ACQUIRING GRAMMATICAL ASPECT VIA LEXICAL ASPECT: THE CONTINUITY HYPOTHESIS

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Previous research in child language acquisition identifies discrepancies between child and adult use of verbal inflectional morphology (Antinucci and Miller, 1976; Behrend, 1990; Behrend, Harris, and Cartwright, 1995; Bloom, Lifter, and Hafitz, 1980; Brown, 1973; van Hout, 1996). In this paper, we consider a case of partial undergeneralization where children's use of the -ed and -ing endings seems constrained by the aspectual class of the host verb. Children, more than adults, seem reluctant to generalize the imperfective morpheme to state verbs. Furthermore, they vastly undergeneralize the use of the -ed morpheme with atelic verbs. Many researchers observe similar generalizations: that children seem unwilling to mark activity verbs like *walk* or unbounded punctiliars like *jump* with an -ed ending, even though this is a tense marker in the adult language that applies to all types of events. They attribute the undergeneralization variously to lack of tense, confusion of tense with aspect, and skewed distribution in the adult input.

These theories fail to cover the asymmetries in the CHILDES data we examine (MacWhinney, 1991). In a study of conversational tiers of three CHILDES file sets (Bloom, Brown, and Suppes), representing eight children, ages 1:4 to 5:1, MLUs 1.055 to 6.007, we find that children use the morphemes to mark restricted grammatical aspect in a way consistent with restrictions on grammatical aspect in other languages. This restriction is most parsimoniously accounted for by a rigorous application of the aspect/tense model in Olsen (1997) consistent with the continuity hypothesis and the subset principle (Berwick, 1985).

Two important theoretical points emerge from this discussion: The first is that, in this model, aspectual features, rather than the verb classes they describe (STATE, ACTIVITY, ACCOMPLISHMENT, ACHIEVEMENT, SEMELFACTIVE), provide the appropriate level of granularity for describing the verb-morphology patterns. Specifically, [+dynamic] licenses participation in the childs aspectual morphology and the corresponding imperfective -*ing*; this morpheme is therefore best analyzed as a progressive in the child language, parallel to similar event restrictions on the imperfective in a variety of languages (Olsen, 1997). The feature [+telic] licenses the resultative perfective morphology realized in English as -*ed*, which is parallel to telicity restrictions on the perfective in other languages, e.g. Korean (Lee, 1995).

Second, contra other approaches cited above, this model does not attribute the observed pattern of development to children's simple modeling of restrictions in the adult data, nor to prototypes (cf. Shirai and Andersen (1995)), nor does it show that initial hypotheses are discontinuous or use primitives not found in the adult state. Rather it argues for a strong innate component that delimits possible adult grammars and defines early stages. In contrast to previous analyses, our model provides an account of why children show these restrictions, how they recover, and what cross-linguistic variation might occur in the emergence of adult competence.

In the next section, we discuss previous work on the acquisition of tense/aspect morphology. Section 2 outlines the model of tense and aspect in Olsen (1997) and discusses what predictions for acquisition follow. In sections 3 and 4, we describe our methodology and results, followed by a discussion of the acquisition profile in section 5. Section 6 concludes.

1 Overview of Previous Work

It has been frequently observed that children learning English seem to place restrictions on the use of the imperfective and past tense morphemes that are not wholly reflected in the adult grammar of this language. Behrend et al. (1995) summarize the literature as showing that "children first regularly apply imperfective inflections to verbs that label durative events with clear actions and past inflections to verbs that label completive events with clear results (Antinucci and Miller (1976), Bloom et al (1980) ...)." Researchers differ in characterizing these early stages relative to the final state, as seen below. Roughly, early stages are described during which the *-ed* ending is not normally found on verbs that denote unbounded events, such as *hug*, *paint*, or *walk* despite the fact that these are fine in the adult grammar, as shown in (1).

(1)   John hugged Mary.
       John painted.
       John walked along.

Similarly, children in the early stages resist using *-ing* with states, and indeed with morphology altogether, such as *love, know, appreciate,* etc. In this case, the restriction found in young children is also partly observed in the adult state, as shown by the oddness of the sentences in (2).

(2)   John is loving Mary.
       John is fearing Mary
       John is believing Mary.

Unlike the child language, adults do use states in the imperfective, as in (3).

(3)   John was loving his new job.
       John was appreciating his new tires more with each snowfall.

Before delving into the particular accounts for this phenomenon, we present the logic of any such account. Any account of the acquisition of tense and aspect morphemes must have four components:

(i)   A characterization of the distribution of tense and aspect morphemes in the adult state. For example, some languages (e.g. Polish, see (Weist et al., 1984)) map tense and aspect with separable morphological affixes and prefixes. There is a separate morpheme both for different tenses, and different aspectual classes. While English uses morphology to distinguish past from present or future time, there is no separate morpheme to express aspectual notions like completed event.

(ii)   A description of differences between the observed production and comprehension at early stages and the adult state. This description will have an explanatory component if it explains why any differences occur between the early and later stages.

(iii) A mechanism that maps the child's early competence into the final adult state; that explains how the child's initial hypothesis plus the child's linguistic environment would cause a change from the mistaken to the correct hypothesis.

(iv)   A description of the range of cross-linguistic variation. An explanatory theory would characterize possible and impossible adult languages.

Theories about the acquisition of the imperfective and past tense morphemes in English differ mainly with respect to the factors that govern the child's initial hypothesis. The stance one takes is partly related to the role and encapsulation of an innate linguistic component. Theories that minimize or eliminate the innate component divide into *cognitive stage* models or *environmentally driven* models. A stage model explains early restrictions on the basis of more general cognitive principles, e.g. to claim that some level of linguistic organization that is active in the adult grammar is not yet available to a child at the appropriate level of development. Thus the child is forced to analyze adult input on the basis of a defective conceptual organization. The absence of one level and appearance of another is usually grounded in a more general theory of how cognitive categories are organized; concrete vs. abstract operations for Piagetians, semantic vs. formal categories for theorists who suggest that semantic categorization is more readily retrievable from the ambient linguistic environment (although see (Gleitman and Landau, 1994) among others for an opposing view). Since the child's early cognitive

organization is assumed to be different from that of an adult, restrictions on the form of adult grammars are irrelevant to the characterization of possible initial states. Once the child moves on to a stage where the relevant categories appear, the linguistic environment can play a role in forcing generalization of the initial hypothesis.

In the case at hand, Antinucci and Miller, and Bloom et al. have adopted versions of what Weist et al. (1984) labeled the "defective tense hypothesis," positing a period of development during which tense is simply not available to young children. Children therefore cannot organize morphology according to tense but according to aspectual classes like "durative event" or "completed event" — -ing in the former case and -ed in the latter — giving rise immediately to the circumscribed state. As the child matures and has the relevant supporting cognitive experiences, the aspectual categorization is disconfirmed, e.g. by examples of -ed with state verbs.

Weist et al. (1984) have provided fairly convincing evidence against this hypothesis from a variety of languages, including Polish. As mentioned above, Polish uses a full paradigm of affixes to distinguish both tense and aspect. Weist et al. collected naturalistic data from Polish children as young as 1:7 and found that even they used the past tense correctly to mark past time, whether the verb was perfective or imperfective, unbounded activity and or bounded.[1] Thus, it seems that there is no conceptual gap regarding tense even in the youngest children. Rather, when the morphology is explicit enough to distinguish tense from the aspectual system, children can use the appropriate conceptual categories.[2]

The second style of explanation again eschews innate linguistic specifications, but places more weight on the role of the environment. In crude form, these theories claim that children's early production or comprehension models subtle differences between the presentation of categories in adult speech to young children and the full correct pattern at the adult stage. Under this analysis, children are simply very good at picking up patterns of distribution in the data they hear. If the data is skewed in some way, their speech will reflect this. There is no innate

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[1]Bloom and Harner (1989) take issue with Weist et al.'s characterization. They demonstrate that differences in acquisition of the tense/aspect forms not attributable to absence of tense, but to restrictions according to lexical aspect. Their findings do not appear to show restrictions of tense acquisition, of the sort we describe, since the restrictions apply across all tenses. Furthermore, their lexical aspect features differ slightly from ours, as discussed below.

[2]Similar styles of explanation occur under the rubric of "maturational theory" (Borer and Wexler, 1987). These authors claim that the child is endowed with an innately specified adult grammar and protogrammar. The principles that make up the protogrammar may disappear as the child matures, leading to possible early stages of production and comprehension that are unattested in the adult state. We do not consider these theories in detail because they adopt the same noncontinuous logic as the theories just discussed, but see Weinberg (1990) for criticism.

component to tell the child that this pattern is impossible as a grammar of a natural language.

Brown (1973), Shirai and Andersen (1995), and Li and Bowerman (to appear) are examples of this type of account. Brown claimed that punctual or resultative events were most consistently mapped to the *-ed* morpheme in mother's speech to their children in his corpus. Modeling to this data resulted in undergeneralization of the use of *-ed* in the child's early performance. He also claimed that children mapped *-ing* onto verbs on a verb-by-verb basis. This morpheme was used most frequently with activity verbs in mothers' speech. Mapping this morpheme not onto a lexical class but verb by verb would explain why the children's production was not overgeneralized. Similar styles of explanation were used by Stephany (1985), and Shirai and Andersen (1995) who claim that grammatical categories are organized according to prototypes. For example, a verb undergoing the imperfective may have a core progressive meaning of "action in progress," but may also include other notions that form the full class. Shirai and Andersen suggest that children search for prototypical patterns in the adult speech to children, generalizing across the core prototype, before acquiring the full category.

However, as Li and Bowerman (to appear, p. 30) note, "the process by which a prototype is formed has not been made clear." Either the prototype is innately specified, or it maps frequency in the adult speech to children. In the latter case, we will see that the adult data to children does not support prototype formation, nor is such an environmentally driven style of account compatible with our data. Children undergeneralize even in places where adults do not. More significantly, prototype theory is mute with respect to one of the important dimensions of language acquisition theory: by relying on environment alone, it fails to explain generalizations about the range of possible languages. For example, a prototype theory uses the presence of examples that do not conform to the child's early generalizations to drive the child to adult competence, but does not explain why in some cases the child could not stay in a particular early stage: why some initial states have no corresponding adult languages, in which the child would not hear evidence disconfirming early hypotheses.

A third style of account relies on a different type of semantic circumscription drawn from the repertoire of adult languages. Bickerton (1981), for example, proposes a "Language Bioprogram" hypothesis, based on data from pidgins and creoles. He claims that adults speaking pidgin and creole languages organize their tense marking along two innate dimensions. The first is a distinction between an event and a state. The second is between a punctual event with a definite end and a non-punctual event that can continue indefinitely. For example, a punctual verb like *destroy* admits of an endpoint within its lexical semantics. A verb like *repair* describes an activity that has an indefinite duration. For Bickerton *-ing* is reserved

for events and *-ed* for punctual verbs.

Bickerton's account is similar to ours in that he assumes that the same innately specified features guide the child's morpheme selection as are relevant for the description of the adult state. However, Bickerton assumes the initial state is that displayed in creoles and pidgins, whereas for us the initial state is determined by learnability considerations. Following standard assumptions in the generative literature, we assume that the child can choose from a repertoire of possible grammars given by an innate linguistic endowment. All of these options correspond to existing adult states. The initial hypothesis must be that option that can be falsified using positive evidence from the types of sentences found in the child's linguistic environment. Given this, the child will pick the most restrictive option given by the innate endowment. Positive examples can show that initial restrictions need to be relaxed in a particular language. If the child made the opposite assumption — picking the least restrictive hypothesis — he would overgenerate, producing examples that were not restricted by the rules of the language and would need negative evidence to retreat from overgeneralization. This idea is formalized as the Subset Principle of Berwick (1985).

For this particular case, we show that Bickerton's description of the data, even if correct for the tense/aspect system of creoles and pidgins, is not correct for young children. Bickerton has picked the wrong features, since children allow *-ed* to attach both to punctiliar verbs like *destroy* and to non punctiliar verbs like *repair*.

To summarize, one or more of the following crucial components are lacking in all the literature: i) descriptive adequacy regarding the adult input and child state, ii) a discussion of why the observed asymmetries exist; iii) an account of how the child develops adult competence; and iv) predictions for cross-linguistic variation. We attempt to address each of these in the following section.

2   The Model

Our account relies on the analysis of aspect outlined in Olsen (1997), which describes principled relations between lexical and grammatical aspect (as well as between grammatical aspect and tense). We use LEXICAL ASPECT to refer to the ability of verbs and other lexical items to describe how a situation (event or state) develops or holds in time. Lexical aspect has also been called situation aspect (Smith, 1991), inherent aspect (Dorr and Gaasterland, 1995), *Aktionsart* (German for 'kind of action'), actionality, and argument/predicate/verb class. We use GRAMMATICAL ASPECT to refer to the view some verbal auxiliaries and affixes present of the development or result of a situation at a given time, also referred to as verbal aspect or viewpoint aspect (Smith, 1991) in the literature.

Aspectual Class	Telic	Dynamic	Durative	Examples
State			+	*know, have*
Activity		+	+	*march, paint*
Accomplishment	+	+	+	*destroy*
Achievement	+	+		*notice, win*

Table 1: Privative Featural Analysis of Aspectual Classes

2.1 Lexical Aspect

The apparent nonindependence of lexical aspect verb classes and grammatical aspect morphology may be explained assuming that lexical and grammatical aspect categories are part of the innate endowment of the child, the UNIVERSAL GRAMMAR (UG). Although many adopt the lexical aspect classes originally described by Vendler (1957), Olsen observes that categorizing and testing verbs for class membership operates on the more fine-grained level of semantic features ((Olsen, 1994; Olsen, 1997), cf. (Smith, 1991; Andersen, 1991)).

Telicity is marked on verbs like *destroy, make, notice,* and *win* that "denote the existence of an end or result to which a situation naturally will lead, not necessarily the actual attainment of such an end" (Olsen, 1997, p. 32). Thus events like *making* may not continue indefinitely, but end with creation of the relevant object, in this case. Telic verbs contrast with those lacking an inherent bound, such as *dance, march, paint,* and *run.* For these verbs, an end may be imposed with other constituents, but it is not entailed in the verb.

Dynamicity is used to distinguish events (marked [+dynamic]) from states. Olsen, following Dowty (1979), identifies the features with "change." Durativity refers to whether a situation (event or state) takes an interval of time [+durative] or not [0durative]. Durativity is selected as the marked value, since it, and not punctilarity (cf. (Bloom, 1970; Bloom, 1973; Andersen, 1991)) is invariable. Olsen demonstrates, in fact, that all the features are semantically privative (+/unmarked) as shown in Table 1, rather than equipollent (+/–). Under this analysis, [+telic] verbs specify an inherent bound, whereas [0telic] verbs generally lack a bound, although they may acquire telicity in the appropriate sentential or discourse context. The model restricts the contribution of other sentential constituents and the pragmatic context to lexical aspect interpretation: they may add features but not remove them. Thus, although *paint* is unmarked for telicity, it may be used in sentences with telic interpretations, as (4) shows.

(4)   Degas will paint.

> Degas will paint two blue dancers.
> Degas will paint for an hour.

In contrast, [+telic] verbs like *win* and *destroy,* always entail a bound. Even in the apparently unbounded phrases, e.g. with plural objects, as in (5), the bound must have been reached (at least twice). Similarly, with implicit objects, the end is entailed, as in (6).

(5)   Michael Johnson wins races.

(6)   Michael Johnson wins!

The privative feature model predicts that only marked features are semantically "real" and may be used as determinants of linguistic behavior. Olsen (1997) demonstrates that this holds crosslinguistically for phenomena as diverse as grammatical aspect (discussed in 2.2), unaccusativity (Levin and Rappaport Hovav, 1995), auxiliary selection, tense, and discourse movement of narrative time. The model therefore predict similar results with the acquisition data: telicity, eventhood and duration will be operative, whereas their unmarked counterparts (atelicity, statehood, and punctiliarity) will not affect inflectional affixation.

2.2   Grammatical Aspect

We now discuss how the lexical aspect features interact with the inflectional morphology under consideration. We suggest that these morphemes—*-ing* and *-ed* in English—encode grammatical aspect in the child as well as in the adult. Since grammatical aspect concerns time—both how situations develop over time and how speakers view situations at a given time—it has often been confounded with tense. In languages like English, single morphemes are used in both tense and aspect systems. Although there are temporal implicatures associated with grammatical aspect forms (see discussion in (Olsen, 1997, pp. 124-5), the temporal notions encoded by grammatical aspect may be separated from those encoded by tense, an analysis supported by languages like Polish (Weist et al., 1984) in which tense and grammatical aspect are distinctly encoded.

According to Comrie (1976, pp. 2-3), tense is DEICTIC: it "relates the time of the situation referred to to some other time," usually the time of speaking.[3] Past tense locates a situation before the speech time (7), present tense at the speech time (8), and future tense subsequent to it (9).

(7)   I owned an original Macintosh.

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[3]Olsen argues that other deictic centers are possible as well, a point not relevant to this discussion.

(8) I own a Mac IIsi now.

(9) I will own a Power PC someday.

In contrast, grammatical aspect is not deictic; it does not relate the time of the situation to any other time, but focuses on a given portion of the internal (temporal) constituency of a given situation. Aspect looks at the "inside" of stiuations, independent of where the situations are located in time. For example, the English imperfective focuses on the ongoing nature of situaitons, whether in the past (10), present (11), or future (12).

(10) We were writing an article.

(11) We are writing the revised draft.

(12) We will be writing a reply to any response.

In English, the imperfective is marked by the affix *-ing*. Although it appears above with the auxiliary *be* in its various tense forms, it can also occur as a participle, without an auxiliary; in (13), for example, it predicates an ongoing (imperfective) property of the spectators.

(13) The waiting spectators appeared impatient. (cf. assisted spectators)

In contrast, the perfective participle denotes a completed situation, because perfective grammatical aspect focuses on the completion of situations, as in (14).

(14) Paul had cooked Mexican food when he worked as a chef.
Paul has cooked Asian food.
Paul will have cooked dinner by the time I get home.

The perfective is marked by the *-ed* affix and used with the HAVE auxiliary, or alone, as in (13) above.

According to Olsen (1997), grammatical aspect crucially interacts with the lexical aspect features. Olsen points out that these lexical aspect features presuppose a two-part event structure: [+durative] and [+dynamic] hold of the ongoing portion of an event, the event NUCLEUS. The presence of telicity indicates that the event progresses toward an eventual end or CODA, as represented below.

$$(15) \quad \begin{bmatrix} +\text{durative} \\ +\text{dynamic} \\ \text{NUCLEUS} \end{bmatrix} \quad \begin{matrix} [+\text{telic}] \\ \text{CODA} \end{matrix}$$

Imperfective grammatical aspect may therefore be said to focus on nucleus of an event and perfective aspect on the coda, each asserting that the relevant features hold. The application of grammatical aspect may also be restricted in predictable ways. Olsen (1997) provides numerous examples from the literature of imperfective grammatical aspect restricted to situations with one or both marked nucleus features. For example, progressives are described as an imperfectives restricted to verbs with a marked [+dynamic] feature. Olsen claims "English does not have a true progressive miperfective, since it does not require situations to be [+dynamic] but applies to situations unspecified for dynamicity as well" (Olsen, 1997, p. 165), as (16) shows.[4]

(16)   John is learning/?knowing Greek.

In other languages, such as Mandarin, states are completely prohibited with the *zai* imperfectives in the adult language ((Li and Bowerman, to appear)). In contrast, we find perfectives restricted to verbs that have the coda feature [+telic], a form Olsen labels "resultative perfective." In Korean, for example, the resultative aspect auxiliary '-e issta' can only occur with [+telic] intransitive verbs: E.g. *cwuk-ta* 'to die,' *nwup-ta* 'lie down,' *anc-ta* 'to sit down, *se-ta* 'to stand', ... etc. cf. Ho-Min Sohn (1994:329)" (Lee, 1995)). Crucially, we do not find the inverse: imperfectives restricted to telic verbs or perfectives restricted to events.

2.3   Developmental Predictions of the Model

In the introduction, we outlined various features that were a neccessary part of any model of language acquisition. In this section, we discuss these features and predictions of our model for the case at hand. As we mentioned, each model much characterize the adult state that the child is both learning from and targeting. We have just discussed a range of aspectual systems that distinguish grammatical and lexical aspect. These systems range from the most restrictive where grammatical aspect is semantically circumscribed by lexical aspectual classes (imperfective restricted to either lexically marked durative or dynamic verbs, and perfective restricted to telic) to less restrictive systems where grammatical aspect is not governed by lexical aspectual class.

We assume an innately driven style of explanation for differences between the initial and adult state. As mentioned above, the restriction of relevant input to positive examples only requires that the child's initial hypothesis be the most restrictive, such that environmental input may serve to relax these restrictions. Because languages restrict grammatical aspect forms by requiring features in the

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[4]For many naturally occuring examples of English states in the imperfective, as allowed by the privative model, see Olsen (1997).

relevant focus area, the *syntactic subset principle* requires that children assume these restricted interpretations initially (Berwick, 1985). That is, they assume the imperfective is restricted to [+dynamic] verbs and the perfective to [+telic] predicates. Since [+telic] predicates are also [+dynamic],[5] they occur with both *-ed* and *-ing* morphemes in the restricted child grammar our data. The restricted assumptions required by the subset principle allows the child to develop the adult competence from positive evidence in the adult language. Our model therefore predicts that:

(i)   children will learn progressive imperfectives and resultative perfectives before general (im)perfectives, based on the syntactic subset principle (Berwick, 1985). Since Olsen's system uses privative features, only marked (+), values can define lexical classes. Therefore we predict that

(ii) marked features will constrain the application of the (im)perfectives by the child. As mentioned, only positive examples are allowed to move the child from an early undergeneralization to the correct option for his language. Therefore we predict that

(iii) in languages like English, which have aspecually unrestricted forms for grammatical aspectual categories like perfective and imperfective, adult input will help children recover from their initial undergeneralization.

In the next section, we will see that these predictions are verifed by the developmental evidence. Children's initial production of the (im)perfective encoded by the *-ing* and *-ed* morphemes is semantically circumscribed in the way predicted by the theory.

Adult input helps to drive the child from this semantically circumscribed stage to the adult state. In the CHILDES adult data, we find, for example, states with *-ing* in the imperfective and atelic verbs in the perfective. Our findings contrast with previous studies in focusing on the lexical aspect features and clarifying the relationship between the lexical aspect features and grammatical aspect. Bloom (1970; 1973)[6], for example, associates *-ing* with prototypical [+durative, -telic] situations and *-ed* (including irregular past tenses) with prototypical [-durative, +telic] events. That is, they predict that certain achievements more than accomplishments will occur with the *-ed* morphology. In contrast, we focus on the positive features [+dynamic] and [+telic] and show that it is these, rather than the classes described by the features, the unmarked features, or the frequency of either in the adult language

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[5]Lexical "stage-level states" may be a possible exception, although these are phrasal (e.g. *be pregnant*) rather than verbal in English.

[6]Also cf. Bloom and Harner (1989).

that determines the distribution of the morphology in the child grammar. We will see that neither the environmentally driven, bioprogram, nor cognitive stage models can characterize the initial stage nor explain the pattern of development as well. We make the following additional assumptions, the first discussed further in section 5.1:

(iv) The real world context associates the verb meaning with the appropriate lexical aspect features. For example, children can tell that *love* is a durative verb because it is used in situations where an action of more than momentary duration is described (Croft, 1991; Croft, to appear; Dowty, 1979; Fisher, Gleitman, and Gleitman, 1991; Levin and Rappaport Hovav, to appear; Pinker, 1989).[7]

(v) Children assume that each meanings and strings, grammatical morphemes in this case, map one-to-one, an assumption also known as the Uniqueness postulate (Wexler and Culicover, 1980; Clark, 1987; Pinker, 1984),"Less is More" hypothesis (Newport, 1984; Newport, 1988; Newport, 1990; Carey and Gelman, 1991), (Goldowsky and Newport, 1992), cf. (Elman, 1993). Specifically, since tense and aspect are confounded, we assume that the one meaning is aspect, demonstrably closer to the verb than tense (see Slobin's introduction to Newport (1988, p. 17)).

Having set out the framework of our analysis, we now turn to our methodology and detailed results. We round out our account in section 5 by describing the input to the early stage of acquisition and the nature of the adult stage.

3   Methodology

The data for this paper was drawn from four CHILDES file sets, representing eight children, several of whom appeared in previous studies on English verb morphology: the subjects in Bloom, et al. (1980) (Eric, Gia, Peter, and Allison); Adam, Eve, and Sarah (Brown, 1973), and Nina (Suppes, 1973).[8] We hand-compiled an exhaustive list of the 664 verbs used by both adults and children in these files, as well as in the Shem data citeClark:1978a,Clark1978b. Each verb was independently assigned by three researchers (Olsen, Drury, and Lilly) to an aspectual class composed of privative features. Thus, a bounded event that could be either durative or punctiliar

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[7]We furthermore assume, and show below, that the lexical aspect features of verbs are relevant to the child's morphological production, without consideration of those added monotonically by other constituents in the VP (cf. (van Hout, 1996)).

[8]We also looked at Shem (Clark, 1978a; Clark, 1978b), but found it difficult to categorize his files into the appropriate stages, since the MLU varied significantly.

was classified as an achievement, unmarked for durativity in Olsen (1994; 1997). Similarly *appreciate*, since it has a stative reading, would be classified as stative, with the event interpretation available in the appropriate context.

We therefore adopt the Uniqueness postulate for verbs' lexical aspect meaning. This assumption follows from Olsen (1997) and contrasts with Bloom (1980) in which verbs were assigned features based on the accompanying context; they therefore could be assigned to multiple classes. For example, verbs were were classified as actions only if they were accompanied by an event; i.e. *fit* was an event in *These fit here* if it was accompanied by an action of putting away blocks, for example.[9]

Classes were assigned by applying standard tests for lexical aspect features (cf. (Dowty, 1979)), such as compatibility with time phrases like *in an hour* or *for an hour*, and entailment in the imperfective. Verbs were tested in the most minimal frame: with singular subjects, and no object (*John ran* vs. *John ran a mile*) or a singular object (*John got a sandwich* rather than *John got sandwiches*).

Verbs like *widen* and *cool*, which behave like both activities and achievements on the standard tests, we treated as achievements (cf. (Song, 1997, pp. 80ff.) for discussion of these verbs and references). No attempt was made to disambiguate verb senses beforehand, as in *Investments appreciate/I appreciate good music*, although the CHILDES context did constrain likely meanings. Two raters (Drury and Lilly) had compiled the lists, so they were familiar with contexts for the subset of verbs we had extracted. All raters agreed on 290 (43.7%) of the verbs, and two raters on an additional 326 (49.1%). For 48 verbs (7.2%) the three raters each had a different category. In this study, we examine only those verbs for which there was

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[9]The Uniqueness Principle may be an axiom of the learning system or may be triggered by more fundamental learning principles as suggested by Goldowsky and Newport's (1992, p. 11) "Less-is-More Hypothesis." Goldowsky and Newport argue "that a limitation on the ability to perceive or remember the full complexity of linguistic input, as seems to occur in young children, may have unexpected benefits for the learning of morphology. If the child begins acquisition with a very restrictive input filter, it will obtain the optimally clean data for the smallest meaningful units in the language. Learning larger units will require a less restrictive filter...and you end up learning the entire language optimally." They suggest children initially assume a morpheme has one meaning, e.g. that *-ed* can only mark perfective, and not past or passive. The types of confounding that we see, should therefore depend on the inventory of forms in the language and the degree and nature of homonymy of forms. This is, in fact, the case, as we discuss in 5.3.

Similarly, Elman (1993) suggests that learning of non-regular languages (i.e. languages that can not be described by a finite state automaton) using only positive evidence can be modeled, if one assumes a development in memory capacity during the language acquisition process. The model produces results similar to networks that are held constant and fed data of increasing complexity. Elman (1993, p. 84) agrees with Goldowsky and Newport, stating that "[t]he effect of early learning ... is to constrain the solution space". Thus early learning of the morphology may filter out the tense meaning that competes with the perfective meaning of *-ed*, or that is encoded in the auxiliary that accompanies the imperfective.

complete agreement (see appendix). Future work will establish a consensus for the remaining verbs.[10]

From the resulting verb list we created a file to use the CHSTRING tool to separate morphologically complex forms: *used* to *use+ed*, *brought* to *bring&ed*, and *broughted* to *bring&ed+ed*. This step was necessary to ensure accurate counting of the morphology, excluding monomorphemic words ending in *-ed* and *-ing* such as *bed* and *thing*. We also used CHSTRING to add tags to the verbs representing the lexical aspect features, allowing either features or classes to be counted.

Mean Length of Utterance was calculated for each of the children's files, also using the CHILDES tool. The children's files were grouped by stages, following Brown (1973). Stages I and II were collapsed for several reasons. First, the files did not (all) show a consistent temporal development at that stage, so it was difficult to assign a set of files to a later stage, if a single file had the relevant MLU, and three or four later files fell below the threshold again. Second, collapsing these stages also allows for more parity between the size of the corpus in each division. Files were divided as follows, with MLUs less than 2.5 were grouped into stages I and II; stages IV+ are those files with MLU greater than 2.5, as shown below.

(17) Stage I-II (MLU 1.5-2.5): adam01-06, allison1-4, eric01-03, eve01-07, nina01-12, peter01-06, sarah001-039

(18) Stage III (MLU 2.5-3.125): adam07-18, eve08-11, sarah040-064, nina13-36

(19) Stage IV (3.125+): adam19-55, allison05-06, eve12-20, peter07-20, sarah065-139, nina37-56

It is not our purpose to examine the theoretical importance of the stages as crucial units in morphological development; rather we want to focus on the fact that the asymmetries are evident at the earliest stages, diminished in later stages, and absent in the adult data. Our results are based on the following token/type counts of verbs with *-ing* and/or *-ed* morphology at each stage, as well as data from the type of verbs that appear only without morphology (see also Tables 2 and 3):[11]

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[10]Disagreements could be resolved in a variety of ways: taking two-person agreements as the correct category for the 326 verbs and discussing the remaining 48; discussing all 374 verbs; or assigning verbs the category with most minimally specified features. The latter approach is more consistent with the privative analysis, accounting for cases where one or two parties failed to recognize a more minimally specified meaning for a given verb, as was the case with *appear* (*It appears that* vs. *The man appeared*). Whether two or one raters classified a verb as an activity, for example, if one classified it as a state, state would be selected.

[11]Table 3 and the percentages based thereon include the adult data from the Shem files (Clark, 1978a; Clark, 1978b)

STAGES I-II

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	469	35	0	504	22	482
-ed	92	464	9	547	451	105

STAGE III

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	636	174	15	795	121	689
-ed	274	550	19	803	503	321

STAGE IV and up

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	2216	663	55	2824	445	2434
-ed	1677	2977	304	4350	2759	1895

ADULT

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	5998	1328	164	7162	963	6363
-ed	9250	4644	1014	12880	4240	9654

Table 2: Verb tokens with tense/aspect morphology

(20)   Stage I-II: 1,060 tokens, representing 151 verb types
       Stage III: 1,634 tokens, representing 173 verb types
       Stage IV and up: 7,533 tokens, representing 223 verb types
       Adult: 21,220 tokens, representing 243 verb types

4   Results

To preview and summarize our results, we find that children have asymmetries in the association of verbs with [+dynamic] and [+telic] lexical aspect features with the *-ing* and *-ed* morphology that are not present in the adult data. Examinations of the verbs by types shows this most clearly: that is, verbs and the morphology they occur with are considered without reference to their frequency, with each verb-morpheme (or no morpheme) combination counted once. The token data, in which verb-morpheme combinations are counted each time they occur, provides further evidence that the child language does not track the adult distribution in any relevant way. The token data does, however, show a role for frequency in morphological acquisition, in providing positive evidence for a child to recover

STAGES I-II

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	48	13	0	61	12	49
-ed	12	15	1	26	14	13

STAGE III

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	73	20	2	91	18	75
-ed	23	22	3	42	21	24

STAGES IV+

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	112	34	1	145	34	112
-ed	62	48	5	105	44	66

ADULT

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	119	44	5	158	42	121
-ed	73	44	9	108	38	79

Table 3: Verb types with tense-aspect morphology

from initial restrictive assumptions that associate [+dynamic] with imperfective and [+telic] with perfective. These results contrast with probabilistic accounts such as Li and Bowerman (to appear) and Shirai and Andersen (1995) which claim that the child is using distribution in the adult data plus some semantic classification to establish prototypes along which morphological categories are established. Crucially, the initial underspecification is not modeling a similar pattern in the adult grammar.

Furthermore, our data suggests that it is the lexical aspect features that are operative in associating verbs with morphology and not the classes per se. Contrary to Bloom, et al., we find the privative features telic, dynamic and durative to operate on the lexical level, independent of physical context and the operations allowed by the linguistic context (e.g. atelic verbs becoming telic by the addition of a telicizing constituent, as in *run a mile*). Also, contrary to both Bloom and Bickerton, all [+telic] verbs take *-ed* endings even though only achievements are [+punctual].

4.1   Types

For both token and type, the verb feature-morphology relationship may be viewed from two directions: one may examine verbs with a given morphological ending and see whether they have a certain feature or set of features a significant number of times. From the theoretical perspective, this is equivalent to asking whether it is possible to predict the feature(s) a verb (type or token) will have, given the morphology it appears with.

However, the subset principle and the association of lexical and grammatical aspect predicts that the reverse should hold: verbs with a given feature should associate with the relevant morphological ending a significant number of times. Thus, one should be able to predict the morphology a verb (type or token) will appear with, given its lexical aspect features. This is, in fact, what we find.

In order to have morphology at all, a verb must have the feature [+dynamic]; as shown in Table 4, events appear with morphology substantially more frequently than states in the child language. The only state that appears with morphology at all in the earliest stages is *have* arguably an auxiliary, in this case. Thus state verbs such as *know, like, love, need, want* only rarely appear in our data with inflectional morphology, as illustrated in (21).

(21)   eve02.cha: *EVE: want lunch.
        nina10.cha: *NIN: I want more.
        peter06.cha: *PET: my dinner # want my dinner.
        sarah037.cha: *SAR: I want go Mummy bed.
        sarah030.cha: *SAR: he love me # yeah yeah yeah.

When they do surface with morphology, it is with *-ed*, this despite the prevalence of

	States	Events
Stages I-II	10	52.5
Stage III	23.1	66.3
Stage IV+	35.7	81.3
Adult	56.3	80.2

Table 4: Percent of verbs with tense/aspect morphology, by type

	-ing	*-ed*
Stages I-II	81.3	36
Stage III	85.3	40.4
Stage IV+	83.4	59.4
Adult	84.8	61.3

Table 5: Percent of inflected verbs with *-ing, -ed*

-ing more generally, as shown in Table 5. This preference diminishes significantly in the adult language.

However, [+dynamic] is not enough to license all the verbal morphology: our data shows an asymmetry between *-ing* and *-ed* as well. In the children's data, atelic verbs appear substantially more frequently with *-ing*, as summarized in Table 6, given in percentage of verb-morpheme types. Thus, activity verbs, such as *carry, hug,* and *help,*, appear overwhelmingly either uninflected for aspect morphology (0 or *-s*) or with the imperfective only, as (22) shows.

(22) eve07.cha: *EVE: carrying a baby Sarah.
      adam06.cha: *ADA: carry buffalo.
      nina01.cha: *NIN: hug the lady.
      nina09.cha: *NIN: see hugging Mommy.
      sarah037.cha: *SAR: you hug her.
      adam02.cha: *ADA: I help.
      nina04.cha: *NIN: helping kitty.
      sarah029.cha: *SAR: help me up.

In contrast, [+telic] verbs may have either *-ed* or *-ing* morphology. Thus, accomplishments like *make* and achievements like *break* and *fall* may occur with either imperfective or perfective morphology, since they are both [+dynamic] and [+telic], as illustrated in (23)– (25).

STAGES I-II

	0tel	+tel
-ing	80	46.4
-ed	20	53.6

STAGE III

	0tel	+tel
-ing	76.1	47.6
-ed	23.9	52.4

STAGE IV+

	0tel	+tel
-ing	64.4	41.5
-ed	35.6	58.5

ADULTS

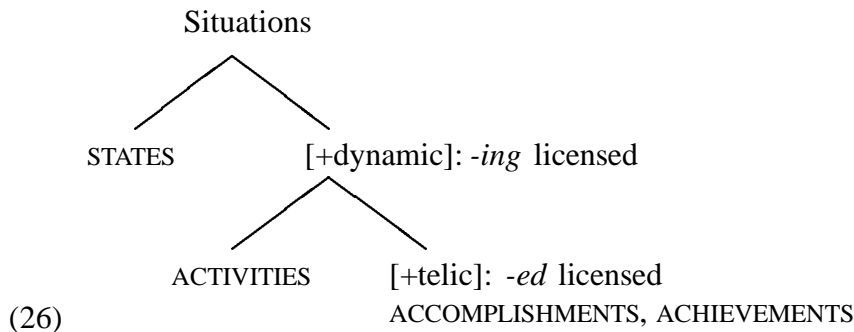|	0tel	+tel
-ing	62	50
-ed	38	50

Table 6: Percent of inflected (a)telic verbs types with *-ing, -ed*

(23) adam06.cha *ADA: made it all up.
      nina10.cha *NIN: I made a table.
      sarah014.cha *SAR: I made bad bed.
      sarah032.cha *SAR: I made pocketbook!
      eve05.cha *EVE: Eve Eve making tapioca.
      nina04.cha *NIN: that car is making a noise # isn't it?
      nina05.cha: *NIN: Becca making a table.
      sarah038.cha *SAR: I making # cake.

(24) adam01.cha *ADA: car broke.
      eric02.cha ERI: broke.
      sarah001.cha: *SAR: I broke dat.
      sarah017.cha: *SAR: my broke it.
      adam04.cha: *ADA: breaking?

(25) adam02.cha: *ADA: fell down.
      eve03.cha: *EVE: I fell.
      peter05.cha: *PET: dump truck # fell down ## dump truck.
      nina10.cha: *NIN: see # that's falling down.

These patterns suggest a hierarchy of events, described by the two features, [+dynamic] and [+telic], as shown in (26).

Situations

STATES   [+dynamic]: *-ing* licensed

         ACTIVITIES   [+telic]: *-ed* licensed
(26)   ACCOMPLISHMENTS, ACHIEVEMENTS

In this model, frequency allows recovery from the initial restrictive assumptions. As seen in our data below, and contra Li and Bowerman and Shirai and Andersen, the children's frequency does not track the adults'. Table 7 shows the distribution calculated as a percentage down the columns, that is, the percentage of each morpheme that appears with a particular feature. Overall, certain distributional features hold constant across age groups, suggesting that they are facts about English rather than acquisition: [+telic] verbs prefer *-ed*, as do states (although, as discussed above, few state verbs occur with morphology), and [0durative] verbs occur preferentially with *-ed*.

STAGES I-II

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	83.6	7	0	52.1	4.6	82.1
-ed	16.4	93	100	47.9	95.4	17.9

STAGE III

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	69.9	24	44.1	49.7	19.4	68.2
-ed	30.1	76	55.9	50.3	80.6	31.8

STAGE IV+

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	56.9	18.2	15.3	39.4	13.9	56.2
-ed	43.1	81.8	84.7	60.6	86.1	43.8

ADULT

	[0telic]	[+telic]	[0dynamic]	[+dynamic]	[0durative]	[+durative]
-ing	39.3	22.2	13.9	35.7	18.5	39.7
-ed	60.7	77.8	86.1	64.3	81.5	60.3

Table 7: Tokens: Percentage of features with a given morpheme

The youngest children show two strong preferences not evident in the other groups, potentially dealt with within an acquisition model: both atelic (91.4%) and [+durative] (81.7%) verbs prefer *-ing*. In addition, adults show a slight preference for associating [+dynamic] verbs with *-ed*. Again, it is not clear how these preferences fit into a theory of acquisition that assumes the subset principle. In the next section we offer our alternative.

5   The Acquisition Profile

In this section, we sketch our account of the early child stages and how it develops into the adult competence, including the role of frequency information in this process. In section 5.1 we discuss what Universal Grammar supplies, including how lexical aspect features associate with verbs of a particular type. In section 5.2, we discuss how the child eventually dissociates lexical and grammatical aspect and acquires adult competence. Section 5.3 discusses what type of variation this model predicts in the acquisition of aspect and tense morphology across languages.

5.1   Universal Grammar and the Child

We assume the initial state of the child provided by UG to follow the spirit of Croft (1990; 1991; to appear), Dowty (1979), Fisher et al. (1991), Pinker (1989), and others, in providing an inventory of types associated with ontological categories. Levin and Rappaport-Hovav (to appear), for example, suggest that verbs with constants of particular types associate with lexical aspect tempolates composed of various combinations of primitive predicates, as in 5.1. For example, verbs that name an instrument, such as *shovel*, appear as activities.

(27) **States**
     LST: `[<state>x]`

(28) **Activities**
     LST: `[x ACT<manner/instrument...> (y)]`

(29) **Accomplishments**
     LST: `[x CAUSE [BECOME [y <state>]]]` or
     `[[x ACT<manner/instrument...>] CAUSE [BECOME [y <state>]]]`

(30) **Achievements:**
     LST: `[BECOME [x <state>]]`

We, however, assume the primitives to be the lexical aspect features in Table 1 above.[12] We therefore propose that the constant-to-language mapping is mitigated by these features, as described above and summarized in 5.1. (cf. (Comrie, 1976; Olsen, 1994; Olsen, 1997; Smith, 1991; Weist et al., 1984)).

(31) dynamic: change/takes energy to maintain

(32) durative: takes time

(33) telic: has a (natural) bound

The association of these features with individual verbs may therefore proceed via a combination of observation (in the case of observable change, duration, and termination) and syntactic context (Fisher, Gleitman, and Gleitman, 1991) (cf. tests in (Dowty, 1979)). In section 2, we provided an account of why the lexical and grammatical aspect would be associated in the child's language. We argued from the privative feature model and the subset principle, that children assume the most restricted interpretation found in adult languages, requiring grammatical aspect markers to pertain only to verbs with certain lexical aspect features. The association of the particular phonological shape with the grammatical aspect meaning comes from the UG assumption that language will encode this meaning paired with the contextual information from the input, that *-ing* is used primarily with ongoing situations (nucleus focus) and *-ed* with completed/perfective situations.[13]

This model does not, therefore, directly depend on asymmetry in the adult input — on more "manner" verbs occuring with *-ing* in the parental input, for example. Although some have claimed otherwise (see discussion in 1 above), our research shows that not to be the case. At a certain stage when children hear contrary evidence, such as manner verbs with *-ed* (e.g. *I stirred the soup.*), or result verbs with *-ing* (e.g. *I'm mixing cookies now.*), they are able to use them to back away from the most restrictive hypothesis. For example, as early as 2:7.12 (sarah021.cha), Sarah says *I go dancing now*, using the imperfective with a manner verb; but she does not use the perfective with "dance" until 4:2.16 (sarah096.cha) *I danced with a boy # remember?*. Similarly, she says *Her writing* at 2:9.0, but *wrote* does not appear in her data until 5:0.10, although her father uses it when she is 2:7.12.

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[12]The features may be read from templates of this sort, though not compositionally combined, as shown by Dorr and Olsen (1996).

[13]The fact that perfective situations are "completed," in combination with the homophony of past and perfective forms accounts for some of the confounding in the literature of tense and aspect.

5.2 Adult Competence

If the adult language associates lexical and grammatical aspect in this restrictive way, the child attains adult competence immediately. (We have not come across any languages that restrict both grammatical aspects categorically.) For other languages, adult competence is attained when children are able to process positive evidence that contradicts their restrictive hypotheses.

In this study, as well as those discussed by Cziko (1989), lexical and grammatical aspect appear to be equated at some point by the child, such that only [+durative] and/or [+dynamic] verbs occur in the imperfective, and only [+telic] verbs in the perfective.[14] Children eventually lose the grammatical encoding of lexical aspect by exposure to positive evidence. For example, a child that hypothesizes that state and event are expressed by *-ed* and *-ing* morphemes need only be confronted with examples of states with *-ing* and events with *-ed*, as well as with examples of both without any grammatical morpheme (e.g. in the first and second person present form).

The relation between lexical and grammatical aspect parallels that in the adult grammars of many languages, as outlined in Olsen (1997). According to Olsen, grammatical aspect operates on lexical representations that incorporate the lexical aspect, such as the Lexical Semantic Templates of Jackendoff and others (Jackendoff, 1990; Jackendoff, 1996; Levin and Rappaport Hovav, 1995; Dorr and Olsen, 1997; Tenny, 1992)). Imperfective grammatical aspect presents a situation (event or state) from the nucleus, denoted by the privative features [+dynamic] and/or [+durative]. The imperfective may either generally apply to all verbs, or may require the presence of specific nucleus features, e.g. the Mandarin progressives *zai* and *-zhe* only apply to [+dynamic] and [+durative] situations, respectively. Perfective grammatical aspect expresses the view of a situation from the result or coda. The adult perfective may therefore require the presence of the coda feature, as in the Korean perfective *-e issta*, which does not apply to atelic verbs (Lee, 1995).

It is therefore natural for children to use the grammatical aspect forms to encode lexical aspect distinctions. (We would not, however, expect children to use the imperfective to encode a coda feature, and the perfective to encode a nucleus feature, or either form to require absence of a marked feature, both of which are absent in Cziko's (1989) survey. Children therefore make distinctions that are universally available, but only grammatically encoded in some languages, although presence of these semantic features may condition grammatical effects: (Levin,

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[14]Cziko investigates the data according to Bickerton's Bioprogram, which confounds punctuality with telicity. Our observations are based on the languages he discusses in which is possible to separate the two.

1993; Olsen, 1996; Tenny, 1994).

5.3 Crosslinguistic Variation

We have proposed that children do not lack tense when they show patterns with English morphology that differs from the adult. Rather they are restricting verbs based on patterns that are found with grammatical aspect morphology across languages. These patterns are operative because the English tense morphology overlaps with the aspect morphology, particularly in the past/perfective *-ed*. We therefore should see other patterns in languages that distinguish tense and aspect morphologically. In Polish, for example, perfective aspect is indicated by prefixes, and tense by suffixes. And, in fact, Weist, et. al. (1984) report that children learning Polish acquire the past tense up to two months earlier than children learning English.

6 Conclusion

In conclusion, the children learning English whom we studied show asymmetries in associating [+dynamic] and [+telic] lexical aspect features with the *-ing* and *-ed* morphology, not tracking adult frequency in any relevant way. Our model predicts that these asymmetries would exist, given that there are adult languages that show the relevant restrictions as well. The adult distribution provides positive evidence for relaxing the restrictions for languages like English, rather than a model for the child to follow, as in connectionist proposals such as Li and Bowerman (to appear) and Shirai and Andersen (1995). Furthermore, our model predicts that acquisition patterns will vary, depending on whether tense and aspect are conflated in a single morpheme, as in English, or not as in Polish and other Slavic languages.

We are in the process of designing experimental tests of the telicity *-ed* restriction, as well as expanding our corpus research to the full set of verbs found, appropriately categorized, as well as to other file sets. We are also examining instances that are exceptions to this restriction (atelic verbs that appear with the perfective *-ed* morphology, to determine whether compositional lexical aspect plays a role. That is, do the exceptions appear with telicizing phrases, such as *two blue dancers* in *Degas will paint two blue dancers*, more often than atelic verbs that follow the generalizations? We expect to show that it is verbal rather than compositional lexical aspect that is operative in the child language. This prediction accords with recent research by van Hout (1998) which shows that even quantized objects, said to add telicity to atelic verbs, only make a telic reading more likely, and less so in English than in Dutch. That is, both adults and children in an experimental context assigned a telic interpretation to *The mouse ate his cheese* more often than to either *The mouse ate* or *The mouse ate cheese*, but only 25-56% of the time (compared

to 17-78% in Dutch), suggesting that the influence of syntax and context does not comletely override the lexical aspect specification of the verb.

7   Acknowledgments

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Appendix 1

States: appreciate, belong, cost, deserve, face, figure, hate, have, hope, intend, know, like, love, need, own, respect, seem, smell, want. **Activities:** act, annoy, approach, argue, balance, blow, boat, boil, bother, bowl, bubble, buzz, call, camp, carry, cello, chase, color, complain, conduct, cradle, crawl, crayon, creep, cry, cuddle, curl, dance, dangle, dig, do, drag, draw, dream, drift, drill, drive, drum, dust, exercise, farm, feed, fight, fish, float, flounder, fly, follow, fry, fuss, grate, grind, handle, help, hug, hum, hunt, hurry, ice+skate, jabber, jiggle, juggle, kid, knead, knit, laugh, leak, listen, manage, march, moan, mock, mother, move, mumble, munch, operate, paddle, paint, pedal, pee, play, pour, pout, practice, pray, pretend, pull, pump, race, rain, read, ride, ring, roam, roar, rock, roll, row, rub, run, rush, sail, scitter [sp], scoop, scramble, scrape, scratch, scream, screw, scribble, scrub,

seek, sew, shake, shop, shout, shovel, sing, skate, ski, skim, skip, slide, smile, smoke, snarl, sneak, sniff, snore, snow, soap, speak, speed, spin, spray, sprinkle, squeak, stare, steer, struggle, study, suck, sweep, swim, swirl, talk, tease, tickle, try, tumble, twirl, twist, type, use, vacuum, visit, wag, walk, wander, wash, watch, wave, whimper, whine, whisper, whistle, wiggle, wind, work, wriggle, write, yell, zip, zoom. **Accomplishments:** accomplish, build, bury, fold, hollow, make, organize, plant, reload, repair, rescue, ruin, smooth, tame, undress, unload, unmake, unpack, unscramble, untangle, unwrap, unzip, unzipper. **Achievements:** admit, arrive, award, begin, bet, brand, break, catch, choose, crash, decide, detach, dip, disappear, discover, drape, drop, enter, escape, fall, fasten, find, finish, flop, forget, get, give, grab, graduate, guess, hand, hurt, identify, injure, kill, land, leave, link, lock, lose, mark, name, notice, pick, place, promise, realize, receive, recognize, remember, rip, scare, seat, set, slip, snap, spill, squash, start, stop, surprise, take, tear, trip, unhook, wake, win. **Semelfactives:** blink, click, cough, hit, kick, sneeze.

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