

with relatively more verbs in Mandarin vs. English. This pattern was found in videotaped interactions (controlling for context), the MacArthur Communicative Development Inventory, and in maternal report of first words. Why might this be the case? We suspect it is a combination of variation in input, cultural context, and possibly formal features of the languages (see also Tardif, Shatz, & Naigles, in press).

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Issues of Complexity in Inuktitut and English Child Directed Speech

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1. Introduction

Speech addressed to children has been referred to as a simplified register of talk, characterized by syntactic and phonological simplicity, limited vocabulary, and reduced propositional complexity (Ferguson, 1978; Snow & Ferguson, 1977; Snow, 1995). In other words, child directed speech (CDS) is seen as presenting the child with a specially fashioned corpus that supposedly renders the learning task less complex. However, in a recent account of morphological affixation in Inuktitut CDS (Crago & Allen, 1997), we have demonstrated that child directed speech in a polysynthetic language can have a striking degree of morphological complexity even with a special lexicon of words reputed by Inuit caregivers to be a simplified form of language. Our findings are reminiscent of Küntay and Slobin's (1996) report on CDS in Turkish. In the present paper, we investigate the relative morphological complexity of CDS and its effect on child speech in two typologically very different languages, English and Inuktitut. We use affixation of verbal and nominal roots as an indicator of morphological complexity. In the two studies described below, we focus first on how the complexity of morphological affixation in CDS relates to the particular language the caregivers are speaking, and second on how these properties of CDS are reflected in the morphological complexity of the children's language.

2. Details of Language Structure

English and Inuktitut have highly contrasting grammatical structures. Inuktitut is a null subject polysynthetic language with numerous verbal, nominal, and possessive inflections as well as numerous affixes that function as verbalizers, nominalizers, valency changers, and modifiers. There are a total of

approximately 1500 affixes and inflections. English is an isolating language with overt subjects and sparse morphology (see Allen, 1996 for a more detailed description). The most important contrast between Inuktitut and English with respect to this paper is the degree of affixation, including inflection, on verb and noun roots. English is notorious for having relatively little affixation or inflection, while it is rare for an Inuktitut root to appear without at least one affix or inflection attached. Example (1) illustrates both simple and complex affixation on verb and noun roots in Inuktitut. In example (1a) the verb root *pisu-* ('to walk') has one 3rd person singular inflection whereas the verbal root in example (1b) has a number of affixes and ends with a third person singular inflection. In example (1c) the nominal root word *aluu-* ('white person') has one affix whereas in example (1d) there are a total of five affixes on the nominal root (note that the underlined morphemes in the examples below are the verb or noun roots).

- (1) a. *Pisuttuq*
pisuk-tuq
 walk-PAR.3sS
 'He walks'
- b. *Annuraarsimalukatsitipaujaalumijug*
annuraaq-sima-lukat-siti-paujaaluk-u-mi-juq
 dress-PERF-unusually-well-EMPH-be-also-PAR.3sS
 'She also often dresses up very unusually'
- c. *Aluuraaluk*
aluu-aluk
 white.person-bad
 'mean white person'
- d. *Quttukallakutaatsiaraapimmut*
quttuq-kallaq-kutaaq-tsiaq-apik-mut
 funny-handsome-tall-nice-cute-ALL.SG
 'By a nice tall handsome cute funny person'

3. Study 1: Affixation in Child Directed Speech

As noted in the introduction, CDS is often referred to as a simplified register of talk that presents the child with a language corpus designed to facilitate the learning task. In light of this, we were surprised to find in a previous study that Inuit caregivers evidence substantial morphological complexity in the affixation on noun and verb roots in their CDS (Crago & Allen, 1997). This result led us to extend our research to English, comparing the relative morphological complexity as indicated by verbal and nominal affixation in two typologically very diverse languages. This section reports the results of this comparison.

Data for this study come from four Inuit Inuktitut-speaking caregivers and

four White English-speaking caregivers, and were collected by videotape in naturalistic communication situations at the homes of the caregivers. The Inuit caregivers lived in two small remote communities located on Ungava Bay in northern Quebec. They include two younger women in their early 20s and two older women, one mother in her 50s, and one grandmother in her 40s who lived with one of the younger mothers. For the purposes of this study, we analyzed almost 1000 utterances directed by these women to their (grand) children between 1;8 and 2;1. The White caregivers lived in the Montreal region in southern Quebec. They include four mothers ranging in age from 31 to 37. We analyzed almost 5000 utterances directed by these women to their children between 1;7 and 1;9 (see Table 1).

Table 1: Participants

	<u>Mother's Age</u>	<u>Child's Age</u>	<u>Utterances (CDS)</u>
Inuit	57	1;8:2,0	311
	42	1;9:2,1	150
	20	1;9:2,1	165
	21	1;8	285
White	37	1;9	1315
	31	1;7	774
	34	1;8	1754
	32	1;9	1137

In order to assess relative complexity in the morphology of the CDS data, we focused on the degree of affixation, including inflection, present on noun and verb roots in the two languages. We distinguished two types of roots: those belonging to the baby word lexicon and those belonging to the lexicon normally used in adult-to-adult speech, which we refer to here as the non-baby word lexicon. Before turning to a discussion of affixation, we first describe the baby word lexicon in each language.

One important component of CDS in Inuktitut and in English is a lexicon of baby words (see Crago & Allen, 1997 for a more detailed discussion). The baby words directed to Inuit children comprise a lexicon of verbal and nominal roots. This lexicon is replaced in both child directed speech and in the child's own speech sometime after the age of three years old. The lexicon is quite standard across both families and communities on Ungava Bay. Inuktitut baby word roots often use simpler, earlier learned phonemes than the equivalent adult roots. In some cases they derive from the adult root, in others they do not. They can be reduplicative, onomatopoeic, and are used more freely in different word class functions. They include semantic areas related to body parts and function, food, people, and animals, among others. Baby words comprise 27% of the noun and verb roots in the Inuktitut child directed speech in our data. Moreover, these baby word roots are often inflected and affixed,

either simply or highly as shown in the CDS utterances from our data in example (2). In the next examples taken from our data this supposedly simple vocabulary of noun and verb roots is both simply and highly affixed and inflected (note that the number of affixes per root is indicated in brackets at the end of each Inuktitut morpheme line).

- (2) a. *Aataartaulangasijualunga.*
 aataaq-jauluruna-si-juq-aluk-una (6)
 hurt-PASS-FUT-PRES-PAR.3sS-EMPH-this.one
 'That guy is going to get hurt.'
- b. *Aataarquq.*
 aataaq-vuq (1)
 hurt-IND.3sS
 'It's broken.'
- c. *Ihiiruluk aaqqaaraaluturumasuuraalummat.*
 iihiiq-guluk aaqqaaq-aluk-tuq-guma-suuq-aluk-u-mmat (7)
 yucky-bad.little dirt-EMPH-consume-want-HABIT-EMPH-bc-
 CSV.3sS
 'Because the little bugs bite the dirty ones'
- d. *Qingaaahuit aaqqaaraaluk.*
 qingaaq-aluk-it aaqqaaq-aluk (1)
 nose-EMPH-your dirt-EMPH
 'Your nose is dirty.'

The two longer verb and noun forms in examples (2a) and (2c) have six and seven affixes respectively whereas the two shorter forms in examples (2b) and (2d) have one inflection or affix. Indeed it was our first observations of this relatively high degree of affixation that led us to query just what the nature of this special baby word vocabulary was and what impact it had on the learning task of young Inuit children.

In contrast, the baby words used by our English-speaking mothers consisted of nouns only, some examples of which are shown here.

- (3) a. *bobo*
 'You are gonna fall and get a bobo.'
- b. *cuppy*
 'It's hot, hot. Hot cuppy.'
- c. *piggies*
 'And all these piggies are putting out the fire with water.'

English baby words comprised only 2% of the total words in the English CDS in our data. Their form was either a separate lexical item as in example (3a) or an adult English word with a diminutive ending as in examples (3b) and (3c).

We turn now to the degree of affixation on noun and verb roots in English and Inuktitut CDS. Since the baby word lexicon presumably represents perceived simplification of language on the part of the caregivers, we have decided to give the results separately for baby words and non-baby words. In assessing these results, it is important to understand that in Inuktitut virtually ALL verb and noun roots are affixed in adult-to-adult speech (Crago & Allen, 1997).

The affixation on baby words (BW) in English and Inuktitut is contrasted on Figure 1. In keeping with the highly affixed nature of Inuktitut a substantial portion of even this supposedly simply lexicon is affixed or inflected. This presents quite a different picture from English where the few existing baby words are substantially less affixed.

Figure 1: Percentage of baby word noun and verb root with and without affixes (including inflections) in Inuktitut and English CDS

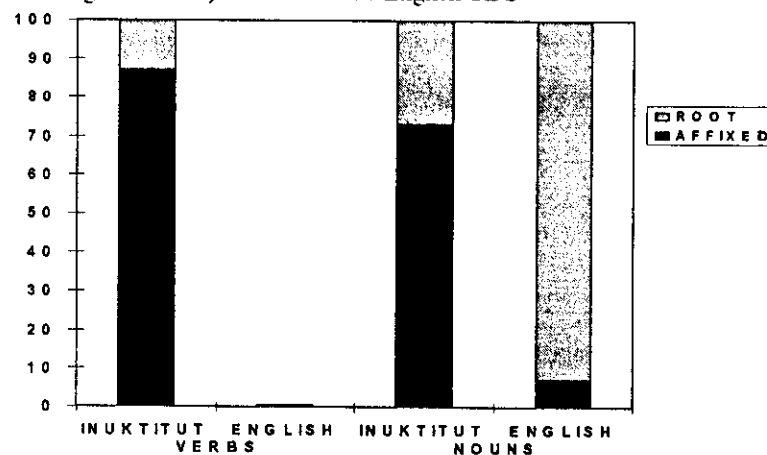
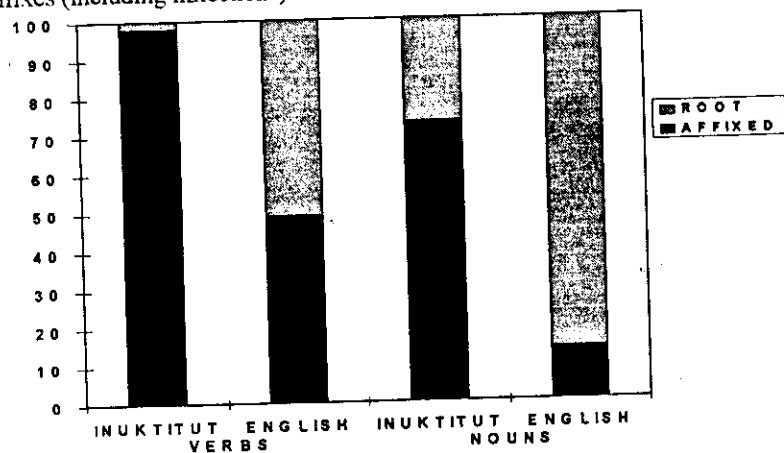


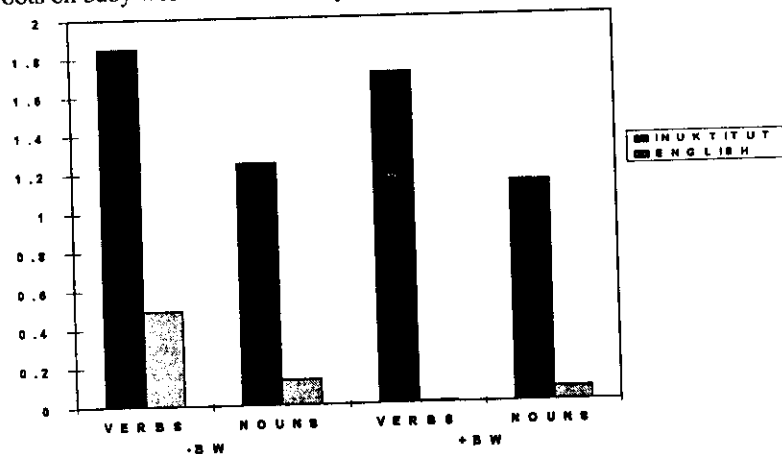
Figure 2 shows the percentage of affixation on CDS verb and noun roots which are not baby words. In the speech directed to the Inuit children, over 90% of all the verb roots as well as over 70% of all the noun roots were affixed or inflected. This means that relatively few unaffixed bare roots are used with Inuit children. In English, the mothers' CDS was almost always grammatically complete and correct (except for a very small percentage of utterances with omissions of the auxiliary, e.g. kitty eating). However, unaffixed bare roots (also called stem forms) were quite prevalent in the English data. This is not to say that the English speaking mothers were not inflecting correctly for tense or person, but rather, that in contrast with Inuktitut, many verb forms in English do not have a perceptible unit added to the stem to signify for instance different persons.

Figure 2: Percentage of non-baby word noun and verb roots with and without affixes (including inflections) in Inuktitut and English CDS



A further comparison helps to clarify the extent of affixation and inflection in Inuktitut and English CDS. Figure 3 shows the mean number of affixes (including inflections) on baby words (+BW) and non-baby words (-BW) in CDS in Inuktitut compared with English. Not surprisingly Inuktitut CDS has a higher mean number of affixes and inflections than does English CDS.

Figure 3: Mean number of affixes (including inflections) on noun and verb roots on baby words and non-baby words in Inuktitut and English CDS



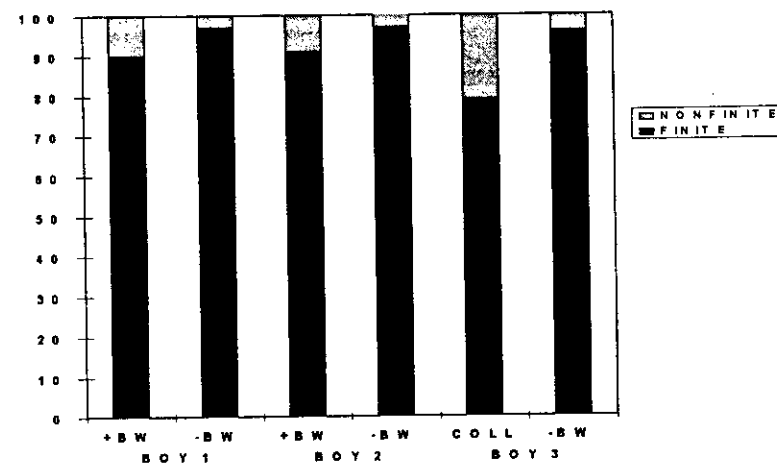
4. Study 2: Affixation in Early Child Speech

In the previous section we found that Inuktitut-speaking caregivers produce

many more affixes on their verb and noun roots in CDS than do English-speaking caregivers. As a follow up to this, we decided to investigate how the relative presence or lack of affixation in Inuktitut and English CDS is reflected in the children's early acquisition of inflections, especially given the amount of research currently being conducted in the area of acquisition of inflections (e.g. Poeppel & Wexler, 1993; Wexler, 1994; Paradis & Genesee, 1996; Rice & Wexler, 1996). One current claim in the literature is that there is a stage in early acquisition when children sometimes correctly inflect their verbs and sometimes do not in utterances in which verbal inflection would be obligatory in adult language (Wexler, 1994). This is known as the Optional Infinitive (OI) stage, since it is assumed that children are using nonfinite forms optionally for verbs for which a finite form would be expected. The actual degree of inflection considered to represent optionality has not yet been clearly established, but the most conservative estimate is that children are out of the OI stage once they are correctly producing finite verbs 90% of the time.

In this section, we report the results of a preliminary study of verbal inflection in three Inuktitut-speaking boys at the two-morpheme stage, compared with data from several English-speaking children reported on in the literature. The Inuktitut data were taken from videotapes of three Inuktitut-speaking boys involved in naturalistic communication situations in their homes (see Crago, 1988 and Allen, 1996 for further details). These boys were between 1;9 and 2;8 at time of taping, with MLUs between 1.5 and 2.3 morphemes. Thus, they were just at the stage of putting two morphemes together. According to the OI theory described above, these boys would be expected to be in the OI stage and thus to not consistently inflecting their verb roots in obligatory contexts. However, we did not find this pattern in Inuktitut. Figure 4 indicates that, when baby words and certain colloquial expressions are eliminated, over 97% of the boys' two morpheme utterances in which one

Figure 4: Percentage of inflected verb roots in two-morpheme utterances in Inuktitut



morpheme is a verb root have a second morpheme that is an inflection. Even if baby words are included, which does sometimes occur in the uninflected root form, approximately 90% of these children's two morpheme utterances including verb roots have an inflection as the second morpheme.

Some examples of the variety of productive inflections used by these children appear in (4).

- (4) a. *salumasaiviit*
salumasai-vit
wash.dishes-INT.2sS
'Are you washing dishes?'
- b. *pisulunga*
pisuk-lunga
walk-ICM.1sS
'I'll walk.'
- c. *atuttara*
atuq-jara
use-PAR.1sS.3sO
'I'm using it.'

The examples in (5) show some of the very few uninflected forms in these data.

- | | | |
|--------|--|--|
| (5) a. | <u>Child's Utterance</u>
<i>aa-aaraahu</i>
aahaaq-aluk
be.dangerous-very
'It-very dangerous.' | <u>Expected Utterance</u>
<i>aahaatualuk</i>
aahaaq-juq-aluk
dangerous-PAR.3sS-very
'It's very dangerous.' |
| b. | <u>Child's Utterance</u>
<i>iqaluk uvvaa-</i>
iqaluk uvaa-
fish bleed
'(The) fish (is) bleed(ing).' | <u>Expected Utterance</u>
<i>iqaluk aunaartuq</i>
iqaluk aunaaq-juq
fish bleed-PAR.3sS
'The fish is bleeding.' |

This finding for Inuktitut is not unlike Küntay & Slobin's (1996) findings for Turkish. However, it is quite different from the OI stage reported for English and German (Poeppel & Wexler, 1993; Wexler, 1994). For the sake of concreteness, we compare in Table 2 figures for percent finite utterances in Inuktitut and English at the two morpheme stage (here, ages 1;9-2;10) and at a later stage when most grammatical knowledge is assumed to be acquired (here, age 5;0) (data sources indicated below).

Table 2: Percentage of Finite Utterances in English and Inuktitut

Age	Inuktitut	English
1;11:2;10	96.33% ¹	17% ²
5;0	98% ³	90% ⁴

¹Study 1 above. ²Paradis and Genesee, 1996. ³Crago and Allen, 1996. ⁴Rice and Wexler, 1997.

The contrast in the children's use of finite and nonfinite utterances across the two languages is striking. The Inuktitut-speaking children have adult-like mastery of verbal inflection at even the two-morpheme stage, while the English-speaking children do not. Thus, our data do not support the idea that the OI stage is universal across all languages.

5. Discussion and Conclusions

Although speculative and still preliminary, it is interesting to hold the child findings in Inuktitut and English up against our findings for the input from the two groups of mothers. This is not necessarily meant to impute causality, a task that is far more complicated than what we have undertaken here (Richards, 1995). Furthermore we recognize that the inflections implied in counts of finiteness are not parallel to counting examples of affixation. However, the differential patterns in acquisition across the two languages must be accounted for. In Inuktitut the children achieve adult levels of inflection by approximately two years of age. This is not true of the English-speaking children, who take considerably longer to attain adult levels of finiteness. It is our contention that the differential frequency of perceptible affixes in the Inuit and English mothers' speech to their children must figure into this difference in the children's performance. In English CDS, verbs often appear in a form identical to an infinitive though they are finite. In the sentence "I don't want to play now", for example, *do* has null inflection while *want* and *play* are nonfinite forms. In this example, *do*, *want*, and *play* all have null inflection in English. These forms are quite different than forms that Inuit children are presented with where there is a regularity of appearance of perceptible inflections and where inflectional forms are attached across a series of recognizable roots. English does, of course, present certain regular inflections that span a number of recognizable verb roots, inflections such as progressive '-ing', third person singular '-s', as well as past tense '-ed'. However, the frequency of their number and occurrence in English is much lower than the numerous and frequent verbal inflections that occur in Inuktitut. Such typological differences between languages mean that what comprises a complex corpus for learners in one language is not necessarily complex in the same way in another language. In Inuktitut children have to learn numerous affixes and inflections. However, it may be that the relative lack of frequent, apparent, and regularly occurring affixation in English makes it more complex as a corpus from which to derive certain of the early properties of inflection.

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Pitch Modifications in Mi'kmaq Child-Directed Speech

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1. Introduction

During the 1970s many studies examined the register of child-directed speech (CDS). The most common features which distinguish CDS from adult-directed speech are simplifications of phonology (DePaulo & Bonvillian, 1978), simplification of the lexicon (Ferguson, 1977), redundancy, (Ferguson, 1977; Snow, 1977) and prosodic modifications (Ferguson, 1977; Fernald, Taeschner, Dunn, Papousek, De Boysson-Bardies & Fukui, 1989; Garnica, 1977). This last aspect, prosodic modifications, includes alterations of pitch, stress, and intensity.

Many of the earliest studies (e.g., Ferguson, 1964; Sachs, 1977) of the prosodic modifications of CDS looked to qualitatively define modifications on a subjective, perceptual basis. These studies noted that adults tend to use a higher overall pitch when using CDS, and employ more expanded intonational contours. In 1977, Garnica made quantitative measures of the prosodic modifications made by mothers engaged in CDS. She described the general prosodic characteristics of CDS as a higher overall fundamental frequency (Fo), expanded intonational contour (greater excursion from Fo), and increased use of emphatic stress and hypothesized that these modifications were made to serve both analytic and social functions. The analytic function includes providing cues to the location of sentence and word boundaries; the social function to attract and maintain attention. Sachs (1977) further postulated that a higher pitch (Fo) may be more perceptually salient to the child, thus this pitch modification may be adaptive for language learning. Garnica's work demonstrated that pitch modifications change as the child ages; the younger the child, the higher the Fo.

Ferguson (1977) collected data from various studies on CDS in 27