narratives and they don't quite know the entailment of non-completion that the tenses carry. Given the context of the experiment setting, these children decided to tell us a story instead of expressing themselves in a factual mode. Also notice that these children used more root infinitives than the other two groups of children 15% (compare with 6% of the 3-4 yr-olds), which indicates that some of these children did not know what tense to use to describe a completed situation. The oldest

like the English –ing form (e.g., *saltando*, 'jumping'). Present Progressive is the combination of the auxiliary *estar* in the present form, and the present participle, like in English be + ing (e.g., *está saltando* 'is jumping'). RIs refer to root infinitivals. In table 2, the term present perfect progressive represents the auxiliary *haber*, the past participle *estar*, and a present participle; in English have + be and –ing (e.g., *ha estado saltando*, 'has been jumping').

group 7-8 year-olds performed like the adults in their use of perfective tenses in completed events.

Concerning the use of imperfective tenses to describe non-completed events, overall, children performed better than in using perfectives to describe completed situations. This may suggest that when talking about completed events, children have to be aware of the syntactic and semantic realizations of the sentence arguments as for example how the direct object relates to the rest of the sentence and how it measures out the event. In describing incomplete events, children have one less variable to factor out in their semantic calculation, namely, the direct object. A language like Spanish, in which the use of imperfective tenses is not based on pragmatic considerations like in Russian or Polish, children may have an easier time acquiring the semantics of imperfect aspect due to the less number of restrictions upon the use of imperfectives when expressing incomplete events.

3.2 Experimental Design of Comprehension Task I

Subjects
Fifteen adults and forty-four children native speakers of Spanish participated in the study. The 3-4 year-old group consisted of 14 subjects, the 5-6 year-old consited of 17 subjects, and the 7-8 year-old was made of 13 subjects. The adults were tested at their homes, and the children were tested at school at two locations, Barcelona and Zaragoza, Spain.

Procedure and Materials
The participant child was first tested in a trial test. The objective of the trial test is to help the child become familiar with the experimental procedure to assure his cooperation in the real test. Both, the trial test and the actual experiment, consisted of a story that describes a situation and a question in the perfective presented at the end of the story. The child's task, for both trial and experiment, is to match the question with the completed event. The trial test introduces the participant to characters involved in actions that described telic predicates plus an adjective that emphasizes the entailment of completion, e.g., fill an entire bucket, write a whole letter. The trial test was presented to the subject in picture format instead of digital video. For example, the subject is told that we are going to play a guessing game, and at the end of the game, he is going to answer a question. The subject is then introduced to two characters, one of them is filling a bucket with water. In the next picture set, the participant is presented with a picture of two buckets, one completely full and the other half full. Then the other character says, 'Billy said that he filled the entire bucket of water', the participant is then asked, can you tell me which bucket Billy filled? The subjects that did not pass the trial tests, or had difficulties understanding the procedure did not take part in the experiment, most of these children belonged to the youngest group.

After the trial test, each participant was introduced to the experiment. The experiment consisted of a context, a story that describes the context, and a who-question presented to the subject at the end of the story. The experiment was shown in digital video format in a computer CD-ROM. The conditions of the experiment were one lexical aspect type—telic, and one grammatical aspect type—perfective, carried by the preterite tense. The two telic verbs used in the task were, *pintar* 'paint' and *construir* 'build'. The events describing the telic verbs were: PAINT THE WALL, and BUILD A ROBOT. For each event, the participants had to select between an ongoing situation and a completed situation. The PAINT THE WALL event presents two children, each painting a wall. As the story is told, the movie shows both children at the ongoing event of painting, i.e., the participant sees both children painting each a wall with a paint roller-brush. Then, as the story ends and before the question 'who painted the wall?' is asked, the screen splits and shows one child ongoing (still painting

the wall), and the other stopped (done painting the wall) showing to the camera the paint roller, indicating that he has finished painting the wall. The background for the boy who is still painting the wall continues to be the same color, whereas the background for the boy who has finished painting the wall, has changed color and contains some decorative stars. In either case, the object of the event—the walls, are not seen in their entirety. In the ongoing event, the movie shows only the part that it is being painted. In the completed event, only the part behind the standing boy is shown. In other words, when the story ends and the question is asked, the participants cannot see the full outcome of the completed event—the whole painted wall.

The following story was used in the painting event:

> *Estos niños tienen que hacer un trabajo bien grande. Cada uno de ellos tiene que pintar una pared. Ves, cada uno está trabajando. Ya llevan un rato trabajando. ¿Quién pintó la pared?*
>
> 'These boys have a big job to do. Each one has to paint a wall. See, each one is working. They have been working for a while now. Who painted the wall?'
>
> Answer: the boy who holds the paint roller to the camera and is not longer painting.

The BUILD A ROBOT event shows two children building a robot each. Both children have pieces of the robot on the table. As the story is told, one of the children finishes the robot and shows the finished robot to the camera, while the other child continues building the robot. In this event, the objects—both robots—are shown in their entirety, i.e., when the story ends and the question is asked, participants see the entire built robot, and the entire ongoing building robot. The following story was used in the building event:

> *A estos chicos les gusta hacer robots. Cada uno quiere hacer un robot. Ves, éste tiene piezas en la mesa, y éste otro también. Ya llevan un rato trabajando. ¿Quién construyó el robot?*
>
> 'These boys like to make robots. Each one wants to build a robot. See, this one has some pieces on the table, and this one too. They have been working for a while. Who built the robot?
>
> Answer: the boy who shows the finished robot.

The events that describe the telic predicates PAINT THE WALL, and, BUILD A ROBOT were alternated with atelic predicates, i.e., one telic predicate was not followed by another telic predicate, but by an atelic predicate. Since this study only reports on the acquisition of the perfective in telic predicates, atelic predicates will not be discussed in this article.

Results

The results for both events are presented in percentages in the table below. Event 1 refers to the painting event. Recall that in this event, the agent is seen engaged in painting the wall, but the full change of the state of the object is not completely shown in neither case, the ongoing situation, nor the completed situation. Event 2 refers to the bulding event. In this event the agent is also seen engaged in building the robot, and the change of state of the object is shown in both situations, the ongoing and the completed situation.

Comprehension I

Table 3. Results of Telic-Perfective in %
Selection between Completed/Ongoing

Age	Event 1'paint'	Event 2 'build'
Adults	100	100
3-4	36	64
5-6	35	94
7-8	69	92

In the painting event, while adults scored 100%, children aged 3-4 and 5-6 performed very poorly. It appears then that checking if the object sizes up the event as a whole, plays a role in children's assessment of a completed situation. Clearly, adults did not use the same strategy as the children. Adults know that the Spanish perfective morpheme *–ó* entails the completion of the event. Therefore when selecting between completed/ongoing, they understand that the entailment of completion is represented by the painter who is holding the roller to the camera and has stopped painting because he is done, and not the painter who is still painting. The young children on the other hand, in order to validate a completed event, they needed to assess the full change of state of the object, and since that was not available they made the wrong selection. Now compare event 1 with event 2, the building robot event. In this event the change of state of the object is clearly observable. Here, adults scored 100%, the youngest group performed almost target-like behavior 64%, and the 5-6 and 7-8 year-olds performed like adults. Clearly, the ability to assess the change of state of the object played a role on the strategy of learning which robot building event was completed.

3.3 Experimental Design of Comprehension Task II

We have seen that the ability to evaluate the full change of the state of the object in a completed event is strategically important in the acquisition of aspectual information. The goal of the second comprehension test was to examine if the involvement of the agent in the event or its presence in the outcome of the event could also play a learnability role on the acquisition of the semantics of perfective aspect.

Participants
The same children subjects that participated in comprehension task I, also participated in comprehension task II. However, the adult results were drawn from a different group than the group from comprehension I.

Procedure and Materials
The conditions of this experiment were the same as the conditions for comprehension I: one lexical aspect type—telic, and one grammatical aspect type—perfective. The preterite tense was used as the perfective tense. However, in this experiment participants had to select between an incomplete/completed situation instead of an ongoing/completed situation of comprehension I. The two telic verbs used in the task in the perfective were, *construir* 'build' and *hacer* 'make. The events describing the telic verbs in the perfective were BUILD A SCHOOL TOWER, and MAKE A DOOR, which were alternated with telic predicates in imperfective aspect, but since this article reports on the acquisition of perfective aspect, the telic predicates in the imperfective will not be commented upon.

This experiment consisted of a story that describes a situation and a which-question stated in the perfective at the end of the story. The child's task is to match the question with the

completed event. The experiment was not shown in digital video format, instead toys and pictures were used, the pictures were presented in the computer screen.

After the participants were explained the procedure, they were introduced to four animal characters that want to build a school. Each animal wants to take part in building the school, so each one selects what he wants to do (e.g., the cow wants to draw the plans of the school, the sheep wants to build the school tower, the horse wants to paint the walls, the pig wants to make the door). At the end of the story each animal says in an I-statement what he did (e.g., I built the school tower). At that point, the subject is presented with a picture that contains a completed outcome (e.g., a tower that has been finished), and an incomplete outcome, (e.g., a tower that is half built). Then, the participant is asked a which-question that leads him to select one of the outcomes presented in the picture. For example, when the sheep says *I built the school tower*, the subject was presented with the picture that contains both outcomes and was asked *which tower is the sheep talking about?* Each animal with it's I-statement, the outcome picture, and the question, is introduced in turn. The animals in the story were never seen engaged in constructing any part of the school, i.e., they only talk about it. When the story ends and the picture of the outcome is introduced, the characters of the story are not standing next to the object they said they built. In other words, the participants are not led in their decision by reading the intentions of the agent, either as the situation develops or in the final outcome. The example below is the story used in the experiment:

> *La vaca, la oveja, el caballo, y el cerdo quieren ir al colegio, pero no pueden porque no hay colegios para ellos. Entonces ellos deciden construir un colegio. Cada animal quiere hacer una parte. La vaca decide dibujar los planes del colegio. La oveja decide construir la torre del colegio. El caballo quiere pintar las paredes. Y el cerdo quiere hacer la puerta. La oveja dice: yo construí la torre del colegio.*
>
> *¿Cuál de las dos torres esta hablando la oveja?*

'The cow, the sheep, the horse, and the pig want to go to school, but they can't because there is no school for them. So they decide to build their own school. Each animal wants to do a part. The cow decides to draw the plans of the school. The sheep decides to build the school tower. The horse wants to paint the walls. The pig wants to make the door. The sheep says: I built (PERF.) the tower of the school.'

Which one of the two towers is the sheep talking about?

Results

The following table contains the results of comprehension II. Event 1 refers to the building of the tower event, and event 2 represents the results from making the door event as they are shown on the table.

Comprehension II

Table 4. Results of Telic-Perfective in %

Selection between Completed/Incomplete
Absence of Agent

Age	Event 1 'build'	Event 2 'make'
Adults	100	100
3-4	64	57
5-6	94	82
7-8	100	100

While adults scored 100% in both events, the 3-4 year-olds scored just above chance for both events, performing non-target like behavior. The results in this second comprehensive experiment clearly indicates again that at the age of 3-4, children still have difficulty determining perfective meaning from perfective morphology. Although children aged 5-6 performed within target, they had more difficulty with event 2. This is probably due to the irregular morphology of the verb *hacer* 'do' in the preterite tense, and not to the absence of the agent's involvement. Children 7-8 performed like the adults.

Interpretation of results of comprehension tasks I and II

The adult pattern indicates that when selecting between ongoing/completed situations in which the object's change of state is not fully shown, adults know, by simply paying attention to perfective morphology alone, which event was the completed event, and which one was the ongoing one. That is, adults do not need to check if the object measured out the event as a whole. Young children, however, showed that when perfective morphology is used to talk about completed situations, children do not rely on just the morphology to interpret the situation, but also on their ability to obtain a full account of the object's change of state. During the experimental procedure, some of the children were asked by the experimenter why they had selected the ongoing painter, to what they replied that they had selected the ongoing painter because the other painter had stopped painting. In other words, these children were interpreting a completed event as a terminated event because the object's change of state was not fully observable, and they assumed that the ongoing event had a better chance to be completed because it was still ongoing. It appears that under these circumstances, young children know that perfective morphology marks the entailment of completion, and as such, they are compelled to search for the result that would confirm their ongoing analysis. If their predictions are not matched, they opt for the next possible analysis, which in this particular case led them to the wrong response. This concept of figuring out if the object measures out the event as a complete whole is a learnability factor that plays a role in the acquisition of semantic morphology. In predicting telic predicates and understanding that perfective aspect entails the completion of an event, children need to learn the grammatical relations between object and event, that is, that argument structure and event structure are intrinsically connected. And not only must they consider the arguments' relation, but how those things are represented in the world. The significance of the role of the object as being perceived as the measurer of the event, can be verified by the results obtained from event 2, the robot building event, in which the object's change of state is fully viewed and therefore accounted for. In this event 64 % of children aged 3-4 answered correctly, while children 5-6 performed within target 94% of the time which is significantly higher than their performance in the wall painting event.

In the second comprehension experiment where participants had to select between completed/incomplete, the absence of the agent was not a deterrent for adults in assessing a completed situation from perfective morphology. The 3-4 year-olds performed equally just above chance in both events which is not within target. This is an indicative that while reading the agent's intentions may play a role in assessing the entailment of completion in a telic predicate, the presence of the agent is not as much of a crucial determinant as is the presence of the full view of the change of state of the object as we saw in the previous task. The results of the second comprehension task also show that the different methodologies of both comprehension tasks brought about similar results, which confirms that, young children's difficulty in determining perfective meaning from form is not due to methodology but to learnability and cognitive factors. The results obtained from children aged 5-6 are consistent with the results from comprehension I, event 2, which also indicates that agency cues are not a significant element in interpreting the entailment of completion. Based on the results of both

comprehension tasks, the presence of the object plays an important role in factoring out the entailment of completion. Young children's knowledge of perfective semantic morphology showed to be about the same in both comprehension tasks; their results were just above chance but not within target, either when selecting between completed/incomplete or when selecting from ongoing/completed. Children aged 5-6 understood the semantics of perfective morphology and performed slightly better when they selected from ongoing/completed than between completed/incomplete (if we don't take into consideration the absence of the object in event 1). Children 7-8 year-old performed well in both types of selection.

4 Discussion and Conclusion

This study contributes to the research on children's acquisition of aspect by presenting data on the acquisition of Spanish aspect in production and in comprehension. In summarizing the results of this study, the successful performance on the comprehension of Spanish perfective aspect takes place around the age of 5-6. A finding which, came as a surprise, was that young learners of Spanish, the 3-4 yr-olds, performed non-target like behavior—although they barely fell short of coming within target—in comprehension as well as in production. Another surprising result was the production results of the 5-6 year-olds. Children aged 5-6 also fell below target on the distribution of perfective morphology according to lexical type, recall that they overextended imperfective tense when talking about completed situations.

Studies on the acquisition of the semantics of Polish and Russian, children showed knowledge of aspectual entailments at an early age, around the age of 2;6, which is significantly younger than the successful performance of the learners of Spanish. Why learners of Spanish didn't perform like the Polish or Russian learners? Studies in English, and in Dutch have also shown children's acquisition of the semantics of the language at a later age than 2;6. Then one may ask, why is there such an age discrepancy on the acquisition of aspectual meaning? Could it be that the encoding of aspectual information is more readily accessible in one language than another? van Hout (in press) has proposed that the acquisition of telicity appears to be easier in languages that mark the entailment of completion on the verb itself, such is the case of Slavic languages (Russian, Polish) in which perfective aspect is marked as a prefix on the verb, than in languages that telicity is marked by the combination of the properties of the verb and its object, as in the case of Germanic languages and Finnish. Spanish is also a language where the entailment of completion is obtained from the properties of the verb and its arguments, in particular its direct object. van Hout distinguishes between what she calls predicate telicity and compositional telicity. Languages like Russian and Polish have predicate telicity in which the entailment of completion is calculated by the verb + affix, whereas, languages like English and Dutch have compositional telicity in which the completion of the event is computed based on the joint properties of the verb + object.

The data presented in this study suggests that the arguments of the verb, particularly the direct object, play a significant role on learning the entailment of completion carried by perfective morphology. The presence of the agent may play a small role in acquiring aspectual meaning, however the data shows that it was not as a strong of an indicator as was the presence of the full change of state of the direct object. In order to understand the entailments of completion of Spanish perfective aspect, young children must calculate the compositional properties of the verb phrase, which includes the quantized reference of the noun phrase (the direct object), the morphology on the verb, which marks perfective aspect and past tense at the same time, and, must confirm that their ongoing analysis matches the results obtained in the direct object. The data shows that when young children cannot confirm their ongoing analysis, they get confused and give the wrong answer. A possible explanation to the late attainment of

aspectual meaning may rest upon figuring out how the outcome of the direct object affects the total result in the semantic equation. It appears that it is through the mechanism of checking local cues that children may master the conceptual domain of aspect, in particular perfective meaning. It is not clear at this point that the learning of aspectual meaning in Slavic languages may require the same learnability procedure as the one presented here, at any rate, it should be considered, for it may bring forth an explanation to the age discrepancy in the acquisition of semantic morphology.

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What particle verbs have to do with grammatical aspect in early child English*

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Abstract

The current study investigates the relation between aspect and particle verbs in the acquisition of English. Its purpose is to determine whether children associate telicity, as argued in previous studies, or rather perfectivity, which entails completion of a telic situation, with their early particle verb use. The study analyzes naturalistic data of four monolingual children between 1;6 and 3;8 from CHILDES acquiring English as their first language. On the one hand, it finds that children use both *–ed* and irregular perfective morphology with simplex verbs before particle verbs. They further use imperfective before perfective morphology with particle verbs. These findings suggest that there is no correlation between telic particle verbs and perfective morphology, as would have been predicted on an account which claims that lexical aspect of predicates guides the acquisition of grammatical aspect (Olsen & Weinberg 1999). On the other hand, the study finds that the children's particle verbs denote telic situations from early on, but not half of them were used to refer to situations that are also completed. This finding questions analyses which claim that, at an initial stage, children will only interpret predicates as telic if they refer to situations that are at the same time completed. Completion information is not necessary for children in order to use particle verbs correctly for telic situations, as would have been predicted on an extended account along the lines of Wagner (2001). As a conclusion, it is suggested that the divergent findings result from a difference in methodology. While restrictions of perfective and imperfective morphology to particular classes of lexical aspect pertain to the production of grammatical aspect morphology, perfective and imperfective viewpoints on situations pertain to the level of interpretation of telic and atelic situations.

1 Aspectual systems

The present paper re-emphasizes the need to distinguish between the two levels of aspect suggested in the literature in analyses of its acquisition. Lexical aspect, on the one hand, refers to what has traditionally been termed "Aktionsart", but also "inherent meaning of situations" (Comrie 1976), "aspectual class" (Dowty 1979), "situation aspect" (Smith 1991), "lexical contents" (Klein 1992, 1994) and "eventuality type" (Filip 1999). In the acquisition literature, it has often been called "lexical aspect" or "inherent lexical aspect" (Shirai & Andersen 1995, Andersen & Shirai 1996; Olsen & Weinberg 1999; Li & Shirai 2000 among others). Lexical aspect is determined by the inherent temporal properties of situations. It has been described in terms of Vendler's (1967) classification into "state", "activity", "accomplishment", "achievement" and other categories added to it or in terms of the inherent temporal features that such a classification is based on, like static vs. dynamic, punctual vs. durative, telic vs.

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atelic. Telicity is the property of situations of having an internal bound. Expressions denoting telic situations correspond to *2-state contents* in Klein's (1992, 1994) terminology. 2-state contents consist of a *source state* and a *target state.* In the case of, for example, the situation of closing a door, the source state corresponds to the process of pushing or pulling the door that leads up to the target state of the door being closed. The contrast of the door not being closed and being closed is already contained in the lexical content of the expression *close the door*. As aspect is commonly assumed to be compositional in nature (cf. Verkuyl 1972, 1993; Comrie, 1976; Smith 1991; Klein 1992, 1994 among others), lexical aspect is not only expressed by the verb itself, but by the verb and its arguments.

Grammatical aspect, on the other hand, refers to what has been termed "aspect" per se (e.g. Comrie 1976; Klein 1992, 1994; Filip 1999), "aspectual form" (Dowty 1979) and "viewpoint aspect" (Smith 1991). In the acquisition literature, it has frequently been called "grammatical aspect" (Shirai & Andersen 1995, Andersen & Shirai 1996; Olsen & Weinberg 1999; Li & Shirai 2000; Wagner 2001 among others). Grammatical aspect specifies the perspective from which a situation is presented. Klein defines this level of aspect as "ways to relate the time of a situation to the topic time" (1994: 99). Situation time (TSit) here refers to the time for which a situation holds, while topic time (TT) refers to the time for which an assertion is made. TSit and TT can basically relate in the following ways: In the *imperfective*, "TSit is interpreted as fully including TT" (Klein 1994: 99), which is why the imperfective is perceived as viewing a situation from inside. In the *perfective*, "TSit is interpreted as partly including TT" (Klein 1994: 100), which is why the perfective gives the impression that it looks at a situation from outside. Here TSit can be fully included in TT. TT can overlap TSit and the pretime of TSit, i.e. the time before the time for which a given situation holds. It can also overlap TSit and the posttime of TSit, i.e. the time after the time for which a given situation holds. In the *perfect* and the *prospective*, "TSit is interpreted as excluding TT" (Klein 1994: 100). This means that, in the case of the perfect, TT is included in the posttime of TSit, while, in the case of the prospective, it is included in the pretime of TSit. These different viewpoints are variously marked by grammatical morphology and adverbials throughout the world's languages. Of the various ways in which lexical and grammatical aspect interact cross-linguistically (cf. Comrie 1976; Smith 1991; also Brinton 1988 for English), I will concentrate on the relationship between telicity and perfectivity in English in the following section.

2 The English aspectual system

In English, telicity as instantiation of lexical aspect can be expressed by simplex verbs with inherently telic semantics, like *die* or *arrive.* On the other hand, telicity in English has been shown to be expressed compositionally by the verb and its NP and PP arguments (cf. Verkuyl 1972, 1993; Dowty 1979; Tenny 1994; Brinton 1988 among others). Thus, transitive verbs with bounded NP complements, such as *sing a song*, *sing the song*, *sing two songs*, are telic, as are verbs of motion with goal PP arguments and directional adverbials, such as *run to the store* and *run home.* Finally, particle verbs, as in *eat up the sausage* and *drink up the beer*, are telic (cf. § 3 below for discussion).

Grammatical aspect, is conveyed by the following morphology in English (Klein 1992: 113): Imperfective aspect, which expresses that TSit fully includes TT, is marked by the *–ing* form (Progressive Aspect), as in *opening* and *writing*. Perfective aspect, which in English can mean that TSit is fully included in TT or that TT overlaps TSit and the posttime of TSit (Klein 1994: 103), is marked by the simple form, as in *opened* and *wrote.* Perfect aspect, which expresses that TT is included in the posttime of TSit, is marked by the English Perfect form, as in *opened* and *written*. Prospective aspect, which means that TT is included in the pretime

of TSit, is expressed by *be going to*, as in *be going to open* and *be going to write*. Note that an atelic predicate in the perfective, as in *Petra ran*, denotes that some arbitrary endpoint has been reached, since the topic time fully includes the time of the situation of Petra's running, in the present case, or overlaps the time of running and its posttime of not running. A telic predicate or 2-state content in the perfective, as in *Martin closed the office door*, is interpreted as having reached the inherent bound of the given situation and, therefore, seen as completed. As the bound is internal to telic predicates or 2-state contents, both the time of e.g. the action of pushing or pulling the door toward its closed position and the time of the door being closed are fully or partly included in the topic time. Here the time of the source state or process corresponds to TSit and the time of the target state of the door being closed corresponds to the posttime of the source state or process leading up to it. Hence, either the times of both source and target state are fully included in TT or TT overlaps source and target state.

Note further that the property of having an inherent goal or endpoint does not necessarily entail the attainment of that goal or endpoint. The property of having an inherent bound is an instance of lexical aspect and can be attributed to the internal temporal structure of telic predicates or 2-state contents, such as *arrive*, as they consist of a source state, here the approaching of the destination, and a target state, here the being at the destination. The attainment of the inherent bound is only entailed by perfective aspect, as an instance of grammatical aspect, since both the time of the source state and the time of the target state are fully included in TT or TT overlaps the time of the source state and the time of the target state, as in *The train arrived*. Imperfective aspect, on the other hand, does not entail the attainment of the target state in examples like *The train was arriving*, as TT is fully included in TSit and TSit again corresponds to the source state or process of approaching the destination. Thus, the target state of finally being at the destination may have been reached or it may not have been because something unexpected happened shortly before the train's anticipated arrival, say an axle broke. The Imperfective Paradox, as the phenomenon has been called (cf. Dowty 1979: 133), can also be observed with particle verbs, which shows that they are telic in nature.

3 Particle verbs and aspect

A semantic problem in the treatment of particle verbs is that they can carry spatial, idiomatic and aspectual meaning. The latter has been attributed to lexical aspect by some researchers and to grammatical aspect by others (see Brinton 1985, 1988 for an overview). Brinton (1985) argues in detail that particle verbs express telicity, not perfectivity. As they determine the lexical aspect of the events they refer to, they are nevertheless compatible with grammatical aspect morphology: the imperfective (cf. 1a), the perfective (cf. 1b) and the perfect (cf. 1c).

(1) a. She was eating up the ice-cream.
b. She ate up the ice-cream.
c. She has eaten up the ice-cream.

Moreover, Brinton argues that it is the particle itself that "may add the concept of a goal or an endpoint to durative situations which otherwise have no necessary terminus" (1985: 160). For example, the event denoted by the simplex verb *eat* does not have any internal boundary, while *eat up* denotes an event that includes the inherent goal or endpoint of total consumption of the thing to be eaten, e.g. the ice-cream.

Drawing on Dowty (1979), Brinton (1985: 162ff.) cites a series of tests to support the telicity analysis. First, particle verbs can appear with the construction *take X time to* (cf. 2) and can be modified by time adverbials with *in* (cf. 3).

(2) It *took* her *months to* write up the paper.

(3) She wrote up the paper *in a night*.

Second, particle verbs used with the matrix verb *finish* entail that the inherent bound has been reached (cf. 4). When used with *stop*, however, they do not (cf. 5). This pattern emerges because the particle verbs are telic in the first place.

(4) She *finished* carrying out the experiment. = She carried out the experiment.

(5) She *stopped* carrying out the experiment (before it was finished).

As a third indication of the telicity involved, particle verbs modified by the adverb *almost* have ambiguous interpretations (cf. 6). On the one hand, they may entail that the event took place, but did not reach its inherent goal. On the other hand, they may entail that the event in question was about to start, but did not take place at all.

(6) She *almost* carried out the experiment.

Taken together, these tests provide evidence that, beside the lexical content itself, an inherent temporal property of lexical contents of particle verbs, like *drink up*, is that they have an internal bound. On an account along the lines of Klein (1992, 1994), the internal bound stems from the contrast between the source state of drinking and the target state of the glass or bottle being empty, in this case.

Finally, telicity interacts with grammatical aspect, when particle verbs occur with imperfective and perfective morphology. In the imperfective in (7a), TT is fully included in the source state or process of doing the experiment. Therefore, the sentence does not entail completion of the experiment.

(7) a. She was *carrying out* the experiment (but fell seriously ill before she was able to finish it).

b. She *carried out* the experiment.

The perfective in (7b), however, denotes the attainment of the goal of the experiment being finished, as TT fully or partly overlaps both source and target state.

4 Acquisition of tense and aspect

Researchers in first language acquisition have long known and often described that children across a wide variety of languages initially restrict their verbal morphology according to the aspectual construal of the events denoted by the predicates. Among the first to notice such a restriction were Brown (1973) for naturalistic English data, Bronckart & Sinclair (1973) for elicited French data, Antinucci & Miller (1976) for naturalistic Italian and English data and Bloom et al. (1980) for naturalistic English data. Thus, children acquiring English as their first language initially limit their use of past tense and progressive *-ing* to the description of particular events in a very regular fashion. Despite some divergent analyses of the details, the common finding is that the morpheme *–ed* and irregular past morphology are initially

restricted to events having an inherent bound and/or a result, while the progressive morpheme *–ing* is initially restricted to durative events.

Shirai & Andersen (1995) and Andersen & Shirai (1996) call this phenomenon the "Aspect Hypothesis" or "Primacy of Aspect" (POA) hypothesis and define it as the "phenomenon of limiting a tense-aspect marker to a restricted class of verbs, according to the inherent aspect of the verb" (1996: 529). This definition pertains to a descriptive level of analysis of children's linguistic performance in spontaneous and elicited production contexts more than it is meant to explain the reported findings. The authors find that English past morphology is restricted to predicates denoting events that are telic, punctual and resultative at the emergent stage. They further claim that progressive *–ing* is initially restricted to activity verbs and "iterative achievement verbs", that is, verbs that denote durative events. The initial restrictions are later relaxed to include other situation types. On the basis of these findings, the authors argue that it is inherent lexical aspect that guides the initial restriction of verbal morphology. However, resultativity is itself entailed by a perfective viewpoint on a telic event, rather than by lexical aspect per se. Moreover, their class of "iterative achievement verbs" does not necessarily constitute a natural class of lexical aspect. Instead, iterativity here appears to be the result of an imperfective viewpoint on punctual events, resulting in a series of repeated actions, which in turn is marked by *–ing* itself. For example, *jumping* was classified as "iterative achievement verb" (Shirai & Andersen 1995: 754f.). Yet the verb *jump* itself is punctual and denotes a singular event; it only becomes iterative by virtue of the progressive morpheme *–ing*.

The author's explanation of the reported findings is based on a prototype account of acquisition, according to which the prototype of a particular category is acquired first and less prototypical members emerge only later. Thus, they argue that achievements, which are telic and punctual, constitute the prototype of the category past tense, while activities, which are durative and atelic, constitute the prototype of the category progressive. The past and progressive inflections, in this sense, attach to the verbs whose meaning they are most "congruent" with (Andersen & Shirai 1996: 554). The explanation in terms of prototypes and "congruence" between lexical aspect of predicates and grammatical aspect and tense morphology still leaves open an answer to the question in what direction the initial restriction works. Shirai & Andersen (1995: 759) hypothesize that children might initially encode either lexical or grammatical aspect. Yet implications differ considerably for the two. If children choose to attach inflectional morphology only to a particular set of predicates according to their lexical aspect, tense and grammatical aspect will initially be underextended. If they encode the lexical aspect of predicates in their use of inflectional morphology, their grammatical aspect marking will be redundant with lexical aspect. Thus, the question remains: what kind of information do children use primarily when acquiring the aspectual systems of their native languages – lexical or grammatical aspect?

Olsen & Weinberg (1999) suggest that, at an early stage of development, children use lexical aspect information to acquire grammatical aspect. Their classification of lexical aspect is based on the features "telic", "dynamic" and "durative", which can be "+" or "0" (unmarked). In their analysis of the distribution of verbal morphology in English, they find that *–ed* and its irregular counterpart are initially restricted to [+telic] predicates, while *–ing* is initially restricted to [+dynamic] and [+durative] predicates. On the other hand, predicates that are [+telic] occur with both *–ed* and *–ing*, since they are at the same time [+dynamic]. Olsen & Weinberg suggest an explanation for their findings in terms of universal and innate principles that govern the relationship between lexical aspect and grammatical aspect in the process of their acquisition as well as in cross-linguistic variation. On this account, the initial stage for children is the most restrictive version and, hence, forms a subset of the aspectual system in languages that are less restrictive, like English. In subsequent stages of development, the

subset is relaxed to include predicates unmarked for the respective features upon encounter of positive evidence. As a result, Olsen & Weinberg clearly propose that it is lexical aspect that guides the acquisition of grammatical aspect.

Wagner (2001) studied the validity of what she calls the "Aspect First hypothesis" for children's comprehension of verbal morphology. She found that children correctly recognized verbal morphology as marked by a form of the copula *be* plus progressive *-ing* if temporal ordering of events coincided with grammatical aspect. Thus, children correctly referred to past-time events when the past tense was used, to present-time events when the present tense was used and to future-time events when the future tense was used. At the same time, the past-time events were also completed, while the present-time events were incomplete. Wagner concludes that completion entailments may have influenced their performance, but the children were able to differentiate all three tenses, even the group of two-year olds, the youngest age group tested. These findings contradict a hypothesis as general as "Aspect First". On the other hand, Wagner studied children's comprehension of verbal morphology (again as marked by a form of the copula *be* plus progressive *–ing*) in a setting where temporal ordering of events did not coincide with grammatical aspect in the form of completion information. She found that the group of two-year old children were only able to distinguish between past and present tense, when temporal ordering of events coincided with grammatical aspect: past tense with completed events and present tense with incomplete events. The three-year olds and four-year olds tested were able to distinguish between past and present tense both when events were completed and when they were incomplete, although all groups of children performed worse when past-time events were incomplete. These results apparently support the "Aspect First Hypothesis". However, what the results have shown and Wagner suggests is a more specific version of the primacy-of-aspect hypothesis, namely primacy of grammatical aspect.

5 Acquisition of aspect and particle verbs

The present study addresses the issue of primacy of lexical or grammatical aspect with regard to the acquisition of particle verbs in English. Children's exceptional treatment of particle verbs has been shown to stand out among the aspectual systems of several Germanic languages. In particular, it is argued to relate to the acquisition of telicity. Van Hout (1998 a, b, 2001) tested three-, four- and five-year old children acquiring English and Dutch as their first language on their aspectual interpretation of the particle verbs *eat up* and *drink up* and intransitive and transitive structures involving the simplex verbs *eat* and *drink*. She found that, from the beginning, children distinguished sentences with particle verbs from all other structures, including intransitive *eat* and *drink*, transitive verbs with bare NP complements, such as *eat cheese* and *drink coke*, and transitive verbs with bounded NP complements, such as *eat his/her cheese* and *drink his/her coke*. Children attributed telic readings to particle verbs more often than to all other structures, regardless whether these are interpreted as telic or not by adult speakers of the target language.

Schulz & Penner (2002) tested children between the ages of 4;1 and 6;4 acquiring German as their first language on their understanding of the particle verbs *aufessen* ('eat up') and *austrinken* ('drink up'), in a parallel fashion to van Hout's study. They found that both children and adults accepted the telic particle verbs to refer to completed situations, but rejected them in case of incomplete situations. Both groups also accepted the atelic intransitive simplex verbs *essen* ('eat') and *trinken* ('drink') to refer to both completed and incomplete situations. Further, both groups behaved alike in accepting telic structures involving a simplex verb with a quantized NP complement, like *den Apfel essen* ('eat the

apple'), to refer to completed situations, while accepting these structures for half of the incomplete situations and rejecting them for the other half. Thus, children performed in an adult-like manner on all verb types tested. Both children and adults treated the verbs with quantized NP complements ambiguously, while they unambiguously allowed particle verbs only to refer to completed situations. Schulz & Penner conclude that particle verbs are strong markers of telicity and as such fully mastered by the children in this study.

Schulz et al. (2001, 2002) and Penner et al. (2003) also tested normally-developing children between 2;00 and 4;10 acquiring German as well as language-impaired children between 3;10 and 8;07 and an adult control group on their understanding of the telicity entailment of the particle verb *aufmachen* ('to open'). They found that all groups accepted the particle verb to refer to situations where the end-state of a container opened is reached. The normally developing children also rejected it for the majority of situations where the endstate of *aufmachen* is not reached, as did the adult native speakers. The authors conclude that normally developing children have acquired the end-state-orientation of the particle verb *aufmachen* as early as at the age of two. In sum, particle verbs stand out as a robust phenomenon among all other telic structures for adults as well as for normally developing children as young as two years of age.

The authors of all of the above studies argue that children, by their performance in the experiments, show knowledge of telicity as associated with particle verbs, i.e. they know that particle verbs have an inherent goal or endpoint. Yet the situations presented to them in all of the studies differed as to whether the situations were completed or not. Thus, telicity of the predicates in question coincided with a perfective viewpoint, which entails the completion of the inherent goal or endpoint of the situations presented visually. For example, the apple was eaten up or the container was opened. Moreover, the trigger sentences used either perfective or perfect aspect as expressed by the Simple Past in English, the Present Perfect in Dutch and the Perfect in German. For example, van Hout asked her subjects:

(8) Heeft de rode/witte muis zijn kaasje opgegeten? (van Hout 1998a: 402)
Did the red/white mouse eat up his cheese?

Schulz, Penner and colleagues asked:

(9) Hat das Mädchen ausgetrunken? (Schulz & Penner 2002: 243)
has the girl UP.drunk-part
'Did the girl drink up?'

and

(10) Hat siese aufgemacht? (Schulz et al. 2001: 412)
has she-her.CL AUF-made.PART
'Did she open it?'

These facts give the impression that children in their use of particle verbs also encode perfectivity rather than telicity alone. If this is so, it will support Wagner's (2001) hypothesis that grammatical aspect information has primacy in the acquisition of tense-aspect systems.

The obvious questions to be addressed now are: What kind of aspectual information do children map onto their early particle verbs: telicity or perfectivity? What do children initially encode: lexical aspect or grammatical aspect? In answer to these questions, two logical possibilities emerge. (I) If they initially use lexical aspect information, children will map telicity onto their particle verbs from early on. They will initially restrict their perfective morphology to telic predicates, where perfectivity entails completion, i.e. attainment of the

inherent bound of the situation. They will initially not use perfective morphology with atelic predicates, where perfectivity denotes termination, i.e. attainment of an arbitrary endpoint. This reasoning is in line with Olsen & Weinberg (1999). Predictions for the acquisition of particle verbs that follow from this possibility and Olsen & Weinberg's hypothesis are: (Ia) Perfective morphology will be used with particle verbs before simplex verbs, as particle verbs are telic. (Ib) Particle verbs will be used with perfective morphology before imperfective morphology. (II) If they initially use grammatical aspect information, children will map perfectivity onto their early particle verbs. They will only recognize predicates as telic when the situations they refer to are also completed, i.e. the inherent bound is reached. Children will initially interpret particle verbs as encoding completion rather than telicity itself. This is an extended version of Wagner (2001). Predictions that follow from it are: (IIa) Perfective morphology will be used with simplex verbs before particle verbs. (IIb) Particle verbs will not be used with perfective morphology before imperfective morphology, if they entail completion themselves.

6 The Study

The analysis is based on longitudinal data of four monolingual children from CHILDES acquiring English as their first language (cf. table 1), which were drawn from the ReVerb Database, as was the coding of the data (cf. Israel 2001).

Table 1. Data comprising the study

Child	Age	MLU	Corpus
Eve	1;6 – 2;3	1.5 – 3.4	Brown (1973)
Naomi	1;6 – 3;8	1.2 – 3.9	Sachs (1983)
Peter	1;9 – 2;7	1.2 – 3.6	Bloom (1975)
Nina	1;11 – 2;10	1.8 – 3.4	Suppes (1973)

The four children were chosen to ensure that the data covered the onset of inflectional morphology and data were available from before age 2;0 (MLU stage I). The organization of the data into developmental stages follows Brown (1973: 56), cf. table 2:

Table 2. Stages by MLU

Stage	MLU
I	< 2.0
II	2.0 < 2.5
III	2.5 < 3.0
IV	3.0 < 3.5

Following Brown (1973: 58), stage I includes all utterances between MLU 1.0 and 2.0. Contrary to Brown, however, the MLUs of all stages differ by 0.5 in order to ensure that the same amount of data were available for analysis across developmental stages for all children and to maintain comparability of the data from the four children in terms of MLU at all stages. The MLUs of the children were calculated by use of the CLAN tool mlu (MacWhinney 1995). The analysis includes all non-imitative utterances with a particle verb and, for the purpose of comparison, also all utterances with a simplex verb in a finite context.

7 Results

Figure 1 shows the children's use of inflectional morphology with particle verbs, and figure 2 with simplex verbs.

Figure 1. Morphology with particle verbs

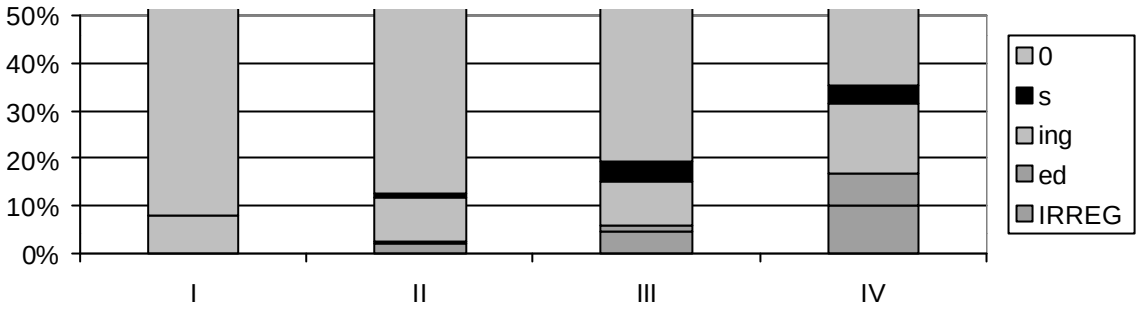
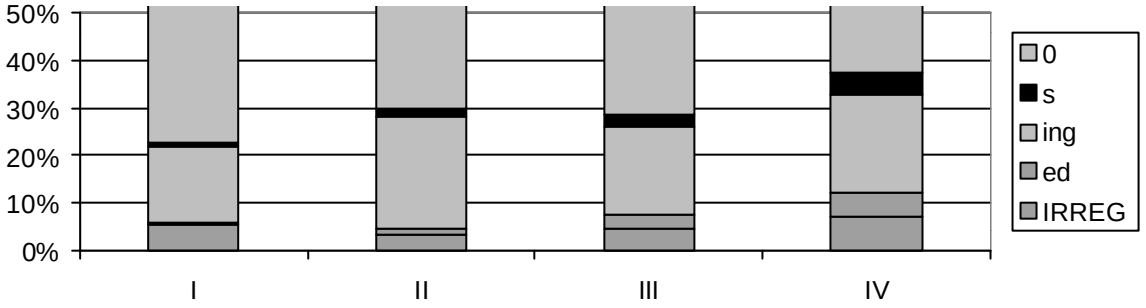


Figure 2. Morphology with simplex verbs



The figures reveal that, first, throughout development up to stage III, particle verbs are inflected less frequently than simplex verbs. Inflection of particle verbs only catches up at stage IV, the last stage investigated here. Second, all children produce perfective morphology with simplex verbs before particle verbs. More precisely, perfective aspect emerges with simplex verbs as early as at stage I, but with particle verbs only at stage II. Third, both the morpheme *–ed* and irregular perfective morphology emerge at the same time: at stage I with simplex verbs and at stage II with particle verbs. Irregular perfective morphology is not produced earlier than *–ed*, neither on particle verbs nor on simplex verbs. Fourth, imperfective *–ing* is produced as early as at stage I both with particle verbs and with simplex verbs. Thus, imperfective aspect emerges earlier than perfective aspect with particle verbs, whereas both emerge at the same stage with simplex verbs.

In order to see whether there is variation between the children in their use of aspectual morphology with particle verbs, figures 3 and 4 show the proportion of particle verbs used with perfective and imperfective inflection respectively.[1]

[1] For Nina, data start only at stage II.

Figure 3. Perfective morphology with particle verbs

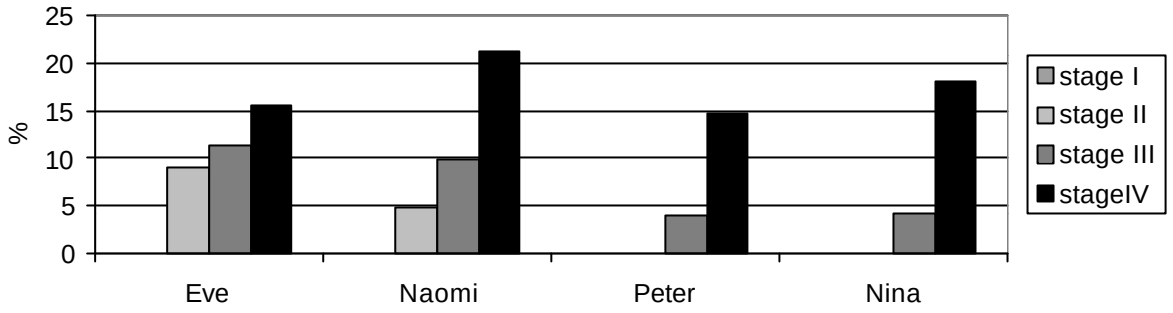
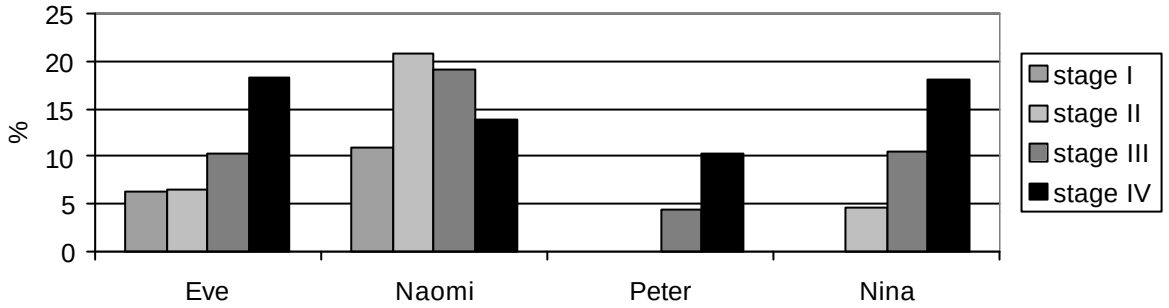


Figure 4. Imperfective morphology with particle verbs



The individual results mirror the overall pattern observed in figure 1. All children use imperfective morphology before they use perfective morphology with particle verbs, except for Peter, who starts to use both at the same stage. Eve and Naomi first produce particle verbs with imperfective morphology at stage I and with perfective morphology at stage II, while Nina's first particle verbs with imperfective morphology can be found at stage II, the first stage where data from her are coherently available, and with perfective morphology at stage III. For all children, the proportion of both perfective and imperfective morphology with particle verbs increases from stage to stage. Only Naomi exhibits a somewhat different pattern in her use of imperfective *–ing*. Hence, there is no initial restriction to perfective morphology. Instead particle verbs are used with both perfective and imperfective inflection from stage II onwards. The finding that telic predicates, like particle verbs, are not initially restricted to perfective morphology, is in line with Olsen & Weinberg's findings.
In order to investigate whether children use their earliest particle verbs to refer to telic or rather completed situations, stage I was analyzed in further detail, cf. table 3.

Table 3. Particle verbs at stage I

Child	Properties of situations denoted by un inflected particle verbs		Morphological marking with particle verbs	
	telic	completed	Ø	*-ing*
Eve	14 (100%)	3 (21%)	14 (93%)	1 (7%)
Naomi	79 (94%)	37 (47%)	84 (87%)	12 (13%)
Peter	31 (100%)	6 (19%)	31 (100%)	0

Table 3 shows that all particle verbs are indeed telic, except for four tokens of idiomatic *watch out* used by Naomi (15) and an instance of *need on*, the meaning of which is not quite clear, cf. (11).

(11) **need sugar on.** (Naomi (14))

It further reveals that 19% to 47% of the uninflected telic particle verbs at this stage were used to denote completion of an event. Examples are given in (12) and (13):

(12) MOT: now everything is on the floor .
MOT: all your toys are on the floor .
MOT: no # Nomi # you can't walk with all the toys on the floor .
MOT: you've got so many toys on the floor .
CHI: fall down .
(Naomi (04))

(13) CHI: I slide down .
FAT: Nomi # you slid down the wrong side .
(Naomi (20))

As was shown graphically in figure 1, between 7% and 13% of all particle verb tokens are inflected and occur with *-ing* at this stage. None of these are overgeneralized to completed situations. Examples are given in (14) and (15).

(14) CHI: lying down .
MOT: oh # you're lying down .
(Eve (04))

(15) CHI: sun going down .
FAT: no # this sun has just come up .
FAT: it won't go down until the end of the day .
(Naomi (15))

8 Discussion

The results of the present study confirm predictions (IIa) and (IIb). Perfective morphology is indeed used with simplex verbs before particle verbs. Particle verbs are used with imperfective *–ing* before perfective morphology. Uninflected particle verbs may be used to refer to completed situations, but *–ing* is not overgeneralized to completed situations. This pattern looks as though children treat particle verbs as entailing telicity and completion and, therefore, delay their use of perfective markers with particle verbs. From a purely morphological point of view on grammatical aspect, it seems that children may map perfectivity onto the structure of particle verbs themselves. On this account, children may associate grammatical aspect with their uninflected telic particle verbs at stage I, which would confirm hypothesis (II). However, completion is not a necessary condition for children to use particle verbs for telic situiations. An alternative explanation for the divergence between simplex verbs and particle verbs with regard to verbal inflection here could be performance-based. Thus, if a child has an MLU of 2.0, she has two "slots" available for uttering either a simplex verb + *-ed* or a verb + particle, provided she analyzes verb and particle into two constituents. However, this account does not explain why irregular perfective morphology is not produced with particle verbs prior to regular *–ed*, as an irregularly inflected particle verb would not occupy more than two slots. Nor does it explain why children do produce *–ing* with particle verbs as early as at stage I.

On the other hand, the findings of the present study also support assumptions underlying predictions (Ia) and (Ib), even though they do not confirm the predictions with regard to

aspectual morphology. From the point of view of grammatical aspect interpretations, the data of stage I support hypothesis (I), which claims that children initially use lexical aspect information. Thus for children, particle verbs entail telicity and are, therefore, associated with lexical aspect interpretations from early on. While virtually all of their particle verbs were found to be telic, not even half of the uninflected tokens were also used for completed situations at stage I. From this perspective, lexical aspect has primacy. The lack of correlation between telicity and perfective markers, which has been found in previous studies, has a straightforward explanation on a subset-principle account. Olsen & Weinberg (1999) have argued that acquisition of grammatical aspect via lexical aspect initially constrains perfective markers to telic situations, but does not in turn restrict telic predicates to perfective morphology. They found that only between 67% and 97% of telic predicates were used with *–ed* across stages I through IV in their data. As telic predicates, such as particle verbs, are also dynamic and can be durative as well, the subset principle equally well explains why they also appear with *–ing* from early on. The same relation holds for the particle verb data investigated here: telic particle verbs are not confined to perfective inflections even at an early stage of development.

What is at stake here is a dichotomy in the type of data analyzed in the present study as well as between previous analyses of the acquisition of aspect. Analyses along the lines of Olsen & Weinberg (1999), which claim the primacy of lexical aspect, pertain to the distribution of grammatical aspect morphology. The analysis advanced by Wagner (2001), which claims the primacy of grammatical aspect, pertains to children's interpretation of aspectual and temporal morphology and, by extension, of particle verbs. The present study investigated both the distribution of aspectual morphology with and children's aspectual interpretations of particle verbs. Thus, it also tried to track down children's understanding of particle verbs from the way they used them in spontaneous speech, but such an analysis is seriously limited. Therefore, controlled comprehension experiments are needed to shed more light on the question of what kind of aspectual information children map onto their early particle verbs, be it telicity or perfectivity or both. In the end, the dichotomy in findings and analyses might boil down to a difference between production and comprehension in the acquisition of aspect.

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Acquisition of ASPECT and AKTIONSART by children in Croatian and French

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Abstract

Our results indicate some differences in the use of aspect between French and Croatian speaking children. In Croatian language children always manage to keep the appropriate aspect, unlike French children. However, the imperfective aspect seems to be better acquired in French children than the perfective aspect. The perfective aspect, the marked form both in French as well as in Croatian, is related to the lexical meaning of the verbs. The acquisition of the Aktionsart in both languages seems to be more a matter of semantics than of morphology. Furthermore, our data suggest the existence of a specific developmental trend in the use of Aktionsart (intensive, iterative and inchoative), which is similar for children speaking Slavic and Romanic languages.

1 Introduction

The aim of this study is to examine the use of verbal aspect and the Aktionsart: intensive, iterative, and inchoative, by the children between 4 and 12 years of age in a Slavic language like Croatian, and in a Romanic language like French.

Subjects and Method

We have examined children's retellings of the story « Deux amis malheureux » (Two unhappy friends), a popular tale from Northern Europe. The original text has been translated from French (Martinot, 2000) into Croatian (Andel *et al*, 2003) The appropriate translation of the text was administered individually to French- and Croatian-speaking children.

After the story has been read to a child twice, he/she retold the story to the examiner. Each retelling has been audio recorded, and recorded samples have been transcribed in CHAT format (Sokolov, Snow, 1994; MacWhinney 1995). The source text consists of 16 sequences forming a complete story.

Participants Croatian Group

Fourteen children participated in the study. All children, whose parents come from different regions of Croatia, live in Zagreb. Six participants were boys and eight were girls, with chronological age between 6;0 and 12;1. Only the youngest child did not attend primary school at the time. We have divided the children into 4 groups, according to their age: the first group – 6 years (3 children), the second – 7-8 years (5 children), the third – 9 years (5 children), and the fourth, consisting of only one child (12 years).

Participants French Group
Eighteen French-speaking children participated in the study. All children live near Paris. Children were divided into 3 groups of 6 children each. The first one – 5-6 years - attend the third or last class of nursery school; the second one – 7-8 years – attend the second class of primary school; and the third one – 10-11 – the fifth or the last class of the same primary school.

2 The verbal aspect

2.1 Expression of the verbal aspect in Croatian

Verbal aspect - perfective and imperfective - as a semantic as well as morphological category is one of the typical characteristics of the Slavic languages, thus Croatian is no exception. While using the terms "perfective" and "imperfective", one must keep in mind the fact that they have nothing to do with temporal meaning of perfect and imperfect verbal tenses.

The classical definition of perfective and imperfective aspect says (Baric et al, 1997):

- The verbs, which indicate an action in process, are called the verbs of imperfective aspect.
- The verbs, which indicate an action as completed one, are called the verbs of perfective aspect.

But this definition lacks vital information about the totality of an action, i.e. action taken as a whole. The opposition of perfective and imperfective verb does not depend on the completeness or incompleteness of an action, rather on totality or entirety of an action. If the action is taken in its entirety and cannot be divided into phases, such actions are expressed by the verbs of perfective aspect.

> "The main characteristic of the opposition of perfective and imperfective aspect is not the completeness or incompleteness of an action, rather divisibility and indivisibility of the action. A perfective action indivisible into the phases can never go with phase verbs such as start, finish, continue etc." (Ridjanovic, 1976)

Comrie (1976) explains the position of a speaker when he uses perfective or imperfective verb. The choice of aspect very much depends on the internal structure of the situation:

> "The perfective looks at the situation from outside, without necessarily distinguishing any of the internal structure of the situation, whereas the imperfective looks the situation from inside, such as crucially concerned with the internal structure of the situation, since it can both look backwards toward the start of the situation, and look forwards to the end of the situation."

In the opposition of perfective and imperfective verbal aspect only the perfective aspect is the marked category, the imperfective is the unmarked one. Thus, the perfective verbs express perfective actions. However, it is not the case with imperfective verbs: While they are unmarked for perfectivity in the aspectual sense, they are capable of expressing imperfective as well as perfective action. Perfectivisation in Croatian language is accomplished through prefixation and suffixation. The imperfectivisation is marked through suffixation only. The real pairs, in which verbs differ only in their aspects, are formed through suffixation only. When perfective verb is formed with prefix, it is not the real aspectual counterpart in the pair, because the prefix, along with perfectivity carries an additional information about the action, i.e. how the action is performed. The process of perfectivisation through prefixation with an additional meaning to the new formed verb is called "Aktionsart". Croatian, along with other south Slavic languages like Serbian, Bulgarian, Macedonian, etc., has special position among

Slavic languages. In Croatian and abovementioned south Slavic languages, the verbal aspect has a temporal value, the aspectual contrast is preserved in tense formation as well. The aorist is formed only with perfective verbs and the imperfect only with imperfective verbs. This information will be of some value in the analysis of children's productions, since the original story contained some verbs in the mentioned tenses.

For the purposes of our research, we have divided the verbs from the source story and those produced by our subjects into 4 categories:

1) perfective verbs
2) imperfective verbs
3) verbs denoting both aspects
4) verbs outside aspectual category (auxiliaries, modal verbs - the aspect of the sentence is determined by the main verb; these verbs have been excluded from our analysis).

The boundaries between categories, especially 2 and 3, can sometimes be extremely hard to establish. In a given context, verbs denoting both aspects can be assigned with an aspectual value.

Some perfective and imperfective verbs can only have one aspectual form that is closely linked to their semantic content. This means, for example, that the verb *ž ivjeti* (to live), used in the sequence no. 1, can only exist in the imperfective form, if we exclude some semantically distant variants obtained by prefixation, like *prež ivjeti* (to survive). On the other hand, as explained in the introduction to Croatian verbal aspect, switching between the imperfective and perfective form of a verb can occur in two different ways. However, only through suffixation we can obtain a real aspectual opposition (ex.: *puštati*-IMPF – *pustiti*-PF, to let out – sequence no. 3). The perfectivisation by means of prefixation inevitably alters the Aktionsart of the verb. Needless to say, we must always bear in mind that the situational context is the principal element to determine what verbal aspect one should use to describe a particular semantic content.

2.2 Expression of the verbal aspect in French

In French language, the existing opposition between perfective and imperfective aspect is expressed differently compared to Slavic languages. French language doesn't use either prefixation or suffixation in the verbal system to express perfective *vs* imperfective aspect. Usually, one considers that the aspectual opposition imperfective/perfective is carried out through verbal simplex vs. compound form (4 simplex tenses and 4 compound tenses respectively). But in actuality, the formal expression of opposition (simplex/compound verbal form) has to be looked through the semantic opposition between completeness (compound forms) and incompleteness (simplex forms) of an action :

je **mange** (I am eating)	*vs.*	j'**ai mangé** (I have eaten)
je **mangerai** mieux demain (I will eat better to morrow)	*vs.*	j'**aurai mangé** quand nous partirons (I'll have eaten when we 'll leave)
je **mangeais** quand l'orage a éclaté (I was eating when the storm broke)	*vs.*	j'**avais mangé** quand l'orage a éclaté (I had eaten when the storm broke)

This opposition doesn't work anymore with the simple tense *passé simple* (Past Historic) and the compound tense *passé antérieur* (Past Anterior). This latter form, like the 3 other compound forms, express a completeness value :

dès que j'**eus mangé** je partis immédiatement
(as soon as I had eaten I left immediately)

The *passé simple* doesn't express an incompleteness value like the 3 others simplex forms but a perfective value (Comrie, 1976) :

je **mangeai**, je **bus** et je **partis**
(I ate, I drank and I left)

With the 4 compound forms, one can add the phase verb: *finir de* (finish to) without any semantic change :

J'ai mangé = j'ai fini de manger
(I have eaten = I have finished eating)

The simplex forms in present, future and imperfect express incompleteness but not the simplex form in *passé simple*.

If we describe the verbal tense system in French language with the same criterion as in Croatian language, we can obtain the following classification of verbal forms :

Imperfective aspect (Baric *et al*, 1997, Comrie, 1976, Ridjanovic, 1976) is expressed by the present, future and imperfect tenses (3 simplex forms) and perfective aspect only by the *passé simple* (1 simplex form). The 4 compound forms divide the referred process into phases.

3 The Aktionsart

3.1 Expression of the Aktionsart in Croatian

Switching between aspects by the means of prefixes in Croatian often means changing the verb's Aktionsart. Every prefix carries certain meaning and changes the original verbal semantic. In their stories, children skilfully use variants of given prefixed verbs, with or without change in the Aktionsart, but always keep the appropriate aspect:

"Pomozi mi izbusiti rupu u ledu." (VIK, 6;02) (source: probiti, synonyme of pro-busiti)

"Help me make a hole in the ice." – source and variant completive

"Baka je izasla van iz kucice." (HEL, 7;11) (source: sisla)

"[The old lady] came out of the house." – source and variant egressive

If we move from the morphological (verb) to the syntactic level (predicate), there are even more possibilities of modifying the verb's Aktionsart, namely, the use of different adverbs to verbs, adjectives to objects or predicatives (different parts of the predicate), combinations of verbs (phase verbs) etc. Although, this change of perspective leads us more towards a semantic analysis, as opposed to a purely grammatical one, focused on the Aktionsart in the prefix or the suffix of the verb itself, a prominent (but idiosyncratic) feature of Slavic verbs. Furthermore, it has to be noted that not every verb can be assigned into a category of Aktionsart with certainty, because the boundaries between them can sometimes be a little unclear.

Aktionsart – *intensive, durative, inchoative, continuative, completive, resultative…* (and many more):

The Aktionsart in Croatian can be examined on two levels – the morphological (verbal, within the verb itself) and syntactic (within the whole predicate).

1. Verb itself – by means of prefixes

Jana je govorila engleski.
(Jana spoke English. – aspect: imperfective, Aktionsart: durative)

Jana je progovorila engleski.
(Jana started to speak English. – aspect: perfective, Aktionsart: inchoative)

2. Phase verbs – to express which part of the action is described

Jana je pocela govoriti engleski.
(Jana started to speak English.)

3. Adverbs – to intensify the meaning of the predicate (*very, hardly…*), to express the iterativity (*often, sometimes…*)

4. Adjectives as (or to) predicatives – especially if in comparative or superlative, to intensify the predicate

5. Multiple negation – possible in Croatian, used as intensifier

Nije nikoga ni cula. – triple negation
(She did not even hear anyone.)

6. Verb iteration – intensifies the meaning of the verb, or indicates iterativity

3.2 Expression of the Aktionsart in French

In an analytic language, such as French, the information about the Aktionsart have to be searched in the whole sentence. They do not necessarily have a morphological basis, as it is the case in the Slavic languages (G.Gross, 1996: 61). In French, the Aktionsart can be expressed by different lexical word categories or sometimes by different morphological means (affixes).

1. Predicative verbs express one or more aspectual meanings because of their lexical meaning:

a. Pierre a regardé la télévision (durative)
(Peter has watched TV)

b. Hier Pierre a téléphoné à tous ses amis (iterative)
(Yesterday Peter has phoned all his friends)

The iterative Aktionsart of (b) is not only expressed by the meaning of *a téléphoné* (has phoned) but also by the plural form of *à tous ses amis* (all his friends) (in this case there are several calls) *vs* b':

b'. Hier Pierre a téléphoné à Marie pendant 3 heures (durative: only one call)
(Yesterday Peter has phoned Mary for 3 hours)

2. Predicative nouns express an aspectual meaning. They are actualised by an appropriate *support verb,* which gives information on the internal nature of the course of the event: the Aktionsart (W.Frawley, 1992).

c. Luc fait son travail (N durative): the sentence expresses a durative meaning
(Luc is doing his work)

d. Luc entame son travail (N durative: the sentence expresses an inchoative meaning)
(Luc begins his work)

e. Luc a terminé son travail (N durative: the sentence expresses a resultative meaning)
(Luc has finished his work)

3. Adverbs like: *souvent* (often), *des fois* (sometimes), *un coup …un coup* (once … once)… express an iterative meaning; *pour une fois* (for once, unusually) expresses a punctual meaning, *toujours* (allways) a durative or iterative meaning ...

4. Adjectives express all possible aspectual meanings : *une explosion* ***instantanée*** (an instantaneous explosion – punctual meaning)

5. The prefix: *re-* (*redemander* – to ask once again, *j'ai refaim* – I am hungry once again); the suffixes: *-ailler* (*criailler* – to grouse), *-eler* (*voleter* – to flutter), *-iller* (*sautiller* – to skip) express an iterative meaning.

4 Results

4.1 Results obtained from Croatian children

4.1.1 Aspect

The first thing to be observed in children's stories is that, regardless their age, they easily follow the aspectual pattern of the story. This means, to retell the first part of the story, they mostly use imperfectives, and for the second perfectives, or imperfectives, with respect to the context and the source story. If some synonym verb is used to replace another from the source story, it is (almost) always in the appropriate aspect (ex.: *"I tako je zaba morala* probusiti, napraviti *rupu u rijeci."* (ROK, 9;02) *"So the frog had to make a hole in the river."* (source: probiti); *"Samo joj je govorila da cisti, da mete pod i da pere sudje."* (MAG, 6;10) *"She just kept telling her to clean, to sweep the floor and to wash the dishes."* (source: no verb – other subject: She had to…).

Six (out of 14) children from our sample did not use any adverbial sign to mark that the first part of the story is over and that they are beginning with the other. This has been observed mostly with younger children. This is possibly due to the fact that younger children still lack some narration skills. Nevertheless, the verbal aspect in Croatian makes possible to differentiate between two portions in their narrations. So the most important clue to this shift has been their sudden switching from imperfectives to perfectives:

"Samo joj je govorila da cisti, da mete pod i da pere sude. Onda je rekla da donese vode…" (MAG, 6;10)

*"She just kept telling*IMPF *her to clean*IMPF*, to sweep*IMPF *the floor and to wash*IMPF *the dishes. Then she said*PF *to her to bring*PF *some water…"* (MAG, 6;10)

"Bakica je tjerala zabicu da cisti sude, da mete, da posprema, da ide na plazu po vode. A kad je dosla zabica na plazu po vode…" (IVA, 7;04)

*"The old lady forced*IMPF *the little frog to do the dishes, to sweep, to clean, to go to the beach to get some water. And when the little frog came*PF *to the beach to get some water…"* (IVA, 7;04)

The need to put the verb in the correct aspectual form (which means, the native speaker's competence) is strong, even with very young children. If they do not find the exact verb right away, they are prepared to accomplish even some very complicated operations, such as imperfectivising an already perfectivised verb, instead of going back to the imperfective, simple one. No matter what operation children use, it does not always result in a confirmed verb, but the aspect is usually correct:

"Bakica ju je natjeravala da radi." (MIS, 6;06)

"The old lady always forced her to work."

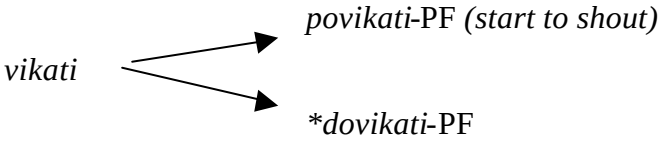
tjerati-IMPF > *na-tjerati*-PF > *na-tjera-va-ti*-IMPF

*"… i onda je *dovikala*-PF*:"* (SAB, 8;08)

"… and then she shouted:"

"Oh, povice-PF *bakica…"* (source)

"Oh, shouted (started to shout) the old lady…"



Some aspectually well-defined verbs have synonyms with two aspects. They are somewhat rare in the language, yet children have no difficulties in substituting them, this way they show a developed ability to feel the aspectuality in all its colours and functions.

"Pogledala (je) u mjesec i vidjela-2ASP psica…" (ADR, 9;0)

"She looked at the moon and saw the little dog…"

*"Podigla glavu i vidjela-*2ASP *njih…"* (MIS, 6;06)

"She raised her head and saw them…"

*"Bakica ljutito podigne pogled prema mjesecu i sto ugleda-*PF*?"* (source)

"The old lady raised angrily her head towards the moon, and (you know what she) saw?"

*"Djevojcica je radila-*2ASP *sav posao za zabom."* (SAB, 8;08)

"The little girl did all the work (after the frog left)."

"… koja je sama morala obavljati-PF sav posao zelene zabice." (source)

"… who had to do alone all the work of the little green frog."

4.1.2 **Aktionsart** (syntactic level – predicates)

4.1.2.1 Intensive Aktionsart

- If the predicate in the source text is intensified by using an adverb:

bijase veoma sretna	(was very happy)
bijase posve nesretna	(was entirely unhappy)
toplo odijevala	(put warm clothes on someone)

6-years-old children use mostly only one intensifying adverb per child, for all given instances (*very* or *well*), *veoma sretna > jako sretna* (very happy), *posve nesretna > jako nesretna* (very unhappy) (VIK, 6;2); *veoma sretna > dobro se zabavljala* (she had a good time/was well entertained) (MAG, 6:10). This is sometimes a litteral repetition of the source text, but most of the time just a simplification of the source.

7-8 years old children still repeat or use (almost) exact synonymes (e.g. *toplo odijevala > toplo oblacila*), but are more ready to vary different syntactic constructions: *bijase posve nesretna > bijase jos tuznija* (was even more unhappy) – predicative = adjective in comparative.

9 years old children are already able to make different variations and use different syntactic constructions, adding intensifiers where they are only implicated in the source: *voljela je* (she loved) > *najvise je voljela* (she loved the most).

The 12 years old boy varied the given constructions as well: *voljela je* (she loved) > *najvise je voljela* (she loved the most); he also summarises the meaning and the value of several verbs and indicates the time span of the action: *...bakica ju je voljela, milovala, toplo odijevala i hranila mnogim ukusnim jelima* (... the old lady used to feed her, put warm clothes on her and feed her with many delicious dishes) > *stalno ju je njegovala* (she used to take good care of her all the time).

- If the intensity (of different kinds) is expressed by several lexical items (adjectives, adverbs, verbs) at the same time:

hranila ju je mnogim ukusnim jelima

(fed her with many delicious dishes)

morala je mesti, prati posude, ici po vodu, cijepati drva…

(she had to sweep the floor, wash the dishes, go get some water, cut wood…)

the youngest group still recurs to the one adverb per child, the same one they prefer in predicates with only one intensifying adverb (very or well) > *dobro ju je hranila* (she fed her well).

In the group of 7 and 8-years-olds only one child gives the syntagm, somewhat simplified: > *davala finu hranu* (used to give her good food), where the verb *hraniti* (to feed) is replaced by the nominal syntagm *davati hranu* (to give food).

The same as in the previous group, of the 9-years-olds only one child gives the expression, but turns back to the verb *hraniti* (to feed) > *hranila finim jelima* (fed her with delicious dishes).

The same as in predicates containing only one intensifying adverb, the 12 years old boy summarises the meaning of several verbs: > stalno ju je njegovala (took good care of her all the time); rijetko ga je njegovala (rarely used to take care of him); morala je mesti, prati posude, ici po vodu, cijepati drva… (she had to sweep the floor, wash the dishes, go get some water, cut wood…) > nikad joj nije pomagala (she never helped her).

- When the source text contains an intensifying phrase, such as: mogla ih je moliti *do mile volje* (she could have begged as long as she wanted).

In the youngest group one child managed to repeat the phrase exactly, the other two omitted it entirely.

The 7-8-years-olds use neutralised expressions (if any), such as: nisu se odazivali (they did not answer); nisu se htjeli vratiti (they did not want to come back).

At the age of 9 years children are already able to paraphrase, or to use other similar phrases with approximately the same temporal value: mogla je moliti do jutra (she could have begged until the next morning); vise nikad nisu sisli (they never came back down); mogla je govoriti sto puta (she could have said hundred times); ma koliko ih je zvala, oni nisu htjeli doci dolje (as much as she called, they did not want to come down); some express the intensity by verb iteration: zvala je i dozivala (she called(imperfective) and called(prefixed imperfectivised perfective), cf. 2).

The 12 years old boy omitted the phrase.

It is to be observed that with age children use notably more intensifiers and more varied syntactic structures.

4.1.2.2 Iterative

The most interesting thing to be observed in iteratives is that they are almost exclusively used by the youngest group. The most used syntactic construction is *adverb + verb* (adverbs: cesto (often), nekad (sometimes), or simply a verb of iterative semantic (davati (to giveIMPF), pustati (to letIMPF)).

So the 6 years old children (all three of them) expressed some kind of iteration, notwithstanding the sometimes misplaced semantic (nije cesto isao spavati (he did not often go to sleep), samo joj je davala (she used to give her just…), samo joj je govorila (she just kept telling her…).

Of the five children from the group of 7 and 8 years olds, only two express an iteration: nekad joj nije dala jesti (sometimes she did not give her to eat), nisu se odazivali (they did not answer).

Only one child of the five in the 9 years old group used an iterative expression (for the abovementioned phrase: mogla je govoriti sto puta (she could have said that hundred times).

For the eldest boy (12) the iterativity is contained in the verbs only: davala joj je hrane (she used to give her food); davala mu ostatke (she used to give him rests of the food).

4.1.2.3 Inchoative

The same as in the source text, inchoatives appear in the children's narrations mostly in form of verbs denoting some kind of motion, although in the source text there is a greater variety of motions:

podji (imperative: come (start moving) towards the speaker)

dodji (imperative: come (end moving) towards the speaker)

sisli su (perfect: they came down)

In the two youngest groups only two verbs express those motions: otisli su (they went away – no matter the position of the speaker or the direction of the movement).

The same verbs appear in the two older groups, along with some other: povedi nas gore (take us up).

Although there are no phase verbs indicating the inchoativity in the source text, the two older groups (9 years + the 12 years boy) seem to be very prone to them: poceli su lupati (they started beating), poceli su se tuziti (they started lamenting), pocela je vikati (she started shouting) etc. Only one child from the younger groups (6 years) used one phase verb to express inchoativity: postala je nestrpljiva (she became impatient).

4.2 Results obtained from French children

4.2.1 Aspect

As already mentioned in the description for the Croatian source text, the French ST can be divided into two parts. In the 4 first sequences, all the verbs express an imperfective aspect (with imperfect tense and infinitive mood respectively). From the 5th sequence on, the perfective aspect appears with 22 verbal occurrences in the Past Historic (*passé-simple)*. However, other verbs express the imperfective aspect in this second part of the story as well. These are verbs with the tenses: imperfect, pluperfect, present, future, perfect, and the moods: infinitive, imperative, present participle.

In the youngest group (5-6-years-old) one child started to use the perfective aspect from the 4th sequence on, and so did 2 children in the oldest group (10-11-years-old). These verbal occurrences in the perfective aspect (Past Historic) are wrong because it is impossible to mix certain tenses or certain aspects in the same sentence when the verbs appear in clusters. However, this new aspect corresponds, for the first time in the story, to the actions or duties that the frog has to perform. Consequently, one can argue that perfective aspect is related to the lexical meaning of the verbs. In the second part of all retellings (that is when children have to 'choose' between perfective and imperfective aspect), from the first occurring of the perfective aspect on, the results are quite different in respect to the age of the children.

We have divided all verbs of the ST and corresponding verbs of the retellings into perfective aspect (verbs in Past Historic) and imperfective aspect (all other verbs).

Table 1. The use of Perfective and Imperfective verbs in children's narratives

Age (n = 6)	Perf. Verbs (total) 132 (100%)	Imperf. Verbs (total) 432 (100%)	Errors
5-6	59 (44,7%)	202 (46,7%)	2,6%
7-8	36 (27,2%)	217 (50,2%)	1%
10-11	45 (34%)	267 (61,8%)	5%

Table 1. shows how the aspects and the rates of errors are divided up in respect to the age[1]. In the group of 5-6 years of age, the rates of perfective and imperfective verbs are very similar in respect to the ST. This result shows that at the age of 5-6-years-old children adhere very closely to the forms they have heard, e.g., they tend to repeat the verbal aspect whatever it is.

In both older groups of children, the retelling differs in relation to the aspect in the ST. In the 7-8-years-old group of children less than 1/3 of the perfective source verbs are retold; and in 10-11-years-old group of children 1/3 of the perfective verbs are used in retelling. The low rate of errors[2] in 7-8-years-old children can be explained by the fact that they produce the least perfective verbs out of the 3 groups.

We argue that children, even in the youngest group, understand the differential value between perfective and imperfective aspect because the occurred verbs in perfective aspect are very different in the 3 groups of age.

From all the perfective verbs produced by each age group during retelling, we have extracted those perfective verbs which do not occur in the ST, nor in the speech of the children with the imperfective aspect. This allowed us to isolate the perfective verbs that children used on their own initiative.

The 5-6-years-old children produced 8 different verbs in perfective aspect : *laver* (to wash), *porter* (to carry), *gronder* (to scold), *se fâcher* (to get angry), *demander* (to ask), **fronder*, *répondre* (to answer), *appeler* (to call).

The 7-8-years-old children produced 5 other types of verbs in perfective aspect : *rester* (to stay), *partir* (to go away), *répliquer* (to reply), *avoir pitié* (to pity), *emporter* (to take).

The 10-11-years-old children produced 7 different types of verbs in perfective aspect : *s'endormir* (to fall asleep), *commencer* (to begin), *supplier* (to beseech), *emmener* (to take), *tourner* (to turn), *rentrer* (to go back), *s'acharner* (to try desperately).

It can be noticed that 5 types out of 8 in the group of 5-6-years- old, refer to speech verbs (against 1/5 in 7-8 olds and 1/7 in 10-11 olds). Only in the group of 10-11-year-olds, the new verbs express inchoative (to fall asleep, to begin) or intensive (to beseech, to try desperately) Aktionsart. Unlike the perfective verbs, the imperfective verbs are almost the same in the 3 groups. These verbs are very frequent in the target language and very simple from a semantic point of view : 2 verbs of perception (*regarder* : to look at; *voir* : to see), 3 verbs of motion (*aller* : to go, *descendre* : to go down, *monter* : to go up), 2 verbs of speech (*demander* : to ask, *dire* : to say, to tell). A few other verbs, like *s'asseoir* (to sit down), *attendre* (to wait for), *creuser* (to dig a hole in) are directly related to the specificity of the story.

In spite of the fact that the Past Historic, which expresses (among other values) the perfective aspect in French, is unusual to encounter in tales, children use it with particular lexical verbs. Even if the morphological forms of verbs in Past Historic are wrong, children seem to 'choose' the perfective aspect that in French language is a very particular one: It expresses specific categories of meanings which correspond to the competence children have at a given age.

Perfective aspect can be seen as a marker for verb categories which are acquired on lexical and semantic levels: various speech verbs in 5-6-years-old group and complex verbs in 10-11-years-old group, are verbs with a lexicalised Aktionsart.

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1 The age groups have 6 children each. To make a comparison possible between each group of children and the ST, the number of occurrences in the ST are multiplied by 6.

2 Only the tense errors are relevant and counted and not the very frequent morphological errors which occur with Past Historic in children.

4.2.2 Aktionsart

4.2.2.1 Intensive Aktionsart

- When intensive Aktionsart is expressed in the source text only with lexical words:

elle la dorlotait	(she spoiled her)
ils se lamentaient	(they cried their woes out loud)
pleurant sur leur misère	(crying a little – on their woes)
ils gémirent tant et tant	(they sighed so heavily)
impatientée	(impatient)
en colère	(angry)

Children at the age of 5 to 6-years-old do not express intensive meaning because they do not use these words.

Children between the ages of 7 to 8-years-old express intensive meaning in four distinct ways:

1) repeating the same verb (dorlotait – spoiled);
2) by using another verb or another adjective which expresses an intensive value (se lamentaient > suppliaient : begged [3]; gémirent tant et tant > après avoir tant prié : after they have so much pressed ; impatientée > inquiète : anxious);
3) by intensification (en colère > tout en colère : very angry); and
4) by a definitional reformulation (impatientée > elle en avait assez/marre : she had enough/she was fed up).

Children at the ages of 10 to 11-years-old express intensive meaning in the same way as the previous group, but they add more advanced ways to use intensifiers. They use semantic paraphrase (pleurant sur leur misère > ils s'apitoyent sur leur sort : they feel sorry for oneself); transformation of the quantitative intensity into durative intensity (tant et tant > pendant un bon bout de temps : during a very long time); or they change the grammatical category (Adj. impatientée > V. s'impatiente).

- When the intensive Aktionsart concerns several notions: quantity, diversity and quality, these notions are transformed into iterative or durative by the youngest children:

5-6-years-old

elle lui donnait **toutes sortes de bonnes choses** à manger > *elle lui donnait à manger* ***tous les soirs***
(she gave her all sorts of good things to eat) >(she gave her to eat every evenings)

Diversity and negative quality: elle le laissait dehors **par tous les temps** (she left him outside in all weathers) > Durative **(…)** ***tout le temps*** (all the time).

7-8-years-old children expressed 2 different notions: quantity and quality, but with other grammatical categories:

elle lui donnait **toutes sortes de bonnes choses** (dét N prép Adj N) à manger > *elle était* ***bien nourrie*** (Adv V) / *elle lui donnait* ***bien à manger*** (Adv V)
(she gave her all sorts of good things to eat)

[3] *Se lamentaient* > *suppliaient* is to understand as : sequence of the source text (ST) > retelling of this latter sequence by a given child

Or they explain the intensive phrase (par tous les temps: in all weathers):

*elle le laissait dehors même **au mauvais temps***
(she left him outside even in bad weather)

Children in the 10 to 11-years-old group, expressed the 3 different notions (quantity, diversity and quality) together in a paraphrase:

elle lui donnait **toutes sortes de bonnes choses** à manger > *elle lui offrait **plein de choses de bien** à manger*
(she gave/bought her a lot of good things to eat)

- When the intensive Aktionsart is expressed with an aspectual or modal operator, 5-6-years-old children express intensive with other categories:

Elle **eut beau** (operator: intensive and iterative) les supplier (she begged in vain) > * *le chien **tellement*** (intensive/quantitative Adverb) *qu'elle supplia le chien et la lune redescendait pas*

Elle l'**obligeait à** (modal verb) travailler (she made her work) > *elle devait faire **tout** le travail* / ***plein de** travail* (the intensive obligation of 'obligeait à' becomes a big quantity of work with the determiner *plein de*)

Children between 7 to 8-years of age, express the intensive and iterative Aktionsart with an agrammatical sentence:

Elle eut beau les supplier > **elle a beau tant crier*

10-11-years-old children, express the complex Aktionsart of the source sentence only with a durative Aktionsart:

a. Elle eut beau les supplier > *malgré qu'elle ait crié **pendant longtemps***
(during a long time)

Or only with an iterative meaning:

b. Elle eut beau les supplier > *la grand-mère cria **plusieurs fois***
(several times)

Or the complex Aktionsart (intensive & iterative) is expressed in a paraphrase (more or less):

c. Elle eut beau les supplier > ? *elle **s'acharna** sur son sort*
(she tried desperately)

Just as younger children, older ones express the complex Aktionsart of the modal verb with a noun phrase, but in the oldest group of children the noun phrase refers both to quantity and diversity:

d. Elle **l'obligeait à** travailler > *elle donnait **plein de corvées** à la grenouille*
(she gave a lot of chores to the frog).

- When intensive is expressed with *V Adv Adj* (elle était très heureuse: she was very happy), all children retell the same categories but in the youngest group the intensive use decreases, or a negative replaces a gradual comparison: le chien était moins heureux (the dog was less happy) > *le chien était pas heureux* (was not happy).

7-8-years-old children express both, intensive and gradual comparison.

10-11-years-old children may replace the source verb with another verb, and the quantity notion is expressed with a quality notion. The reformulation maintains the intensive Aktionsart:

Elle l'habillait **bien** chaudement > *elle lui offrait de **beaux** habits.*

4.2.2.2 Iterative Aktionsart

The iterative Aktionsart is expressed in the source text with: 1) verbal lexicon: *coasser* (to croake), *aboyer* (to barke), *nourrir* (to feed), *soigner* (to take care); 2) with a plural noun phrase: *toutes sortes de bonnes choses* (all sorts of good things); 3) with an adverb: *souvent* (often); 4) with the combination verb – adverb: *gronder tout le jour* (to scolde all day); 4) with a repetition of the same verb: *elle **regarde** à droite elle **regarde** à gauche* (she looked to the right and she looked to the left), *elle **cria** elle **cria*** (she called and she called).

As mentioned elsewhere in the text, some sentences express a complex Aktionsart, that is both iterative and intensive (dorloter – to spoil; gémir tant et tant – to sigh so heavily and so often; avoir beau supplier – to beg in vain ; toutes sortes de bonnes choses – all sorts of good things).

We now examine only the use of iterative Aktionsart in new cases.

Iterative in verbal lexicon

None of the children in the 5 to 6-years-old group repeated the verbs: *coasser* (to croake) and *aboyer* (to bark), but produced speech verbs such as *dire* (to say), *répondre* (to answer), and the general verb : *faire* (to do). Few older children repeated these two verbs; the others used speech verbs like younger children.

The verbs *nourrir* (to feed) et *soigner* (to take care) were used by all children (as direct speech). One child in the second group (7-8-years-old) gives a definitional reformulation of *je vous ai nourris* (I fed you) with *je vous ai donné à manger* (I gave you to eat).

Iterative in adverb

a. La vieille ne le caressait pas **souvent**
(the old woman didn't pet him very often) (ST)

b. **Souvent** elle allait se coucher sans avoir dîner
(she often went to bed without any supper) (ST)

No differences were observed in the use of iterative adverb in all 3 age groups. The adverb occurs generally in sentence (a). In sentence (b) the same adverb doesn't occur and is changed in *des fois* (sometimes) in only 2 children, probably because of the first place of the adverb[4]

Iterative in combination verb – adverb: no occurrence at all in children

Elle avait grondé la petite grenouille tout le jour
(she had scolded the poor frog all day) (ST)

Iterative in repetition

a. Elle regarde à droite elle regarde à gauche
(she looked to the right and she looked to the left) (ST)

[4] When the adverb or any other complement occurs in the first place it is usually not constructed by the verb of the sentence. Till at least 7 years, 90% of the sentences have only arguments, that is complements which are constructed by the verb (Martinot, 2003).

b. Elle cria elle cria
(she called and she called) (ST)

The repetition of the verbs occurs the more in older children. At 7-8 years children confirm the aspectual iterative with *un coup*:

Elle regarde un coup à gauche un coup à droite
(she looks once to the right once to the left)

To notice: When the Aktionsart is complex, the iterative meaning is generally omitted except in oldest children.

4.2.2.3 Inchoative Aktionsart

The inchoative is only realised in the source text in 2 sentences. First with the support verb in:

a. Elle les **prit** en pitié
(she took pity on them);

and with the meaning of the verb in:

b. Vous m'**abandonnez**
(you have run away from me)

The youngest children do not express at all (a), the older (7 to 8 and 10 to 11) express another support verb, *avoir*, with a durative meaning:

Elle a eu pitié d'eux
(she had pity on them)

The sentence (b) is repeated by all children, if not the new verb expresses an inchoative Aktionsart:

5-6: *vous me quittez* (you leave me)
10-11: *vous partez* (you go away).

5 Provisional conclusions

The reformulation paradigm allows the researchers to follow the linguistic growth in children at different stages of language acquisition. Moreover, the idea of a specific controlled text that can be translated into different languages and used with different ages of children, provides an ideal background for crosslinguistic studies.

Our data indicate some differences in the use of aspect between French and Croatian speaking children. In French children the occurred verbs in the perfective aspect are very different in the 3 groups of age unlike verbs in the imperfective aspect which are very similar in all French speaking children. In Croatian language children always keep the appropriate aspect unlike in French children, even in the eldest group, which replace often imperfective (in the ST) with perfective aspect and vice versa.

However, in both languages, one can notice the sudden switching from imperfectives to perfectives even if errors occur in French children in the second part of the story. Thus, one can argue that perfective aspect, the marked form in both languages, is related to the lexical meaning of the verbs, whatever the language.

Then our data indicate specific developmental trend in the use of Aktionsart by children speaking Slavic and Romanic languages. In both languages (Croatian and French) the highest diversity of means was found in the expression of intensive Aktionsart.

The youngest children in both linguistic groups prefer an intensive adverb rather than an intensive verb. They often omit the verb when they do not know its meaning.

By the age of 7-8-years-old, children produce exact synonyms, or definitional reformulations. The growing linguistic abilities allow them to replace the source sentence structure and express more than one Aktionsart in a verb (intensive & iterative).

The oldest children can express 3 Aktionsarten in a verb, producing complex verb structures. They are also capable to produce many different paraphrases of a source text without losing its meaning.

The iterative Aktionsart is almost exclusively used by 5-6-years-old Croatian children: there is less frequency of iterative Aktionsart use in narratives of the older groups of Croatian children. In French language, the iterative is used by the youngest children in the form of direct speech, but not in the indirect one.

From the age of 9-years-old on, the inchoative Aktionsart is expressed by children in both linguistic groups by phase verb, aspectual operator, or support verb.

In conclusion, our data indicates that, in spite of the differences between the two languages regarding the morphological possibility of expressing it, there are more similarities than differences in the use of Aktionsart by French- and Croatian-speaking children. This might indicate that the acquisition of the Aktionsart is more a matter of semantics than of morphology, which shows the practical value of comparisons like this one.

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Effects of Semantic and Syntactic Complexities and Aspectual Class on Past Tense Production

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Abstract

This paper reports results from a series of experiments that investigated whether semantic and/or syntactic complexity influences young Dutch children's production of past tense forms. The constructions used in the three experiments were (i) simple sentences (*the Simple Sentence Experiment*), (ii) complex sentences with CP complements (*the Complement Clause Experiment*) and (iii) complex sentences with relative clauses (*the Relative Clause Experiment*). The stimuli involved both atelic and telic predicates. The goal of this paper is to address the following questions.

Q1. Does semantic complexity regarding temporal anchoring influence the types of errors that children make in the experiments? For example, do children make certain types of errors when a past tense has to be anchored to the Utterance Time (UT), as compared to when it has to be anchored to the matrix topic time (TT)?

Q2. Do different syntactic positions influence children's performance on past-tense production? Do children perform better in the Simple Sentence Experiment compared to complex sentences involving two finite clauses (the Complement Clause Experiment and the Relative Clause Experiment)? In complex sentence trials, do children perform differently when the CPs are complements vs. when the CPs are adjunct clauses? (Lebeaux 1990, 2000)

Q3. Do Dutch children make more errors with certain types of predicate (such as atelic predicates)? Alternatively, do children produce a certain type of error with a certain type of predicates (such as producing a perfect aspect with punctual predicates)? Bronckart and Sinclair (1973), for example, found that until the age of 6, French children showed a tendency to use passé composé with perfective events and simple present with imperfective events; we will investigate whether or not the equivalent of this is observed in Dutch.

1 Introduction

In this paper, we will investigate whether syntactic and/or semantic complexity influences past tense production by young Dutch speaking children. The sentences with past tense forms are of our interest because a past tense displays various semantic complexities that a present tense does not. For example, when a past tense appears in a complex sentence as in (1) (we call (1) PAST UNDER PAST SENTENCES following Abusch (1988)), there are two interpretations available depending on how the past tense is anchored (see Section 2 for more details):

(1) past under past sentences

A monkey said that a girl had red hair.

(1) can be a paraphrase of either (2a) or (2b):

(2) a. A monkey said "a girl had red hair."
b. A monkey said "a girl has red hair."

We call (2a) a real past reading and (2b) an overlapping reading. In (2a), the Topic Time (TT) (Klein 1994) of the girl having red hair does not overlap but precedes the TT of the monkey saying so. The TT of the girl having red hair is the time for which the claim that the girl having red hair was made (Klein 1994). In (2b) two TTs overlap with each other. We may contrast (1) with the sentence in (3), where a present tense appears in the complex sentence. Here, things are more straightforward because a present tense is always understood with respect to the Utterance Time (UT).

(3) A monkey said that a girl has red hair.

(3) is about a girl still having red hair at the UT.

Although there has been a vast amount of research on the acquisition of Tense and Aspect, much less has been published on the interaction of two finite predicates (see Hickmann (1993) and Hollebrandse (1999)). This is partly because previous research had a different focus, such as the emergence of past tense morphology, which is first found in one-word or two−word utterances (see the well-known debates on the Primacy of Aspect Hypothesis and Lexical Aspect Before Tense Hypothesis). This paper aims to investigate issues that go beyond past tense morphology; namely, how a past tense is actually introduced. To succeed in these experiments, children must know whether or not a past tense has to be interpreted with respect to the UT in certain syntactic positions but with respect to the time point introduced by matrix finite predicates in other positions. The results of this study will cast light on what factors influence the production of a past tense form by young children. We aim to find out whether or not it is syntactic complexity that interferes with children's production, or whether it is anchoring the TT to other temporal points that is difficult for the children, or a combination of the two.

Bowerman (1979) claims that the ability to produce complex sentences in English emerges between the ages of 2 to 4 (stage IV-MLU from 3-3,5). A brief inspection of the CHILDES database (MacWhinney and Snow (1990)) below shows that utterances involving two predicates first appear around age 3;2 for Adam, 2;3 for Eve, and not until 4;6 for Sarah.

(4) Early complex sentences by Adam[1]
a. CHI: what me think? (adam15.cha: line 992) (2;10.2)
b. CHI: what he xxx name # <I> [/] I think? (adam18.cha: line 37) (2;11.13)
c. CHI: what me # think # looking? (adam18.cha: line 997)
d. CHI: I going make a trailer # I think. (adam20.cha: line 256) (3;0.11)
e. CHI: I think I will use dis color. (adam25.cha: line 1960) (3;2.21)

(5) Early complex sentences by Eve
a. CHI: I think # in the basket. (eve 08: line 4864) (1;9)
b. CHI: I think # in dolly bed.
c. CHI: Mamma think downstairs.
d. CHI: I think that good enough. (eve 12: line 1447) (1;11)
e. CHI: I think it going round now. (eve 12: line 2626) (1;11)

[1] Combo search was conducted using other propositional verbs such as *say*, *tell* but *think* was the most frequently used verb and it also appeared earliest in the database so I report the data involving *think*.

f. CHI: I think I have tear one and I think I can write one. (eve 19: line 633) (2;3)
g. CHI: I think we have the rest of it in here. (eve 19: line 1702)

(6) Early complex sentences by Sarah
a. CHI: I think somebody found it. (sarah 118; line 50) (4;6.17)
b. CHI: I think I gettin(g) a pretty good job. (sarah 118; line 564)
c. CHI: I think I got it now. (sarah 118; line 833)
d. CHI: but # I think when I grow up I will # go on tv. (sarah 119; line 834) (4;7.24)

The CHILDES data above suggest that children display various types of errors when they start producing complement clauses with intensional verbs. Many ungrammatical sentences are found in (4) to (6). Notably, Adam appearsto treat *think* as though it takes a non-finite complement. In (4c) and (4d), for example, progressive participles (*looking* and *going*) are used with *think*. Grammatical sentences (4e) with two finite predicates are first found at age 3;2. Eve makes similar types of errors. At age 1;9, she produces ungrammatical sentences, combining *think* with a locative PP (see (5a), (5b) and (5c) with an adverbial). She also produces a complement clause with a progressive participle: see *going* in (5e). Sarah's first use of an intensional verb with a complement is not until 4;6 when she uses it correctly (see (6a)). However, this is followed in (6b) by the same error that was made by Adam and Eve; namely, a complement clause with a progressive participle: *getting*.

There are several possible explanations as to why all three children produce non-finite verbs as complements of *think*. First, this might be an overgeneralization error where children apply an incorrect argument structure to the verb *think*. It is conceivable that these children are incorrectly applying the argument structure of one of the early verbs: *look (at)*, to the verb *think*. Tomasello (1992) reports that his daughter produced the following sentences at age 1;8.04 (232; 1992):

(7) a. Look Weezer climbing a tree.
b. Look at girl drinking a Kool-aid.

Related to the subcategorization error is the case in (8), which Banfield (1984) discusses. As shown in (8), the embedded clause with *say* does not necessarily include obligatory finite markings.

(8) John said to go. (p.71; Banfield (1984))

A sentence such as (8) in the input might facilitate children's production errors. It might be possible that children first set their grammar to use finite and infinite predicates interchangeably in embedded clauses. This speaks to the errors such as (4c), (5e) and (6b).

Second, it might be the case that these children omit the *be*-auxiliaries in progressive constructions. If this were the case, we would expect children to use correct finite predicates when a complement clause contains a simple tense without any auxiliaries.[2]

Third, it might be that embedded sentences also show an influence of the (lexical) Aspect before Tense Hypothesis. It is well known that children's first utterances include either no verbs or include only non-finite verbs (Antinucci and Miller (1976), Bloom et al. 1980, Olsen and Weinberg(1998), Shirai and Andersen (1995) among others). It is reported that children initially use a perfective marker with the predicates that describe events with clear results,

[2] This point was raised by Melissa Bowerman (p.c. July 2nd, 2002).

whereas they use a progressive marker with predicates without any clear end points. In Bronckart and Sinclair (1973), it is shown that this trend even lasts until 6 years old. In the CHILDES data above, the embedded predicates where Adam, Eve and Sarah use the progressive participles are restricted to atelic predicates; hence, it is conceivable that the Aspect before Tense Hypothesis applies to a complement clause, too.

Given the scarcity of relevant utterances in CHILDES, the following elicited production experiments were conducted to investigate whether children produce ungrammatical embedded predicates, and if so, what factors (semantic and/or syntactic complexity or Lexical Aspect) contribute to these errors. An elicited production task was the methodology chosen here to carefully control the environment where the past tense predicates should occur; such as, in a simple sentence, in a complement clause and in a relative clause.

2 Semantic, Syntactic and Lexical factors

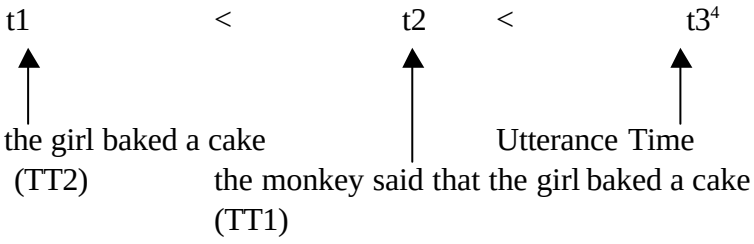
In this section, we will discuss the three formal factors (semantic, syntactic and lexical) that can potentially influence children's performance in the experiments.

The first factor is the semantic complexity that is related to temporal interpretations of past tense discussed in Klein (1994), Enç (1987) and Stowell (1996). Klein (1994), modifying the traditional Reichenbachian approach, argues that Tense always determines the relationship between the TT and the UT; for example, a past tense calls for a TT to be placed prior to the UT. In interpreting one of the stimuli used in The Simple Sentence Experiment (in (9)), children have to know that the TT of the flying must precede the UT. The TT of the flying in (9) is the time for which the claim that flying took place was made (Klein 1994).

(9) Simple sentence
The cat flew.

The complex sentences used in the Complement Clause Experiment and the Relative Clause Experiment, however, involve more complex temporal structures. Examples (10) and (12) are the English equivalents of the Dutch test sentences used in the experiments:

(10) Complement Clause (past under past sentences)
The monkey said that the girl baked a cake[3]. (real past reading)



[3] In English, this sentence involving a telic predicate such as *bake a cake* is different from the sentence where an atelic predicate is used such as in (i):

(i) The monkey said that the girl was sad.

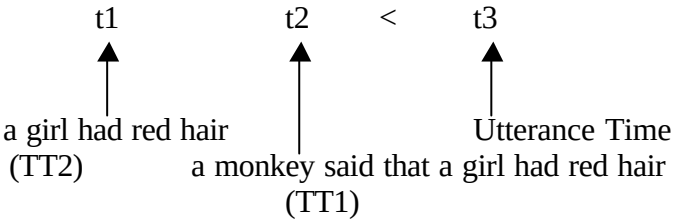
In (10), the target state where the girl finished baking a cake is reached within TT2 (Klein 40; 1994); however, when a predicate is atelic as in (i), it is unclear whether the target state is reached or not. It is possible that the girl is still sad at the UT.

[4] Three temporal points are indicated as t1, t2 and t3.

In (10), there are two TTs. One is the TT of the monkey making a remark (about the girl baking a cake) and the other is the TT of the girl baking a cake. We call them TT1 and TT2 respectively. The first past tense (in *said*) positions the TT1 prior to the UT and the second past tense in *baked* also positions the TT2 prior to the UT. However, what is crucial here is that there should be an ordering restriction between TT1 and TT2. In (10), TT2 must precede TT1; we call this a real past reading. Such an ordering restriction is discussed in detail in Enç (1987) and Stowell (1996); only the relevant aspects of the mechanism will be discussed below. Before turning into a temporal mechanism, we need to note that there is another reading for the English PAST UNDER PAST SENTENCE when the embedded predicate is stative as shown in (1) repeated here in (11):

(11) Complement clause (PAST UNDER PAST SENTENCES, stative)

A monkey said that a girl had red hair. (overlapping reading)



(11) can have a reading where TT1 and TT2 overlap (called an overlapping reading). There is a cross-linguistic variation in whether or not PAST UNDER PAST SENTENCES allow an overlapping interpretation as in (11). The languages which allow embedded past to display an overlapping interpretation are called Sequence of Tense (SOT) languages.

Among SOT languages, there are two types. In one type, such as in English, an overlapping interpretation is restricted to the case where the embedded predicate is stative (see (11)). The other type, such as in Dutch, no such restriction is observed. A Dutch counterpart of (10), shown in (12), is ambiguous between a real past and an overlapping readings. This is because Dutch simple past is equivalent to both past progressive and simple past in English.

(12) De aap zei dat het meisje een taart bakte.
the monkey said that the girl a cake baked
'The monkey said that the girl baked a cake.'

(12) has an overlapping reading where the monkey said that the girl was baking a cake and a real past reading where the monkey said that the girl had baked a cake.

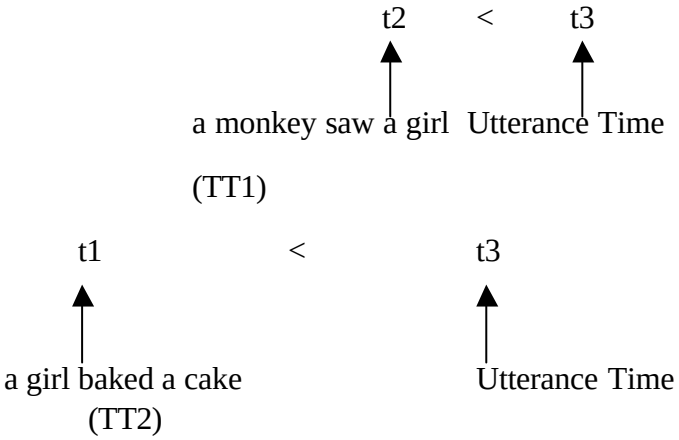
There are also languages that do not allow an embedded past tense to exhibit an overlapping interpretation at all. These languages are called 'non-SOT languages' and in these languages, a present tense is used instead of a past tense to represent the overlapping interpretation. The SOT phenomenon will be discussed more later in the paper.

Returning to the various interpretations of PAST UNDER PAST SENTENCES, Enç (1987) accounts for the ordering restriction of the real past interpretation (discussed in (13), using the theory of Government and Binding, in terms of indices. Index 0 refers to the UT and the matrix past has index i, which refers to the point that precedes the UT. The embedded COMP is bound by the (co-indexed) matrix tense and the embedded past has index j, which precedes the temporal point represented by index i. The co-indexed embedded COMP makes sure that the embedded past (j) refers to a point that precedes (i):

(13) [$Comp_0$ [NP [$PAST_i$ [V [$Comp_i$ [NP [$PAST_j$ … Enç (644; 1987)

Matters are different in sentence (14), one of the stimuli used in the Relative Clause Experiment. In (14), there is no ordering restriction between TT1 and TT2; (14) thus yields a so-called independent reading.

(14) Relative clause
A monkey saw a girl who baked a cake. (independent reading)



In (14), TT1 can be either before or after TT2 as long as they are both placed in the past with respect to the UT. In Enç's theory, the independent reading is represented as in (15):

(15) [$Comp_0$ [NP [$PAST_i$ [V [NP [Comp $_0$ […$PAST_j$ (independent)(Enç (1987))

In (15), two Comps have index 0 that refers to the UT and two past tenses refer to the points that are past with respect to the UT. The adjoined COMP, which is indexed as 0, cuts the dependency between two past tenses. It is said that the predicate in the relative clause in (14) and (15) behaves as if it is in a simple sentence and not embedded. Compare (15) with (17):

(16) John died.

(17) [$Comp_0$ [NP [$PAST_i$ [VP (Enç (1987))

Notice that both in (15) and (17), Comp has an index 0, which refers to the UT (644; 1987). The past tense has an index i, which can refer to any point in the past with respect to the Utterance Time (0).

An alternative analysis is presented in Stowell (1996); Stowell proposes that tense phrases (called ZP in his paper) have a pronominal specifier (called PRO-ZP), which has to be controlled by tense bearing elements. In Stowell (1996), different control possibilities correspond to different temporal interpretations. For example, (10) is distinguished from (14) by a syntactic movement (Quantifier Raising of QPs or NPs). PAST UNDER PAST SENTENCES as in (10) cannot have an independent interpretation because they do not include any NPs that can undergo LF movement. The CP argument of an intensional verb always stays in situ; hence, the embedded PRO-ZP is always controlled by the matrix past tense, yielding a real past reading where TT2 precedes TT1. (14), on the other hand, receives an independent reading when the NP undergoes an LF movement, pied-piping the relative clause. After the movement of an NP to a matrix CP, the past tense within the relative clause no longer has any c-commanding controller. By default, PRO-ZPs refer to the UT when they have no controller and a past tense chooses any point in the past with respect to the UT.

Both Enç's and Stowell's theories describe the fact that the past tense in a relative clause behaves as if it is in a simple sentence, whereas the past tense in a complement clause must always refer to the point that precedes the matrix TT. Based on these, it is conceivable that the stimuli in the Complement Clause Experiment (PAST UNDER PAST SENTENCES) are semantically more complex than the stimuli in either the Simple Sentence Experiment or the Relative Clause Experiment.

If children are sensitive to this type of semantic complexity then we predict a contrast between the results of the Simple Sentence Experiment and the Relative Clause Experiment, and the results of the Complement Clause Experiment. This contrast can be observed in two different ways: first, in the percentage of correct responses and second, in the error types for the three conditions.

The second factor that can influence the results of the experiments is the various syntactic positions where a past tense form appears. The experiments in this paper compared three positions: in simple sentences, in complex sentences with complement clauses and in complex sentences with relative clauses. According to Lebeaux (1990, 2000), young children in the face of processing difficulty fail to make use of the rule that adjoins adjuncts, such as relative clauses (Adjoin α). However, these children have less problems with complement clauses, since these are licensed as arguments of verbs. Lebeaux (1990, 2000) distinguishes adjuncts from complements by arguing that adjuncts are not licensed by theta theory and a verb does not subcategorize them. The Projection Principle does not call for the adjuncts to be present at all levels. In the Relative Clause Experiment, the stimuli call for Adjoin α; by contrast, the other two experiments (the Simple Sentence Experiment and the Complement Clause Experiment) do not call for Adjoin α. If syntactic complexity influences children's performance, we should see a clear divergence in the results of the experiments.

The third factor that might influence children's production of past tense is the Lexical Aspect of the verbs used in the stimuli. As briefly discussed in Section 1, Bronckart and Sinclair (1973) show that the trend of the (lexical) Aspect before Tense Hypothesis lasts until the age of 6 in French. We included an equal number of telic and atelic predicates in all three experiments to investigate whether or not the Aspect before Tense Hypothesis is also observed in Dutch with 4-6 year old children.

3 Predictions (by three factors)

In this section, we will summarize how the three factors discussed above (semantic and syntactic complexity and lexical aspect) can influence children's production data.

The first possible outcome pertains to semantic complexity. If it is difficult to produce a past tense that needs to be anchored to a matrix past tense, then children might perform better in the Simple Sentence Experiment and the Relative Clause Experiment than in the Complement Clause Experiment. In other words, if the semantic complexity solely influences children's performance and if it is easier for children to produce a past tense when it is anchored to the UT, we should observe better performance in the Relative Clause Experiment than in the Complement Clause Experiment although the stimuli involved in experiments are syntactically more complex. Or, it is also possible that children show a certain type of error in the Simple Sentence Experiment and the Relative Clause Experiment and another type of error in the Complement Clause Experiment. However, what is crucial here is there should not be an interaction between children's error rate and error pattern as in the third possible outcome.

The second possible outcome pertains to sentence complexity concerning the rule: Adjoin α. The term "complexity" here is related to the formal syntactic analysis; sentences are considered to be complex if they include embedded CPs and even more if these CPs are adjuncts, as opposed to complements. If this type of complexity interferes with children's ability to provide a correct past tense, then we predict that a significant differences among all three experiments. We should observe better performance in the Simple Sentence Experiment than the Complement Clause Experiment, and better performance in the Complement Clause Experiment than the Relative Clause Experiment. By hypothesis, such difficulty is related to the general processing system, where children find it difficult to perform well in the task if the stimuli are hard to process. We also predict that children might come up with strategies to deal with their difficulty. We should find uniform pattern of errors; for example, children to give infinitive or present forms as their strategy to deal with complex structures involving Adjoin α. This prediction does not speak for or against the theory of tense described above.

The third outcome involves an interaction between syntactic and semantic complexity. This would result in children performing in the same manner hierarchically as in the second case (the Simple Sentence Experiment > the Complement Clause Experiment > the Relative Clause Experiment); however, we should see a different error pattern in the Complement Clause Experiment from the Relative Clause Experiment. Children should perform well in the Simple Sentence Experiment, because neither tense anchoring nor sophisticated processing ability is required to interpret a simple sentence. In the Complement Clause Experiment, children should perform worse than in the Simple Sentence Experiment because the stimuli are more complex, and because tense ordering is required. The Relative Clause Experiment should be more difficult still. Children might find adjuncts more difficult to process than complements; however, we might observe the same error pattern between the Simple Sentence Experiment and the Relative Clause Experiment because in both cases, we need to anchor a past tense with respect to the UT.

Finally, if Lexical Aspect of the verbs influences the production data by 4 to 5-year-olds in Dutch, children should produce past tense more often in telic predicate trials in all three experiments. Table 1 and 2 summarize the predictions discussed so far:

Table 1: The prediction of three factors

factor	hierarchy	error type
semantic complexity	Simple Sentence Experiment /Relative Clause Experiment > Complement Clause Experiment	certain type of errors in the Simple Sentence & the Relative Clause Experiments and different type in the Complement Clause Experiment.
syntactic complexity	Simple Sentence Experiment > Complement Clause Experiment > Relative Clause Experiment	some strategies to deal with processing difficulty (uniform in complex trials)
lexical aspect	telic>atelic (in all experiments)	past tense forms found more with telic than with atelic predicates

Table 2: different complexity

complexity type	sentence type	description
(i)semantic complexity	Simple Sentence	past tense must be interpreted with respect to the UT
(ii)semantic complexity	complex sentence with a complement clause	past tense must be interpreted with respect to the TT1 ordering restriction between TT1 and TT2 necessary
(iii)semantic complexity	complex sentence with a relative clause	past tense must be interpreted with respect to the UT No ordering restriction between TT1 and TT2 necessary
(iv)syntactic complexity	Simple Sentence	simple and the easiest
(v)syntactic complexity	complex sentence with a complement clause	more complex than (iv) No need of Adjoin α
(vi)syntactic complexity	complex sentence with a relative clause	more complex than (iv) involves Adjoin α

In the following section, we will introduce the three experiments and discuss which of the possible outcome best explains the results obtained.

4 Simple Sentence Experiment

The goal of the Simple Sentence Experiment was to determine whether 4-5 year olds can supply correct verbs with past tense morphology across different predicate types. Only simple sentences were used so that we can later compare the results from the Complement Clause and the Relative Clause Experiments.

4.1 Method

4.1.1 Subjects

The subjects were twenty two children in total (eleven 4-year-olds (from 4;2-4;11 with a mean of 4;7) and eleven 5-year- olds (from 5;1-5;11 with a mean of 5;5)) plus five adult controls[5]. All children were native speakers of Dutch. Subjects were tested in Utrecht-Nijmegen area basis (elementary) schools.

4.1.2 Materials

Each subject received twelve test trials and nine control trials (total of twenty one trials). The twelve test trials included six telic and six atelic predicates listed in Table 3:

[5] The results from the five adults were 100% correct.

Table 3: The predicates used in the experiments

Dutch	**English**	**Telicity**	**Regular?**
was groen-gestippeld	was green-dotted	Atelic	irregular
had toverkracht	had magic power	Atelic	irregular
had honger	was hungry	Atelic	irregular
waren verdrietig	was sad	Atelic	irregular
een huis bouwden	built a house	Telic	regular
een koekje bakte	baked a cookie	Telic	regular
huppelde	Hopped	Telic	regular
piepte	Beeped	Telic	regular

4.1.3 Procedure

An Elicited production task (modeled on van Hout (1996) (following Berko (1958)) was used to elicit a certain sentence type (here, a simple sentence) involving telic or atelic predicates. Two experimenters were involved in the experiment. The first experimenter told a story using pictures from a picture book; the second experiment played the role of a 'forgetful puppet'. After each story, the 'forgetful puppet' related what had happened in the story but sometimes she forgot what she was going to say. Children were asked to help the puppet complete the sentence, or to reward the puppet when she was able to say the whole sentence. Children gave stickers to the puppet when she successfully completed a sentence without help; these completed trials served as filler sentences. We exploited the fact that in Dutch the finite verb appears sentence-finally in embedded sentences. The target is listed in (18) with a picture from the picture book; the intended target verb is given in parentheses:

(18) De kat (vloog)
The cat (flew)
'The cat flew'

One child at a time was tested in a separate room. It took 20 minutes to run each session but children were reminded that they were allowed to go back to their classroom whenever they wanted to. The sample response in this experiment is in (19):[6]:

(19) Exp 1: this is a story about a boy and a girl. They are going for a walk in the Magic Forest. There are many special things happening there. Look, here, they are getting near to a very old tree. It is a magic tree. The boy and the girl like to dance around the tree. Look, they are done now; they are standing still by the tree.
Exp 2 (a puppet): Ze dansten. (filler)
They danced.
Child: Yes, the puppet gets a reward!
Exp 1: Because of the dancing, the tree is going to sing a song. It is a real Magic Tree!

[6] All stories were given in Dutch but here, for convenience, the target sentence is given in Dutch and the rest of the stimuli are given in English.

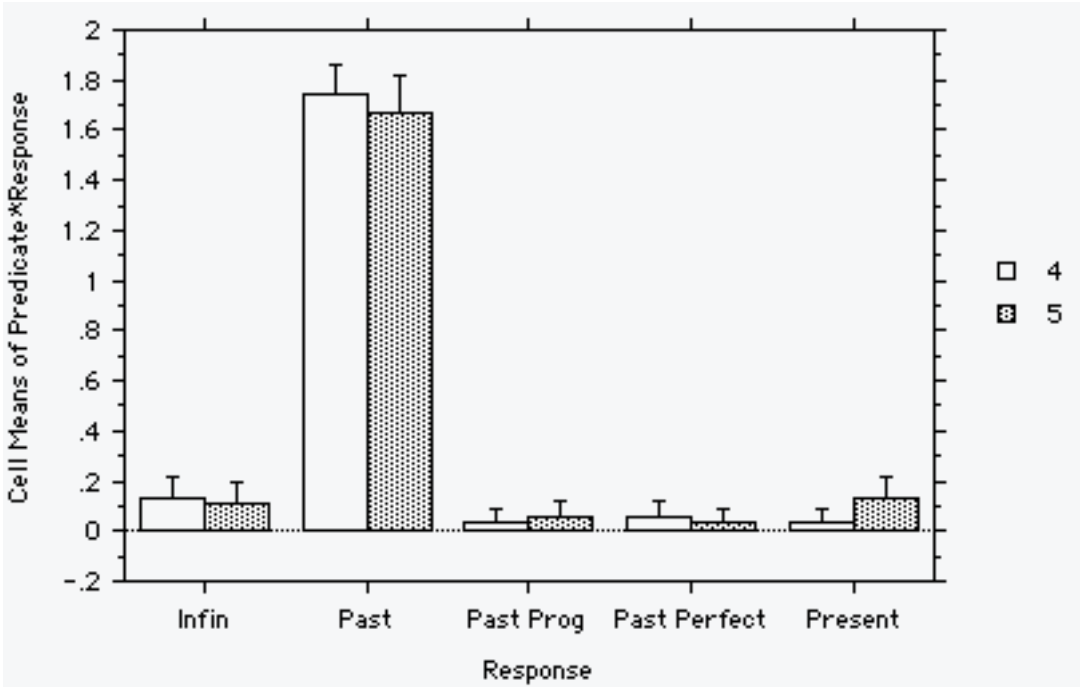
Now, the singing is over and the boy and the girl are moving on[7]. (turn the page)
Exp 2: De boom …ummm…
The tree…ummm…
Child: zong een liedje!
sang a song!

The responses were recorded on an answer sheet as well as audio-taped. It was irrelevant for us to elicit the exact lexical item. We scored a response as 'correct' if it contained a verb with a past tense morphology or a present perfect.[8] Responses were scored correct even when children morphologically overregularized irregular verbs[9].

4.2 Results

As shown in Figure 1, overall, children performed very well in this experiment. The overall percentage correct was 85.5%. 4-year-olds performed 84.85% correct; surprisingly, 5-year-olds perfo rmed a little worse with 79.55% correct.

Figure 1: Simple Sentence Experiment (Response types given by 4 and 5-year-olds)



As shown above, most of the errors children made were to produce verbs with an infinitive marking instead of a past tense. Children had most success with accomplishment predicates (95.5% correct) and the least success with activity verbs (75% correct). The most common

[7] We made it clear that the events were completed and in the past. All stories included the sentence saying "now, they finished …" or "they are done with…" and we also turned a page to show that the event took place in the past.

[8] In Dutch, either a present perfect or a simple past form is used interchangeably for the cases where a simple past is used in English. However, the Dutch children mostly used past tense except for a few cases.

[9] The 12 verbs used in the experiment included 4 regular and 8 irregular (as shown in Table 3). Birdsong (p.c) July 2nd, 2002) suggested that one might expect to see a difference in children's performance depending on whether the verbs are regular or not; however, such a tendency was not observed.

errors involved producing an infinitive marking with activity verbs (15.9%) and producing a present tense marking with achievement verbs (9%).

4.2.1 Analysis

The results of the Simple Sentence Experiment were entered into separate (subjects and items) analyses of variance (ANOVAs). For the subjects ANOVA, there was one between-subject variable: age (levels=2) and one within-subject variable: telicity (levels =2). For the items ANOVA, there was one between-cases variable: telicity (levels 2) and one within-cases variable: age 4 or 5 year olds (levels 2). In all cases, the dependent variable was the percentage of correct responses.

4.2.2 Analyses of the results

The subject ANOVA revealed no effect of age: ($F(1, 21)=.652$, $p=.429$). There was a marginal effect of telicity:($F (1, 21)=3.735$, $p=.0675$) but no interaction between age and telicity:($F (1, 21)=.031$, $p=.8623$). The item ANOVA revealed no effect of telicity ($F (1, 11)=.1217$, $p=.2957$) or age (($F (1, 11)=1.109$, $p=.3172$). There was no interaction between telicity and age: ($F (1, 11)=.023$, $p=.8834$)

4.3 Discussion

As predicted, the Simple Sentence Experiment was easy for both 4 and 5-year-olds. They managed to produce correct past tense markings in telic as well as atelic trials. Occasional errors included supplying various markings such as infinitive, past progressive, past perfect and present; however, infinitives were the most common mistake. There was no trend of Aspect before Tense observed in the responses.

5 Complement Clause Experiment

In the second experiment, we investigated whether children find it more difficult to supply correct verbs with past tense markings in a complement clause. As discussed in Section 3, children might find this experiment more difficult than Simple Sentence Experiment, either because the structure involved is more complex, or because children have to possess knowledge of the temporal anchoring mechanism between a main and an embedded finite verb, or for both of these reasons.

In principle, the presence of a matrix predicate with a past tense could facilitate or hinder correct responses. The presence of a matrix predicate might facilitate a correct response since if children paid attention to the verb form, they would just have to copy the tense to succeed. Alternatively, it could interfere with a correct response if temporal anchoring is difficult, or if children decide that a temporal marking in an embedded clause is not obligatory as discussed concerning the example in (8).

5.1 Method

5.1.1 Subjects

The subjects were thirteen children (six 4-year-olds (from 4;2-4;9 with a mean of 4;7) and seven 5-year-olds (from 5;1-5;11 with a mean of 5;5)) plus five adult controls. Subjects were all native speakers of Dutch and they were tested in Utrecht-Nijmegen area basis (elementary) school.

5.1.2 Materials

The predicates used were identical to those in the Simple Sentence Experiment (six telic and six atelic predicates). The experiment included twenty one total trials (twelve test trials plus nice control trials).

5.1.3 Procedure

The procedure was the same as the Simple Sentence Experiment (an elicited production task). As discussed in 4.1.3, the first experimenter told a story using a picture book; however, in this experiment, the first experimenter took a role of the monkey, a storyteller, to elicit a sentence that started with "the monkey said that—." We made sure that the differences made between this and the Simple Sentence Experiment were kept to a minimum except that the first experimenter, who told stories to the children, pretended to be a monkey. A sample sentence from this experiment is given in (20):

(20) De aap zei dat het meisje de trap (op liep)
The monkey said that the girl the stairs up walked
'The monkey said that the girl walked up the stairs.'

This procedure showed more control than the "question-answer" task used in Hollebrandse (1999), in which the child was asked to answer a question such as "what did the monkey say". In such a task, if a child answers "the girl walked up the stairs" or just "walk up the stairs", it is very difficult to tease apart whether children are using direct or indirect speech. In the present experiment, all children were asked to do was to supply a verb; children were not given any freedom to use a "direct" quotation due to the presence of a complementizer: "that" as well as due to the word order. If it is a direct quotation, (20) should look like (21):

(21) De aap zei "het meisje liep de trap op".
The monkey said the girl walked the stairs up
'The monkey said "the girl walked up the stairs".'

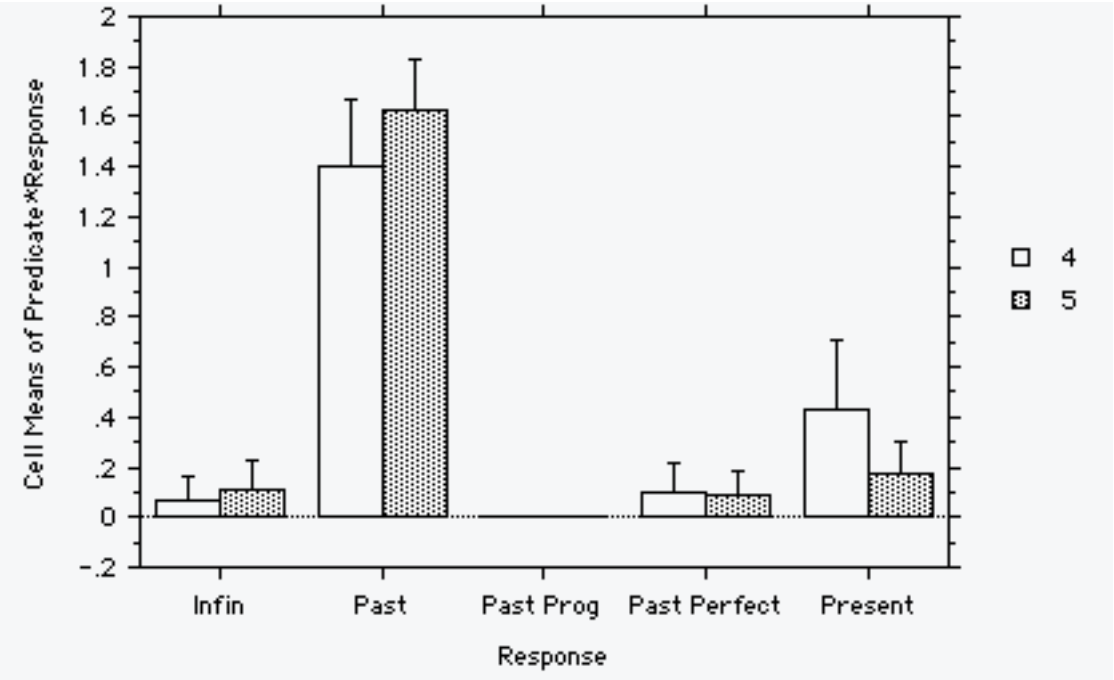
A sample response of the Complement Clause Experiment is given in (22):

(22) Exp 1 (a monkey): Look, here is a man. He is a bit sad. But look, he sees a piano and he is happier! He likes pianos very much. (turn the page)
Exp 2 (puppet): De aap zei dat de man verdrietig…
The monkey said that the man sad
Child: was!
Exp 2 (puppet): En de aap zei ook dat de man piano's heel mooi vindt.
And the monkey said also that the man pianos very much liked
' 'and the monkey also said that the man liked pianos very much.'
Child: Yes, the puppet did a good job this time!
Exp 1 (monkey): Look, he is going toward the piano and he starts to play! He plays a couple of songs. Now he is very happy and walking away. (turn the page)
Exp 2 (puppet): De aap zei dat de man piano ….
The monkey said that the man piano ….
Child: speelde.
played

5.2 Results

The overall results in Figure (Total of 79.1% correct) seem only slightly worse compared to the Simple Sentence Experiment; however, the results look quite different when analysed according to age. (67.86% correct for 4-year-olds and 83.67% correct for 5-year-olds).

Figure 3: Complement Clause Experiment (Response types given by 4 and 5-year-olds)



As in the Simple Sentence Experiment, children's errors included supplying various markings:infinitive, past perfect and present tense. Here again, accomplishment predicates produced the best performance (82% correct). Figure 3 makes it clear that the common error that the children made was to supply a present tense marking instead of a past tense marking.

5.2.1 Analyses of the results

The subject ANOVA showed that the effect of age was not significant: ($F(1, 12)=1.747$, $p=.2061$); the effect of telicity was also not significant: ($F(1, 12)=1.173$, $p=.2959$). There was an interaction between age and telicity: ($F(1, 12)=7.27$, $p=.0166$). The item analysis showed an effect of telicity: ($F(1, 11)=8.115$, $p=.0173$). The effect of age was marginally significant: ($F(1, 11)=3.817$, $p=.0793$); however, an interaction between telicity and age was not significant: ($F(1, 11)=.603$, $p=.4553$).

5.3 Discussion

The results of this experiment diverged from that of the Simple Sentence Experiment in two ways. First, overall, the younger children performed worse in this experiment compared to the Simple Sentence Experiment. Second, the error pattern in Figure 3 shows that most of the errors (up to 33% for stative predicates, among 4-year-olds) included the production of present tense forms. This contrasts with the error pattern seen in the Simple Sentence Experiment, where most errors were infinitival forms.

There are at least two possible interpretations of the frequent usage of a present tense in this experiment. The first interpretation is related to the difference between so-called Sequence of Tense and non-Sequence-of-Tense languages and how they represent an overlapping

interpretation. As already discussed in Section 3, in Dutch and English (SOT languages) an embedded past tense with a stative predicate is ambiguous:

(23) John said that Bill was happy.

(24) Jan zei dat Bill gelukkig was.

In (23) and (24), there is a reading where Bill was happy at the time of John's saying so (overlapping) or Bill was happy before John said so (real past). Non-SOT languages (Hebrew, Japanese, Polish, Russian and others), however, do not have an overlapping reading in PAST UNDER PAST SENTENCES (see (25)):

(25) John-wa Bill-ga shiawase-datta to itta
John-Top Bill-Nom happy-was that said

(25) only has a real past interpretation (where Bill was happy before John said so).

There have been many proposals how this difference arises (see Enç (1987), Ogihara (1996), Stowell (1996) among others). Stowell (1996), for example, takes a lexical view and argues that English past tense is ambiguous between "real" and "null" past; however, Japanese past is a real past.

According to the Semantic Subset Principle as interpreted by Crain and Lillo-Martin (1998), it is conceivable that English and Dutch children start out with the grammar where past tense is "real" as in Hebrew, Japanese, Polish, or Russian. This could explain why Dutch children used present tense in the Complement Clause Experiment in an overlapping scenario (see (22)). For young Dutch children, the past tense strictly means "past" as in simple sentences and they use a present tense to represent overlapping interpretation. Later, Dutch children find out in certain syntactic positions the past tense is ambiguous between "real" and "null" past through positive data; they start using past tense more often in the Complement Clause Experiment when they reach 5 years old (see Figure 3). This idea presupposes that 4-year-olds know that this is a complex structure and that the first past tense c-commands the second past tense but what they do not know is the ambiguity of the past tense morpheme. If 4-year-olds do not know that the stimuli in the Complement Clause Experiment are complex and involve c-command, then there is no account for the difference in their responses in the Simple Sentence Experiment and Complex Clause Experiment. It should not be surprising even if children use more infinitive markings in Complex Clause Experiment.

Notice that it cannot be that children incorrectly expect it to have only one tense in a complex sentence (compatible with the examples in (8)). This possibility does not hold because children are using present tense markings in an embedded clause instead of infinitive. Moreover, the children did not just copy the tense of a matrix predicate.

6 Relative Clause Experiment

In the final experiment, we tested another type of complex sentence, this time involving a relative clause. The stimuli used here are syntactically more complex than the ones in the Complement Clause Experiment because they involve an adjunction structure. As discussed above, Lebeaux (1990, 2000) observes that children's grammars are different from adults' with respect to the rules governing adjunction (Adjoin α). Lebeaux seeks to account for the fact that young children face problems in interpreting relative clauses reported in Tavakolian

(1978). Tavakolian shows that children between 3;0 and 5;6 tend to interpret sentences such as (26) as though they were conjoined clauses as in (27):

(26) The sheep kissed the monkey who tickled the rabbit.

(27) The sheep kissed the monkey and tickled the rabbit.

Lebeaux (1990, 2000) proposes that children have a problem with rule Adjoin-α; as a consequence, they treat all adjunct clauses as conjuncts. If children have a problem with " Adjoin-α", then they should face some difficulty in this experiment.

6.1 Method

6.1.1 Subjects

The subjects were thirteen children (six 4-year-olds (from 4;6-4;11 with mean of 4;7) and seven 5-year-olds (from 5;1-5;11 with a mean of 5;6)) plus five adult controls. Subjects were all native speakers of Dutch and they were tested in Utrecht-Nijmegen area basis (elementary) school.

6.1.2 Materials

The predicates used were identical to those in the Simple Sentence Experiment and the Complement Clause Experiment (twelve different predicates—two from six different predicate types). The experiment included twenty one total trials (twelve test trials plus nine control trials).

6.1.3 Procedure

The procedure was the same as in the Simple Sentence Experiment and the Complement Clause Experiment. The first experimenter told a story using a picture book; and the second experimenter played a role of a forgetful puppet. The children were encouraged to help the forgetful puppet. There was no difficulty in eliciting the target predicates. A sample sentence from this experiment is given in (28):

(28) Er was een heel rare hond die groen gestippeld (was).
There was a very strange dog that green dotted was
'There was a very strange dog that was dotted green.'

The experiment proceeded as in (29):

(29) Exp 1: The boy and the girl are walking in the magic forest and look, there is a very weird dog! "I am green - dotted!" says the dog. Then he disappears through the trees. (turn the page)
Exp 2 (puppet): Er was een heel rare hond die groen gestippeld…
There was a very strange dog that green striped…
'There was a very strange dog that … green striped."
Child: was!
Exp 1: They see a dwarf in the grass. He says: "I am building a house. Can you give me a hand? It is almost finished." "Come on, let's help him" says the girl to the boy.
Exp 2 (puppet): I know, the boy and the girl helped the dwarf.
Child: Yes! You did well so you get a sticker!

Exp 1: Now they are finished building the house. The dwarf house is finished; the boy and the girl are walking on. (turn the page)

Exp 2 (puppet): De jongen em het meisje zagen de kabouter die een huis…
The boy and the girl saw the dwarf that a house
"The boy and the girl saw the dwarf that … a house."

Child: bouwde.
built

6.2 Results

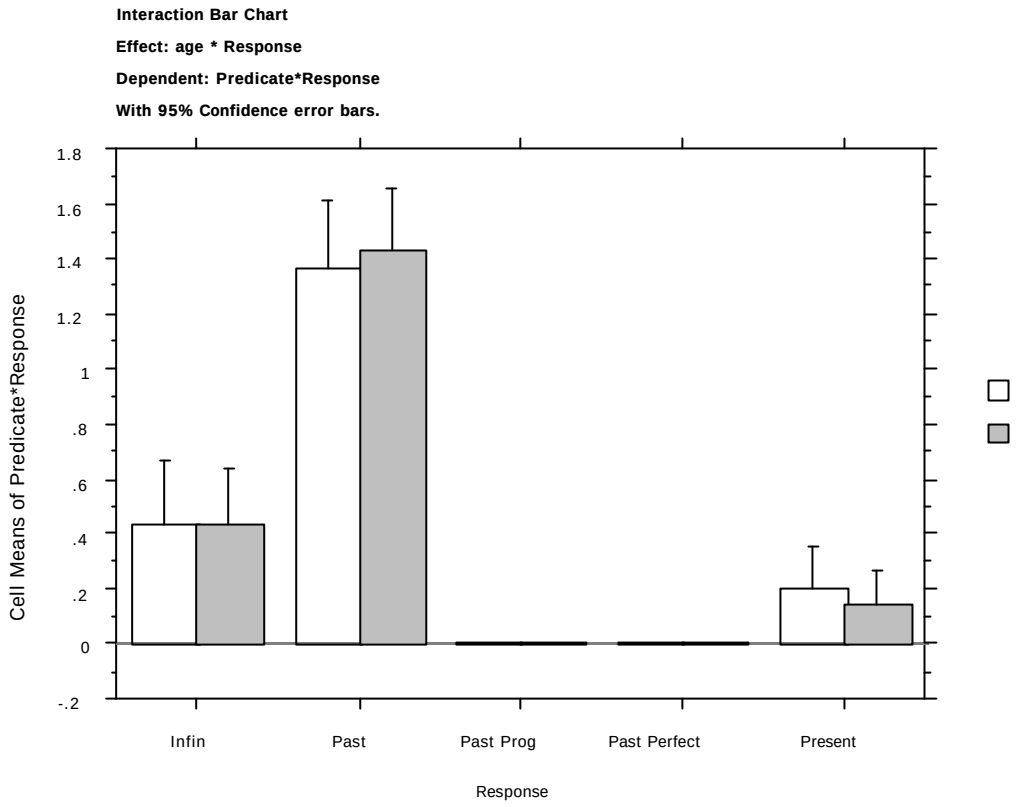
The total percentage correct for this experiment was 67.7%, which was the worst among the three experiments introduced in this paper (see Figure 4).

6.2.1 Analyses of the results

The subject ANOVA revealed no effect of age: $F(1, 12)=.328$, $p=.5753$). There was no effect of telicity: $F(1, 12)=.081$, $p=.78$) or no interaction between age and telicity: $F(1, 12)=.349$, $p=.5635$). An items analysis showed no effect of telicity, age or an interaction between the two.

6.3 Discussion

The result of this experiment was different from both in the Simple Sentence Experiment and the Complement Clause Experiment. Neither 4 nor 5-year-olds performed well. The error pattern was also different: there was no production of past progressive or past perfect markings. When children made errors, they used infinitives more often than present tense markings as they did in the Simple Sentence Experiment (see Figure 4).



7 General Discussion

7.1 Overall results

The results of the three experiments were entered into one meta-analysis of Subjects and Items ANOVAs. For the subjects ANOVAs, there were two between-subject variables: age (levels=2) and experiment (levels=3) and one within-subject variable: telicity (levels =2). For the items ANOVAs, there was one between-cases variable: telicity (levels=2) and two within-cases variable: age 4 or 5 year olds (levels=2) and experiment (levels=3). In all cases, the dependent variable was the proportion of correct responses.

7.1.1 Analyses of the results

The subject ANOVA revealed no effect of age: ($F(2, 47)=1.502$, $p=.2272$) but there was a marginal effect of experiment (on correctness): ($F(2,47)=2.838$, $p=.0698$). There was no effect of telicity: ($F(2,47)=.028$, $p=.8682$). There was a marginal interaction of experiment and age): ($F(2,47)=2.535$, $p=.0914$). The items ANOVA revealed no effect of experiment: ($F(2,34)=2.319$, $p=.1147$) or telicity: ($F(2,34)=2.013$, $p=.9915$).

7.2 Discussion

The results of the three experiments (see Figure 5) suggest that both structural complexity and temporal complexity influence children's performance. Both 4 and 5-year-olds performed well in the Simple Sentence Experiment; only 5-year-olds performed well in the Complement

Clause Experiment , while neither 4 nor 5-year-olds performed well in the Relative Clause Experiment.

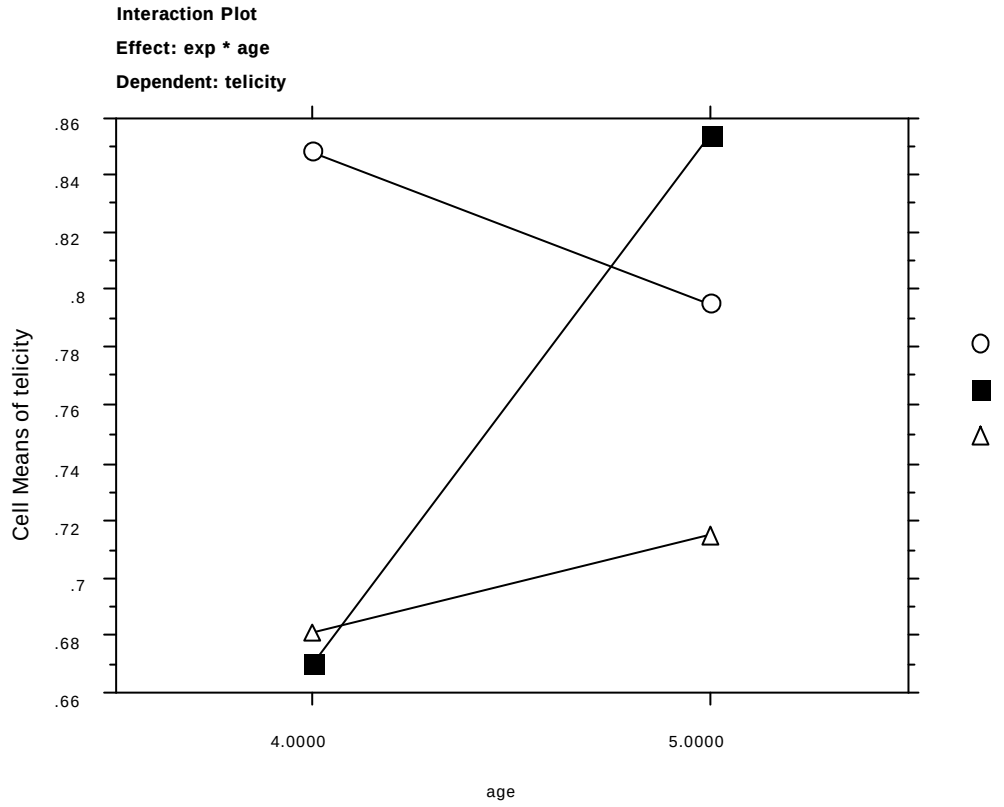


Figure 5: 3 experiments combined (Response types given to different predicate types)

The Relative Clause Experiment was most difficult because it included a CP adjunct. As discussed in Section 5.3, the drastic difference on responses given by 4-year-olds and 5-year olds on the Complement Experiment is best explained by the lexical learning of a past tense taking place between 4 and 5 years of age. Temporal complexity influenced children's production of infinitive verbs in the Simple Sentence and the Relative Clause Experiments.

Besides the structural influence, we investigated whether Aspect before Tense hypothesis was observed with 4 and 5-year-old Dutch children (as found in Bronckart and Sinclair (1973). There was no effect of telicity in the analyses; Table 4 shows the contrast between the proportion of correct responses in telic and atelic trials and Figure 6 represents the contrast graphically:

Table 4: Percentage correct for telic vs. atelic predicates

	telic	atelic
Simple Sentence Experiment	86.4	80.9
Complement Clause Experiment	74.4	85.6
Relative Clause Experiment	64.1	73.08

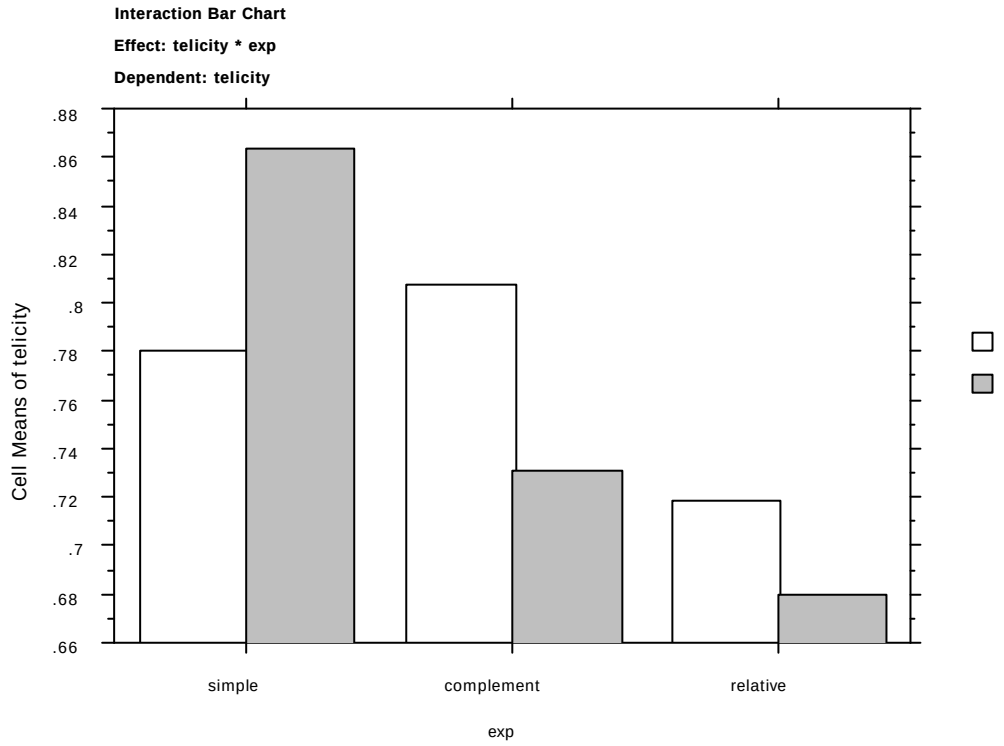


Figure 6: Interaction between Telicity and Experiment (3 experiments combined)

If the effects of Aspect before Tense hypothesis are still observed in this age group, we would predict that children might give correct answers more often with telic predicates[10]. As Table 4 and Figure 6 make clear, children performed slightly better with telic predicates in the Simple

[10] In the experiments reported here, the punctual predicates behaved in a strange way. Shirai and Andersen (1995) report that children mainly use a progressive morpheme with punctual predicates in English. The representative utterances from Naomi are something like (i):

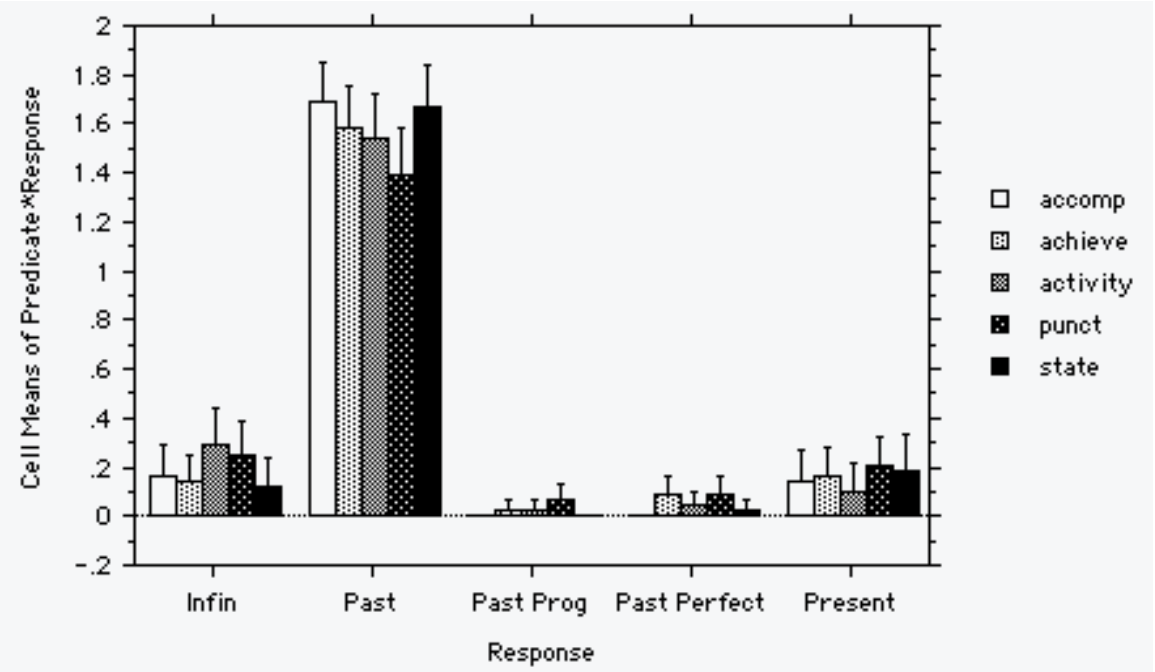
(i) Punctual verbs: flopping around, ju mping

However, Dutch children tested here produced many instances of past perfect with punctual predicates. This goes against the prediction considered in the Introduction where 4 and 5-year-old Dutch children show an effect of the Aspect before Tense hypothesis.

Sentence Experiment; however, the reverse was true in the Complement Clause and the Relative Clause Experiments. We conclude that Telicity did not influence the performance of the Dutch children in these experiments with this age group. Other characteristics of the verbs such as regular vs. irregular; frequent vs. infrequent did not influence children's performance at all (see Appendix).

Figure 7 shows the results classified according to Vendler's classification. The children performed best with accomplishment and stative predicates but performed relatively poorly with punctual predicates.

Figure 7: 3 experiments combined (Response types given to different predicate types)



7.3 Development

One of our research questions was to investigate whether there is any development in past tense production across different age groups. Figure 5 makes it clear that there is a difference between 4 and 5-year-olds. What distinguishes them is that 4-year-olds do not seem to share an adult interpretation of a past tense. Below, I will explain the results from 4 and 5-year-olds separately. First, 5-year-olds performed well in the Simple Sentence Experiment; they performed much better than 4-year-olds in the Complement Clause Experiment. I proposed that this was the case because 5-year-olds have expanded the semantics of past tense through positive data. Unlike Experiments 1 and 2, 5-year-olds performed poorly in the Relative Clause Experiment. Both syntactic and semantic complexities must have influenced their performance. The children found the stimuli in the Relative Clause Experiment too complex because they involved adjunct CPs. Their error pattern showed the influence of the semantic complexity. When the children relate the TT of an event to the UT, they produce more infinitive markings (the Simple Sentence and the Relative Clause Experiments).

As for 4-year-olds, they performed well only in the Simple Sentence Experiment and not in the Complement Clause and the Relative Clause Experiments. However, as was the case with 5-year-olds, the error patterns in the Complement Clause and the Relative Clause Experiments were very different. The syntactic complexity view alone cannot explain the

results because it predicts that children should produce the same type of errors across the board. Children must know that there is a difference between the two types of embedded clauses: complements and adjuncts. We raised one explanation that is compatible with these results; 4-year-olds know that the temporal anchoring is necessary in the Complement Clause Experiment but they overproduce a present tense marking because their semantics of a past tense is very restricted and does not include an overlapping interpretation. What is clear is that neither 4 nor 5-year-olds have an adult interpretation of adjunct CPs in the Relative Clause Experiment.

Based on the results, I suggest that children must go through a two-fold development to perform well in the experiments (or more generally, to correctly produce a verb with a past tense in embedded clauses). First, they must acquire the complex semantics of past tense. A past tense does not always denote the event in the past; a past tense in a complement clause can denote that the events are overlapping. Second, children must possess a matured processing ability for CP adjuncts (Adjoin α). They must be able to assign all possible temporal interpretations to complex sentences with relative clauses.

7.4 Production Errors

There are two interesting observations in the error analysis. First, in these three experiments, an inverse relationship was observed between how well children performed and how many different types of error they produced. The Simple Sentence Experiment included the lowest error rate (14.5% incorrect); however, it included four error types: infinitive form, present tense, past progressive and past perfect. The Complement Clause Experiment included more errors (20.9%) and it included three error types: infinitive form, present tense and past perfect. Finally, the Relative Clause Experiment had the greatest number of errors (30%) overall, but only two error types: infinitives and present tense forms.

There is no principled reason found for these observations. One possibility, however, is that children were adopting a different strategy in the Relative Clause Experiment. The impression gained is that in the Relative Clause Experiment, the structure was so complex syntactically that children adopted with a specific response strategy to respond in these questions—just by supplying past tense, infinitive or present tense markings (compared to supplying five different forms in the Simple Sentence Experiment). Tables 8 and 9 summarize the discussion in Section 8.

Table 8: The results of the three experiments

age	hierarchy	characteristics
4-year-olds	Simple Sentence Experiment>Complement/ Relative ClauseExperiments	difficulty with an overlapping interpretation of past tense difficulty with Adjoin α different error pattern between Complement and Relative Clause Experiments
5-year-olds	Simple Sentence /Complement Clause Experiments > Relative Clause Experiment	difficulty with Adjoin α different error pattern between Complement and Relative Clause Experiments

Table 9: different complexity types and the results

complexity type	sentence type	description	How are comlexity types manifested in the results?
(i) semantic complexity	Simple Sentence	past tense must be interpreted with respect to the UT	40.6% of the overall errors were to give infinitive markings
(ii) semantic complexity	complex sentence with a complement clause	past tense must be interpreted with respect to the TT1 ordering restriction between TT1 and TT2 necessary	Errors included many present tense markings (39.3%)
(iii) semantic complexity	complex sentence with a relative clause	past tense must be interpreted with respect to the UT No ordering restriction between TT1 and TT2 necessary	66.6% of the overall errors were to give infinitive markings
(iv) syntactic complexity	Simple Sentence	simple and the easiest	85.5% correct
(v) syntactic complexity	complex sentence with a complement clause	more complex than (iv) No need of Adjoin α	78.8% correct
(vi) syntactic complexity	complex sentence with a relative clause	more complex than (iv) involves Adjoin α	67.7% correct

8 Conclusion

The experiments reported here shows that both semantic and structural complexity greatly influenced children's past tense production. The structural complexity here is not based on the number of subjects and predicates but whether or not a CP is a complement or an adjunct. The varying patterns of errors across sentence-type were also revealing. For the Complement Clause Experiment, where children used a relatively high proportion of present tense forms, we discussed the theoretical possibility that Dutch children initially have more restricted semantics of the past tense as found in other non-SOT languages.

Furthermore, the results showed that the aspectual property of telicity does not influence children's production of a past tense at this stage of the development unlike the findings in

Bronckart and Sinclair (1973). Also, other characteristics of the verbs such as regularity or frequency did not influence the results at all.

Finally, the systematicity of children's production errors casts doubt on the claim that children form their grammar only through the input. If children learn when to supply a past tense just from the input, there is no account for why the children used a present tense so often in the Complement Clause Experiment and not in the Relative Clause Experiment.

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Appendix 1

I. Results of Experiments 1-3 (Vendler's predicate types)

Table 1: Simple Sentence Experiment (percentage correct)

	accomp	achieve	activity	punctual	states	total
Simple Sentence Experiment	95.5	79.5	75.0	84.1	93.2	85.5

Table 2: Complement Clause Experiment (percentage correct)

	accomp	achieve	activity	punctual	states	total
Complement Clause Experiment	84.1	77.3	86.4	59.1	88.6	78.8

Table 3: Relative Clause Experiment (percentage correct)

	accomp	achieve	activity	punctual	states	total
Relative c Clause Experiment	65.4	76.9	76.9	61.5	69.2	68

II. Results of three Experiments (response types (%))

	infinitive	past	past progressive	past perfect	present
Simple Sentence Experiment	5.91	85.45	2.27	2.27	4.09
Complement Clause Experiment	7.95	78.79	0	4.92	8.33
Relative Clause Experiment	21.53	67.69	0	0	8.46

III. Error types (different predicates)

	verb type	infinitive	past	past prog	past perf	present
Simple Sentence Experiment	accomp	0	95.45	0	0	4.55
	achieve	4.54	79.55	2.27	4.55	9.09
	activity	15.9	75	2.27	4.54545	2.27
	punctual	6.82	84.1	6.82	0	2.27
	states	2.27	93.18	0	2.27	2.27
	total	5.91	85.45	2.27	2.27	4.09
Complement Clause Experiment	accomp	5.55	82.1	0	4.55	7.82
	achieve	21.45	75.27	0	0	3.27
	activity	5.55	75.27	0	13.64	5.55
	punctual	5.55	84.36	0	0	10.1
	states	12.36	57.1	0	11.36	19.18
	total	7.27	78.83	0	0	14.09
Relative Clause Experiment	accomp	7.95	78.79	0	4.92	8.33
	achieve	26.92	65.38	0	0	7.69
	activity	15.38	76.92	0	0	7.69
	punctual	23.08	76.92	0	0	0
	states	26.92	50	0	0	11.54
	total	17.38	67.73	0	0	15.38

IV. Frequency of stimuli[11]

The utterances by two Dutch children in the CHILDES database (van Kampen corpus) (MacWhinney and Snow (1990)) were searched to see how frequent the verbs used in the experiments are. We searched for all possible forms of the verbs.

verb	frequency
bake	101
beep	11
build	58
fly	151
have	2153
hop	1
be	5379
jump	23
sing	39
walk	77

The nonparametric correlational analysis (Spearman's Rho) showed no effect of frequency on the proportion of correct responses (p.=.291)

[11] I am grateful for Birdsong (p.c.) for raising this point about frequency.

Appendix 2: List of fillers

INTRODUCTION (PICTURE 0)

This is a story about a boy and a girl. They are going for a walk in the Magic Forest. There are very special things happening there. Now they are on their way.

F. Puppet: They went for a walk

PICTURE 2

Now they are getting to a very old tree. It is a magic tree. The boy and the girl dance around it. When they are done, they are standing still again.

F. Puppet: They danced.

PICTURE 4

The boy and the girl are walking on. They hop on one leg.

F. Puppet: He hopped (on one leg)

PICTURE 5

There is a field (of grass). There is a unicorn standing in it, and he doesn't look happy. "How sad, he cries!" says the boy to the girl.

F: Puppet: The unicorn cried.

PICTURE 6

Now they are getting to a very high tree. You can climb it. When you're at the top, you can see everything that is happening in the forest.

F. Puppet: On the top they saw everything that happened.

PICTURE 7

They see a dwarf, in the grass. He says: "I am building a house. Can you give me a hand?

It is almost finished." "Come on, let's help him" says the girl to the boy.

F. Puppet:They helped the dwarf..

PICTURE 9

Over there are two dwarfs. They are clapping their hands. Suddenly, they stop.

F: Puppet: The dwarfs clapped their hands

PICTURE 11

In front of the boy and the girl is a squirrel. The squirrel climbs high in the ladder-tree.

F:Puppet: The squirrel *climbed high in the tree*

PICTURE 12

The boy and the girl are getting to the edge of the forest. It was very nice in the Magic Forest, but now they are going home, to tell about the beautiful things they saw in the forest.

F. Puppet: The boy and the girl went home.

The use of aspect in Czech L2

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Abstract

The focus of the present paper is on the difference between English and German learners' use of perfectivity and imperfectivity. The latter is expressed by means of suffixation (suffix *-va-*). In contrast, perfectivity is encoded either by suffixation (*-nou-*) or by prefixation (twenty different prefixes that mostly modify not only aspectual but also lexical properties of the verb).

In the native Czech data set, there is no significant difference between the number of imperfectively and perfectively marked verb forms. In the English data, imperfectively and perfectively marked verb forms are equally represented as well. However, German learners use significantly more perfective forms than English learners and Czech natives. When encoding perfectivity in Czech, German learners prefer to use prefixes to suffixes. Overall, English learners in comparison to German learners encode more perfectives by means of suffixation than prefixation.

These results suggest that German learners of Czech focus on prefixes expressing aspectual and lexical modification of the verb, while English learners rather pay attention to the aspectual opposition between perfective and imperfective. In a more abstract way, the German learner group focuses on the operations carried out on the left side from the verb stem while the English learner group concentrates on the operations performed on the right side qfrom the verb stem.

This sensitivity can be to certain degree motivated by the linguistic devices of the corresponding source languages: English learners of Czech use imperfectives mainly because English has marked fully grammatical form for the expression of imperfective aspect - the progressive *-ing* form. German learners, on the other hand, pay in Czech more attention to the prefixes, which like in German modify the lexical meaning of the verb. In this manner, Czech prefixes used for perfectivization function similar to the German verbal prefixes (such as *ab-*, *ver-*) modifying *Aktionsart*.

1 The aspectual system of the target language

Czech has developed a systematic method for *aspect* marking: it is marked by morphological devices on the verb root or stem. These devices are grammaticalized and in many cases still productive. The difficulty seems to be that aspect is not a pure grammatical category, and as we will see later it is not easy to distinguish between morphological means and word formation means (cf. perfectivization via prefixation).

It is traditionally assumed that a Czech verb, aside from a few exceptions, exists in two forms (Karlík et al. 1995, Short 1993, Petr et al. 1987): *perfective* (Perf) and *imperfective* (Imperf).

> In Czech, most verbs appear in two or three forms which do not differ in their basic lexical meanings but rather in their aspect. (Petr et al. 1987: 179)

Because of this dichotomy it is often assumed that many though not all Czech verbs form so-called *aspectual pairs*. A pair consists logically of two forms, a *perfective* and an *imperfective*

form. The fundamental difference between the two forms is aspect. This difference is considered to be grammatical.

The claim that every Czech verb is either *perfective* or *imperfective* and that the main pattern within the aspect domain is aspectual pairing, immediately raises the question: How does the speaker (or a learner!) know that a particular verb form is Perf or Imperf?

Assuming that a grammatical category, such as the Czech aspect, is based on a mapping between a particular form and particular function(s), two answers are possible:

The categories Perf and Imperf are based on an explicit **formal** marking represented by any type of verbal inflectional morphology (such as a prefix) or by some other morphosyntactic device. In this sense, the meaning connected to each aspect can cover an entire range of variants. That means that only the formal contrast matters.

The categories Perf and Imperf are based on a specific **meaning** such as "degree of completion", which characterizes each category in a unique way. These semantic features might, depending on context, vary to some extent but they must be stable enough so that one can clearly differentiate between Perf and Imperf.

To start off, we concentrate on the form-based possibility: the distinction between Perf and Imperf is based on an explicit formal marking. For this reason, we need to outline the way in which verbs in Czech are assigned aspectual interpretation or are overtly marked for aspect.

Simplex verbs
Simplex verbs are verb forms that are not morphologically marked for aspect. Most simplex verbs are *imperfective* (e.g. psát 'to write'). However, there is also a small group of simplex *perfective* verbs (e.g. *dát* 'to give'). Additionally, some simplex verbs are ambiguous between Perf and Imperf (e.g. *jmenovat* 'to name/to appoint').

Verbal prefixes
A large set of *prefixes* can be used in order to form a *perfective* verb. These prefixes are: 1. *do-*, 2. *na-*, 3. *nad*(*e*)-, 4. *o-*, 5. *o*/*ob*(*e*)-, 6. *od*(*e*)-, 7. *po-*, 8. *pod*(*e*)-, 9. *pro-*, 10. *pøe-*, 11. *pøed*(*e*)-, 12. *pøi-*, 13. *roz*(*e*)-, 14. *s*(*e*)-, 15. *u-*, 16. *v*(*e*)-, 17. *vy-*, 18. *vz*(*e*)-, 19. *z*(*e*)-, 20. *za* (Karlík et al 1995: 199ff).

Each of them is associated with a cluster of meanings, most of them exhibit polysemy and homonymy, and the realization of a given meaning of a prefix is highly dependent on the context in which the prefix occurs. Four main possibilites can be observed here.

(1) The verbal prefix modifies the underlying meaning of the verb in a characteristic way. Thus it regularly makes the verb, for instance, inchoative (*roz-esmát* 'to start laughing'), resultative (*do-psat* 'to write to an end'), etc. In other words, these prefixes not only lead to *perfective* aspect but also introduce a specific *Aktionsart* to the verb. Note that depending on the verb, one and the same prefix can express different types of *Aktionsart*.

(2) The verbal prefix not **only** modifies the aspectual properties but also influences the lexical semantics of a verb: malovat vs na-malovat 'to draw vs to finish drawing something', zvonit vs za-zvonit 'to ring a bell vs to ring a bell once'. As described above, the same prefix can also be used for Aktionsart-alternation (e.g. only aspectual modification: vy-cvièit psa 'to complete the training of a dog' vs additional lexical modification with verbs of motion vy-couvat 'to back out of a parking space', which gives only directional information).

(3) The verbal prefix can perfectivize but only to produce a **new lexical item**. They often have a local meaning. For example, *pøed-* 'pre-' as in *vést* vs *pøed-vést* ('to carry vs to perform'), *pod-* 'sub' as in *vést* vs *pod-vést (*'to carry vs to cheat'), *od-* 'away from' as in *jet* vs. *od-jet*

('to go vs to go away'). There is also a small group of prefixes containing a long vowel that never perfectivize. E.g., *závidìt* 'envy', *pøíslušet* 'appertain'. Also the rare *pa-*, as in *padìlat* 'counterfeit'.

(4) A prefixed verb has a lexical meaning that can not be compositionally derived from its components at all. For example, *dovést* 'to be (cape)able', *vejít se* 'to fit (can go in)'.

In summary: the majority of verbal prefixes change lexical meaning in one way or another. In other words, they change the aspectual but also the lexical properties of a verb. Some prefixes can have a pure perfectivizing function. Other prefixes always modify the aspectual **and** the lexical characteristics of a verb. Overall, it is not an easy task (even for a native speaker) to determine whether a prefix is used only for aspectual or also for lexical modification because depending on the verb, one and the same prefix can be purely aspectual or aspectual and lexical.

Verbal suffixes

Suffixation can also express *aspect*. There are two suffixes, one for imperfectivity,-*va*-[1], and one for perfectivity -*nou*-. These two suffixes are "morphological exponents of the imperfective and perfective aspectual operator, respectively" (Filip 2001: 14). In addition, the suffix -*va*- can have a generic interpretation. Here, we adhere to the view of Filip and Carlson (1997: 103): "… although imperfective sentences can have a contextually induced generic/habitual reading, genericity is a category sui generis, formally and semantically independent of the imperfective category". This interpretation of the suffix will not be discussed here.

The suffix **-va-** can form:

(a) an *imperfective* verb from a derived or simplex perfective verb

vy-psat (*derived* Perf)	vy-piso-***va***-t
PREF.write.INF	PREF.write.IMPERF.INF
to write out/to be writing out	to write out
to announce/to be announcing	to announce
dát (simplex Perf)	dá-***va***-t
give.INF	give.IMPERF.INF
to give	to give/to be giving

(b) an *imperfective* verb with the generic -*va*- from a simplex imperfective verb

psát (*simplex* Imperf)	psá-***va***-t
write.INF	write.HAB.INF
to write	to have the habit of writing

The suffix **-nou-** can form

(a) a perfective verb from a simplex imperfective verb[2]

køièet (*simplex* Imperf)	køik-***nou***-t
to be screaming/to scream	to scream (only once)

[1] The form -*va*- is used as an overgeneralization of all the possible allomorphs of this form which can be found in the actual data.

[2] Note that some verbs suffixed with -*nou*- are imperfective (e.g. tisk-nou-t 'to press'). Hence, the presence of this suffix does not necessarily predict that a verb will be perfective.

Note that the only contribution of the suffix -*nou*- is to change the aspectual properties of a verb. The lexical meaning is not changed in any way. The perfectivizing suffix -*nou*- can be applied to some but not all Czech verbs.

Based on the difference made between *simplex* and *derived* verbs and the outline given for aspectual derivation possibilities (*suffixation* and *prefixation*) in Czech, the following types of Perf - Imperf combinations need to be distinguished:

(1) Some forms are ambiguous between Perf and Imperf (e.g. *vìnovat* 'devote/give'). These verbs only form a small group and are not relevant for the purpose of our study.

(2) There are few aspectual pairs, where a *simplex* Imperf and *simplex* Perf are contrasted: *bìžet*/*bìhat* 'to run/to be running'. Additionally, there are few suppletive pairs, notably *brát*/*vzít* 'take', *klást*/*položit* 'put', etc.

(3) Some verbs have no aspectual partners. For example, modal verbs and some statives do not have aspectual partners as they are inherently *imperfective.* They are called *imperfectiva tantum*: *muset* 'must', žít 'live', *viset* 'hang', etc. There is also a small group of verbs that exclude imperfectivity and can only be interpreted *perfectively*. They are called *perfective tantum*: *nadchnout* 'to inspire', *vynadívat se* 'to see enough of something', etc.

(4) Some *simplex* Imperf verbs have a *derived* Perf partner, which is formed by *suffixation* (suffix -*nou*-). This is a pure aspectual contrast based on a systematic morphological process. However, it applies only to a restricted set of verbs of a particular type that is not easy to specify.

(5) The opposition between *simplex* Imperf and a *derived* Perf verb can also be formed by *prefixation*. The problem here is that most prefixes add a new *lexical meaning* to the verb, which makes the two aspectual partners differ not only in aspect but ALSO in lexical meaning. Furthermore, in some cases the *imperfective* partner can then have several perfective partners, each of which expresses a particular *Aktionsart*. This is rather unfortunate for the concept of aspectual pairs (partners) that are supposed to differ essentially in *aspectual* properties.

(6) There are few cases of *derived* Imperf (suffixation -*va*) and *simplex* Perf forming a pair. For example, *koupit/kupovat* 'buy/to be buying'. Since *simplex perfectives* are rare, this group is very small.

(7) There is a larger group of aspectual counterparts where a *derived* Imperf (formed by means of *suffixation*) is paired with a *derived* Perf (formed by means of *prefixation*). For example, *s-lepo-**va**-t*/ ***s**-lepit* 'to glue together'. As in the case described in (4), the difference between these two forms is a pure aspectual contrast based on a systematic morphological process. The problem is that only a particular type of verbs can undergo this process. Moreover, it is not easy to characterise this verb type in clear semantic terms.

It can be concluded from points (1) through (7) that aspectual marking is not based on formal marking. Many verbs are simplex *imperfectives*, a smaller group are simplex *perfectives*. From a formal point of view, no *simplex* verbs are marked for aspect at all.

Moreover, the possibility of forming pure aspectual pairs is restricted to only a few verbs and is therefore not to be understood as a rule but rather as an exception. This way, the difference between Imperf and Perf is only partially grammaticalized in Czech (cf. Klein 1995 for Russian). On the other hand, the English contrast between the *simple* form and the progressive -*ing* form affects the majority of verbs (except a few verbs such as *to know*, *to love*).

Since we rejected the first possibility that the differentiation between Perf and Imperf is based on formal marking, the second option must be explored: the categories Perf and Imperf are based on a specific meaning. In what follows, we will focus on the the notion of *completion*.

It is widely assumed that the categories perfective vs imperfective differ with respect to degree of completion (completed vs non-completed).

> […] these forms have the same lexical meaning but differ with respect to the degree of completion of the action depicted by the verb. (Karlík et al. 1995: 318)

There are three major problems with this analysis. First, imperfective verbs can also be used for depicting situations that are clearly completed. Consider the following example:

(1) Jana spala (***Imperf***) vèera u kamarádky.

Jana sleep.3sg.Past.Imperf-S yesterday at friend.Gen.sg.Fem

Yesterday, Jana slept at a friend's.

The verb used in example 1 is *simplex imperfective* although the situation is bounded and completed. This is not because the situation is in the past, which should not matter for aspect in any case. The same holds true for situations in the future:

(2) Jana bude zítra pracovat (***Imperf***)/pracuje (***Imperf***) od dvou do osmi.

Jana 3sgAUX tomorrow work.Inf.Imperf/3sg.Perf Prep TempAdv

Tomorrow, Jana will be working/works from two to eight.

The situation in example 2 is completed at eight o'clock. In other words, similar to example 1, despite the fact that it is a bounded/completed situation an imperfective verb is used. The reason is that the verb *pracovat* 'to work' is a simplex verb, which has no perfective partner with the same lexical meaning. A further consequence of this fact is that the simplex imperfective form *pracuje* can be used in the simple future form, which is normally reserved for perfective verbs.

The second major problem with the notion of *completion* is that speaking of completion only makes sense with respect to some particular time. In other words, "completion is always relative to a time interval" (Klein 1995: 676). A situation is completed at some time and at any time thereafter (the so-called posttime). It is, however, not completed at any time before that. This 'completion time' can but need not to be explicitly specified in the utterance. Nevertheless, without a clear notion of this 'completion time' at which completion was achieved, the notion of completion as a definition for the difference between Perf and Imperf remains incomplete.

A third weakness of the notion of *completion* is that it emphasizes the endpoint of the situation while ignoring other parts, specifically the onset point (Comrie 1976). As pointed out by Klein (1995: 677), this observation is correct, however, difficult to demonstrate. We only refer to this point in order to complete the picture.

For our present purposes, the first of the two problems discussed above are sufficient to indicate that the **meaning** approach can not systematically account for the differences between Perf and Imperf. This is supported by Klein (1995: 673) who demonstrated the same point for other common notions such as '± totality', and '± internal boundary'. All these notions are valuable intuitions, however, unsatisfactory when used as defining criteria for the difference between Perf and Imperf.

The definition we adopt for the analysis of Czech aspect is a strict time-relational analysis that was already introduced in 2.1 and 2.3. Within this approach, *aspect* is defined as a temporal relation between topic time (TT) and time of situation (TSit). The aspectual system in Czech consists of only two aspects: the *imperfective* and the *perfective* aspect.

The *imperfective* aspect is defined as TT included in TSit, which naturally corresponds to the intuition of *incompletion*: within a given TT, there is no change and therefore also no completion. Compare the following figure (dashed line ----- refers to the TSit, brackets [ ] refer to TT)[3]:

Figure 1 Imperfective aspect as a temporal relation between TT and TSit

Imperfective:	Petr *vcházel* dovnitř.	-----[--------]-----
	Peter *was coming* in.	Posttime

The perfective aspect, on the other hand, is defined as TT at TSit and in the posttime of the TSit. This definition can also easily account for the *completion* intuition: within a given TT, there is always a change and therefore a situation gets completed. For illustration, consider figure 2:

Figure 2 Perfective aspect as a temporal relation between TT and TSit

Perfective:	Marie *zavřela* dveře.	----------[----------]
	Mary *closed* the door.	Posttime

From an acquisitional point of view, it seems that German and English learners probably need to focus on different parts of the Czech aspectual system. While German learners could encounter difficulties acquiring the basic opposition between *perfective* and *imperfective*, English learners might be challenged by the use of prefixes for derivation of *perfective* aspect. In any case, it is assumed that both learner groups are familiar with the concept of *aspectual* marking from their native language, but to a highly varying degree. We will delve further into this assumption later.

2 The use of aspect: Czech native speakers vs learners of Czech

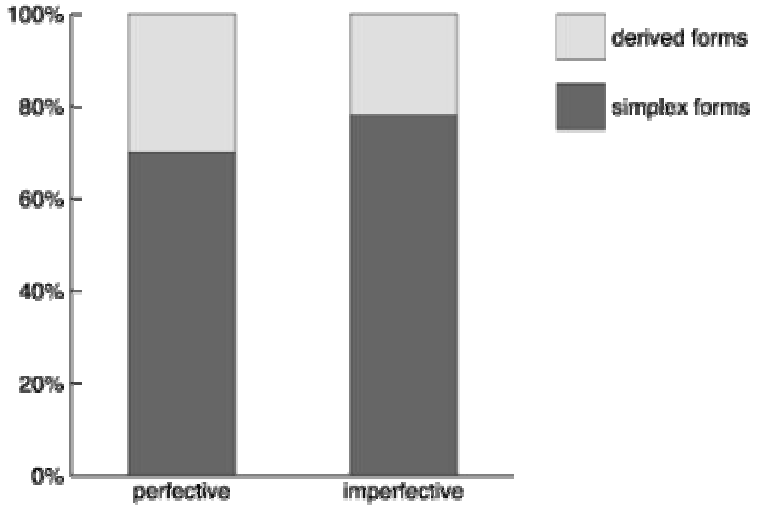
First, we shall view the results of the Czech native speakers. The Czech native speakers used a total of 627 verb forms - *simple* and *derived* forms together (types: 383). Out of these forms, 40% (252 occurrences) represent *perfective* verb forms: *simplex* perfective verb occurs in 70% (token: 177; types: 68) of the cases and *derived* perfective verbs in 30% (token: 75; types: 71). *Imperfective* verb forms were found in 60% (375 occurrences) of the cases: *Simplex* imperfective verbs represent 78% (token: 261; types: 160) whereas *derived* imperfective verbs are used 22% (token: 114; types: 52) of the time.

Within each aspectual category, Czech natives used significantly more *simplex* than *derived* forms in our experiment [for the perfective: χ^2 (1, N = 252) = 20.23, $p < .05$); for the imperfective: χ^2 (1, N = 375) = 18.7, $p < .05$)]. However, when comparing the distribution of

[3] Klein (1994) differentiates between the *source state (SS)* and the *target* state (TS) of a situation. For example, in 'to enter a room' the SS is 'being outside of a room' and the TS 'being inside a room'. Other verbs, like 'to stand' includes only a single state, which can be treated either as SS or TS. In this analysis, only the source state is treated for English as the relevant part of TSit for all verbs.

the *simplex* and *derived* forms of the two aspects, no significant difference could be found (z = 0.21 [Perf]; z = 0.45 [Imperf], n.s.). For an overview, consider figure 3:

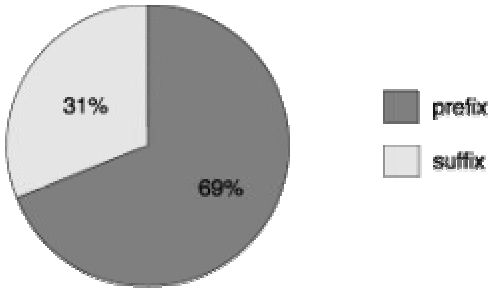
Figure 3 The use of perfective and imperfective aspect by Czech native speakers



For the imperfectivization, the only option available in Czech is to use the suffix *-va*. Perfectivization, however, can be accomplished either by using a *prefix* or a *suffix*. Czech native speakers derive a *perfective* verb form by means of a *prefix* 69% (88 occurrences) of the time. They employ a *suffix* for this purpose only in 31% (40 occurrences) of the cases. This difference is significant (χ^2 (1, N = 128) = 5.21, p < .05). In other words, Czech native speakers derive a *perfective* verb form by adding a *prefix* rather than a *suffix* to the verb stem/root.

Compare the following figure illustrating the proportion of prefixed and suffixed verb forms used by Czech natives when deriving perfectivity:

Figure 4 The use of prefixes and suffixes for perfectivization by Czech native speakers

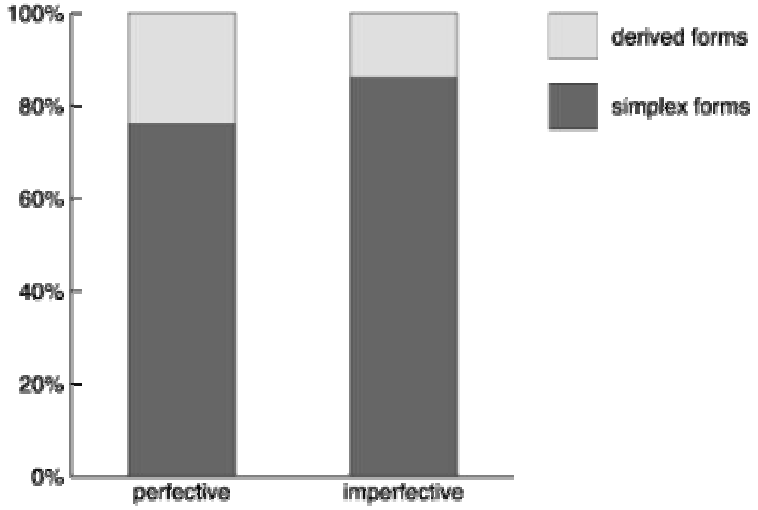


The English learners used 1142 verb forms in total (types: 754). Out of them 35% (400 occurrences) represent *perfective* verbs and 65% (742 occurrences) *imperfective* verbs. *Simplex* perfective verbs occur 76% (token: 304; type: 63) of the time, *derived*[4] perfective verbs 24% (token: 96; type: 55). Of all the *imperfective* verbs, 86% (token: 638; type: 542) are *simplex* imperfective forms. *Derived* imperfectives are used in 14% (token: 104; type: 79) of the cases.

4 These verbs are formed either by means of prefixation or suffixation.

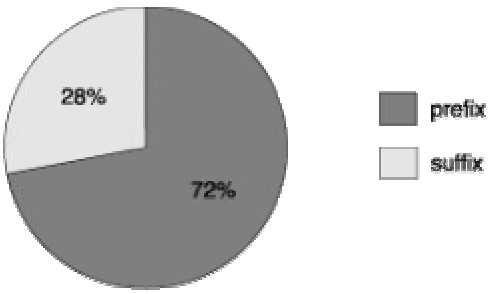
Furthermore, of all *perfective* verbs, 31% (125 occurrences) are *derived* perfectives. The difference between derived *perfective* and *imperfective* verbs is not significant. Like Czech native speakers, English learners use significantly more *simplex* than *derived* forms in each aspectual category [for the perfective: (χ^2 (1, N = 400) = 23.2, p < .05); for the imperfective (χ^2 (1, N = 742) = 21.84, p < .05)]. In addition, similar to the Czech native group, no significant difference could be found when comparing the distribution of *simplex* and *derived* verbs of the two aspectual categories (z = 0.64 [Perf]; z = 0.73 [Imperf], n.s.).

Figure 5 The use of perfective and imperfective aspect by English learners



Finally, like Czech native speakers, English learners also achieve perfectivization more often by using a *prefix* 72% (90 occurrences) of the time than by a *suffix* 28% (35 occurrences). This difference is statistically significant (χ^2 (1, N = 125) = 5.69, p < .05). Consider figure 6:

Figure 6 The use of prefixes and suffixes for perfectivization by English learners



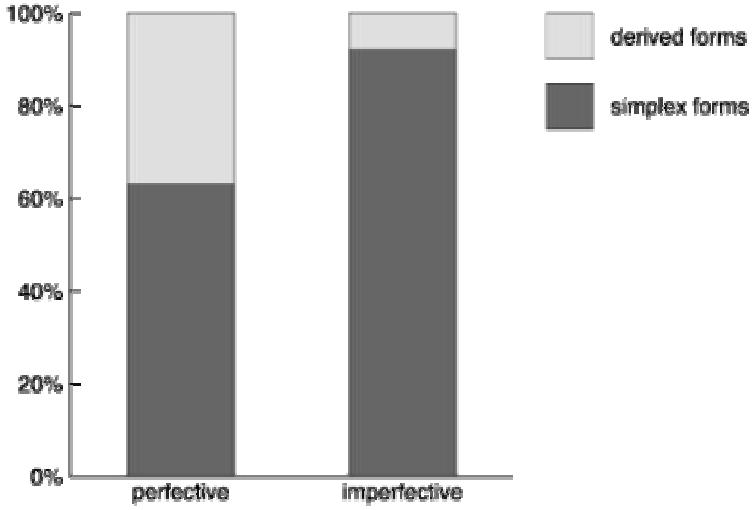
Concering the German learners, they employ overall the largest number of verbs.[5] The total number of verbs is 1227. *Simplex* perfective verbs are used in 63% (token: 258; type: 96) of the cases and *derived*[6] perfective verbs in 37% (token: 151; type: 149). *Simplex* imperfective forms occur in 92% (token: 753; type: 512) of the cases whereas *derived* imperfectives are employed only in 8% (token: 65; type: 14). Similar to the two previous groups, German learners, too, employ significantly more *simplex* than *derived* verbs within each *aspectual*

5 The number of verbs used by learners and native speakers is related to the length of the entire retelling. In this sense, German learners produced the longest narrations overall.

6 These verbs are formed either by means of prefixation or suffixation.

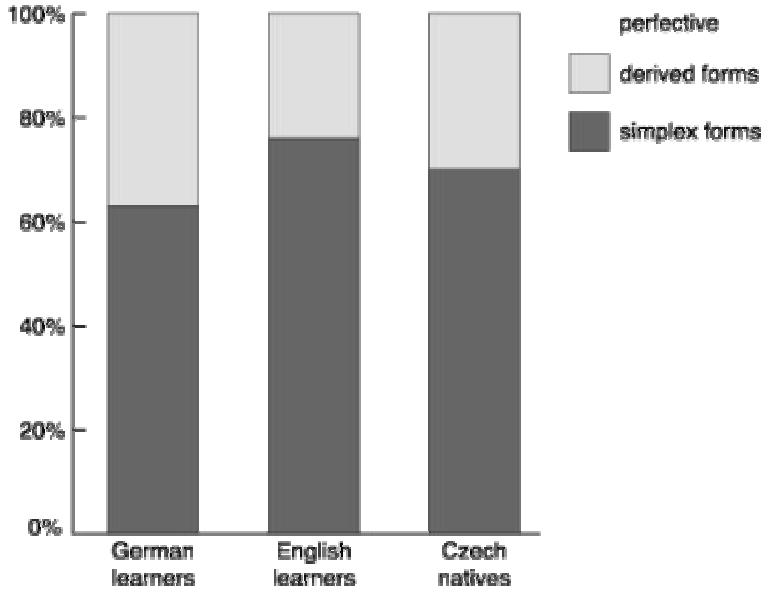
category [for the perfective: (χ^2 (1, N = 409) = 6.3, p < .05), for the imperfective: (χ^2 (1, N = 818) = 38.9, p < .05)]. For a better overview, see the next figure:

Figure 7 The use of perfective and imperfective aspect by German learners



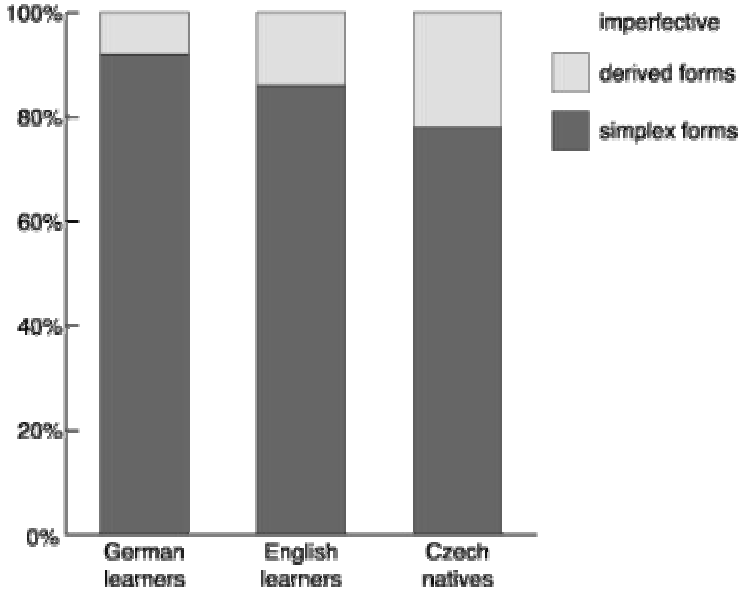
Unlike Czech natives and English learners, the German learners' use of ***derived perfective*** verbs is higher than that of English learners and Czech native speakers (z = 4.9 [Ger-learners vs Eng-learners], z = 2.1 [Ger-learners vs Cz-natives), p < .05). When comparing English learners and Czech native speakers, no such a difference can be found (z = 0.9, n.s.). In other words, English learners and Czech natives use *derived perfective* verbs equally often. For comparison, consider the following figure:

Figure 8 The use of simplex and derived perfective aspect by all learners and Czech native speakers



English learners, on the other hand, use ***derived imperfective*** aspect significantly more often than German learners (z = 4.3, p < .05). Czech native speakers employ *derived imperfective* aspect significantly more often than any learner group (z = 3.7 [Cz-natives vs Eng-learners]; z = 7.6 [Cz-natives vs Ger-learners), p < .05). These findings are summarized in figure 9:

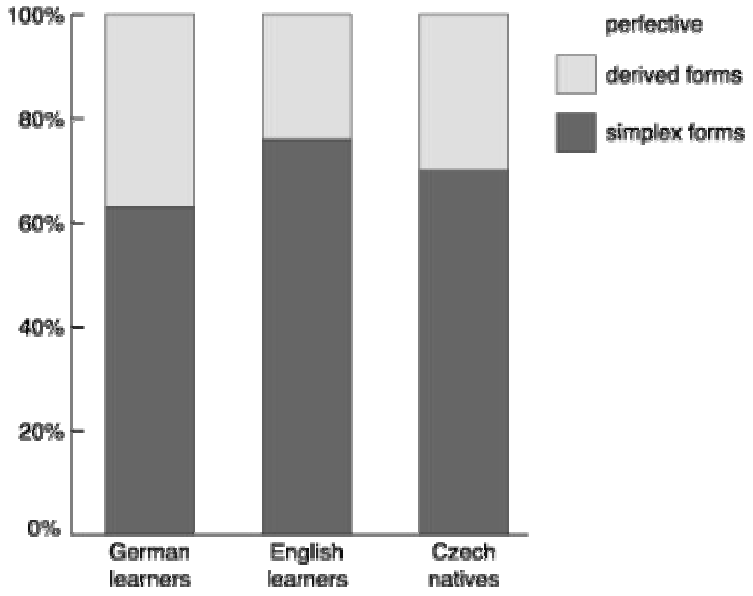
Figure 9 The use of simplex and derived imperfective aspect by all learners and Czech native speakers



In order to derive a *perfective* verb, German learners also prefer *prefixes* to *suffixes*. Prefixes are used 91% (372 occurrences) of the time, suffixes only 9% (37 occurrences). Similar to the other two groups, German learners use prefixation significantly more often than suffixation for deriving the *perfective* aspect (χ^2 (1, N = 409) = 13.7, p < .05).

When the use of the perfectivization *suffix* and *prefix* by the learner groups and the Czech native group is compared, the following differences can be established: (1) German learners employed significantly more *prefixes* than English learners and Czech natives (z = 5.3 [Ger-learners vs Eng-learners]; z = 7.2 [Ger-learners vs Cz-natives]. English learners, in contrast, used the perfectivization *suffix* significantly more often than German learners (z = 4.9, p < .05). With respect to the use of this suffix, no significant difference was found between the English learner group and the Czech native group (z = 0.6, n.s.). For comparison, consider the following figure:

Figure 10 The use of prefixes and suffixes for perfectivization by German learners, English learners and Czech native speakers



To sum up: English and German learners differ significantly in their frequency of deriving *perfective* and *imperfective* verbs. While German learners use significantly more derived *perfective* verbs, English learners make significantly more use of *imperfectively* marked verbs. Also, German learners use significantly more perfectively derived verbs than Czech natives. This does not hold true for the English learners: Czech natives use derived *imperfective* verb forms significantly more often than the English learner group (and the German learner group).

In other words, German learners "overuse" the *derived perfective* verbs in Czech. At the same time, they use a lot fewer imperfectively derived verbs than the Czech native speakers as well as the English learner group. English learners, on the other hand, never match the amount of derived *imperfective* or *perfective* verbs used by the Czech natives. In this sense, *imperfectively derived* verbs are underrepresented in both learner groups.

German learners use significantly more *prefixes* than English learners or Czech native speakers for deriving perfective verbs. Although English learners employed *suffixes* for perfectivization significantly more often than German learners, there is no significant difference between German learners' use of *suffixes* and Czech natives' use. The same holds true for *prefixes*: no significant difference between English learners and Czech native speakers.

These results suggest that German learners have a strong inclination to derive *perfective* verbs and to carry out the perfectivization mainly by means of *prefixes*. In addition, the use of *imperfective derived* verbs is not only far less extensive than the use of *perfective derived* verbs but also substantially less frequent compared to the English learners and Czech natives.

English learners show a tendency to derive fewer *perfective* verbs than German learners. Overall, however, the difference between the amount of perfectively and imperfectively *derived* verbs within the English learner group is not significant. In this manner, English learners resemble Czech natives more than German learners.

English learners exhibit the ability to realize both *aspectual* derivation possibilities equally well. At this point, it can be concluded that English speakers of Czech are receptive to the basic *aspectual* distinction between *perfective* and *imperfective*, which makes it easier for them to express simultaneity in Czech by using *aspectual* marking.

German learners focus greatly on the derivation of *perfective* verbs. Despite the possibility of using both options for perfectivization in Czech, a very strong preference for *prefixation* can be detected. *Imperfective* verbs are derived, but only rarely. This suggests that German learners are capable of imperfectivizing though they do not use this derivational strategy as often as Czech native speakers. Therefore, German speakers are **not insensitive** to the central *aspectual* opposition between the *perfective* and *imperfective* in Czech. However, they focus too much on the process of perfectivization and hence neglect the other operation necessary for effective use of the *aspectual* system.

As far as the target language employment of *aspect* is concerned, the Czech native speakers in our experiment used *simplex imperfective* and *perfective* verbs more often than the respective *derived* forms. Additionally, in the area of overtly marked *aspect*, the proportion of *derived perfective* and *derived imperfective* verbs used by Czech native speakers is similar.

3 The use of aspect: learners at different proficiency levels

Before turning to some possible explanations for our findings in the domain of *aspect* use, we outline its use by English and German learners at the three proficiency levels. We investigate

the question whether or not the differences between learners proposed in the previous section also hold true at different acquisitional stages. For the purpose of this analysis, the entire database containing all the retellings of all eleven testing items was used.

Recall that both learner groups employ *aspectual* marking when expressing simultaneity in Czech. English learners tend to use aspectual *juxtaposition* of two *imperfective* verbs more often than aspectual *contrast*. German learners, on the other hand, display the opposite by preferring aspectual *contrast* of a *perfective* and an *imperfective* verb to aspectual *juxtaposition*.

As pointed out in Chapter 2, many verbs in Czech are *simplex*. This means that they are not morphologically marked for *aspect*, however, they have an *aspectual* meaning. In what comes next, we distinguish between *simplex* and *derived* verb forms in the learner data and investigate whether then too learners differ from each other and from the Czech native group. In our analysis of the Czech *aspectual* system only a few regularities grounded in the presence of inflectional morphology could be established. In other words, it has been shown that from a formal point of view, the Czech *aspectual* system is based on more exceptions than rules. Although this system is certainly challenging for a learner acquiring Czech as a second language it is feasible to acquire (cf. sections 7.3 through 7.6). One could speculate here that learners when acquiring *aspect* in Czech do not (only) rely on the grammatical information but also make use of **another information source** such as location of the inflectional morpheme. This hypothesis is labeled as "perceptual saliency hypothesis". We outline and discuss this hypothesis in section 5.

3.1 Basic level of proficiency

English as well as German beginners employ significantly more *simplex imperfective*, for example *psát* 'to write/to be writing', than *simplex perfective* verb forms such as *dát* 'to give once' [English beginners: (χ^2 (1, N = 322) = 4.6, $p < .05$); German beginners: (χ^2 (1, N = 94) = 4.8, $p < .05$)]. Note that beginners do not always assign the target like function to *aspectual* forms. This, however, does not further affect learners' proper use of *aspect* for expressing simultaneity in the target language.

But a z-test revealed that when comparing the use of the *simple imperfective* form between the groups, English beginners used *simplex imperfectives* significantly more frequently than German beginners ($z = 2.96$, $p < .05$). In addition, English beginners made use of some *derived imperfective* verbs (14 occurrences), while German beginners did not use *derived imperfective* verb forms at all.

A reverse pattern can be observed with regard to the use of *simplex* and *derived perfective* verbs. When comparing the two beginner groups, German beginners employed *simplex perfective* verbs significantly more often than English beginners do ($z = 2.6$, $p < .05$). Furthermore, they also used significantly more *derived perfective* verbs than English beginners ($z = 1.9$, $p < .05$). Both learner groups used more *prefixes* than *suffixes* for deriving *perfective* verbs. There is no significant difference between English and German beginners when compared with respect to their use of perfectivizing *prefixes* and *suffixes* ($z = 0.36$, n.s.).

In addition to these findings, German beginners did not use *aspectual* pairs at all (for a discussion of this notion, see chapter 2, section 2.5). English beginners, by contrast, produced 5 *aspectual* pairs.

Summary: For both beginner groups, it holds true that they make more use of *simplex imperfectives* than *simplex perfectives*. Furthermore, both groups prefer to apply *prefixes* for *perfective* verb derivation.

In comparison, however, German beginners use significantly more *simplex* and *derived perfective* verb forms than English beginners. At the same time, English beginners employ significantly more *simplex imperfective* and *derived imperfective* verbs than German beginners.

3.2 Medium level of proficiency

At the medium level of proficiency, the English as well as the German learner group used significantly more *simplex imperfective* than *perfective* forms (English learners: χ^2 (1, N = 457) = 4.7, p < .05; German learners: χ^2 (1, N = 594) = 53.3, p < .05).

Note that the χ^2-score is much higher for German than for English intermediate learners (English: χ^2 = 7.6; German: χ^2 = 53.3). This shows that the German intermediate learners use more *simplex imperfective* than *simplex perfective* verbs, while the tendency in English intermediate learners is rather towards the middle: a more balanced occurrence of *simplex perfective* and *simplex imperfective* verb forms. Further, together with the increased usage of *simplex imperfective* verbs, German intermediate learners start to produce some *aspectual* pairs (5 in total).

When comparing the two groups, an unexpected result emerges: English intermediate learners make significantly more use of *simplex perfective* forms than German intermediate learners (z = 2.7, p < .05). German intermediate learners, by contrast, use *simplex imperfective* forms significantly more often than English learners (z = 3.5, p < .05).

However, in the **derivational** domain, German intermediate learners use significantly more *perfectively derived* verbs than English intermediate learners (z = 3.1, p < .05); and furthermore, English intermediate learners use significantly more derived *imperfective* verbs than German intermediate learners (z = 2.4, p .05).

Like in the beginners, both intermediate groups favor *prefixation* over *suffixation* for deriving *perfective* verbs.[7] But in addition, German intermediate learners in comparison to English intermediate learners use significantly more *prefixes* than *suffixes* (z = 1.9, p < .05).

This preference can not be explained by a difference in the total number of verbs since English as well as German learners at the medium level of proficiency employed on average a comparable amount of verbs: English intermediate - 62 verbs per subject; German intermediate - 66 verbs per subject.

Next, we summarize the findings at the medium proficiency level and compare them with those from the basic proficiency level.

Also at medium proficiency level, English and German learners employed *more* imperfective than *perfective* verbs overall. Yet, when comparing the two intermediate groups, English learners used significantly more *simplex* ***perfective*** verbs than German intermediate learners. They, in contrast, used significantly more *simplex* ***imperfective*** verbs than English intermediate learners. As pointed out above, English and German **beginners** adopted an opposite pattern.

German intermediate learners, nonetheless, exhibited the same behavior as German beginners and used significantly more ***derived*** *perfective* verbs than English intermediate learners. The German intermediate learners used significantly more *prefixes* for *perfective* derivation than

[7] A possible explanation for this finding could be that this preference is driven by the frequency of prefixed verbs in the input. This remains to be found out.

the English intermediate learners. This difference was not found between the two beginner groups.

Similar to the English beginner group, English intermediate learners employed significantly more *derived imperfective* verbs than German intermediate learners. Finally, German intermediate learners, as opposed to German beginners, assembled *aspectual* pairs.

3.3 Advanced level of proficiency

As observed earlier, learners as well as natives prefer to use *simplex imperfective* over *simplex perfective* forms. This also holds true for advanced English and German learners of Czech. Yet, no significant difference between the two advanced learner groups could be detected in their overall use of *simplex imperfective* and *simplex perfective* forms. In other words, they used *simplex* verb forms equally often, which is in line with target language use.

The two advanced groups differ with respect to the aspectual derivation. German advanced learners used significantly more *derived perfective* verbs than English advanced learners ($z = 1.92$, $p < .05$). In the same way, English advanced learners make use of *derived imperfective* verbs significantly more frequently than German advanced learners ($z = 2.64$, $p < .05$).

When compared to the English advanced group, the German advanced group employed significantly more *prefixes* when marking verbs for perfectivity ($z = 2.71$, $p < .05$). The English group, on the other hand, exhibited the opposite. When compared to German advanced learner group, they favor perfectivizing a verb by means of *suffixation* ($z = 2.54$, $p < .05$).

Moreover, looking at the preference within each group, Germans clearly chose *prefixes* over *suffixes* in order to signal the *perfective* aspect (χ^2 (1, N = 352) = 12.3, $p < .05$). In English advanced learners, by contrast, no significant difference could be observed between the employment of *suffixes* and *prefixes* in the area of perfectivization. In other words, English advanced learners show a more balanced use of prefixes and suffixes for deriving perfectivity and make use of suffixes more often than German learners at the same proficiency level.

As far as constructing *aspectual* pairs goes, the two advanced groups are comparable: each German and English advanced learner produced about 8 *aspectual* pairs. In comparison, in our data, every Czech native speaker used 14 *aspectual* counterparts on average.

In summary, like the learners at the other levels of proficiency, advanced learners also use more *imperfective* than *perfective* verbs. But when comparing these groups, there is no significant difference in their usage of *simplex* perfective and *simplex* imperfective verb forms. In other words, they use them equally frequently. However, they differ significantly with respect to the amount of derivations they perform. English advanced learners make significantly more derivations of *imperfective* verbs than German advanced learners. The latter group, however, use the *perfectively derived* verbs significantly more frequently than the English advanced learners.

In comparison to the beginners and intermediate learner groups, a very strong pattern can be noticed in the area of *aspectual* derivation. Throughout all levels of proficiency, German learners derive *perfective* verbs significantly more often than English learners. The derivation is performed by *prefixes*. Except in the beginner group, German learners derive significantly more *perfectives* by prefixation than English learners. Although English learners derived far fewer *perfective* verbs than German learners, they did it significantly more often by *suffixes* than German learners at the intermediate and advanced level.

In the domain of imperfectivization, another solid pattern emerges. In all levels of proficiency, English subjects use significantly more *derived* imperfectives than German subjects.

A striking pattern change can be seen at the medium level of proficiency in the overall use of *imperfectives*. Here, the common pairing - English with an increased use of *imperfective*, German together with an increased use of *perfective* - is completely reversed. German intermediate learners use significantly more *simplex imperfective* verbs and English intermediate learners use significantly more *simplex* perfective verbs.

In the advanced learners, all significant differences disappear from the area of *simplex perfective* and *simplex imperfective* verbs. Both learner groups use a comparable proportion of *simplex* verb forms.

4 Conclusions

The data shows several significant results that are steady throughout all levels of proficiency.

(1) Each learner group at every level of proficiency prefers to use *simplex imperfective* over *simplex perfective* verbs. This finding is highly affected by the fact that there are more *simplex imperfective* than perfective verbs in the Czech input. This may also explain the common assumption of prescriptive Czech grammars that the *simplex* (non-derived) *imperfective* form serves as a basic form for further derivation of the *perfective* (for discussion, see chapter 2, section 2.5).

(2) English learners focus on ***derivation*** of *imperfective* verbs during the entire acquisition course, as depicted and defined by this study. In the domain of the use of *simplex imperfective* verbs, this pattern is interrupted at the intermediate level of proficiency. Here, German learners take over and use the *simplex imperfective* verb form more often than the English group. The use of *simplex imperfective* forms is accompanied by the co-appearence of some *aspectual* pairs. This, in fact, may be the reason for the increased use of *simplex* imperfectives in intermediate German learners.

This latter finding suggests that English speakers learning Czech focus on the derivation of *imperfective* aspect. German speakers acquiring the same target language, on the other hand, pay attention to another *aspectual* operation: the derivation of aspect by means of prefixation. **Both these results are significant at all levels of proficiency.**

English subjects use *suffixes* for deriving *perfective* verb forms more often than German subjects. This difference is significant at all levels except the basic level of proficiency. We discuss this finding in more detail in the next section.

5 Perceptual saliency hypothesis

The difference in *aspect* use by English and German learners of Czech could be motivated by the linguistic devices of the corresponding source languages: English learners of Czech use *imperfective* mainly because English has a fully marked grammatical form for the expression of the *imperfective* - the suffix *-ing*. German, on the other hand, has a wide range of *prefixes* that modify the *Aktionsart* of the verb, which often leads to a *perfective* reading (for more detail, see chapter 2, section 2.4). Hence, German learners of Czech use more derived *perfective* than *imperfective* aspect. According to the logic of this account, German learners

should derive a comparable amount of *perfective* aspect by *prefixation* as well as by *suffixation*. This, however, is not the case.

Consider the following alternative explanation. Let us ignore *aspect* for a moment and focus on differences in the ***location*** of the operation that is carried out in order to mark *aspect* in Czech (cf. for a similar hypothesis in L1 Slobin (1973).

One can see that *aspectual* operations are taking place either on the **left** or the **right** side of the verb stem. Note that on the **right** side, **two** different operations can take place: (a) imperfectivization (suffix -va) or (b) perfectivization (suffix -*nou*). Recall that perfectivization can also be accomplished by using a *prefix* which is added to the verb on the left side. In other words, on the **right** side, **two** distinct operations can be carried out, on the **left** side, only **one**. These observations are summarized in figure 11:

Figure 11 The Czech aspectual system from a perceptual point of view

LEFT		**RIGHT**
various prefixes (one operation)	verb stem	suffixes (two operations)
e.g. *VY-*		*-NOU* & *-VA*

There is clear evidence that German learners of Czech "overmark" the *perfective,* while English learners show the opposite pattern by "overmarking" the *imperfective.* Furthermore, English learners use the suffix -*nou* significantly more often for expressing the *perfective* aspect. In other words, German learners focus on the **LEFT** side of the verb stem in their perception whereas English learners concentrate on the **RIGHT** side of the verb stem. Compare:

Figure 12 The English aspectual system from a perceptual point of view

LEFT		**RIGHT**
not present	verb stem	suffixes
not present		*-ing* (for imperfective)
not present		particles *up*, *off* (for perfective)

Figure 13 The German aspectual system from a perceptual point of view

LEFT		**RIGHT**
particles	verb stem	not present
e.g. *auf-* / *ab-*		not present

For illustration, compare the following examples.

	LEFT	**RIGHT**	
German example - perfective reading			
(3)	***auf-***	ess-(en)	
English example - perfective reading			
(4)		eat-infinitive (to eat)	***up***
English example - progressive reading			
(5)		eat-infinitive (to be eat)	***-ing***

We can see from these examples that all operations related to aspectual modification are carried out on the **right** side of the verb stem in English, while in German this is done on the **left** side of the verb stem. We are aware of the fact that many German *prefixes* such as the *prefix ab-* are separable and hence often appear on the right side of the verb stem as in the sentence *Trenn dieses Präfix* ***ab***![8] In English, on the other hand, this is never the case. Particles as well as the suffix *-ing* always appear on the right side of the verb.

The fact that English learners use significantly more *suffixes* for perfectivization than the German group indicates that they also perceive the *aspectual* operations performed on the *right* side of the verb stem. Note that imperfectivization is also achieved by means of suffixation in Czech. From this point of view, there is no difference between suffixation for the purpose of perfectivization and imperfectivization.

On the basis of these observations and our experimental evidence, a *saliency effect* hypothesis is proposed which plays a role in the acquisition of *aspect* by German as well as English learners of Czech. This view does not exclude the former interpretation that the preference for a certain *aspectual* category (*perfective* vs *imperfective*) is motivated by the respective source language. It suggests that learners might also rely on other than *aspectual* information, namly on **locational difference**, which is motivated by the make-up of the **source language**.

In summary, an important difference between English and German speakers with regard to their respective ways of dealing with the Czech *aspectual* system was found. German learners focus on *prefixes* expressing *aspectual* and *lexical* modification of the verb, while English learners also pay attention to those operators that only modify *aspect*. English speakers are, in other words, more inclined to decode the *aspectual* operations that take place on the right side of the verb stem: *imperfectivization* by the suffix *-va* and *perfectivization* by the suffix *-nou*.

As a consequence, English learners are able to grasp and use the opposition between *perfective* and *imperfective* sooner than German learners. This sensitivity is certainly motivated or inspired by the linguistic devices of the corresponding source languages. In this sense, the data shows that there is evidence that the source language is a relevant factor for learners when choosing linguistic means in the target language.

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The acquisition of tense-aspect morphology and the regular-irregular debate[1]

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Abstract

This paper reviews research on English past-tense acquisition to test the validity of the single mechanism model and the dual mechanism model, focusing on regular-irregular dissociation and semantic bias. Based on the review, it is suggested that in L1 acquisition, both regular and irregular verbs are governed by semantics; that is, early use of past tense forms are restricted to achievement verbs—regular or irregular. In contrast, some L2 acquisition studies show stronger semantic bias for regular past tense forms (e.g., Housen, 2002, Rohde, 1996). It is argued that L1 acquisition of the past-tense morphology can be accounted for more adequately by the single-mechanism model.

1 Introduction

The acquisition of past tense morphology has been extensively investigated in language acquisition research. There are two aspects of past tense acquisition that have received particular attention: semantic bias in early past tense marking, and the regular/irregular asymmetry in the acquisition of past tense morphology. Both areas have been areas of controversy, in particular concerning the question of innateness. The former has been used as the evidence for Bickerton's (1981) Language Bioprogram Hypothesis, and the latter has been the center of attention in cognitive science in the past fifteen years in relation to the debate between the connectionist and the symbolic paradigms (Rumelhart & McClelland, 1986; Pinker & Prince, 1988).

Although so much research has been done concerning both these issues, the two lines of research have practically ignored each other. However, for children acquiring the past tense morphology, these are one and the same phenomenon that needs to be tackled in their first years of life, and thereafter. This paper is the first systematic attempt to relate these two. In particular, it addresses the question of how the semantics of verbs interacts with regular and irregular past tense morphology, and tests the claims made by Pinker (1984) and Bickerton (1981).

2 Semantic bias in early tense-aspect morphology

The semantic bias of early past tense morphology has been attested in various languages at least since the early 1970s. In a longitudinal study of three children, Brown (1973) noted that early past tense forms are primarily restricted to punctual change-of-state verbs such as *fall,*

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break. Bronkart and Sinclair (1973), in an experimental study of the acquisition of French verb forms, showed that children tend to use perfective past tense forms (*passé composé*) for actions with clear end results, and to use present tense forms for actions without such change of states. Antinucci and Miller (1976) also showed that in the conversational data of seven Italian children, early past tense forms (*passato prossimo*) are limited to verbs that denote observable change of state.

Bickerton (1981) reinterpreted the findings of these studies and claimed that they constitute support for his Language Bioprogram Hypothesis. According to his theory, children are endowed with innate ability to make some linguistic distinctions, such as specific vs. non-specific, realis vs. irrealis. The punctual-nonpunctual distinction is one such distinction children can make based on an innate bioprogram, and he claimed that children at the early stages of acquisition in fact are marking punctuality rather than pastness by the past tense morphology.

Although there is no consensus regarding the explanation for such semantic bias, this phenomenon has been attested in various languages: English (Bloom, Lifter & Hafiz, 1980; Shirai & Andersen, 1995), Chinese (Erbauh, 1978; Li & Bowerman, 1998), Greek (Stephany, 1981), Turkish (Aksu-Koç, 1988, 1998) Japanese (Shirai, 1993), and even in second language acquisition (see Andersen & Shirai, 1996 and Bardovi-Harlig, 2000 for review). Although Weist et al. (1984) presented Polish data that go against this semantic bias, Bloom and Harner (1989) and Andersen (1989) reanalyzed Weist et al.'s results and showed that such semantic bias is present in the Polish data.

Concerning the acquisition of progressive marking, it has been observed that children do not make errors of attaching progressive marking onto stative verbs (Brown, 1973; Kuczaj, 1978). Bickerton claimed that this is also because of the bioprogram, although this question is beyond the scope of this paper (see Shirai, 1994, which focuses on this issue).

These results have been reinterpreted using inherent aspect categories proposed by Vendler (1957)[2], which can be summarized as follows:

1. Children first use past marking on achievement/accomplishment verbs, eventually extend use to activity and stative verbs. This roughly corresponds to Bickerton's (1981) punctual/non-punctual hypothesis.
2. In languages that encode the perfective/imperfective distinction, imperfective past appears later than perfective past, and imperfect past marking begins with stative verbs, extending next to activity verbs, then to accomplishment verbs, and finally to achievement verbs.
3. In languages that have progressive aspect, progressive marking begins with activity verbs, then extends to accomplishment/achievement verbs.
4. Progressive markings are not incorrectly overextended to stative verbs. This corresponds to Bickerton's state-process hypothesis. (Shirai, 1991, pp. 9-10)

[2] Briefly, Vendler's semantic categories of verbs are state, activity, accomplishment, and achievement. State terms (e.g., *love*) describe a situation that is viewed as continuing to exist unless some outside situation makes it change. Activity terms (e.g., *run*) describe a dynamic and durative situation that has an arbitrary endpoint, i.e., it can be terminated at any time. In contrast, accomplishment terms (e.g., *make a chair*) describe a situation that is dynamic and durative, but has a natural endpoint after which the particular action cannot continue (i.e., they are telic). Finally, achievement terms describe an instantaneous and punctual situation, i.e., one that can be reduced to a point on a time axis. States are [-dynamic], [-telic], [-punctual]; Activities are [+dynamic], [-telic], [-punctual]; Accomplishments are [+dynamic], [+telic], [-punctual]; Achievements are [+dynamic], [+telic], [+punctual]. Bickerton's punctuality roughly corresponds to telicity as far as the discussion in this paper is concerned. In this paper, I use the term punctuality when discussing his theory, but in reality it refers to telicity in aspectology.

This is known in the literature as the Defective Tense Hypothesis, the Aspect Hypothesis, the Primacy of Aspect Hypothesis, and so on. Although there may be disagreements regarding the details, this generalization appears to be universal, and needs explanation. Bickerton (1981), in particular, attributed this to an innate bioprogram within the broader context of his Language Bioprogram Hypothesis, which originally came from his research on creole genesis. The argument is that a pidgin language, a simplified contact variety that does not have complexity equal to that of a natural language, acquires various complex linguistic structures once children in the community acquire it as a native language, and the pidgin becomes a creole language. The structures that are invented by the new generation of the speakers are bioprogrammed, according to Bickerton. In the domain of tense-aspect, the punctual-nonpunctual distinction and the state-process distinction are argued to be among them. Bickerton reviewed the child language literature and argued that children's acquisition pattern suggests that they have these distinctions pre-wired. This bioprogram scenario has received a lot of attention and now is even discussed in some books written for the general public (Jackendoff, 1993; Pinker, 1994) as support for the innate basis of linguistic knowledge.

3 Regular-irregular dissociation in past tense morphology

The relationship between regular and irregular past tense acquisition has been important in language acquisition research, in particular because of the intriguing phenomenon of overregularization and recovery (e.g., Ervin, 1964; Karmiloff-Smith, 1986). Children are known to make past tense forms of irregular verbs by adding the past tense suffix *-ed* (e.g., *goed, eated*), and later recover from such overregularization errors. The overregualrization is treated as the paradigm case of rule learning; unless children internalize a rule, such forms as *comed, goed* would not appear.

Interest in this phenomenon has become more intense since the advent of connectionism, or Parallel Distributed Processing—a radically different model of human cognitive processes proposed as an alternative to the predominant symbolic model, which is based on symbols and their manipulations by rules. Connectionists propose a model of human information processing which relies on representation consisting of neuron-like units and connections between them, in which processing of information is achieved by massively parallel activation of these units, the pattern of which determines the information that emerges. Learning in this model is change of representation via change in connection weights between processing units (see, for example, Plunkett, 1995).

Rumelhart and McClelland (1986) presented one such model that simulated past tense acquisition in English. This model, without representing any overt rules, exhibited a similar behavior to that of human children. The model has a single-mechanism that takes care of both regular and irregular past tenses, and Rumelhart and McClelland suggested that their model shows that it is not necessary to represent symbolic rules to deal with acquisition of regular and irregualr morphological systems separately. Furthermore, they suggested that the rule-like behavior is just an emergent phenomenon that results from the pattern of activation in the network.

Pinker and Prince (1988) presented a comprehensive critique of the R & M model, but revised models such as MacWhinney and Leinbach (1991), Plunkett and Marchman (1993) responded to Pinker and Prince's criticisms. This debate between the symbolic camp and the connectionists is far from over, and it is still one of the most contentious issues in cognitive science (e.g., Pinker & Ulman, 2002, McClelland & Patterson, 2002, Marslen-Wilson &

Tyler, 2003). The regular-irregular issue in relation to single- vs. dual-mechanism models encompasses various domains, such as the denominal problem (Kim, Pinker, Prasada & Snyder, 1991; Harris, 1993; Harris & Shirai, 1997; Shirai, 1997a; Ramscar, 2002), frequency effects for irregulars (Prasada, Pinker & Snyder, 1990; Sereno & Jongman, 1997), double dissociation in specific populations (Marchman, 1993), phonological similarity and overregularization (Marchman, 1997). Almost all these studies, however, totally ignore the temporal semantics of the verbs, which has been shown to be very important in the acquisition of past tense morphology.

4 Semantic bias and the regular-irregular issue

As noted earlier, the two lines of research have mostly benn pursued independently of each other, and the studies on semantic bias do not pay much attention to how they interact with the variable of regular vs. irregular, whereas the studies that focus on the regular-irregular issue ignore the semantic bias in the early acquisition of past tense morphology. There are, however, studies that are relevant to this problem. Notably, two nativist researchers I mentioned earlier, namely Bickerton (1981) and Pinker (1984), presented specific hypotheses concerning the acquisition of regular and irregular past tense forms in relation to semantic bias in tense-aspect acquisition.

4.1 Bickerton (1981)

Bickerton (1981, pp. 177-180) presented a speculative account of regular/irregular past tense acquisition and semantic bias. His bioprogram theory predicts that children use tense-aspect markers to mark distinctions which he assumes to be part of the bioprogram. In tense-aspect acquisition, what children mark first are the state-process distinction and the puncutal-nonpunctual distinction, of which only the latter is discussed in this paper since the state-process distinction is not relevant to the regular-irregular issue.

Bickerton proposed a three-stage scenario: (1) Children acquiring English first start out with base forms for all verbs, but then they first mark nonpunctuality using the progressive inflection *-ing*. (2) The next step is for them to mark the punctual side of the semantic space, and they use irregular past to mark punctuality. (3) Later when they encounter the regular past, they realize that the regular past is the punctual marker, not the irregular past, and start to use *-ed* to irregular verbs as well.

His account appears to be based on the observation that irregular past is generally acquired earlier than regular past and that children, after the initial stage of correct use of irregular past forms, start to apply the regular past inflections (*-ed*) to irregular verbs. In hindsight, this is an oversimplification. As Marcus, Ullman, Pinker, Hollander, Rosen and Xu (1992) have shown, children's overregularization rates are quite low (median 2.5% of irregular past tense forms), and it is not the case that at the stage of overregularization children apply regular past marking systematically to all irregular verbs (Kuczaj, 1981). However, if the type of learning process Bickerton proposed is at work, we can predict the following association between semantics and regular-irregular morphology.

> • Initially, only irregular past tense forms are associated with punctuality, whereas the regular past is not.

4.2 Pinker (1984)

Pinker (1984) proposed a comprehensive model of language acquisition, in which he briefly referred to the studies that reported semantic bias, and to the paradigm building for past tense acquisition. In proposing his acquisition model of inflectional morphology, he suggested that children at early stages acquire lexical items together with the inflectional morphology, which he calls a word-specific paradigm. Later they extract general rules of inflection, and they exhibit overregularization errors. To support this claim, he stated:

> Children initially use inflections such as *-ing*, *-s*, and *-ed* only on a tiny subset of the words that allow those inflections, and then gradually expand their usage to more and more verbs (Bloom, Lifter, and Hafitz, 1978 [sic]; Brown, 1973; Cazden, 1968; Kuczaj, 1977, 1981). They learn inflected irregular forms just as easily as regular ones at first; overregularization of irregular forms tends to occur at a later stage (Brown, 1973), Kuczaj, 1977). (Pinker, 1984, p. 180)

Therefore, on Pinker's account the early semantic bias is due to the word-specific paradigm, when children produce inflected forms as unanalyzed units by rote learning. Only later, when they start creating a general inflectional paradigm, do children start to produce overregularization errors. Note that Pinker avoided any reference to semantic bias. For him, it is not important that early inflections are semantically biased, because children just rely on rote learning, and therefore, in principle, can produce past tense forms regardless of the semantics of the verb.

This proposal is in line with Marcus et al.'s (1992) claim that overregularization first appears when a child starts marking past tense reliably. Marcus et al. (1992), in response to the connectionist challenge, did a quantitative analysis of the CHILDES database (MacWhinney & Snow, 1985; MacWhinney, 1995) and showed that the proportion of overregualrization is relatively small, and that there are no such clear-cut stages as hada been supposed previously.

Marcus et al., along with Pinker (1991) and Pinker and Prince (1991), advocate a dual-mechanism model of regular/irregular morphology, in which irregular morphology is dealt with by associative memory, and regular morphology by rule. Thus, the early word-specific paradigm is based on learning by memorization, and the general paradigm that comes later is based on a rule-learning mechanism. Thus, the dual-mechanism model makes the following prediction:

> • Early past tense forms are frozen forms, and at this stage overregularizaton is not observed. The onset of overregularizations coincides with the obligatory marking of past tense.

These two hypotheses proposed by Bickerton (1981) and Pinker (1984) are only a small part of their global pictures. Nonetheless, they constitute an important part of their proposals, and need to be tested, because both Bickerton's bioprogram hypothesis and Pinker's semantic bootstrapping hypothesis have received so much attention from language acquisition researchers.

To my knowledge, there is only one empirical study that specifically addressed the interaction of regular vs. irregular inflections and semantic bias in the acquisition of past tense (to be discussed below). This is unfortunate in view of the considerable attention both issues have received, and their theoretical importance.

In the remainder of this paper, I will review relevant studies to address the following questions; in so doing, both Bickerton's and Pinker's hypotheses will be tested:

> • What is the relationship between verb semantics and overregularization?

• Is there regular-irregular dissociation in the acquisition of past tense in relation to verb semantics?

• How do L1 and L2 acquisition differ in this regard?

5 Overregularization and semantic bias

The one exception mentioned above is Barr and Regier (1998). This is the only study available that specifically investigated the relationship between verb semantics and regular vs. irregular morphology. Given the observation that telic verbs inflected for the past tense often denote result state rather than true deictic past, they hypothesized that activity verbs are more likely to be associated with pastness than telic verbs, and hence, overregularization rate of activity verbs would be higher than that of telic verbs. The prediction was borne out in the analysis of four children's data from CHILDES, activity verbs showing a significantly higher rate of overregularization (0.67) than telic verbs (0.39) ($p < 0.01$).

Although this is an important study, it was only published as a one-page summary in a Cognitive Science Society Proceedings, and due to space limitations, some aspects of the study are not clear. In particular, it appears that Barr and Regier only looked at activity verbs and telic verbs, and nothing is mentioned about stative verbs. Stative verbs, when combined with past tense form, refer to deictic past in many cases (e.g., *I loved Mary*). Neither is it clear how the verb tokens were classified. However, their study does propose an important account of how regular past inflection is associated with temporal semantics, and why.

Shirai (1991, also Shirai & Andersen, 1995) is a study of the acquisition of English tense-aspect morphology by three children. Although this study focused on semantic bias, it also looked at the issues pertaining to the regular-irregular debate. Also, this study reported the results for regular and irregular past forms separately in its Appendix, and so reanalysis is possible.

The gist of Shirai's findings is summarized succinctly by a recent paper by McClelland and Patterson, which I quote here:

> Shirai and Anderson [sic] examined the use of the past tense as a function of semantic properties of the situation referred to in children's speech. When it first appears, the use of the past tense (including over-regularization) is largely restricted to descriptions of punctuate events that have endpoints and produce results (such as '*I dropped it*'); it then gradually spreads to cases in which one of the typical properties (is punctuate, has endpoint, produces results) is violated. (McClelland & Patterson, 2002, p. 469)

What is important in this context is that the acquisition of the past tense is restricted to prototypical cases, and even the overregularized forms of past tense are restricted to those. Shirai 1991 (also Shirai & Andersen 1995) reported that the first three past tense forms used by Naomi (Sachs, 1983), one of the children studied, were *fell* (4 tokens) *found* (one token) and *throwed* (5 tokens), an overregularized form. That is, even at this emergent stage of past tense, when all past marked verb tokens were restricted to achievement verbs, overregularization is observed. In fact, Naomi produced *throwed* even before producing any correct regular past tense form. Note that generally it takes over a year from the emergence of the past tense morpheme to the attainment of 90% marking in obligatory contexts (see McClelland & Patterson, 2002, pp. 467-468). Therefore, the claim by Marcus et al. that onset of overregularization coincides with obligatory marking appears to be incorrect.

Marcus et al. (1992) claimed that "Overregularization first appears when children begin to mark regular verbs for tense reliably (i.e., when they stop saying *Yesterday I walk*)" (p. v),

based on the data from four children: Abe (Kuczaj, 1977), Adam, Eve, and Sarah (Brown, 1977). However, their claim is only supported by correlation. McClelland and Patterson (2002) clearly show that their evidence is based on a shaky ground of weak correlation, which in fact is a function of age and gradual development.

It should be also noted that the same trend is seen for the progressive marking. Shirai (1991) reported that Naomi used *sittinging down*, which is a reduplication of *-ing* produced when her progressive was mostly limited to activity verbs, suggesting that the morphological process starts when the progressive is still limited to activity verbs. This indicates that semantic bias is not necessarily caused by lexical, rote learning, even though Pinker (1984) suggests otherwise. It appears that initial representation of the progressive category is also limited to activity verbs (at least as it is inferred from the production of *-ing*). The prototype scenario of acquisition can explain the acquisition of not only irregular and regular past marking, but also of progressive marking (to be discussed in section 8).

6 Semantic bias and regular-irregular dissociation

As discussed earlier, Bickerton (1981) predicted that the irregular past develops first with punctual verbs, and that later, when the regular past appears, it will be overregularized to irregular verbs. Although Pinker (1984) does not make any specific prediction concerning the relation between semantics and regular vs. irregular past forms, if different patterns are found between regular and irregular past tense forms, that would be more consistent with the dual-mechanism model, and the single-mechanism model would have to come up with an explanation for the dissociation. Table 1, extracted here from Appendix A in Shirai (1991), shows the relationship between inherent aspect (states, activities, accomplishments, achievements) and the past tense forms at the earliest stage of past tense acquisition. The stages of development in this and subsequent tables are based on children's MLUs.

Table 1. Emergence of past tense marking at stage 1 (token count)

Adam	State	Act	Acc	Ach	total	State	Act	Acc	Ach
irreg	0	1	0	16	17	0.0%	5.9%	0.0%	94.1%
-ed	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Eve									
irreg	0	0	0	2	2	0.0%	0.0%	0.0%	100.0%
-ed	0	0	0	2	2	0.0%	0.0%	0.0%	100.0%
Naomi									
irreg	0	0	0	5	5	0.0%	0.0%	0.0%	100.0%
-ed	0	0	0	5	5	0.0%	0.0%	0.0%	100.0%

Adam's data appear to support Bickerton's argument in that at stage 1, only irregular past forms are produced, and they mark punctuality (i.e., 94% of the past tense forms are on achievements verbs.) However, Eve and Naomi both produce the same number of regular and irregular past forms, all of which are attached to achievement verbs. This individual difference cannot be explained by a bioprogram account, which presupposes innate constraints on acquisition. Furthermore, two out of three children go against Bickerton's prediction. Note also that Naomi's 5 regular past forms are all overregularized form *throwed*, which, according to Bickerton, should come after the period when irregular past tense forms are used to mark punctuality.

Next, let us examine whether regular-irregular dissociation can be found in the course of development. Table 2 shows the percentages of past tense forms applied to achievement verbs, the semantic prototype.

Table 2. The percentages of achievement verbs among past tense marking (token count in parenthesis)

Adam	Stage 1	Stage 2	Stage 3	Stage 4
irreg	94.1%(16/17)	86.4% (57/66)	80.0% (32/40)	67.5% (27/40)
-ed	NA	88.9% (8/9)	78.3% (18/23)	70.8% (17/24)

Eve	Stage 1	Stage 2	Stage 3
irreg	100% (2/2)	70.0% (21/30)	63.3% (19/30)
-ed	100% (2/2)	62.5% (10/16)	55.6% (5/9)

Naomi	Stage 1	Stage 2	Stage 3	Stage 4
irreg	100% (5/5)	92.5% (37/40)	43.1% (22/51)	66.2% (104/157)
-ed	100% (5/5)	73.1% (19/26)	63.0% (17/27)	37.6% (35/93)

Adam's case is the most straightforward—there is virtually no difference between regular and irregular past marking except at the first stage as we discussed earlier. Both types of the past tense inflection gradually relax their restriction to achievements. Eve's case is also similar, except that the regular past shows slightly faster relaxation compared to the irregular past. Naomi's case is the most problematic, showing a zig-zag pattern of development. At stage 2, the irregular past is more strongly associated with achievements, but this pattern reverses at stage 3, and then at stage 4, the irregular past tense again has stronger association with achievements.

This is somewhat puzzling, but it appears that there is no regular-irregular dissociation. If there is, the trend seems to be that irregulars are slightly more constrained by semantics than regulars. This is congruent with Barr and Reiger's prediction that activity verbs show stronger association with the regular past than telic verbs.

In sum, a reanalysis of Shirai's (1991) study suggests that Bickerton's prediction is not supported because regular past can appear at the same time as irregular past, and that regular-irregular dissociation is not clearly observed.

7 L1-L2 difference in regular-irregular past tense acquisition

There are some studies in L2 acquisition that reported the differences between regular and irregular past in the acquisition of past tense. First, Rohde (1996) reported that the regular past was almost exclusively attached to achievement verbs, whereas the irregular past involved more variety of verb types, in particular stative verbs, which is predicted to be most unlikely to be inflected for the past tense. The study analyzed 6-month longitudinal data of 6- and 9-year-old German boys acquiring English in California. The following table is calculated based on Rohde's Figures 5 to 8, and clearly shows that the regular past is much more strictly confined to its semantic prototype (i.e., the past tense marking on achievement verbs) than the irregular past.

Table 3. Percentages of achievement verbs among past tense marked verbs (based on type count, in parenthesis)

Lars	May	June	July	August	September
irreg	0% (0/1)	66.7% (4/6)	42.9% (3/7)	63.6% (7/11)	50% (7/14)
-ed	100% (1/1)	100% (3/3)	100% (4/4)	100% (6/6)	77.8% (7/9)

Heiko	May	June	July	August	September
irreg	50% (1/2)	85.7% (6/7)	55.6% (5/9)	68.8% (11/16)	72.7% (8/11)
-ed	100% (5/5)	75% (9/12)	62.5% (5/8)	77.8% (14/18)	50% (2/4)

Housen (2002) specifically discussed the dual-mechanism model in the context of second langauge acquisition. In his study of a Dutch child studying English in Belgium, he found that progressive *-ing* and regular past *-ed* were more strongly associated with inherent aspect than was the irregular past, irregular state verbs showing an unexpectedly high ratio of past marking, which goes against the predicted semantic bias. Based on this observation, Housen suggests that the dissociation between regular morpholgoy (*-ing* and *-ed*) and irregular morphology can be accounted for by the dual-mechanism model. He stated:

> …one could speculate that conceptual-semantic notions (prototypes) such as stativity, durativity and telicity play a steering role in the process of morphological rule-learning, which mainly affects regular morphology like *-ing*, but not or less so in associative learning, which mainly affects irregular forms such as went, go. These irregular forms would be directly mapped onto a given conceptual scene and then stored as a one specific form-meaning unit in lexical memory. (Housen, 2002, p. 188)

However, it is premature to jump to this conclusion. Rocca (2002) reported that there was no regular-irregular dissociation in her longitudinal study of three Italian children acquiring Enlgish in the UK. She found that both irregular and regular past tense forms are strongly accociated with telic verbs. In any event, it appears that it is in L2 acquisition, not in L1 acquisition, that regular-irregular dissociation is observed, and even in L2 studies it is not always the case that the dissociation is observed. If the dual-mechanism model is to apply to first language acquisition and native speakers of a language, it is hard to see why it applies better to L2 acquisition than to L1 acquisition.

8 Distributional learning and prototype-based initial representations

To summarize the discussion so far regarding the regular-irregular issue and semantic bias, we can offer the following observations:

- Overregularization is observed even at the stage when the morphology is restricted to its semantic prototype.

- In L1 acquisition, there is no clear pattern of regular-irregular dissociation in past tense acquisition.

- In L2 acquisition, there is some evidence for regular-irregular dissociation in relation to semantic bias, regular morphology being more strongly tied to semantics.

Clearly, these observations are not consistent with the dual-mechanism model (or the Words-and-Rules theory of Pinker, 1999), or the Language Bioprogram Hypothesis of Bickerton (1981).

How, then, do we account for such observations? In earlier work, I have proposed prototype formation based on distributional learning as an explanation for the semantic bias in early tense-aspect morphology, and in other aspects of grammatical development (Shirai, 1991; Shirai & Andersen, 1995; Shirai, 1997b; Shirai, 2000). In short, the semantic bias comes from biased frequency distribution in the input and learners' prototype formation based on such biased input. To illustrate, let us look at Table 4. What we see here is that if 60% of past tense forms in the input are on achievement verbs, children will create almost 100% restriction, creating a semantic prototype for the broader category 'past tense'. The same trend holds for progressive marking, with its prototype as activity verbs denoting action in progress. This input-based learning has been successfully simulated by a self-organizing neural network in Li and Shirai (2000).

Table 4. Distribution of the past tense morphology and inherent aspect in three children's and their mothers' speech at the earliest stage (Shirai, 1991) (average percentage based on token count)

	State	Activity	Accomplishment	Achievement
Children	0%	2%	0%	98%
Mothers	17%	10%	13%	60%

There are some objections to this model, and I would like to address them. One common objection to this type of prototype model is that the observed pattern of acquisition may not reflect children's competence, but rather may just be due to the discourse context in which children's spontaneous conversation is taped.[3] Weist (1989) makes such an argument to account for skewed distribution in the use of tense-aspect morphology in Polish.

This is a valid criticism, and the real test of whether the skewed distribution was purely based on discourse factors must come from experimental studies. Regarding the semantic bias in tense-aspect acquisition, at least two comprehension studies (Li & Bowerman, 1998 for Chinese, and Stoll, 1998 for Russian) show that children's competence is in fact limited, and that they have higher comprehension scores for prototypical combinations (e.g., perfective and telic predicates) rather than non-prototypical combinations (e.g., perfective an atelic predicates). These studies suggest that children's restricted production patterns also reflect their restricted semantic representation.

Another, related, objection concerns the nature of semantic bias. Tomasello's usage based approach to language acquisition (e.g., Tomasello, 2003) is generally compatible with my proposal since the emphasis is on environmental factors, in particular, the role of input. However, Tomasello's (1992, 2000) Verb Island Hypothesis, like Pinker's verb-specific paradigm, presupposes that early restriction of grammatical forms is based on item-based learning, and not on productive semantic representation. My proposal is different in that I argue that the early restriction results from restricted semantic representation. The evidence, as discussed above, comes from overregularization of the past tense forms that we discussed earlier. At least for one child (Naomi), the onset of overregularization was the emergence of the regular past tense; that is, this child, at least in the transcripts, produced an overregularized form *throwed* even before a correct regular past form, and this comes around the same time as the first use of the irregular past tense. This means that rule-learning must have started even before Naomi produced any past tense forms.

[3] When I presented my prototype hypothesis of tense-aspect acquisition at a workshop in 1992 in Tokyo, Steven Pinker, who was on the panel, made such a comment.

What is the mechanism behind such precocious rule-learning? It appears that comprehension is the key. Recent studies of very young children, using a variety of experimental paradigms, have shown that children, even before speaking a word, are engaged in linguistic information processing and are sensitive to linguistic distinctions that are encoded in the language. For example, Choi, McDonough, Bowerman and Mandler (1999), using preferential looking experiments, showed that Korean children are more sensitive than English children to linguistic distinctions made in Korean but not in English, even though the majority of the children, who were aged between 19 to 23 months, had not yet produced the target word. In the same vein, while children comprehend adult utterances containing tense-aspect markers, they process the input and create initial form-meaning associations, in this case the *-ed* form and punctuality, telicity, dynamicity, etc. Thus, it would be reasonable to assume that children, on the basis of the comprehension of verb forms prior to active production, have already created a restricted semantic representation of these morphological forms. Some children, like Naomi, are more attuned to rule-learning, while others, like Adam, are more likely to rely on lexical, rote learning at the early stages, and thus the irregular past may precede the production of the regular past. Eve, perhaps, is in between. Such individual differences are reported in the child language literature (Peters, 1977, 1983; Bates, Bretherton & Snyder, 1988).

How can we make sense of the L1-L2 difference in the acquisition of regular and irregular morphology? Since the number of relevant studies is very small, we should be cautious in making premature generalizations. But if indeed this trend—more regular-irregular dissociation in L2 than in L1—is confirmed in future studies, we can propose the following account. The discrepancy appears to be based on the degree of rote learning used by L1 and L2 learners. In the L2 acquisition literature, it has been suggested that L2 learners, due to their higher rote-memory capacity, can produce long formulaic forms even when their creative language is very limited. For example, Huang and Hatch's (1978) 5-year-old Chinese learner of English says things like *It's time to eat and drink*, when his productive ability of copula was still limited, (saying things like *this…kite*, instead of *This is a kite.*) Irregular verbs are frequent (only frequent words can survive as irregulars, Pinker, 1999), and therefore both L1 and L2 learners can produce them frequently relying on rote memory. But if rote memory is more readily available for L2 learners, then this explains the observation that irregulars are less constrained by semantics in L2 acquisition, since L2 learners can produce rote-learned forms even before they acquire their semantic representation. They even produce past tense forms for future contexts (Robison, 1995). This is not the case for L1 children. Brown (1973) suggests that most of children's uses of past tense are appropriate, i.e., overuse of past tense forms is very rare. Thus this type of haphazard production of rote-learned forms in L2 learners probably contributed to the weaker semantic bias in irregulars than in regulars in L2 acquisition (for further discussion of this issue, see Shirai, in press.)[4]

Now, does this mean we need to posit two separate mechanisms? Certainly not. The default is that both forms are acquired by the same principle—form-meaning mapping and generalization. The dissociation is observed only if other external and internal factors come into play. Note that rote learning can occur for regulars as well. It is just that irregulars are more prone to rote learning, but this is a matter of degree (Bybee, 1995). Some children may prefer rote strategy more than others, and that explains individual differences. And L2 learners may prefer rote-learning since they are capable of such a strategy and also since they

[4] The difference between Rohde's and Housen's studies and Rocca's study still needs to be explained. It perhaps resulted from the differences in learners L1s and in the tasks used in these studies. But this is beyond the scope of this paper.

are often in situations where they have to produce some linguistic expressions beyond their control, in which case they have to rely on rote-learned forms.

9 Conclusion

In this paper, I have tried to integrate the two lines of research in tense-aspect acquisition—the regular-irregular debate and the semantic bias hypothesis, by reviewing and reanalyzing previous research. The observations concerning the relationship between inflection type and semantic bias presented here are still preliminary, and need further empirical investigations. In particular, not just post-hoc analysis of published research, but new studies that focus on the relationship between the two are necessary. Still, we can tentatively conclude that the empirical evidence appears to be more consistent with the single-mechanism model than the dual-mechanism model, and with the prototype hypothesis than Bickerton's bioprogarm hypothesis. The onset of overregularization does not coincide with obligatory past marking, contrary to the prediction of the dual-mechanism model. Irregular past is not necessarily acquired first to denote the non-punctual side of the semantic space, contra the bioprogram hypothesis. There seems to be much individual variation in terms of regular-irregular dissociation, and L2 learners seem to be more consistent with the dual-mechanism model than L1 children, which is certainly puzzling for the dual-mechanism model that presupposes two distinct mechanisms in human language faculty. These observations are all consistent with input-based prototype formation as a model of form-function mapping, which does not distinguish regular and irregular in any fundamental sense. Although the issue of nature vs. nurture in language acquisition cannot be settled easily, we need a more integrated view of language acquisition. I hope this paper has made a modest contribution to this goal.

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On the Early Development of Aspect in Greek and Russian Child Language, a Comparative Analysis[1]

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Abstract

The category of aspect is grammaticized in both Greek and Russian opposing perfective and imperfective verb forms in all inflectional categories except the nonpast ('present'). Despite these similarities there are important differences in the way the aspectual systems function in the two languages. While in Greek nearly all verbs oppose a perfective to a given imperfective grammatical form, Russian aspect is more strongly lexicalized with pairs of imperfective and perfective lexemes not only differing aspectually, but also as far as their lexical meanings are concerned. This is especially true of perfective verbs formed by prefixes as compared to their imperfective bases. Thus, in pairs of prefixed and unprefixed dynamic verbs, the derived prefixed (perfective) member has a telic meaning while its unprefixed (imperfective) counterpart is atelic (e.g. *sjest'* (PFV) 'to eat up' vs. *jest'* (IPF) 'to eat'). Such derived perfective verbs may in turn be "secondarily" imperfectivized by suffixation furnishing the only "true" perfective/imperfective pairs of verbs (e.g. *sjest'* (PFV) 'to eat up' vs. *sjedat'* (IPF) 'to eat up' (iterative)). "Secondary" imperfectives do not occur in our child data.

In this pilot study, we will analyze the tense-aspect-mood forms of the 20 most frequent verbs with equivalent meanings occurring in the longitudinal audiotaped data of a Greek and a Russian boy between 2;1 and 2;3 (their entire lexical inventories comprise approx. 100 verbs each).

We adopt a constructivist perspective on the development of aspect in Greek and Russian child language and will show that in spite of a broad inventory of imperfective and perfective verb forms to be found in the speech of both children aspect has not yet developed into a generalized grammatical category, but is strongly dependent on *aktionsart* (stative/dynamic, telic/atelic) in both languages. While this results in a strong preference for perfective verb forms of telic verbs and of imperfective forms of atelic ones in the speech of the Greek boy, the Russian child tends to use the unmarked members

1 Introduction

An important question arising from the detailed study of different child languages is if early child language follows universal principles of development or if children are sensitive to differences in the various languages they are acquiring.[2] When the first author began to study the development of the grammatical categories of the Greek verb a quarter of a century ago she found that not only inflectional development in such a typical Indo-European language with a

[1] We would like to thank Anastasia Christofidou, Greek Academy of Sciences, Athens, for offering us her Greek data and helping with its analysis.

[2] See the controversy between Slobin (1985) and Bowerman (1985).

rich inflectional system is precocious as compared to languages of a more isolating type like English, but also that the tense-aspect-mood categories of the verb as well as person and number are all formally distinguished in the speech of children in the last fourth of their second year, the point in time when data collection started. Greek children enter the inflectional stage very early. Thus, the boy Christos already uses two different verb form categories carrying clear morphological markers by 1;8 and three different verb form categories at 1;9. Most importantly, these are used in a largely functionally adequate way as far as the categories of tense, aspect, and mood are concerned (Christofidou and Stephany 2003). However, neither the full set of verbal forms is acquired at this stage nor do the functions of forms used by the child equal those of standard Greek in every respect (Stephany 1985).[3]

Perfective and imperfective aspect was found to be marked in 90% of verb form tokens on average already by 1;9 with this percentage rising to 98% by the age of 2;10 (Stephany 1985:82). The prototypical combinations of aspect, tense, and *aktionsart* predominate in Greek child-directed speech and are the first ones to develop in child Greek (Stephany 1985, 1997). "While tense depends on aspect in child Greek, aspect is in turn dependent on lexical *aktionsart*" (Stephany 1997:327). At least up to 2;6, the dependence of aspect on *aktionsart* is much stronger in early child Greek than in the standard language (Stephany 1997:327). It is only when the category of aspect shifts from a more concrete category accompanying *aktionsart* to a more abstract grammatical category to be used with one and the same lexeme in both of its possibilities (perfective/imperfective) in a given tense or mood and when the category of tense is explicitly expressed that the category of aspect specializes (Stephany 1992:298-299, 295; 1997:328). A similar process of specialization of a grammatical category in Greek language acquisition may be observed in the subjunctive. Due to its fundamental role in expressing deontic meanings in everyday interaction, the subjunctive mood is more frequently attested at 1;10 than either the indicative or the imperative. The global category of the early subjunctive mood is gradually differentiated into the more specialized categories of subjunctive mood and future tense (Stephany 1992:297; 1997:203, 328).

As far as Russian child language is concerned, the development of aspect was first studied by Gvozdev (1949), who noticed that children use aspectual forms correctly from the very early stages on, quite in contrast to adult learners of Russian. These findings agree with those of Ceytlin (1989) in whose data aspectual errors are very rare, quite in contrast to the numerous morphophonemic mistakes concerning stem choice in finite verb forms. More recent work on the acquisition of Russian aspect by Poupynine (1998) shows that "errorless" occurrence of aspectual forms at the very beginning is due to a lack of contexts in which concurrent forms may be used. Stoll (2001) finds that even at the age of six children do not yet use Russian aspect in an adult-like way.

In the last ten years, the development of Russian verb morphology and the acquisition of aspect in particular has been the object of a number of studies, among which those by Poupynine (1996, 1998), Gagarina (2000a, 2000b, in press), and Stoll (1998, 2001).[4] Poupynine (1996, 1998) found that in the beginning of verbal development, there is an opposition between the imperative and the infinitive, with the infinitive being a kind of unmarked all-purpose or "mediator" form. When finite verb forms develop, the infinitive is restricted to modal functions and the perfective past and future are opposed to the imperfective present. Both the perfective past and the perfective future are closely related to utterance time (Poupynine 1998). According to Gagarina (2003), the first aspectual distinctions may already be detected in children's use of reduplicated onomatopoetic forms expressing repeated actions. In the

[3] See also Stephany (1981, 1997) and Christofidou and Stephany (2003).

[4] See also Kiebzak-Mandera (1999), Kiebzak-Mandera, Smoczynska, and Protassova (1997).

early stage of the development of perfective and imperfective aspectual forms, these are not used symmetrically: while perfectives occur in the past, imperfectives are used in the present (Gagarina 2000a). In her detailed investigation of the acquisition of Russian aspect based on longitudinal as well as experimental data from children aged from 2 to 6, Stoll (2001) distinguishes three stages: (1) Item-based learning, (2) context-based learning, and (3) context-independent proficiency. What is most relevant for our own results is Stoll's finding that while verbs of other *aktionsart* than the telic one "are predetermined for aspect and no choice is available", there is "a negative correlation of use of the perfective aspect within the telic Aktionsart and age" in a complex narrative production task. "Still the perfective aspect is very much prominent for the 5- and 6-year-olds as well [as the 3- and 4-year-olds] tested."

Since both Greek and Russian possess the grammatical category of aspect and oppose the perfective to the imperfective in their synthetic verb forms, we found it tempting to study the early development of this important verbal category in a Greek and a Russian child in order to find out in how far the development of aspect follows general lines of development or is influenced by differences in the two languages.

As opposed to the Cognition Hypothesis of the Piagetian tradition and followed for example in Slobin's famous paper published in 1973, the Language Specificity Hypothesis first supported by comparative work of Bowerman and Choi's[5] "emphasizes the child's productive analysis of the form-function patterns of the target language " (Behrens 2001:458). Slobin (2001:412) stresses that "crosslinguistic diversity in patterns of grammaticization points to adult communicative practices as the most plausible source of form-function mappings in human languages, rather than prototypical events in infant cognition." In a generative theoretical framework, Hyams (2002:226) points out that "even in the domain of inflectional morphology, where language particular variation is the richest, children acquire the specifics of the target language at a strikingly early age." This is what is called "Early Morphosyntactic Convergence."[6]

These considerations lead to the role of input frequency in language acquisition. One of the tenets of Bybee's (1991:89) model of the acquisition of inflectional morphology is that "the most often repeated experiences (in production and perception) have the strongest [mental] representation." In a recent number of *Studies in Second Language Acquisition* entirely devoted to the role of frequency in language processing and language development, Ellis (2002a:145; 2002b:298) discusses the relative roles of input frequency and of "noticing" in language acquisition as well as the importance of saliency and semantic load of grammatical phenomena (2002b:307). In view of recent research in the neuroscience of "noticing" and of implicit vs. explicit learning it seems inappropriate to dismiss the role of input frequency by arguing that it does not play an exclusive role in language acquisition (see Ellis 2002a; 2002b).[7]

We agree with the basic tenet of usage-based models of language acquisition, that young children use language to communicate and that they "begin by imitatively learning specific pieces of language in order to express their communicative intentions" trying to use language the way they have heard it used by mature speakers in their environment (Tomasello 2000:70-71). A comparison between child speech and child-directed speech will therefore be included in this comparative study of the early development of aspect in Greek and Russian. Jakobson's (1977:8) ideas on the role of input and his characterization of early language development in

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5 See Bowerman (1985), Choi and Bowerman (1991), Gopnik and Choi (1995).

6 See also Hoekstra & Hyams (1998).

7 Thus, Hyams (2002:249, fn.21) criticizes input-based statistical models of language acquisition because "the child so often ignores robust properties of the adult input."

children as ”creative imitation” regain importance in the framework o of contemporary theories of language acquisition:

> *Was hier stattfindet, ist weder eine mechanische Übernahme noch eine wunderbare Schöpfung aus dem Nichts. Das Nachahmen öffnet den schöpferischen Kräften des Anfängers weite Möglichkeiten. Das vorhandene Muster gestattet eine Auslese der vollbrachten Entlehnungen und deren gesetzmäßige Reihenfolge, der zudanken das Kind anfangs das eine und dann erst das nächste sich anzueignen weiß.*

2 A note on the grammatical structure of the Greek and Russian aspectual systems

As mentioned above, the category of aspect is grammaticized in both Greek and Russian opposing perfective and imperfective verb forms in all inflectional categories expressed by synthetic verb forms except the nonpast (‘present’).

Table 1. The main inflectional categories of the Greek verb in the active voice (from Christofidou & Stephany 2003:93)

Mood	Tense	Aspect	
		Imperfective	Perfective
Indicative	Non-past	líno[1]	-
	Past	élina	élisa
	Future	tha líno	tha líso
Subjunctive		na líno	na líso
Imperative		líne	líse

[1] ‘to solve, untie’

In Greek, nearly all verbs formally distinguish between imperfective and perfective forms. These occur in the simple past, the future, the subjunctive, and the imperative. The other grammatical categories expressed inflectionally by the Greek verb are mood, tense, and voice, as well as person and number. Modern Greek has no infinitive. Aspect is marked on the stem, while mood and tense are expressed by the verb ending, together with person and number. Active and medio-passive voice are marked on the verb ending as well as the stem.[8] The main temporal opposition is past/non-past. Table (1) exemplifies the principal tense-aspect-mood categories of the Greek verb.

In Russian, the two aspects are contrasted not only in finite verb forms (except the present tense) but also in the infinitive and the participles (table 2). Since participles are very rare in child speech as well as in child-directed speech we will not consider them here.[9]

Despite the similarities mentioned above, there are important differences in the way the aspectual systems function in the two languages. While in Greek nearly all verbs oppose a perfective to a given imperfective grammatical form, Russian aspect is more strongly lexicalized with pairs of imperfective and perfective lexemes not only differing aspectually, but also as far as their lexical meanings are concerned.

[8] Since the medio-passive is irrelevant for early verb development it will not be considered here.

[9] For a full representation of the Russian system see Gagarina (2003).

Table 2. The main inflectional categories of the Russian verb in the active voice

		Aspect	
		Imperfective	Perfective
Infinitive		reshat'[1]	reshit'
Mood	Tense		
Indicative	Present	reshaet	-
	Past	reshal	reshil
	Future	budet reshat'	reshit
Subjunctive		reshal by	reshil by
Imperative		reshaj	reshi

[1] *reshat'* and *reshit'* both mean 'to solve'.

This is especially true of perfective verbs formed by prefixes as compared to their imperfective bases. Thus, in pairs of prefixed and unprefixed dynamic verbs, the derived prefixed perfective member has a telic meaning while its unprefixed imperfective counterpart is atelic (examples 1). Such derived perfective verbs may in turn be "secondarily" imperfectivized by suffixation furnishing the only "true" perfective/imperfective pairs of verbs (examples 2). However, such "secondary" imperfectives do not occur in our child data.

(1) RUSSIAN (a) *sjest'* (PFV) 'to eat up'
(b) *jest'* (IPF) 'to eat'

(2) RUSSIAN (a) *sjest'* (PFV) 'to eat up'
(b) *sjedat'* (IPF) 'to eat up' (iterative)

The semantic and syntactic functions of the aspectual systems of Greek and Russian are highly complex. We will here limit ourselves to the description and comparison of the semantic functions of aspectual verb forms in early Greek and Russian child language.

3 The data

In this pilot study, the tense-aspect-mood forms of the 20 most frequent verbs with equivalent meanings occurring in the longitudinal audiotaped data of a Greek and a Russian boy between the ages of 2;1 and 2;3 will be analyzed. The lexical inventories of the two children comprise approximately 100 verbs each. The entire audiotaped data covering this period consists of 2.052 utterances for the Greek boy and 1.923 utterances for the Russian boy.

4 Form and function of aspectual verb forms in early Greek and Russian child language

4.1 The early development of verb forms in Greek and Russian

The types and tokens of verb forms occurring in different tense-aspect-mood categories in the speech of both boys from the beginning of data collection through the age of 2;3 are summarized in tables (3) and (4). By the age of 2;1, the Greek as well as the Russian boy seem to make a spurt in the development of verbal morphology: They use a considerably

larger number of different tense-aspect-mood forms both type- and tokenwise than before this age. Although the development of verbal inflection began much earlier, it has reached an impressive diversity at the beginning of the third year in the two languages. The numbers of verb form tokens occurring in the age range between 2;1 and 2;3 are 769 for the Greek boy Christos and 523 for the Russian boy Filipp.

Table 3. Greek: Types/Tokens of Christos' Verb Form Categories from 1;7 to 2;3

AGE	PRES	PAST		FUT		IMP		SUBJ	
	IPF	PFV	IPF	PFV	PFV	IPF	IPF	PFV	IPF
1;7	7/8	-	-	-	-	-	-	2/3	-
1;8	4/5	2/4	-	-	-	-	-	-	1/5
1;9	14/27	6/15	1/1	-	-	-	-	1/1	1/1
1;10	16/77	6/10	-	-	-	-	-	-	-
1;11	24/77	8/14	-	-	5/9	-	-	3/3	-
2;0	24/82	10/19	2/2	4/6	10/12	-	-	3/6	-
2;1	38/144	25/78	1/1	19/27	36/49	-	-	10/24	-
2;2	24/53	16/55	1/3	18/21	26/45	2/4	2/2	2/3	1/1
2;3	25/66	53/118	2/11	16/18	13/22	2/4	1/1	6/13	4/6

Table 4. Russian: Types/Tokens of Filipp's Verb Form Categories from 1;4 to 2;3

AGE	PRES	PAST		FUT		IMP		INF	
	IPF	PFV	IPF	PFV	IPF	PFV	IPF	PFV	IPF
1;4	-	-	-	-	-	3/5	1/1	1/14	-
1;5	-	1/1	-	-	-	1/4	2/2	1/82	-
1;6	-	2/2	-	1/1	-	4/9	-	1/60	1/1
1;7	1/1	1/3	-	1/1	-	-	1/1	1/47	-
1;8	11/22	2/2	-	3/5	-	4/7	6/6	1/56	7/15
1;9	28/43	10/11	5/5	2/2	-	6/22	4/5	7/21	12/17
1;10	12/17	4/5	4/4	1/1	-	5/7	-	2/2	3/3
1;11	12/19	13/14	1/3	5/9	-	5/11	4/7	6/9	3/3
2;0	18/26	11/16	15/18	6/10	-	5/12	7/9	2/3	5/10
2;1	46/81	32/46	14/24	9/20	½	8/15	4/4	3/6	10/12
2;2	22/33	29/39	7/9	16/23	2/3	8/14	8/11	5/9	10/16
2;3	36/59	14/15	8/19	13/15	1/1	4/12	8/10	2/2	8/15

It is important to point out that in Greek and Russian finite verb forms do not only express the category of aspect but also mood and tense. Thus, contrasting use of such forms not only concerns aspect but also the latter two categories.[10] As shown in tables (3) and (4), in both Greek and Russian a shift in aspect is usually accompanied by a shift in tense or mood.

[10] In this paper, we will not be concerned with the categories of person, number, and gender.

Changes of aspect within one and the same tense or mood are very rare. This is true for the two children's speech as well as the child-directed speech of their mothers (see tables 7 and 8 below).

Let us next consider the use of the aspectual forms occurring in the two children's speech in more detail and compare the child data to what is found in child-directed speech.

4.2 Use of perfective and imperfective verb forms with stative, telic, and atelic verbs in child Greek and child Russian as compared to child-directed speech

In spite of the fact that most Greek verbs distinguish imperfective and perfective forms, these forms are not evenly distributed in speech. Besides the interaction of aspectual verb forms with the categories of tense and mood, there is a strong interaction with the inherent aspectual character of verbs, their *aktionsart*. As shown by Stephany (1985), this holds true for colloquial Greek, but is especially prominent in both Greek child language and child-directed speech, where a more or less strong dependence between the two aspects and stative vs. dynamic verbs is found on the one hand and telic vs. atelic verbs on the other. The distribution of the aspectual forms of 21 of Christos' verbs belonging to the classes of stative, telic, and atelic verbs, respectively, is summarized in table (5).

Table 5. Greek: Usage of the perfective and imperfective aspect with 21 stative, telic, and atelic verbs in Christos' speech from 2;1 to 2;3 (lemmas/tokens)

Aktions-art	PRES	PAST		SUBJ/FUT		IMPERATIVE	
	IPF	PFV	IPF	PFV	IPF	PFV	IPF
Stative (3 lem.)	3/36	-	-	-	-	-	-
Telic (10 lem.)	3/58	6/103	-	10/66	3/5	2/24	-
Atelic (8 lem.)	5/83	2/5	1/1	5/88	2/8	2/5	-

While stative verbs are exclusively used in the present tense and thus with the imperfective aspect, Christos shows a strong tendency to use telic verbs both in the perfective past and the perfective subjunctive or future. Altogether, perfective verb forms amount to more than 75% of tokens with telic verbs, while atelic verbs occupy a more moderate position as far as the distribution of the two aspectual categories is concerned: about 50% of atelic verb form tokens are imperfective and the other 50% perfective.

In Russian, the situation is different: Stative and atelic verbs typically have no true perfective correspondence since with these verbs a change of aspect causes a simultaneous change of *aktionsart*. Thus, *exat'* – 'to go by vehicle' is imperfective and atelic, whereas its perfective counterparts are all telic (examples 3).

(3) RUSSIAN (a) *exat'* – 'to go by vehicle' – IPF, atelic
(b) *poexat'* – 'to start going by vehicle' – PFV, telic
(c) *uexat'* – 'to leave by vehicle' – PFV, telic
(d) *priexat'* – 'to arrive by vehicle' – PFV, telic

Given this situation, both perfective and imperfective forms only occur with telic verbs in standard Russian and children thus have no opportunity to hear any perfective forms of atelic

verbs. They accordingly use both stative and atelic verbs exclusively in the imperfective aspect (table 6). With telic verbs, there is an even stronger preference for the perfective aspect than in Greek, with 90.8 % of all telic verb tokens being perfective. Thus, the use of aspect with stative verbs in Greek exactly corresponds with Russian, while telic and atelic verbs behave differently in the two languages. The reason seems to be that the more strongly aspect is lexicalized the more it depends on *aktionsart*.

Table 6. Russian: Usage of finite aspectual forms from 35 stative, telic, and atelic verbs in Filipp's speech from 2;1 to 2;3 (lemmas/tokens)

Aktionsart	PRES	PAST		FUT		INF		IMPERATIVE	
		PFV	IPF	PFV	IPF	PFV	IPF	PFV	IPF
Stative (3 lemmas)	13	-	-	-	-	-	1	-	-
Telic (24 lemmas)	1/5	14/38	-	11/33	-	5/16	1/1	5/22	4/5
Atelic (8 lemmas)	7/45	-	4/8	-	1/1	-	4/16	-	-

Comparing the children's language to child-directed speech it is found that the distribution of aspectual forms in the Greek boy's speech corresponds quite closely with his mother's usage in her child-directed speech between 2;1 and 2;3 (table 7). She uses stative verbs exclusively in the present imperfective. With telic verbs, perfective verb forms amount to 73.5% and thus by far outnumber imperfective ones. As is the case in her son's speech, imperfective and perfective verb forms are more evenly distributed with atelic verbs, where imperfective forms amount to 57.3% of tokens.

Table 7. Perfective and imperfective verb form tokens (%) in Greek child speech and child-directed speech (CDS)

	Aktions-art	PRES	PAST		SUBJ/FUT		IMPERATIVE	
		IPF	PFV	IPF	PFV	IPF	PFV	IPF
Child 2;1-2;3 (21 lem.)	Stative	100%	-	-	-	-	-	-
	Telic	22.7%	40.2%	-	25.8%	1.9%	9.4%	-
	Atelic	43.7%	2.6%	0.05%	46.3%	4.2%	2.6%	-
CDS 2;1-2;3 (37 lem.)	Stative	100%	-	-	-	-	-	-
	Telic	24.7%	30.7%	-	28.3%	2.2%	14.5%	0.6%
	Atelic	44.1%	4.4%	0.4%	38.2%	4.0%	4.0%	4.8%

The Russian child's exclusive use of stative and atelic verbs in the imperfective aspect exactly corresponds to that of his mother (table 8). With telic verbs, the perfective aspect is also preferred by the mother, in whose child-directed speech it amounts to 68.7% of tokens. The mother, however, uses the imperfective present and the imperfective imperative of telic verbs much more often than her son.

Table 8. Perfective and imperfective verb form tokens (%) in Russian child speech and child-directed speech (CDS)

	Aktions-art	PRES	PAST		FUT		INF		IMP	
		IPF	PFV	IPF	PFV	IPF	PFV	IPF	PFV	IPF
Child 2;1 – 2;3 (35 lem.)	Stative (3 lem.)	92.9%	-	-	-	-	-	7.1%	-	-
	Telic (24 lem.)	4.2%	32%	-	27.5%	-	13.3%	0.8%	18.1%	4.1%
	Atelic (8 lem.)	64.4%	-	11.4%	-	1.4%	-	22.8%	-	-
CDS 2;1-2;3 (35 lem.)	Stative (3 lem.)	97.1%	-	2.9%	-	-	-	-	-	-
	Telic (24 lem.)	18.8%	40.6%	-	9.8%	-	6.4%	3.5%	11.9%	9.0%
	Atelic (8 lem.)	72.6%	-	16.1%	-	0.8%	-	9.7%	-	0.8%

4.3 The functions of aspectual forms in early Greek and Russian child language

As mentioned above, in both Greek and Russian finite verb forms, aspect cooccurs with mood or tense. Depending on these latter categories as well as on the *aktionsart* of verbs, there are certain preferred combinations of aspect, tense, and mood used with certain functions in the two standard languages, in child-directed speech, and in child language. Typical examples from Greek and Russian child language are given in examples (4) to (6).

(4) GREEK

(a) Christos 2;1.9 PRES:IPF, atelic*odhigho* 'to drive'

FAT: tu baba to kikinito@b [: aftokinito] echi timoni.
of.the daddy the car has steering.wheel
'Daddy's car has a steering wheel.'

CHR: otiji [: odhiji] (o) PikioC@c [: Christos] (to) kinimo [: aftokinito]
drive:IPF:NONPAST:3S (the) Christos (the) car
timoni (to) kikineto [: aftokinito].
steering.wheel (the) car
'Christos drives the car steering wheel car.'

(b) Christos 2;2.18 PAST:PFV, telic *pefto* 'to fall'

CHR: epetse [: epese]. 'It has fallen.'
fall:PFV:PAST:3S

MOT: ti epese moro mu?
'What has fallen (PFV:PAST) baby of.me?'

CHR: to (for)tigho Medi [: Mersedes] epetse [: epese].
the truck Mercedes fall:PFV:PAST:3S
'The Mercedes truck has fallen.'

(c) Christos 2;1.23 SUBJ:PFV, atelic *troo* ‘to eat‘
GRM: na su katharisi i jaja ap(o) to kukutsi ke na fas?
MDL.PTL you:GEN clean:PFV:SUBJ:3S the granny of the stone and MDL.PTL eat:PFV:SUBJ:2S
‘Shall Granny clean (it) for you from the stone and that you eat?‘
CHR: (tha/na) fai kilika [: elitsa].
(FUT/MDL.PTL) eat:PFV:SUBJ:3S olive:DIM:SG
‘He will/wants to eat (an) olive.‘

In the Greek example (4a), in which the atelic verb *odhigho* ‘to drive‘ is used in the present tense while the child and his father are playing with a toy car simultaneously referring to cars in the real world. The function of the present imperfective is descriptive and the situation is unbounded. In example (4b), the perfective past used with the telic verb *pefto* 'to fall' is also descriptive but has a resultative meaning. The function of the perfective past is therefore aspectual rather than temporal with the topic time being the present rather than the past. The perfective subjunctive of the atelic verb *troo* ‘to eat‘ in example (4c) has a more future-like or more subjunctive-like modal interpretation depending on the particle used. In Christos’ speech, it expresses a wish or an intention and has a strong deontic modal character. All of Christos’ imperative forms occurring in the data studied are perfective and there is thus not yet any aspectual distinction within this mood. Besides, all early Greek verb forms are finite.

(5) RUSSIAN

(a) Filipp 2;2 PRES:IPF, atelic *exat'* 'to go by vehicle'
*FIL: Netu gruza.
%eng: no load:GEN:SG
*MOT: Nu potom najdem.
%eng: later on we find:FUT:PFV
*FIL: Nasha mashina bez gruza edet.
%eng: Our car without load go:PRES:IPF

(b) Filipp 2;1 PAST:PFV, telic *upast'* 'to fall down'
*MOT: a chto obezjanka sdelala?
%eng: and what monkey do:PFV:PAST
*FIL: upala.
%eng: fall_down:PFV:PAST

(c) Filipp 2;3 FUT:PFV, telic *ubrat'* 'to tidy up', *lech'* 'to lie down'
*MAM: Tebja zovut Filipp, a ee kak zovut ?
%eng: your name is Filipp and what is her name?
*FIL: Zhakonja.
%eng: Zhakonja.
*FIL: Baba uberet i ljazhesh' spat' .
%eng: Granny tidy_up:FUT:PFV and you go:FUT:PFV to bed
%com: addressing the monkey

The examples of imperfective present and perfective past form usage of the Russian child given in (5a) and (5b) are quite typical and immediately compare to examples (4a) and (4b) of the Greek boy. Both utterances are descriptive and refer to the here-and-now of the situation. In example (5a), Filipp speaks about an unbounded action. While the process itself lies in the immediate past in example (5b), the state resulting from the monkey's falling exists at the time of the utterance. The perfective future is clearly used with a temporal function in the first predication of example (5c), whereas the second predication may also be interpreted modally.

(6) RUSSIAN

(a) Filipp 2;2 INF:IPF, atelic *kushat'* 'to eat', stative *ljubit'* 'to love'
*FIL: nado kushat', nado babu ljubit'.
%eng: need to eat:IPF:INF need to love:IPF:INF granny
%com: addressing the toy cat

(b) Filipp 2;2 INF:PFV, telic *sjest'* 'to eat up'
*MOT: kogo xochet sjest'?
%eng: whom:ACC want (the fox) to eat_up:INF:PFV
*FIL: zajchika sjest' .
%eng: hare eat_up:PFV:INF.

(c) Filipp 2;2 IMP:PFV, telic *pochinit'* 'to repair'
*FIL: na pochini sobaku.
%eng: there repair:PFV:IMP dog:ACC
*MOT: ne budu ja, ty lomaesh' ee, ne budu chinit' .
%eng: I shall not, you break it, I shall not repair:FUT:IMP

(d) Filipp 2;2 IMP:IPF, telic *sadit'sja* 'to sit down'
*FIL: sadis, otkrytku dam
%eng: sit_down:IPF:IMP, postcard give:FUT:PFV
'Sit down I will give you a postcard.'

In example (6a), a stative and an atelic verb are used in the imperfective infinitive while in example (6b), a telic verb occurs in the perfective infinitive. In both examples, the infinitive carries a modal meaning. In examples (6c) and (6d), telic verbs are used with the perfective as well as the imperfective imperative. As far as the perfective imperative form used by the child in example (6c) is concerned, there is a small difference in meaning between this perfective form and a possible imperfective one: Use of the perfective form implies that the child's directive is not yet known to his mother and comes to her as new information. The imperfective imperative would be used if the directive was already known to the hearer. It is also natural in a situation such as the one in example (6d). It is questionable though whether the child already understands these subtle differences in meaning.

(7) GREEK

(a) Christos 2;2.4 SUBJ:IPF, atelic *troo* 'to eat'
na t(r)oi mam.
MOD:PTL eat:SUBJ:IPF:3S food
'He shall eat food.'

(b) Christos 2;1.27 SUBJ:IPF, atelic *troo* 'to eat'
(tha) majetsi [: majirepsi] i jaja to [: na] poi [: troi] fatses [: fakjes].
(FUT.PTL) cook:SUBJ:PFV:3S the granny MOD.PTL eat:SUBJ:IPF:3S lenses
'Granny will cook lenses for him to eat.'

(c) Christos 2;1.27 SUBJ:IPF, atelic *pino* 'to drink'
(th)eli na pini ne(r)o (o) Pitsio.
wants MOD.PTL drink:SUBJ:IPF:3S water (the) Christos
ne(r)o (th)eli na pji (o) Pitsios.
water wants MOD.PTL drink:SUBJ:PFV:3S water (the) Christos
'Christos wants to drink water.'

In the speech of the Greek boy, there are only a few examples in which he uses an atelic verb in the imperfective subjunctive. If a mature speaker used such a form one would have to interpret it as having a marked meaning, for example an iterative one. With Christos, however, there is only one example of the verb *troo* 'to eat' where the imperfective subjunctive has such a meaning and is colloquially correct (example 7a). In the other four tokens of this verb form, he seems to be using a memorized form without sufficient knowledge of the relation between the aspectual forms of the superordinate and the subordinate verb (example 7b). In standard Greek, the subordinate verb would be in the perfective subjunctive form *fai* 'eat:SUBJ:PFV:3S'. The only other atelic verb occurring in the imperfective subjunctive is *pino* 'to drink' (1 token). Here, Christos immediately corrects the inadequately used imperfective form to a perfective one in the next utterance (example 7c). As far as the imperfective past is concerned, there is only one token of the atelic verb *troo* 'to eat'. However, it seems to have been wrongly used instead of a present or subjunctive form.[11] These few examples seem to demonstrate that Christos has not yet achieved the mapping between form and meaning of such marked aspectual forms of the language he is acquiring. In the light of such findings, Hyams' claim that "there is a strict mapping between form and meaning" in children's early inflections (2002:236-237) and that "children do not typically assign wrong aspectual or modal meanings to inflectional forms" (2002:244-245) seems too categorical.

5 Universal and particular in the acquisition of Greek and Russian aspect

The main findings of this pilot study comparing the development of the category of aspect in early Greek and Russian child language may be summarized as follows:

In both languages, the early use of aspect strongly depends on *aktionsart*. While stative verbs exclusively occur in the imperfective aspect, the perfective aspect is strongly preferred with telic verbs in Greek as well as Russian. This agrees with what Stoll (2001) found, especially for her younger subjects. There is a difference between the two languages as far as atelic verbs are concerned. While these are more or less evenly used with both aspects in Greek, they exclusively occur in the imperfective aspect in Russian. As mentioned above (section 4.2), the reason is that the perfective aspect would automatically change these verbs into telic ones. Still, it can be maintained that in neither child language has the category of aspect as yet

[11] At 2;2.14, Christos still uses the form *etroje* 'he ate:IPF:PAST:3S' inappropiately.

developed into a generalized grammatical category and demonstrates more local, low-scope systematicity instead.

In Greek as well as Russian, there is a strong correlation between aspectual use in the children's and their mothers' speech. Thus, early child Greek shows typical characteristics of aspectual use of Greek while early child Russian shows typical characteristics of Russian. Such language-specific features of aspectual use are even stronger in child language than in child-directed speech.

The correlation between the children's and their mothers' speech also concerns the types of verb form categories used in each language: While in Greek the subjunctive is a very important verbal category in everyday interaction expressing deontic modal meanings, the infinitive and the future are used in comparable functions in Russian.

To conclude, our study seems to support the hypothesis that from very early on children are sensitive to the specific characteristics of the language they are acquiring.

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