

Finiteness systems and lexical aspect in child Polish and English

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Abstract

The purpose of this research was to discover how the aspectual properties of predicate structure influence the acquisition of agreement and tense morphology in Polish and English. We investigated the corpora of six children learning each language by tracking the emergence of their verb morphology within a set of predicates in each of three categories, i.e., stative, dynamic-atelic, and dynamic-telic. We used contrast as a measure of acquisition, e.g., past versus nonpast. In Polish, the age of the initial contrast in agreement and in tense was very similar for dynamic predicates, and agreement emerged before tense in stative predicates. In English, contrasts in tense preceded contrasts in agreement for dynamic predicates, but the pattern of acquisition was the same for stative predicates. The interaction of grammatical and lexical aspect permeated the pattern of the acquisition of the finite morphology. For stative predicates, finite contrasts occur exclusively in the imperfective aspect in Polish and exclusively in the nonprogressive aspect in English. In Polish, finite contrasts for atelic predicates were very likely to be found in the imperfective aspect and telic predicates in the perfective aspect. The related pattern in English was much less distinct. In Polish, when a contrast in agreement (e.g., 3rd versus 1st person singular) coincided with a contrast in tense (e.g., past versus future), all of the children demonstrated the capacity to immediately (i.e., without further development) produce the agreement contrast in both tenses. These findings indicate that the children are acquiring their knowledge of tense and agreement in a systematic manner driven by the acquisition of predicate-argument structure.

1. Introduction

The purpose of this research was to investigate the nature of the child's knowledge of the linguistic systems that underlies the emergence

of finite verb morphology. The research focused on the acquisition of agreement and tense morphology in the highly inflected language Polish and the sparsely inflected English language. The research was designed to discover the underlying semantic-syntactic structure of child language from longitudinal observations of the pattern of the acquisition of the verb morphology within individual predicates that vary in lexical aspect.

The process of constructing linguistic systems starts with information processing. Slobin (1973, 1982, 1985) proposed a set of perceptual — conceptual procedures for processing linguistic data, called operating principles. While the theory of operating principles has evolved over two decades, the notion of “typological bootstrapping” remains as an invariant feature of the theory (Slobin 2001: 441). Some properties of the finite morphology are likely to facilitate information processing, and they include: 1) predictability; obligatory marking versus optional marking, 2) perceptual salience; suffixed versus prefixed and syllabic versus non-syllabic, 3) one-to-one mapping; a unique morpheme expresses a single semantic concept, 4) local coding; morphemes affixed on the main verb versus an auxiliary, 5) invariant form, and 6) consistently applied across a paradigm, e.g., agreement specified on all tense forms (see Slobin 1982: 151 and Weist 2009). In our description of the finite morphology of Polish and English in the method section, we will show that the morphology of Polish is more likely to exhibit these properties than that of English, and therefore, we expect to find a more precocious acquisition pattern in the Polish children.

Research on child language during the last decade has shown that children begin the process of constructing semantic-syntactic systems from a relatively concrete starting point. Tomasello’s (1992) investigation of his daughter’s (Travis’s) emerging verb concepts represents the most extensive verb-centered investigation of this type. Tomasello proposed that during an early phase of acquisition children acquire relatively independent verb constructions, called verb-island constructions (e.g., 1992: 238). The verb concept at the core of the construction organizes a set of argument roles. The arguments were viewed as specific to the individual verb island, such as *giver*, *given*, and *recipient* for the concept *give*. Argument structures varied in the number and kind of arguments, e.g., *fall-down* (1992: 111) and *crying* (p. 143) both contained a single argument role, i.e., object-like for *fall-down* and actor-like for *crying*, and the argument structure for *make* (p. 57) and *take* (p. 103) contained two arguments plus the concept of “cause”.¹ Verb-island constructions are at the core of Tomasello’s “usage-based” grammar. Tomasello (1992: 237, 2003: 117 and 298, 2006: 275) proposed that the specific arguments of the island

concepts are mapped onto slot-filler sentence construction, e.g., (*_ crying*) and (*_ singing*). These slot-filler constructions provide the mechanism for the acquisition of abstract arguments such as *actor* and *object*, e.g., [*_ VERB-ing*] mediates the acquisition of the category *actor* from the more specific *crier* and *singer* (see Tomasello 1992: 244, Table 8.6 for a summary of Travis's acquisition patterns).

Regarding finite morphology, Tomasello (1992: 254) observed that, "although T had 24 past tense forms and 23 present progressives, there were only 4 verbs that were used with both endings". When contrast is used as a measure of the productivity, the estimates of the age of acquisition have been relatively late. In their investigation of the longitudinal caregiver-child interaction data, Weist et al. (2004) tracked the emergence of tense and aspect morphology in a set of telic and atelic predicates in children learning Polish and English. Considering exclusively tense contrasts, e.g., past versus future perfective, and exclusively aspect contrasts, e.g., perfective versus imperfective past, the average age of emergence was as follows: (i) Polish, tense 2;4 and aspect 2;11, and (ii) English, tense 3;0 and aspect 3;5 (see also Mueller Gathercole et al. 1999 for Spanish; Pizzuto and Caselli 1992 for Italian). The estimates of acquisition based on comprehension studies have yielded a more precocious picture of acquisition. Given a sentence-picture matching task children learning Polish and English demonstrated the capacity to resolve tense contrasts and aspect contrasts at 2;6 (Weist et al. 1991), and in an experiment just involving tense and aspect problems and children learning Polish and English, Weist et al. (1999) found that 3-year-old children were able to "pass" (i.e., deviate from chance expectations) sentence-video as well as sentence-still-picture contrasts. Utilizing a related comprehension procedure, Valian (2006) found that children learning English understand tense contrasts at 2;6. A less precocious outcome has been derived from a number of transfer studies involving novel verbs (see Tomasello's 2006 review), and a more precocious estimate has been derived from longitudinal observations of caregiver-child interactions where the context of the children's utterances was well understood and precisely documented (e.g., Bowerman 1981).

Tomasello's (1992) investigation of Travis demonstrates that children construct verb concepts which are distinguished by the number and type of arguments. Brown (1973) observed that lexical aspect also plays a productive role in the child's early verb concepts. Brown found that children observe the distinction between stative and dynamic by reserving progressive aspect for dynamic predicates. An extensive body of cross-linguistic research has shown that within the set of dynamic predicates the distinction between atelic and telic is relevant to the development of the

conceptual structure underlying the child's verbs (e.g., see reviews by Li and Shirai 2000 and Weist 2002a).

According to Tomasello (2003, 2006), children begin with relatively specific verb concepts (e.g., 2003: 120 Figure 4.3) and they acquire verb concepts with abstract properties such as "syntactic roles", e.g., "X's VERBing me", *I'm VERBing X*, and *X's getting VERBed* (2003: 299). Tomasello (2003: 220) is aware of the interaction between lexical and grammatical aspect, and he attributes this fact about child language to the distribution of forms found in child directed speech (e.g., Shirai and Andersen 1995). While Tomasello's theory of abstract verb concepts includes the notion of syntactic roles, a representation of the child's knowledge of lexical aspect is absent.

In contrast, the theory of semantic structure within role and reference grammar (RRG) integrates argument structure with the distinctive properties of lexical aspect that have been found to shape language acquisition (see Van Valin and LaPolla 1997: Chapter 3). According to RRG (see Table 1), four basic predicate types form the foundation for lexical aspect. The four basic predicate types are state (e.g., *know*, *love*), activity (e.g., *cry*, *play*), accomplishment (e.g., *make*, *melt*), and achievement (e.g., *fall*, *find*) (see also variations on this basic theme by Dowty 1979; Smith 1991; and Vendler 1967). A category of punctual activities e.g., *cough*, *bounce*) may also be viewed as fundamental (Smith 1991 and Van Valin 2005). As shown in Table 1, the basic units of the metalanguage include *do'* and *predicate'* (*pred'*). The element *do'* is the generalized activity predicate, e.g., the predicate in the activity example would be realized as *play'*. The predicate in the accomplishment example in Table 1 would be realized as *broken'*. BECOME and INGR (ingressive) are predicate modifiers. The semantic representations that include these modifiers have the property telic. Within this framework, the structure of the predicate is viewed as guiding the semantic-syntactic interface that yields agreement.

Table 1. *The representation of the semantic structure of the predicate*

VanValin / Vendler-type	Structural representation	Sentence example
1. State	predicate' (x) or (x,y)	<i>The toy is broken</i>
2. Activity	do' (x, [pred' (x) or (x,y)])	<i>Eva played in school</i>
3. Accomplishment	BECOME pred' (x) or (x,y)	<i>The toy broke</i>
4. Achievement	INGR pred' (x) or (x,y)	<i>Eva found the toy</i>
Active-accomplishment	do' (x, [pred' (x)]) & BECOME pred' (x)	<i>Eva walked to school</i>
Causative	do' (x,∅) & CAUSE & [logical structure of 1–4]	<i>Eva broke the toy</i>

Following Tomasello's (2006) argument, children begin to acquire predicate structure with relatively specific thematic relations such as *breaker* and *thing broken*, and at a latter phase, they acquire more abstract thematic relations. Van Valin (2001: Figures 2.1 and 2.2) shows how more abstract thematic relations are related to the very specific relations, e.g., *broken to patient* and *given to theme*, and then *patient and theme* to Undergoer, and Tomasello (2003: Figure 5.1) has proposed stages in the acquisition process that might lead to such abstractions. Within RRG, Actor and Undergoer are higher order thematic relations (or macro-roles), and they constitute generalizations over more specific thematic relations such as agent or effector versus patient or theme. Agent is viewed as the unmarked choice for Actor and patient for Undergoer. A selection hierarchy maps arguments of the predicates onto macro-roles, and then depending on the typology of the language, onto the privileged syntactic argument (PSA), i.e., a concept of subject (see Van Valin and LaPolla 1997: Chapter 4). In this way, the acquisition of predicate structure has consequences for the mapping of the arguments of the predicate to syntactic relations (cf. Tomasello 2003: 298 and 299). The PSA is privileged because the verb is likely to agree with it. Polish and English are nominative-accusative languages, and children learning these languages, as opposed to an ergative language, need to learn that the PSA is nominative in case and agrees with the verb.

According to Van Valin (1991), the structures that are proposed within the RRG framework are accessible to the information-processing child. The fundamental idea that language structure is derived from the ambient linguistic information is consistent with (or fundamental to) the usage-based proposal. Utilizing Braine's (1992) "developmental primitives" and "learning processes", Van Valin (2009) has outlined such an information processing hypothesis. Within the RRG framework, clause structure is viewed as a layered structure with each layer being semantically motivated. Moving from the basic layer to more inclusive layers, the nucleus is defined by the predicate, the core layer incorporates the predicate and its arguments, and the clause includes the core and the periphery. Tense and aspect are viewed as operators where tense has the clause in its scope and aspect has the nucleus in its scope. When children produce tense contrasts, they are actively locating their entire clause at some interval in time, i.e., event time, relative to speech time. We expect to discover evidence revealing the child's acquisition of scope relations.

Within the RRG framework, agreement requires a relationship between semantic and syntactic structure. Predicate structure is essential. When children acquire distinctions within predicate structure that define lexical aspect, e.g., activity versus accomplishment, they are also learning

distinctions that are relevant to syntactic relations. We expect to determine how children acquire predicate structures, and the structural representations proposed within RRG constitute a working hypothesis (see Table 1).

In this research, we traced the acquisition of agreement and tense morphology in a set of stative and dynamic predicates in six children learning Polish and six children learning English. The dynamic predicates were further partitioned into atelic and telic subsets. The telic subset included predicates with BECOME/INGR in their logical structure, e.g., accomplishments and achievements (see Table 1). The major dependent measure was contrast. Within the corpus of each child, the predicates that entered the design revealed contrasts in both agreement and tense, making it possible to evaluate the relative (or comparative) course of development. The research was based on longitudinal naturalistic observations of caregiver-child interactions making it possible to obtain an individualized history of the emergence of the verb morphology.

2. Method

2.1. Children

The corpora for most of the children were found in the CHILDES archives (MacWhinney and Snow 1985), and a complete description of the corpora and how they were obtained can be found in the archives. Basia, Inka, Jaś, Kasia, and Michał were taken from the Kraków project (see Smoczyńska 1985) and Wawrzon from the Poznań project Weist et al. 1984). As for the children learning English, they were as follows: Abe (Kuczaj 1976); Adam and Sarah (Brown 1973); Matty (SUNY Fredonia); Naomi (Sachs 1983); and Nina (Suppes 1974). Table 2 contains the children and the age span that was investigated. We discontinued our analysis at 4;11. Matty was audio-tape recorded in interactions with his

Table 2. *The children and their age span*

Polish	Age span	English	Age span
Basia	1;5–4;11	Abe	2;4–4;11
Inka	1;0–4;11	Adam	2;3–4;10
Jaś	1;6–4;11	Matty	2;3–4;2
Kasia	1;3–3;1	Naomi	1;2–4;9
Michał	2;0–4;11	Nina	1;11–3;3
Wawrzon	2;2–3;2	Sarah	2;3–4;11

mother twice a month in a laboratory situation for approximately 30 minutes per session, and there are 56 transcripts. These data were transcribed in CHAT format, and they are currently included in the CHILDES archives. A presentation and explanation of MLU (mean length of utterance) data, relevant to a crosslinguistic comparison, are found in the results section.

2.2. *Predicate tracking and classification*

The fundamental criterion for acquisition was the concept of contrast, and the process of analysis was called predicate tracking. We followed the emergence of the agreement and tense morphology in a set of predicates in the corpus of the 12 children found in Table 2. Given an individual child and a specific predicate, we found the initial occurrence of an agreement/tense morpheme in the child's corpus and then we searched through subsequent corpora for a morphological contrast in agreement/tense, i.e., we documented the history of the development of finite morphology for each target predicate (see examples in Tables 5 and 6). The child was given credit for the contrast at the age at which she/he produced the second and contrasting form. The set of predicates included three subsets: (i) stative predicates, (ii) dynamic-atelic predicates (i.e., activities), and (iii) dynamic-telic predicates (i.e., achievements, accomplishments, active-accomplishments, and causatives). The Shirai and Andersen (1995: 749) version of Dowty's (1979) tests was used to classify predicates in English and the Weist et al. (2004: 59) tests were used for Polish. These tests have the potential to further partition the telic predicates into the accomplishment and achievement categories, but a more extensive corpus for each of the children would have been required to do so. A predicate was included in the analysis for a child if it could be clearly classified, and if it entered into *both* agreement and tense contrasts. Two different values of tense (e.g., past versus future) and two different values of agreement (e.g., 3rd versus 1st person singular) would constitute sufficient data for the predicate to be included. The average number of predicates (per child and the range) was as follows: (i) English: stative 5.7 (4–8), atelic 9.2 (6–10), and telic 8 (5–10), and (ii) Polish: stative 5 (5–5), atelic 11.8 (11–12), and telic 11.2 (9–12).

Predicates were classified and not verbs. There were numerous utterances in which the surface verb form was present in the corpus yet the target predicate was absent. A few salient utterances will help to clarify this issue. When searching for stative predicates, the verb *to have* was a likely candidate for contrast. However, the verb *to have* is often used as a

dynamic consumption predicate, e.g., Mother: *No, she doesn't want anymore*, Adam (1;10) *She had some? Drink some*. When tracking the stative predicate *to have*, this utterance was excluded. Among dynamic predicates motion verbs, consumption verbs, and creation verbs may constitute the realization of either atelic or telic predicates. Considering the motion verb *to go*, at 2;5 Matty said, *The ball went into the water*, and this is an active-accomplishment, i.e., a telic predicate. It was not until 2;7 that Matty produced the activity predicate, *I went on the sled*. Regarding consumption verbs, the verb *to eat* required particular attention, e.g., compare the atelic predicate in the utterance, Abe (2;5) *He's eating peanuts*, with the telic predicate in the utterance, Abe (3;1) *I will eat all of it*. In English, bare stems create a particular problem when searching for present tense non-3rd singular forms as the following example demonstrates. When Abe was 2;5, he said, *I eat my dinner*; the utterance could have had the habitual meaning, *I always eat my dinner*. However, his mother replied with, *No, you didn't!* Hence, the form *eat* was a bare stem for the form *ate*. At 2;9 Abe produced the following clear example of a present tense non-3rd singular form, *Animals eat berries, and they eat mushrooms*.

To repeat, in this study, predicates were classified as stative versus dynamic, and the dynamic predicates were further classified as atelic versus telic. Four typical examples of the three types of predicates are presented in Table 3 for the two target languages.

Table 3. *Prototypical stative, atelic, and telic predicates in English and Polish*

Type	#1	#2	#3	#4
English				
Stative	<i>have</i>	<i>know</i>	<i>want</i>	<i>like</i>
Atelic	<i>cry</i>	<i>play</i>	<i>walk</i>	<i>eat</i>
Telic	<i>fall</i>	<i>come</i>	<i>take</i>	<i>break</i>
Polish				
Stative	<i>mieć</i> 'have'	<i>umieć</i> 'know'	<i>chcieć</i> 'want'	<i>lubić</i> 'like'
Atelic	<i>plakać</i> 'cry'	<i>trzymać</i> 'hold'	<i>śmiać się</i> 'laugh'	<i>jeździć</i> 'go'
	<i>popłakać</i>	<i>potrzymać</i>	<i>pośmiać się</i>	<i>pojeździć</i>
Telic	<i>kupować</i> 'buy'	<i>zamykać</i> 'close'	<i>dawać</i> 'give'	<i>psuć się</i> 'spoil'
	<i>kupić</i>	<i>zamknąć</i>	<i>dać</i>	<i>zepsuć się</i>

How do we know that a form is productive in a child's language? This question doesn't have a single answer. Some investigators have used a frequency measure, e.g., "when the term productive is used, it means that the form in question is used with more than 5 different verb types during a particular month" (Shirai 1998: 287). Shirai's criterion is quite reason-

able as it focuses on acquisition within a short period of development. However, even in an analytic language like English where bare stems are common, it is possible to find more than 5 verb types emerging in a form that may not be productive. At 19 months, Tomasello's daughter Travis produced the following: *Crying Mommy, Grover sleeping, Lady screaming, Clothes swinging, Drinking the bottle, Walking here funny*, etc. (Tomasello 1992: Appendix). However, there was an absence of contrast, which Tomasello interpreted as an absence of progressive aspect. In the current study, the measure of productivity started with the observation of contrast within a single predicate, and the statistical analysis was based on the mean contrast age summed over a set of predicates (see the average numbers and range figures above). The only instance where an estimate of productivity was based on fewer than 5 predicates was for Matty's stative set, but for dynamic predicates, the median number of predicates was 10. In a highly inflected language like Polish, there are no "bare stems", and verbs emerge in an inflected form. Here, it becomes more obvious that the concept of contrast is needed to infer acquisition.

2.3. Agreement and tense morphology

2.3.1. *English.* In English, agreement is coded in the morphology differently for nonprogressive and progressive aspectual verb forms. For nonprogressive aspect, agreement is coded by the suffix *-s* in the 3rd person singular present tense, e.g., *She play-s tennis*. Third singular forms are contrasted against non-3rd singular forms, e.g., *They always play-Ø outside*, where there is a zero morpheme. This immediately creates a methodological problem in child English since a verb-Ø form is likely to be a bare stem. Thus, the context of the utterance is important in the identification of a true present tense form. Bare stem forms were detected by evaluating the obligatory context (e.g., Naomi (2;4) *I come back again*, Mother *What DID you come back with*, *Nomi?*). For progressive verb forms, agreement is coded in the progressive auxiliary where there is a distinction between 1st and 3rd singular versus other person-number forms. This is the case in the present and the past tense, e.g., *He (is/was) playing tennis* versus *They (are/were) playing tennis*. The progressive auxiliary is found in contracted and uncontracted forms, e.g., *She's (She is) playing/You're (You are) playing*.

Regarding information processing, this system is relatively opaque. For the nonprogressive aspect, coding is limited to a single value of tense and a limited component of the conjugation pattern. Coding is local but non-syllabic, and the *-s* morpheme has other functions. For progressive

aspect, while coding extends across the tenses, it is not local and it takes different forms, i.e., contracted versus uncontracted.

In English, tense morphology also depends on aspect. For nonprogressive forms, past tense is coded by the suffix *-ed*, e.g., *play/play-ed*, a stem alternation, e.g., *run/ran*, or zero, e.g., *put/put*. Tense contrasts are made with past versus present or future forms, e.g., *He (played/plays/will play) with Mary*. For progressive aspect, tense is coded in the auxiliary, *to be*, e.g., *She (was/is) playing with Mary*. In addition to absolute tenses, English has perfect tenses (i.e., absolute-relative forms, see Comrie 1985). For perfect forms, tense is coded in the auxiliary, *to have*. English has a past/nonpast distinction in the temporal morphology. There are a variety of ways to express future time reference. Future tense is explicitly coded with the auxiliaries *will* and *be going to*. These forms are classified as modal futures and the aspectual value is nonprogressive. Comrie (1976: 65) has pointed out that *be going to* constructions have a prospective aspectual meaning. Agreement operates within this construction like a progressive form implicating the internal auxiliary *to be*, e.g., *He is going to play/they are going to play*.

The tense system of English is also relatively opaque as it relates to information processing principles. In general, mapping is many-to-one. There are three primary ways to form past tense. Coding is local only for the nonprogressive, and the nonprogressive has irregular as well as regular forms. There are numerous ways to form future meaning. Aspect is coded by the presence versus absence of the auxiliary, *to be*.

2.3.2. *Polish*. In Polish, the subject agrees with the verb in person and number, and in the past tense and in one future construction, the verb also agrees with the subject in gender. Polish verbs have past and nonpast stems, and the agreement morphology is somewhat different for the different stems but not for different aspectual forms (see Table 4). The nonpast form of the verb has future meaning for perfective verbs and present tense meaning for imperfective verbs. For imperfective verbs, future tense is formed with the future form of the auxiliary verb *być* 'to be' inflected

Table 4. *The Polish conjugational pattern*

Person	Past stem		Non-past stem	
	Singular	Plural	Singular	Plural
1st	-m	-śmy	-ę / -m	-my
2nd	-ś	-ście	-sz	-cie
3rd	-Ø	-Ø	-Ø	-ą

with the nonpast conjugation plus the infinitive or participle form of the main verb. The auxiliary verb *być* agrees with the subject in person and number, and the participle agrees in gender. In general, there is only one past tense morpheme in Polish, and it is the suffix *-ł* [w]. Aspect morphology is separate from tense morphology. Aspect is coded by suffixation, prefixation, or suppletion.

Regarding information processing, a number of features of the finite morphology have the potential to facilitate acquisition. With the exception of the imperfective future, agreement and tense coding is local. All verbs demonstrate agreement with the subject in all tenses and in both aspectual forms. The coding for past tense is one-to-one.

2.4. Contrast evaluation

2.4.1. *English.* Agreement and tense contrasts were identified within and across aspectual forms. Thus, for both agreement and for tense, there were three kinds of contrasts: (i) within nonprogressive forms, (ii) within progressive forms, and (iii) open (unrestricted for aspect). Table 5 contains sentence examples of the first occurrence of a variety of forms for the atelic predicate *to walk* and the contrasts that were produced by Abe. Beginning with contrasts within a single value of aspect, in Table 5, Abe's (2;11) initial nonprogressive agreement contrast was *(he) walks/you walk*. The 3rd singular form emerged at 2;8, and then the non-3rd person singular form (here 2nd singular) emerged at 2;11. In these sentences, the dynamic predicate in present tense has a habitual meaning. For nonprogressive aspect, agreement contrasts can only be found in the present tense. For the progressive aspect, contrasts may be found within or between present and past tense, e.g., in Table 5, *He's walking/Why am I walking*

Table 5. *Age and sentence examples of agreement and tense contrasts for Abe and to walk*

Tense	Aspect	Person	
		3rd S	Non-3rd S
Past	Non-prog.	3;1 then the Mommy walked ...	Emerged later or was absent
Past	Prog.	3;10 Mom was walking outside.	Emerged later or was absent
Pres.	Non-prog.	2;8 (the king / he) walks every night too.	2;11 When you don't walk on your heels, you walk on ...
Pres.	Prog.	2;8 ... see that he's walking	3;11 Why am I walking upside-down
Fut.	Non-prog.	Emerge later or was absent	3;9 Are you gonna walk in it?

upside-down?, or *Mom was walking//Why am I walking upside-down?*. Abe's initial agreement contrast in progressive forms occurred at 3;11 with the emergence of the 1st person form in, *Why am I walking upside-down?*. When agreement contrasts were between different values of aspect, we called them "open" (i.e., unrestricted) contrasts. In the Table 5 example, the initial open contrast was between either (*he*) *walks* or *he's walking* (3rd SG) and *you walk* (2nd SG) at 2;11.

Tense contrasts were also analyzed within and between aspectual values. For the nonprogressive, in Table 5, there are past, present, and future forms. The initial contrast was between (*he*) *walks* and *Mommy walked* at 3;1. Children within the age constraints of this study almost never produce future progressive forms (e.g., *We will be walking until midnight*). Hence, the potential contrasts were between past and present, e.g., *He's walking* versus *Mom was walking* at 3;10. Open tense contrasts were not restricted to a single value of aspect. In Table 5, the initial open tense contrast was between *Mommy walked* at 3;1 and either one of the earlier present tense forms, i.e., (*he*) *walks* or *he's walking*, both at 2;8.

2.4.2. *Polish*. In Polish, just as for English, three kinds of contrasts were evaluated: (i) within perfective, (ii) within imperfective, and (iii) open (i.e., unrestricted for aspect). In Table 6, Kasia's initial imperfective agreement contrast was in the present tense between 3rd person singular *bawi* '(she = Kasia) plays/is playing' and 1st plural *się bawimy* '(we) play/are playing' at 1;10. The initial perfective agreement contrast was in the future tense, i.e., *się pobawi* '(she = Kasia) will play' and *się pobawię* '(I) will play', also at 1;10. The first open agreement was also at 1;10, and in addition to the contrasts just given above, the 3rd versus 1st person contrast was also realized with the imperfective present versus the perfective future.

Table 6. *Examples of predicate forms and age of emergence for Kasia and the predicate, bawi-ć się (IPFV): po-bawi-ć się (PFV) 'to play'*

Tense	3rd Person	1st Person
Past-ipfv	1;11 bawi-ł-∅-∅ się play-PAST-M-3:S REFL	2;8 się bawi-ł-a-m REFL play-PAST-F-1:S
Pres.-ipfv	1;7 bawi-∅ Kasia 3/1 play:NPAST-3:S Kasia	1;10 się bawi-my 1st PL REFL play:NPAST-1:P
Fut.-pfv	1;10 Kasia się po-bawi-∅ 3/1 Kasia REFL PFV-play:NPAST-3:S	1;10 się po-bawi-ę REFL PFV-play:NPAST-1:S

a. 3/1 indicates that the child was using third person morphology to refer to herself

Tense contrasts were analyzed in the same manner. In the Table 6 example, the initial imperfective tense contrast was between present tense, *bawi* '(she = Kasia) plays/is playing' and past tense *bawil się* '(he) played/was playing' at 1;11. In this example, there was no minimal perfective tense contrast. The initial open tense contrast was between present imperfective and the future perfective at 1;10. In the Table 6 example, the initial open agreement and open tense contrasts emerged at the same age (i.e., 1;10), and just two sentences created both contrasts (i.e., present imperfective 3rd singular versus future perfective 1st singular).

3. Results

3.1. Finite morphology and lexical aspect: sentence examples

Examples (1) through (6) demonstrate the primary trend in the data for English. In examples (1a) and (1b), Naomi produced a present-past tense contrast for the atelic predicate *to play* at 2;2. The first agreement contrast was 3rd plural–1st singular, and it occurred with two progressive forms at 2;5, as shown in examples (2a) and (2b). Examples (3a) and (3b) and (4a) and (4b) contain similar evidence from Nina's acquisition of the telic predicate *to fall*. Examples of the stative pattern are found in (5a) and (5b) and (6a) and (6b). Matty produces an agreement contrast 3rd plural–3rd singular first at 3;4 followed by a present–past tense contrast at 3;5.

- (1) a. *I play with Todd's toys.*
(Naomi 2;2)
- b. *I played.*
(Naomi 2;2)
- (2) a. *The boys were playing on my swing.*
(Naomi 2;4)
- b. *I'm playing in the bathtub.*
(Naomi 2;5)
- (3) a. *He falled down.*
(Nina 2;3)
- b. *The people will fall.*
(Nina 2;3)
- (4) a. *That's falling down.*
(Nina 2;1)
- b. *I was falling in it?*
(Nina 2;5)
- (5) a. *No, bears like berries.*
(Matty 3;0)

- b. *He really likes # sweet ones.*
(Matty 3;4)
- (6) a. *I like (th)em broken.*
(Matty 2;8)
- b. *And then I liked it.*
(Matty 3;5)

Examples (7) through (9) contain tense and agreement contrasts for Polish.² Examples (7a) and (7b) contain a 2nd singular-3rd singular agreement contrast (i.e., *-sz/-Ø*) for the stative predicate *mieć* at 1;10, and example (7c) created the initial tense contrast at 2;3 between present and future (i.e., *ma-sz/będę miała*). For the atelic predicate *śmiać się*, examples (8a) and (8b), the tense and agreement contrasts emerged at the same time with the shift from 3rd singular present tense to 1st singular future tense (i.e., *-Ø/-ę*). In examples (9a) through (9c), Inka has past (i.e., *-ł*)–future (i.e., nonpast stem of the perfective verb) contrast first at 1;7, and then a 3rd–2nd person agreement contrast at 1;11 (i.e., *-Ø/-ś*).

- (7) a. *Ma-sz tam tat-y płaszcz*
have:IPFV-2:S there dad-GEN coat:ACC
'Over there you have Dad's coat.'
(Basia 1;9)
- b. *Zajaczek ma-Ø ocz-y?*
bunny:NOM have:IPFV-3:S eye-PL:ACC
'Does the bunny have eyes?'
(Basia 1;10)
- c. *Będę miała kurczątka?*
be:FUT-1:S have:IPFV-PP-F chick:ACC
'Will I have a chick?'
(Basia 2;3)
- (8) a. *Hi-hi-hi, tak śmieje-Ø się Kasia.*
hi-hi-hi, so laugh:IPFV-3:S REFL Kasia:NOM
'Hi-hi-hi, that is how Kasia laughs.'
(Kasia 1;10)
- b. *Będę się śmieja-ł-a@.*
be:FUT-1:S REFL laugh:IPFV-PP-F
'I'm gonna laugh.'
(Kasia 2; 0)
- (9) a. *Mamusia przyszła-Ø.*
mom:NOM come:PFV-PAST-F-3:S
'Mom came.'
(Inka 1;7)

- b. *Hanka przyjdzie-Ø.*
 Hanka:NOM come:PFV-3:S
 ‘Hanka will come.’
 (Inka 1;7)
- c. *Do dom-u przyszedł-aś*
 to home-GEN come:PFV-PAST-F-2:S
 ‘Home you came.’
 (Inka 1;11)

3.2. *Finite morphology and lexical aspect: statistical outcomes*

For each child and for each type of predicate, we determined the average age of the initial open (i.e., not limited to a single value of aspect) agreement and open tense contrast. An analysis of variance³ having type of predicate (stative, atelic and telic) and type of morphology (agreement and tense) within children and language (English and Polish) and between children was computed.

In English, tense contrasts emerge before agreement contrasts in dynamic predicates but not in stative predicates. In Polish, contrasts in agreement emerge before contrasts in tense in stative predicates but not in dynamic predicates. Examples (1) through (6) and (7) through (9) above provide examples of the patterns for children learning English and Polish respectfully. These trends combined to create an interaction of the type of predicate by the type of contrast, $F(2,20) = 14.4, p < .001$. However, the difference in the trends between the languages was not sufficient to cause a three-way interaction. The average age and range of ages are found in Table 7. The children learning Polish constituted a more homogeneous group. The average range in acquisition was six months for the

Table 7. *Average age and (range) of the initial open agreement and open tense contrast, for 3 predicate types*

Predicate type	<i>English</i>		Predicate type	<i>Polish</i>	
	Agreement	Tense		Agreement	Tense
Stative	3;2 (2;7–3;8)	3;2 (2;5–3;8)	Stative	2;1 (1;11–2;3)	2;6 (2;3–2;7)
Atelic	3;1 (2;5–3;9)	2;11 (2;5–3;4)	Atelic	2;4 (2;0–2;7)	2;5 (2;0–2;9)
Telic	3;1 (2;7–4;1)	2;9 (2;4–3;4)	Telic	2;4 (2;1–2;6)	2;3 (2;0–2;7)

children learning Polish and 14 months for the children learning English. For the children learning Polish, the agreement contrast with stative predicates was always the first distinction acquired, and for children learning English the tense contrast with telic predicates was always the first distinction acquired. Otherwise, the order of acquisition was variable within the two language groups. Finally, verb morphology was acquired more rapidly in Polish than in English (i.e., 2;4 versus 3;0 for the overall means) with $F(1, 10) = 15.3, p < .003$.

Brown (1973: 55, Figure 1) demonstrated that MLU (mean length of utterance) provides a better comparative measure of acquisition than age for children learning English. Because of the differences in the inflectional properties of Polish and English, a crosslinguistic comparison of utterance length in morphemes would produce a biased outcome. However, a comparison based on utterance length in words (MLUw) may be valuable. To review, the analysis above included six values for each child representing the acquisition of agreement and tense morphology for stative, atelic and telic predicates (see Table 7). The best estimate of an individual child's acquisition of finite morphology is the average age across these six values. We calculated MLUw for the transcripts that corresponded to that age for the 12 children. Following Brown's suggestion (and utilizing CLAN programming), the first 10 utterances of each transcript were omitted and the next 100 utterances were included in the analysis. The following data give the average acquisition age and the average [MLUw] value for that age: English; (i) Abe, 2;10, [5.909], (ii) Adam, 3;3, [3.391], (iii) Matty, 3;0, [4.594], (iv) Naomi, 2;11, [2.930], (v) Nina, 2;6, [3.192], and (vi) Sarah, 3;8, [3.169]; and Polish; (i) Basia, 2;4, [4.059], (ii) Inka, 2;3, [4.218], (iii) Jaś, 2;6, [4.515], (iv) Kasia, 2;1, [4.475], (v) Michał, 2;2, [4.109], and (vi) Wawrzon, 2;6, [2.520]. The average MLUw values at this milestone for the children learning English was 3.864 as compared to Polish at 3.983. The Polish children were producing slightly longer utterances at a younger age with less variability across children.

3.3. *Finite morphology and grammatical aspect*

In addition to open contrasts, we found the likelihood of the emergence of agreement and tense contrasts within the two different aspectual values for the two languages, i.e., perfective (PFV) and imperfective (IPFV) for Polish and nonprogressive (NPROG) and progressive (PROG) for English. In general, we will refer to perfective and nonprogressive aspect as coding external perspective and imperfective and progressive aspect as

Table 8. *The percentage of agreement and tense contrasts for the three predicate types in Polish and English*

Aspect	Polish		English	
	PFV	IPFV	NPROG	PROG
			Agreement	
Stative	Impossible	100	100	Nonstandard
Atelic	18	97	58	80
Telic	96	46	81	75
			Tense	
Stative	Impossible	100	100	Nonstandard
Atelic	6	100	95	65
Telic	97	34	98	35

coding internal perspective (see Smith 1991: 6). Table 8 displays the likelihood of the different contrasts as a function of lexical aspect and grammatical aspect. The likelihood (or percentage of occurrence) values in Table 8 were calculated by dividing the number of contrasts that were found within a predicate class (i.e., atelic, telic, and stative) for a single value of aspect by the total number of predicates in the set. For example, there were 10 predicates in Nina’s atelic set, and all 10 (or 100%) of the nonprogressive forms entered into a tense contrast while only 8 (or 80%) of the progressive forms did so. The crosslinguistic differences are dramatic. In Polish, some stative predicates only have an imperfective form, e.g., *potrafić* ‘to know how to’. For most stative verbs that have an aspectual pair, the imperfective predicate is stative and the perfective has an inchoative meaning making it telic and an achievement, e.g., *lubić/polubić*, ‘to like/to get to like’.⁴ For these reasons, stative perfectives were not found, as they are not found in Polish. In English, the opposite interaction of lexical aspect and grammatical aspect occurs. Progressive aspect codes the concept of ongoing, and this property is absent in the typical stative predicate. However, speakers of English use the progressive aspect with stative predicates and children are included, e.g., Naomi 3:4, *But I’m having all these toys*. While progressive stative predicate forms were observed, they never entered into an agreement or a tense contrast. As seen in Table 8, the interaction is dramatic, since for Polish, there were zero contrasts for external perspective and 100 percent contrasts for internal perspective, and exactly the opposite was true for English. This demonstrates a major difference in the child’s knowledge of the properties of perfective versus nonprogressive and imperfective versus progressive. In Polish, but not in English, there is a strong interaction of

telicity and aspect such that contrasts involving atelic predicates and perfective aspect or telic predicates and imperfective aspect are less frequent as shown in Table 8 (see also Weist et al. 2004). Once again, children behave as if they have acquired an understanding of the typological differences found in the aspectual opposition of Polish versus English.

In a closely related analysis, we found the average age of the initial contrasts in agreement and tense for the atelic and the telic predicates within each of the two values of aspect for English and Polish. Since contrasts involving stative predicates are absent for one value of aspect that varies with the language, they were omitted from the statistical analysis (see Table 8). For Polish and for atelic predicates, perfective tense contrasts were not found within the set of the predicates evaluated for four of the six children, and the mean value for the type of contrast replaced these zero values in the analysis. This substitution provides a complete design with a neutral effect on the statistical outcome. The results are summarized in Tables 9a and 9b. For English, there is one relatively salient component of the acquisition pattern. Since the children in this study didn't produce future progressive forms, the only tense contrast available in the progressive aspect was past versus present, and the past progressive

Table 9a. *The average age for agreement and tense contrasts for lexical and grammatical aspect*

Aspect	<i>Atelic</i>		<i>Telic</i>	
	Agree	Tense	Agree	Tense
			English	
Non-progressive	3;4	3;0	3;6	2;10
Progressive	3;4	3;6	3;4	3;7
			Polish	
Perfective	3;3	3;5	2;5	2;5
Imperfective	2;5	2;5	3;0	2;11

Table 9b. *Average age of all morphological contrasts as a function of lexical and grammatical aspect*

Lexical Aspect	<i>English</i>		<i>Polish</i>	
	NPROG.	PROG	PFV	IPFV
Atelic	3;2	3;5	3;4	2;5
Telic	3;2	3;5	2;5	3;0

is acquired somewhat late or is absent entirely (see Table 8 for the likelihood). Hence, tense contrasts in the progressive aspect are relatively late at 3;6 and 3;7. In Polish, there was a major interaction of lexical and grammatical aspect. In general, verb morphology in the “natural” (or aspect-matching) combinations (i.e., telic-perfective and atelic-imperfective) is acquired early. The interaction of lexical aspect by grammatical aspect by language was significant with $F(1, 10) = 14.4$, $p < 0.004$ as shown in Table 9b. In addition, the overall interaction of lexical aspect by grammatical aspect was also significant, $F(1, 10) = 21.48$, $p < 0.001$.

3.4. Lexical and grammatical aspectual interactions

Examples 10 through 13 demonstrate the differences between the emergence of contrasts in aspect-matching forms, i.e., atelic-imperfective and telic-perfective, versus mismatching forms in Polish where the interaction is salient (see Tables 8 and 9). The verb *kręcić – pokręcić* ‘to turn (IPFV-PFV)’ was classified as a dynamic and atelic predicate (i.e., an activity predicate). Examples (10a) and (10b) demonstrate a typically early tense contrast with the imperfective forms of this atelic predicate, and examples (11a) and (11b) show how much later perfective forms enter into a tense contrast. The perfective forms involve a boundary on the turning process, i.e., a delimited meaning. In comparison, *naprawiać – naprawić* ‘to fix (IPFV-PFV)’ was classified as a telic predicate. With this predicate the opposite pattern was found. In examples (12a) and (12b) the early tense contrast occurred between two perfective verb forms, and at a later phase of acquisition, examples (13a) and (13b) emerged providing a tense contrast with the imperfective verb form. In examples (13a) and (13b), the child is taking an internal perspective on the telic process.

- (10) a. *Będzi-em@ kręci-ć cukier.*
 be:FUT-1:S turn:IPFV-INF sugar:ACC
 ‘I’m gonna grind the sugar.’
 (Jas 2;1)
- b. *Ja kręci-m@ zegarek.*
 I turn:IPFV-1:S watch:ACC
 ‘I’m winding the watch.’
 (Jas 2;2)
- (11) a. *Tak po-kręc-e i wilk-u idź stąd!*
 So PFV-turn-1:S and wolf-VOC go:IMP from:here
 ‘I’m going to turn (this) a bit, and go away wolf!’
 (Jas 4;2)

- b. *Po-kręci-l-Ø-Ø* *kierownic-q.*
 PFV-turn-PAST-M:3:S steering:wheel-INSTR
 ‘He turned the steering wheel a bit.’
 (Jas 4;2)
- (12) a. *Czy* *to* *ty* *naprawi-l-e-ś?*
 QUEST this you:NOM fix:PFV-PAST-M-2:S
 ‘Did you fix it?’
 (Michał 2;1)
- b. *Naprawi-e* *te* *koł-a.*
 fix:PFV-1:S these:ACC wheel-PL:ACC
 ‘I’m gonna fix these wheels.’
 (Michał 2;1)
- (13) a. *Naprawia-my* *mam-o* *okienko.*
 fix:IPFV-1:PL mom-VOC window:ACC
 ‘We are fixing the window, Mom.’
 (Michał 2;9)
- b. *A* *szofer* *mia-l-Ø-Ø* *takie*
 and chauffeur:NOM have-PAST-M:3:S such
drut-y *i* *naprawia-l-Ø.*
 rod-PL:ACC and fix:IPFV-PAST-M:3:S
 ‘And the chauffeur had these rods, and he was fixing.’
 (Michał 3;1)

3.5. Agreement transfer: zero lag person contrasts in Polish

As children acquire the agreement system of Polish, they produce contrasts in person in different tenses. We computed the number of months between the first contrast within one tense and the first contrast within a second tense, and we called the variable ‘lag time’. The Appendix contains all of the verbs from the six children that had lag times of zero, one, or two. Table 10 contains three zero-lag examples. The Table 10 examples have been truncated so as to include only the critical cells. The complete table would contain six rows. In Table 10, Basia’s first-person contrasts for the verb *plakać* ‘to cry’ occurred with zero lag in the past and the future tense. In the past, the contrast was 3rd versus 1st singular, and in the future, it was 3rd versus 2nd singular. In Table 10, Inka’s first agreement contrasts also emerged within two tenses in the same month. The contrasts were 3rd versus 2nd in the past and 3rd versus 1st in the future. For the verb *być* ‘to be’, Wawrzon contrasted 3rd with 1st singular in the past tense and 3rd singular with 3rd plural in the present tense as shown in Table 10. Future tense contrasts emerged a few months later.

Table 10. *Examples of simultaneous person contrasts within two tenses (i.e., zero lag): Shown within truncated agreement tables*

Basia		plaka-ć : po-,za-plaka-ć ‘to cry’	Atelic	
P/N	Past	Present	Future	
1s	2;3 nie plaka-l-a-m		2;4 nie będę-m plaka-ć	
2s		2;9 płacze-sz	2;3 będzie-sz plaka-l-Ø	
3s	2;0 plaka-l-a-Ø	1;8 płacze-Ø	2;0 będzie-Ø plaka-l-a 3/1	
Inka		przychodzi-ć : przyji-ść ‘to arrive’	Telic	
P/N	Past	Present	Future	
1s	2;9 przysz-l-a-m	4;5 przychodz-ę	1;11 przyjd-ę	
2s	1;11 przysz-l-a-ś	4;9 przychodzi-sz	2;8 przyjdzie-sz	
3s	1;7 przysz-l-a-Ø	3;1 przychodzi-Ø	1;7 przyjdzie-Ø	
Wawrzon		by-ć ‘to be’	Stative	
P/N	Past	Present	Future	
1s	2;2 by-l-e-m	2;6 jeste-m	2;7 będ-ę	
3s	2;2 by-l-a-Ø / by-l-Ø-Ø / nie by-l-o-Ø	2;2 jest-Ø	2;5 będzie-Ø	
3p	2;5 by-l-y-Ø	2;2 są	2;7 będą	

3.6. *Order of acquisition of person in Polish*

In order to determine the order of the acquisition of person agreement in Polish, we calculated the number of times that a morpheme emerged in the positions first through sixth (cf. Table 4). For dynamic predicates, the second person plural was extremely unlikely. The order of emergence was 3rd-SG, 1st-SG, 2nd-SG, 1st-PL, and 3rd-PL for atelic predicates, and it was 3rd-SG, 1st-SG, 2nd-SG, 3rd-PL, and 1st-PL for telic predicates. For stative predicates, the most probable sequence was 3rd-SG, 1st-SG, 2nd-SG, 3rd-PL, 1st-PL, and 2nd-PL. Sometimes the subject of the sentence was the child’s name and the verb was correctly inflected for 3rd person singular. While this is grammatically 3rd person, it was pragmatically the 1st person. In the singular, the pattern of acquisition was identical for the three predicate types, and there was some variability in plural.

4. Discussion

4.1. Access to verb morphology

One of the major differences between Polish and English is that Polish is relatively highly inflected. Furthermore, the verb morphology is largely agglutinative and local on the main verb. Tense and aspect are coded separately, and past tense is formed with a single morpheme (i.e., mapping is 1 to 1). The form of person agreement in the singular is similar to the plural and the complete paradigm is inflected. Thus, the agreement and tense morphology, while extensive, are relatively transparent in Polish as compared to English. In general, the children learning Polish acquired finite morphology more rapidly than the children learning English, and this finding supports previous research (e.g., Johnston and Slobin 1979; Slobin 1982; Weist 2009). In order for a child learning English to produce an agreement or tense contrast in the progressive aspect, they have to fuse that information into the progressive auxiliary, e.g., *is* versus *are* or *is* versus *was*. As Roger Brown and his colleagues (Brown 1973) found some time ago, children are likely to omit the auxiliary in the early stages of acquisition. There are additional issues for tense contrasts in the progressive. Progressive aspect requires an internal perspective on an event that is unfolding. This requires that the child place reference time (RT) at event time (ET). When the event in question has occurred prior to speech time or when it is anticipated subsequent to speech time, the child's locus of temporal reference must be shifted away from speech time (ST), i.e., away from the deictic center. The capacity to make this shift emerges at a later phase of development (Weist 1986, 2002a, 2002b). The contrasts can be made within nonprogressive (or simple) forms, but this creates another difficulty. For dynamic predicates, the present tense often expresses a habitual meaning. Here, conceptual development enters into the acquisition of the linguistic systems. In the temporal domain, speech time represents the egocentric frame of reference. Forms such as past progressive, which require a shift in temporal reference away from speech time, create additional conceptual complexity. Regarding the concept of habitual, an argument can be made that coding the concept of the repeated occurrence of an event over an extended period is conceptually more complex than coding an ongoing event.

4.2. Semantics of the verb

In this study, two semantic distinctions were critical: (i) stative–dynamic, and (ii) atelic–telic. These distinctions create major differences in predi-

cate structure as well as general typology of the target languages (see Chung and Timberlake 1985). These distinctions lie at the heart of the interaction between lexical and grammatical aspect, and they create a major difference in the language acquisition pattern. Looking back to the work of Brown and his colleagues once again, there is evidence that children tend to observe the constraint on the use of progressive aspect with stative predicates. While we observed a few progressive statives, there were no contrasts (see Table 8). In Polish, stative predicates do not occur in perfective aspect. Hence, the stative versus dynamic distinction within the structure of predicates creates a distinct difference in the pattern of acquisition in these two languages.

In Polish, there is a major interaction between telicity and aspect. There is a “natural” relationship between the property telic and the perfective value of aspect (see also Bar-Shalom 2002 and Stoll 1998 for Russian). This is the relationship between a predicate that has an inherent terminal point and an operator that specifies a boundary. As a consequence, contrasts in agreement and tense morphology for telic predicates in perfective aspect are frequent and acquired relatively early (see Tables 8, 9a, 9b and examples (12) and (13)). Furthermore, there is a natural relation between atelic predicates and imperfective aspect because imperfective does not specify a boundary. Boundaries can be imposed on atelic predicates, and an arbitrary interval (i.e., delimited meaning) will be established as shown in examples (11a) and (11b). However, utterances having this aspectual configuration are infrequent and relatively late in acquisition (see also Weist et al. 1984). An adequate theory of language acquisition must have an explanation for the nature of the child’s knowledge of verb concepts that motivates the stative — dynamic and telic — atelic distinctions, e.g., the one proposed within RRG (see Table 1).

4.3. *Systematic acquisition*

In this project we evaluated the emergence of contrasts in agreement and tense morphology and we found that this phase of acquisition has systematic properties. Specifically, this phenomenon was revealed in the highly inflected properties of the Polish data. When the children learning Polish contrasted person-number agreement in one tense, *every one of the children in this study* demonstrated the capacity to do so in a second tense. If the children only knew the association between one of the stems (i.e., past or nonpast) and the person-number suffix, they would not be able to transfer that kind of knowledge to a second tense. The evidence for knowledge that extends beyond simple associations requires a more

substantial explanation of what the child knows about their verb morphology. Sometimes the verb morphology emerges with predictable non-fluent forms. In examples (10a) and (10b), Jaś used the wrong conjugational pattern to formulate the first singular agreement, but this is an overregularization, i.e., an “error” that reveals system level knowledge. Overregularization is a well documented phenomenon in children learning English (see Marcus et al. 1992; Maratsos 2000).

4.4. *Deictic relations*

When children contrast agreement and tense morphology, they are exhibiting their knowledge of a distinction between the speaker and the hearer and their capacity to locate event time relative to speech time. In Polish, children are quite likely to code 3rd singular first followed by 1st and 2nd singular. Sometimes the 3rd singular agreement makes reference to the child herself, e.g., example (8a), but true 1st versus 2nd person contrasts also emerge rapidly. In English, there have been numerous investigations of the acquisition of personal pronouns, (e.g., Rispoli 1999), and that research shows the pattern of the acquisition of the speaker-hearer contrast. We did not include contrasts in personal pronouns in our analysis. It would be possible to include third person singular contrasts such as *he* versus *she* or non-3rd singular contrasts such as *we* versus *they*. In English, these contrasts were not included in our analysis as they do not change the verb morphology, i.e., *-s* versus *-s* and *-Ø* versus *-Ø*. In Polish, they do create a difference and that difference was measured. Thus, our data show that an understanding of personal deixis as well as temporal deixis is included in the child’s system.

The child’s capacity to locate event time relative to reference time is influenced by the conceptual nature of the to-be-located situation. There is some evidence that situations with clear terminal points lend themselves to temporal location relative to speech time and static situations with no inherent boundaries do not. Thus, tense contrasts are early with achievement predicates, e.g., examples (8a) and (8b), but late with stative predicates, e.g., example (6b). Table 7 shows the overall pattern of acquisition, and this pattern is familiar in both first and second language acquisition (see Li and Shirai’s 2000 review).

5. Conclusion

The data support the hypothesis that children construct a linguistic system that integrates the semantic structure of predicates with some form of

clause structure that may be viewed as a layered structure. Further, when children inflect an utterance for tense, they appear to understand the deictic relation expressed and they appear to know that the entire utterance is within the scope of that relationship. It is possible that children begin the process of constructing predicate concepts with very specific thematic relations and without abstract categories of lexical aspect as Tomasello (1992) proposed. However, the distinctions between stative and dynamic and atelic and telic are acquired rapidly and represented in the child's conceptual structure. These distinctions are acquired so quickly that they have an immediate impact on the acquisition patterns of the children investigated in this study. RRG provides a potentially adequate theory of the logical structure of predicates, and children behave as if they have learned the basic components of that structure. According to Tomasello's (2003, 2006) argument, children utilize slot-filler constructions to acquire abstract categories of thematic relations. This research does not provide the critical evidence to support or reject the idea that slot-filler constructions provide the actual learning mechanism. However, this research does provide evidence that the child's predicate structure includes higher-order thematic relations. Utilizing the RRG framework, these relations are Actor and Undergoer. The data show that children have the capacity to map thematic relations onto syntactic relations, and at least the Polish data show that they can transfer knowledge of argument across tenses. In summary, children construct representations of predicates, and they acquire the capacity to relate the arguments of those predicates to clause structure. Furthermore, they acquire the scope of the aspect and tense operators, and the pattern of this acquisition process is shaped by properties of predicate structure from the earliest phase of morphological contrasts.

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Appendix

ATELIC	Contrast Type					
	Verb (ipfv/pfv) for Basia	Past	Present	Future	Initial	Lag
chodzić/pochodzić 'to walk'			2;6	2;6	2;6	0
plakać/popłakać 'to cry'	2;3	2;9	2;3	2;3	2;3	0

Verb (ipfv/pfv) for Inka	Past	Present	Future	Initial	Lag
spać/pospać 'to sleep'	2;0	1;10	2;0	1;7	2

Verb (ipfv/pfv) for Jaś	Past	Present	Future	Initial	Lag
bawić się/pobawić się 'to play'	2;7	2;0	2;2	2;0	2
jeździć/pojeździć 'to ride'	2;11	2;7	2;7	2;6	0
spać/pospać 'to sleep'	2;5	2;3	3;0	2;3	2

Verb (ipfv/pfv) for Kasia	Past	Present	Future	Initial	Lag
bawić się/pobawić się 'to play'	2;8	1;10	1;10	1;10	0
chodzić/pochodzić 'to walk'	2;9	2;7	2;9	1;10	2
leżeć/poleżeć 'to lie'		1;9	1;9	1;9	0
patrzeć/popatrzeć 'to look'		2;1	2;1	2;0	0
śmiać się/pośmiać się 'to laugh'		2;0	2;1	2;0	1

Verb (ipfv/pfv) for Michał	Past	Present	Future	Initial	Lag
siedzieć/posiedzieć 'to sit'		2;0	2;2	2;0	2
spać/pospać 'to sleep'	2;5	2;3	2;5	2;2	2
trzymać/potrzymać 'to hold'		2;1	2;1	2;1	0

Verb (ipfv/pfv) for Wawrzon	Past	Present	Future	Initial	Lag
fikać/pofikać 'to flip'		3;0	3;0	2;7	0
wiercić/powiercić 'to drill'		2;8	2;8	2;8	0

TELIC	Contrast Type				
Verb (ipfv/pfv) for Basia	Past	Present	Future	Initial	Lag
kupować/kupić 'to buy'	2;4		2;4	2;4	0
przychodzić/przyjść 'to come'	2;2		2;1	2;1	1

Verb (ipfv/pfv) for Inka	Past	Present	Future	Initial	Lag
kłaść/położyć 'to put'	2;8		2;6	2;6	2
kupować/kupić 'to buy'	1;10		1;10	1;10	0
przychodzić/przyjść 'to arrive'	1;11		1;11	1;11	0

Verb (ipfv/pfv) for Jaś	Past	Present	Future	Initial	Lag
dawać/dać 'to give'	1;11	2;9	1;9	1;9	2
spadać/spaść 'to fall'	2;5		2;3	2;0	2

Verb (ipfv/pfv) for Kasia	Past	Present	Future	Initial	Lag
kończyć/skończyć 'to finish'	2;7		2;8	2;3	1

Verb (ipfv/pfv) for Michał	Past	Present	Future	Initial	Lag
budować/zbudować 'to build'		3;0	3;0	2;4	0
dawać/dać 'to give'	2;0	2;1	2;0	2;0	0
kupować/kupić 'to buy'	2;3		2;1	2;1	2
naprawiać/naprawić 'to fix'	2;1	2;9	2;2	2;1	1
wchodzić/wejść 'to enter'	2;3	2;8	2;5	2;3	2
wychodzić/wyjsć 'to leave'	2;5	2;3	2;9	2;1	2

Wawrzon [There are no lag times values of 2 or less for telic verbs.]

STATIVE	Contrast Type				
Verb (ipfv) for Basia	Past	Present	Future	Initial	Lag
być 'to be'	2;2	2;0	2;2	2;0	2

Verb (ipfv) for Inka	Past	Present	Future	Initial	Lag
być 'to be'	1;10	1;9	2;0	1;9	1

Verb (ipfv) for Wawrzon	Past	Present	Future	Initial	Lag
być 'to be'	2;2	2;2	2;6	2;2	0
widzieć 'to see'	2;6	2;8		2;6	2

Jaś, Kasia, and Michał [There are no time lag values of 5 or less for stative verbs.]

Notes

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1. Tomasello's (1992: 36) analysis of Travis's (T's) verb concepts was guided by the Piagetian framework and on the assumption, "that T lived in a sensory-motor world of objects and their spatial, temporal and causal relations." However, in his more recent writing (e.g., Tomasello 2006), Tomasello embraces the research and theory of Mandler (1992) and Bauer (1996) both of whom present a very different view of development than Piaget. The most important point here is that the infant may never live in the sensory-motor world imagined by Piaget because of their very early adaptive perceptual processing ability, e.g., Slater et al. 1990, their capacity for intermodal (i.e., "sensory-sensory") perceptual analysis, e.g., Kuhl and Meltzoff (1984), and their capacity to construct explicit memory representations, e.g., Rovee-Collier (1997). There is no known conceptual impediment to the acquisition of complex predicate representations that serve to relate semantic concepts to finite morphology.
2. The abbreviations for the sentence examples are as follows: @ nontarget form, ACC accusative, F feminine, FUT future, GEN genitive, IMP imperative, INF infinitive, IPFV imperfective, M masculine, NOM nominative, NPAST nonpast, NPROG nonprogressive, NVIR nonvirile, PAST past, PFV perfective, PL plural, PP past participle, PROG progressive, REFL reflexive, S or (SG) singular, VIR virile, and 3 third person.
3. In this research, we exhausted the supply of adequate English and Polish data in the CHILDES archives. Hence, the analysis of variance contained a relatively small *n*. There were 12 children with 6 children in each of the two languages. When the *n* is relatively small, there must be a larger difference between the set of target means in order to detect a "significant" difference, i.e., confidence in validity is raised. However, when the *n* is small, confidence in reliability is lower, calling exact probabilities into question. We only made claims about very robust statistical outcomes, i.e., *p* values ranging from .004 to .001.
4. There are exceptions to this rule, e.g., *boleć/poboleć* 'hurt for some time', *mieszkać/pomieszkać* 'live/live for a while' and some verbs can have an imperative use.

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