Polysynthesis in the acquisition of Inuit languages

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1. Introduction

One of the main goals of the field of language acquisition is to determine which patterns and mechanisms in acquisition are universal to all children, and which are specific to individual languages or language typologies. To achieve this goal, we need research on the acquisition of languages of a variety of typologies since each type of language presents different acquisition challenges and thus provides different insights into the overall process. The majority of research to date has focused on the acquisition of analytic languages (e.g., English, German, Japanese), with a relatively small but growing amount of research on the acquisition of synthetic languages (e.g., Turkish, Hebrew, Hungarian). However, comparatively few studies of language acquisition focus on the acquisition of polysynthetic languages (Kelly, Wigglesworth, Nordlinger & Blythe 2014). In the present chapter we take a step towards ameliorating this situation by bringing together the relevant research literature on the acquisition of Inuit languages, often cited as a quintessential example of polysynthesis.

Polysynthetic languages are “languages with complex morphologies capable of packing into a single word many morphemes that in more analytic languages would be independent words” (Fortescue 1994: 2600). Not surprisingly, they typically have a high number of morphemes per word; Greenberg (1960) calculates that Eskimo (i.e. Inuit) has 3.72 morphemes per word while English has only 1.68. This morphological complexity derives from a number of features including the incorporation of the noun stem within the verbal complex, derivational processes that enable the shifting from noun to verb and back within a single word, a large inventory of bound morphemes including a variety of adverbal elements, and pronominal marking of subjects and objects (as well as other core arguments) on verbal forms as well as possessors on nominal forms (Fortescue 1994: 2601). Evans and Sasse (2002: 3) summarize this as follows: “A prototypical polysynthetic language is one in which it is possible, in a single word, to use processes of morphological composition to encode information about both the predicate and all its arguments, for all major clause types (i.e. one-, two- and three-place predicates, basic and derived), to a level of specificity allowing this word to serve alone as a free-standing utterance without reliance on context”.

This polysynthetic structure presents numerous challenges for language acquisition. How do children break into the language system and identify individual morphemes given the sheer length of typical words? How do children master the complexity of verbal and nominal morphology? How do children navigate argument structure, given that subjects and objects are realized in cross-referencing affixes on the verb and overt noun phrases realizing arguments are optional? How do children learn structures like noun incorporation and
nominalization where they must shift grammatical classes productively within the word? How do children negotiate syntactic structures like passive and causative that change valency, given that the relevant morphology is word-internal? Many of these challenges are not present in languages of other structures, and thus understanding how children acquire polysynthetic languages is crucially important to understanding what is universal and language-specific in the process of acquisition.

One polysynthetic language family for which there is a reasonable acquisition literature is the Inuit languages – particularly Eastern Canadian Inuktitut (e.g., Wilman, 1988; Allen 1996; Crago & Allen, 1998; Parkinson, 1999; Swift, 2004) and West Greenlandic (e.g., Fortescue, 1984; Fortescue & Lennert Olsen, 1992). This literature covers a variety of topics from language socialization to morphosyntax to narrative to argument structure. However, a substantial portion of the literature focuses on the acquisition of structures relevant to polysynthesis, which is the focus of the present chapter.

The chapter is structured as follows. Section 2 briefly presents the structure of Inuit languages, concentrating on features relevant to polysynthesis. Section 3 introduces the existing literature on the acquisition of Inuit languages. Sections 4-6 overview the general trajectory of acquisition of morphosyntax during the preschool years, covering the one-morpheme stage (Section 4), the two-morpheme stage (Section 5), and the stages beyond two morphemes (Section 6). Sections 7-9 focus in more detail on the acquisition of three structures involving valency alternation: noun incorporation (Section 7), causative (Section 8) and passive (Section 9). Sections 10-11 highlight particularly complex structures produced by young children including those with multiple valency alternations within one word (Section 10) and multiple changes of word class within one word (Section 11). Finally, Section 12 concludes the chapter with a summary of ways in which the acquisition of a polysynthetic language informs our understanding of language acquisition in general.

2. Inuit Languages

Inuit languages are part of the Eskimo-Aleut language family, and are spoken by some 140,000 people across Alaska, northern Canada, and Greenland (Dorais, 2010). Inuit languages are typically divided into four groups: Alaskan Inupiaq, Western Canadian Inuktun, Eastern Canadian Inuktitut, and Greenlandic Kalaallisut. Each of these is itself divided into dialects and subdialects, for a total of sixteen different dialects and numerous subdialects.
Although most speakers of Inuit languages in Alaska and western Canada are older adults, children still learn Inuit languages from birth in most areas of eastern Canada and Greenland. Most Inuit in these regions are native and fluent speakers of the language, using it as their main language at home and often at work as well. In addition, children typically learn an Inuit language at home as their native language. Some children are also simultaneous bilinguals, learning both an Inuit language and either English or French (Eastern Canada) or Danish (Greenland) from birth (Allen, 2007).

Several structural characteristics of Inuit languages are particularly relevant with regard to polysynthesis (Dorais, 2010; Fortescue, 1994; Mithun, 2009). First, they use morphology to express in one word what would be a complete sentence in a language like English. Words fall into three classes: verbs, nouns (including pronouns and demonstratives), and uninflected particles. The former two require a root and an inflection, and then allow up to eight or more derivational morphemes in between, affixed in order of accumulating semantic scope from left to right. A typical example is shown in (1)\(^1\).

\[(1) \text{Illujuaraалуммукулусимаалингмалиттуак.}\]

\[\text{illu-} \text{juaq-} \text{aluk-} \text{mut-uq-} \text{lauq-} \text{sima-} \text{nngit-} \text{nama-} \text{li-} \text{ttauq}\]

house-big-EMPH-ALL.SG-go-PAST-PERF-NEG-CTG.1sS-but-also

‘But also, because I never went to the really big house.’ \(\) (Dorais, 1988, p. 8)

Second, Inuit languages have some 400 word-internal derivational suffixes. These suffixes represent categories that are often morphemes in other languages such as tense, aspect, emphasis, and the like. More relevant for polysynthesis, these morphemes also represent categories that have a syntactic function including adjectival or adverbial modification, negation, changing word classes, and changing valency. Typically each suffix realizes one unit of meaning (e.g., negation, distant past tense, causation). Several of these derivational morphemes are evident in the example in (1): -juaq ‘big’, -aluk ‘EMPH’, -uq- ‘go’, -lauq- ‘PAST’, -sim- ‘PERF’, and -nngit- ‘NEG’.

Third, Inuit languages have a very rich inflectional system. In Eastern Canadian languages, more than 900 portmanteau verbal inflections mark verbal modality as well as person and number of subject and object. In addition, more than 300 portmanteau nominal inflections mark case and number as well as person and number of possessor if applicable. Greenlandic has only about 300 verbal and nominal inflections in total, since Greenlandic differentiates only singular and plural numbers but not dual as in Eastern Canadian Inuit languages. The sentence in (2) highlights this inflectional complexity. It contains 6 words, all
but one of which have an inflection.

(2) *Ullarutuarmat taanna surusi pillujuuminik takusarasuarsuni pitaqanngijialik.*

ulloq-guq-tuaq-mmat   ta-an-na   surusi-Ø
morning-become-as.soon.as-CTG.3sS  PRE-this.one-ABS.SG  boy-ABS.SG
pillitajuq-minik  taku-saq-gasuq-tsunu  pi-taq-qaq-ngit-jialik.
frog-MOD.4Ssg  see-really-try-CTM.4sS  thing-possession-have-NEG-PART
‘When it became morning the boy tried to look at his frog but there was nothing.’

(Allen, Crago & Pesco, 2006, p. 585)

As a result of the extensive verbal inflection system, ellipsis of both subjects and objects is very common in Inuit languages (Allen, 2000). This is evident in both preceding examples where most subjects are omitted – i.e. ‘I’ in (1), pleonastic ‘it’ and ‘there’ in (2).

Finally, Inuit languages exhibit a structure virtually identical to classic noun incorporation. In Inuit languages, the noun root incorporates into a bound verb root instead of incorporating into an independent verb root as in classic noun incorporation (Mithun, 2009; Fortescue, 1994). The preceding examples reveal three instances of noun incorporation (or quasi-incorporation) – i.e. illu ‘house’ in (1), ulla ‘morning’ and pi- ‘thing’ in (2)).

3. Research on the Acquisition of Inuit Languages

The available research on the acquisition of polysynthesis in Inuit languages derives from four (sets of) studies. Each attests to the fluent acquisition of Inuit languages by preschool and early school-aged children, the age group that is the focus of this chapter. The first set of studies comprises spontaneous speech data from children aged 1;0-5;1 (age in years;months) learning *Tarramiut*, spoken along Hudson Strait in Nunavik, the northernmost region of Quebec, Canada. Crago (1988) reports on longitudinal data from four children aged 1;0-1;9 at outset, videotaped at four-month intervals for a total of four sessions per child. Allen (1996) reports on similar data from four children aged 2;0-2;10 at outset, videotaped monthly for nine months. Finally, Crago and Allen (2001) report on data from one five-year-old child with specific language impairment and a typically-developing child of the same age. Data in all of these studies were collected in the homes of the children, and comprise natural everyday interactions between the children and their families and friends. These studies have resulted in numerous publications related to the acquisition of polysynthesis (e.g., Allen, 1996, 1998, 2000, 2013; Allen & Crago, 1996; Allen & Dench, submitted; Crago & Allen, 1998, 2001; Skarabela, 2007; Swift, 2004).
The second set of studies comprises spontaneous speech data from children aged 2;2-5;2 learning *West Greenlandic*, spoken along the western coast of Greenland. Fortescue (1985) analyzes naturalistic spontaneous speech samples from one child age 2;3, while Fortescue and Lennert Olsen (1992) analyze similar data from five children aged 2;2, 3;1, 3;4, 4;7 and 5;2. Data in both these studies were collected by audiotape in the homes of the children, and comprise natural everyday interactions between the children and their families and friends. Several aspects of the acquisition of polysynthesis are covered in these two publications.

The third study comprises narrative and spontaneous speech data from 23 six-year-old children learning *Tunumirmiut*, spoken along the northern coast of Baffin Island in Nunavut, the Inuit territory of Canada. Wilman (1988) collected three types of data from each of the children: descriptions of three pictures of scenes familiar to the children, narration of a wordless story book, and spontaneous speech in small group free play activities. These data were analyzed to determine the children’s mean frequency of use of roots, affixes, and combinations of affixes, which then could be used to inform curriculum development for primary school children. Information from this study about the overall complexity of utterances and the frequency of use of certain affixes is relevant to the acquisition of polysynthesis.

The fourth study, the only experimental study of Inuit languages reported to date, was conducted with children aged 4 to 6 years (30 per experiment) learning *Kivalliq*, spoken in the coastal and inland areas west of Hudson Bay, in Nunavut, the Inuit territory of Canada. Parkinson (1999) conducted two experiments focused on children’s knowledge of noun incorporation – one in which children imitated sentences spoken to them by an adult, and a second in which children selected a picture from an array of pictures that best matched the sentence they heard. The study revealed that children at this age can interpret and process complex sentences containing noun incorporation, and are aware of their underlying syntactic structure.

Several additional studies in Eastern Canada and Greenland cover aspects of the acquisition of Inuit languages that are not reviewed in this chapter. Numerous studies assess the language abilities of school-aged children (e.g., Allen, 2007; Allen et al., 2006; Crago, Annahatak, Doehring & Allen, 1991; Dorais, 1989; Dorais & Sammons, 2002; Langgaard, 2001; Taylor & Wright, 2003; Wright, Taylor & Macarthur, 2000). Further studies focus on aspects of acquisition of Inuit languages that do not particularly relate to polysynthesis including narratives (e.g. Engberg-Pedersen & Trondhjem, 2004), language socialization (e.g. Crago, 1990; Crago, Annahatak & Ningiuuruvik, 1993), and language use in schools (e.g.
Crago, 1992; Eriks-Brophy & Crago, 1993, 1994, 2003; Spada & Lightbown, 2002). Finally, one study analyzes the simultaneous acquisition of Inuit languages and English by six bilingual preschool children in the South Baffin region of Canada, highlighting their code mixing patterns (Allen, Genesee, Fish & Crago, 2002) and their realization of subjects in the two languages (Zwanziger, Allen & Genesee, 2005), and showing how they are sensitive to the differences between polysynthetic (Inuit) and analytic (English) language structure.

We turn now to a review of the language acquisition data with a focus on stages and structures relevant to polysynthesis. The next three sections cover stages in the trajectory of development from the earliest utterances through the preschool years. The subsequent sections focus on structures of particular importance for polysynthesis.

4. One-Morpheme Stage

The most obvious challenge facing children learning a polysynthetic language is breaking into the complex morphology of the language. Children must segment words in the language they hear around them into their component morphemes, and then must learn to use those morphemes to build words in their own utterances.

As in other languages, Inuit children’s first utterances typically comprise one word, which is also one morpheme (Crago & Allen, 1998). This can be an uninflected particle that can freely stand alone (3a), a single noun (3b), or a verb root that appears without inflection (4, 7b).

(3) a. Auka.
   ‘No.’ (Tumasi 1;9; Crago & Allen, 1998, p. 262)

   b. Piipi.
   ‘Baby.’ (Sarah 1;4; Crago & Allen, 1998, p. 262)

Many of these early words are baby words—a nursery vocabulary that is used by and to children up to about age 3 (Crago, Allen & Pesco, 1998). The example in (4) shows a baby word verb as compared to its adult equivalent utterance.

(4) Apaapa. [adult: Niri-guma-junga.]
   food/eat [ eat-want-PAR.1sS]
   ‘Food/eat.’ [ ‘I want to eat.’] (Jini 1;0; Crago & Allen, 1998, p. 262)

Importantly, these early productions are all identifiable morphemes. Note that noun and verb roots rarely appear in caregiver speech without affixation: Crago and Allen (1997) report that 90% of verb roots and 70% of noun roots are followed by at least one affix (mean 1.8 affixes for verb roots and 1.2 affixes for noun roots) in speech directed by four different
mothers to their children aged 1;8-2;1. Thus, children’s early production of isolated morphemes shows that they are not simply repeating memorized forms but rather have been able to isolate individual morphemes from the input and can use them productively.

A first stage of producing individual morphemes is also found in other morphologically complex languages including Navajo, Quechua, and Tzeltal (Kelly et al, 2014) – all languages with relatively little fusion across morpheme boundaries in the adult language. In contrast, the first productions in morphologically complex languages with more fusion between morphemes (e.g. Mohawk, K’iche’ Mayan) tend to comprise the most prominent syllable of a word, whether or not it is a complete morpheme. This difference in patterning indicates that not only morphological complexity but also morphophonological patterns allowing identification of morphemes play a crucial role in early acquisition in polysynthetic languages.

5. Two-Morpheme Stage

By around two years of age, Inuit children start producing an average of two morphemes per utterance. At this point, their utterances begin to differ substantially from those of children speaking more analytic languages, revealing their early sensitivity to language-specific patterns.

Children in the two-morpheme stage who are learning analytic languages (e.g. English, German) typically produce two separate words per utterance, and thus this is commonly known as the ‘two-word stage’ (Brown, 1973). These children use very few grammatical morphemes reliably or productively, with most appearing only several months later. English-speaking children at this stage typically use only two inflectional affixes: present progressive –ing and plural –s (Brown, 1973).

Children learning Inuit languages, in contrast, start adding grammatical morphemes to verb and noun roots during this stage (and earlier as well), so that many of their utterances are comprised of a root and an affix rather than two separate words. Thus, it makes more sense to refer to this as the ‘two-morpheme stage’ for polysynthetic languages. This acquisition pattern is similar to that for children learning agglutinative languages such as Turkish (Aksu-Koç & Slobin, 1985) and Hungarian (MacWhinney, 1985), who also produce many root + morpheme units at this stage. However, the variety of inflectional and derivational affixes used productively is likely higher for Inuit languages compared to agglutinative languages given the much higher number of such affixes regularly used in Inuit languages.
Data at this stage is available for both West Greenlandic and Tarramiut. For example, Fortescue and Lennert Olsen (1992) report that one West Greenlandic-speaking child aged 2;2 used ten verbal inflections, three nominal inflections, and eight derivational suffixes more or less productively in a data session comprising ten typed pages of transcription, and that his longest word contained four morphemes. Fortescue (1985) reports that another West Greenlandic-speaking child aged 2;3 used 25 verbal inflections, 15 nominal inflections, and 24 derivational suffixes more or less productively in one half-hour session, and his longest word contained five morphemes. Exact figures are not available for Tarramiut, but the pattern is very similar (Allen, Dench & Isakson, in prep). It is clear from these examples that children are already productively producing many derivational and inflectional morphemes at the two-morpheme stage.

Typical utterances comprising two morphemes include either a verb root or a noun root plus an affix. The utterances in (5) illustrate a verb root plus an inflection. The utterances in (6) illustrate a noun root plus an adjective (6a), instrumental case marker (6b), possessive marker (6c), conjunction (6d), and demonstrative enclitic (6e).

(5) a. Qai-git.
    come-IMP.2sS
    ‘(You) come here.’
    (Jini 1;8; Crago & Allen, 1998, p. 263)
b. Aamar-poq.
    open-IND.3sS
    ‘It opens.’
    (L 2;2; Fortescue & Lennert Olsen, 1992, p. 141)

(6) a. Qimmi-aluk.
    dog-bad
    ‘Bad dog.’
    (Lucasi 2;8; Crago & Allen, 1998, p. 263)
b. Timmisartu-mik.
    airplane-MOD.SG
    ‘With an airplane.’
    (L 2;2; Fortescue & Lennert Olsen, 1992, p. 143)
c. Ataata-ga.
    father-ABS.1Ssg
    ‘My father.’
    (Aqissiaq 2;3; Fortescue, 1985, p. 108)
d. AnneMarie-lu.
    AnneMarie-and
    ‘And AnneMarie.’
    (Aqissiaq 2;3; Fortescue, 1985, p. 108)
e. Suna-ana.
what-that
‘What is that?’ (Aqissiaq 2;3; Fortescue, 1985, p. 108)

Utterances at this stage may also contain two separate words of one morpheme each, as in (7a). It is rare to find a two-word utterance composed of a verb root plus a subject or object as in (7b), even though this is one of the more typical utterance types at the two-morpheme stage in English.

(7) a. Auka Siasi.
   no Jessie
   ‘No, Jessie.’ (Sarah 1;11; Crago & Allen, 1998, p. 262)

b. Iqaluk uvaa-.
   fish bleed
   ‘The fish is bleeding.’ (Tumasi 2;1; Crago & Allen, 1998, p. 264)

Finally, some utterances appear to be two morphemes in length but are more likely memorized fixed forms. The examples in (8), in which the verbal inflection is missing, are frequent expressions in both child and adult Tarramiut (but not West Greenlandic). Since both the verb stem and the verbal inflection may be omitted in constrained contexts in Tarramiut (but not West Greenlandic) adult colloquial speech, these utterances cannot be considered ungrammatical (Swift & Allen, 2002a, 2002b).

(8) a. Su-ningit. [Su-ningi-tunga.]
   do-NEG [do-NEG-PAR.1sS]
   ‘(I’m) not doing anything.’ (Tumasi 2;1; Crago & Allen, 2001, p. 80)

b. Tii-tuq. [= Tii-tu-ruma-gama]
   tea-consume [tea-consume-want-CTG.1sS]
   ‘(I want to) have some tea.’ (Sarah 1;11; Crago & Allen, 2001, p. 81)

It is difficult to determine whether a given morpheme combination at this stage is used productively or reproduced as a fixed form. Fortescue (1985) and Allen and Crago (1996) discuss several criteria for determining productivity, some of which are discussed in later sections of this chapter.

In contrast with more analytic languages like English, the two-morpheme stage in Inuit languages is not considered telegraphic. This is the case for three reasons. First, subject and object ellipsis are common in the adult language, so omitting subject and object in child language is not seen as non-target-like. Second, Inuit languages do not have many of the function words typically omitted in early child English such as articles and auxiliaries. Third,
Inuit-speaking children master verbal inflections (agreement) and nominal inflections (plural, possessive) very early compared to English-speaking children.

6. Beyond the Two-Morpheme Stage
The trend of more separate words in analytic languages like English, and more morphemes within one word in Inuit languages, continues beyond the two-morpheme stage and into adulthood. One representative study of English-speaking children showed that three-year-olds had an average mean length of utterance (MLU) in words of 3.25, while their average MLU in morphemes was 3.58, yielding an average of 1.1 morphemes per word (Rice, Redmond & Hoffman 2006, p. 798). In contrast, Allen and Dench (submitted) found that Tarramiut-speaking three-year-olds had an average MLU in words of 1.22 (range 1.10-1.38), while their average MLU in morphemes was 2.63 (range 1.88-3.26), yielding an average of 2.15 morphemes per word (range 1.69-2.44) – twice as many as in English. The mean length of the longest word in morphemes at age 3 in Tarramiut was 6.29 (range 4-7), while the mean length of the longest utterance in morphemes was 8.57 (range 5-13).

The same pattern holds for slightly older children. Rice et al. (2006, p. 798) found that English-speaking five-year-olds had an average MLU in words of 4.06, while their average MLU in morphemes was 4.51, again yielding an average of 1.1 morphemes per word. In contrast, Wilman (1988, pp. 92-97) found that Tununirniut-speaking six-year-olds had an average MLU in words of 1.64 (range 1.14-2.67), and an average MLU in morphemes of 3.91 (range 2.89-5.39), yielding an average of 2.39 morphemes per word (range 2.16-2.92) – again twice as many as in English. The mean length of the longest utterance in morphemes at age 6 in Tununirniut was 22.30 (range 10-39); data on longest words is not provided.

This pattern indicates considerably more complexity within words in Inuit languages as compared to English. Beyond the two-morpheme stage, Inuit children gradually produce more morphemes per word in their utterances. Fortescue and Lennert Olsen (1992) reported that the youngest children in their study (age 2;2, 2;3, and 3;1) used at most one derivational affix between the verb root and the inflection (for a total of three morphemes in the word). The child aged 3;4 produced 16 utterances with two derivational affixes between the root and the inflection, as well as one utterance with three derivational affixes. The child aged 4;7 used 45 utterances with two derivational affixes and 11 with three derivational affixes between the root and the inflection. This pattern is consistent with findings for Tarramiut as well (Allen, Dench & Isakson, in prep). Some ordering in the emergence of different types of affixes is also apparent across children (Allen, Dench & Isakson, in prep; Fortescue, 1985;
Fortescue & Lennert Olsen, 1992), with remarkable similarity in the patterns across Tarramiut and West Greenlandic. This is covered in the following subsections.

6.1 Verbal Inflectional and Derivational Affixes

Verbal inflections are produced among the first two-morpheme utterances, and are rarely omitted except in contexts where adults would also omit inflections in colloquial speech (Crago & Allen, 2001; Swift & Allen, 2002b). Imperative (e.g., -git ‘IMP.2sS’) and indicative (e.g., -juq ‘PAR.3sS’) inflections denoting singular subjects appear first. Inflections in the contingent (e.g., -gama ‘CTG.1sS’) and interrogative (e.g., -vit ‘INT.2sS’) moods appear next, followed later by the more complex contemporative (e.g., -tsuni ‘CTM.4sS’) and incontemporative (e.g., -lunga ‘ICM.1sS’) moods that are used only in subordinate clauses. (The contemporative inflection expresses that the action in the subordinate clause verb is happening or has already happened at the same time as the action in the main clause verb; the incontemporative inflection expresses that the action in the subordinate clause verb will happen in the future at the same time as the action in the main clause verb.) In addition, the range of persons and numbers denoted by the inflections gradually becomes more broad. The earliest inflections denote only subjects apart from one imperative inflection marking both subject and object (−guk ‘IMP.2sS.1sO’). However, more inflections marking both subject and object emerge as linguistic ability develops. Fortescue and colleagues report 10 different productive verbal inflections for the child at age 2;2, around 25 different verbal inflections for the children aged 2;3-3;4, and then 35-40 different inflections for the children aged 4;7 and 5;2.

The prevalence of verbal inflections denoting both subject and object in Inuit languages means that speakers can express a full sentence within one word, and adults very often do so. This holds for children as well: they express the subject only through verbal inflection (i.e., with no independent noun phrase or demonstrative) in about 85% of instances, and express the object only through verbal inflection in about 70% of instances (Allen, 1997). Importantly, children are not random in how they express arguments. They use only verbal inflection when the identity of the intended subject or object is accessible to the interlocutor, such as through prior mention in the discourse or joint attention in the physical context. In contrast, they use an independent noun phrase or demonstrative when the identity of the intended subject or object is not accessible, such as when it is newly introduced in the discourse or not present in the physical context (Allen, 2000; Skarabela, 2007).
Interestingly, verbal inflections are identified as a difficult aspect of acquisition in the only study of specific language impairment (SLI) in Inuit languages (Crago & Allen, 2001). The five-year-old Tarramiut-speaking girl with SLI in this study used verbal inflections on only 60% of her verb stems (n=50) in one half-hour play session. This is in stark contrast to typically-developing peers matched for age or language who used inflections on 98-100% of their verb stems (all figures not including situations where omission of inflection is permitted in colloquial speech, as discussed in section 5). The child with SLI omitted mention of the referent completely in a quarter of the instances (9a), used an overt first or second person pronoun to realize the subject in another quarter of the instances (9b), and substituted a nonce inflection –mi in place of the target inflection in the remaining half of the instances (9c). None of these options are grammatical in adult speech, nor are they found in the speech of typically-developing children.

(9) a. Aaa qai-si. [= Aaa qai-si-juq]
   yes come-PRSP [= yes come-PRSP-PAR.3sS]
   ‘Yes, is coming.’ [= ‘Yes, he/she/it is coming.’]
   (5SLI; 5;4; Crago & Allen, 2001, p. 93)

b. Ah umia-mi ah sin-i-mi. [= Sini-nga-luk umiar-mi.]
   um boat-LOC.SG um sleep-MI [= sleep-pretend-IMP.1dS boat-LOC.SG]
   ‘Um on the boat, um sleep.’ [= Let’s pretend to sleep on the boat.’]
   (5SLI; 5;4; Crago & Allen, 2001, pp. 94-95)

c. Anaana annuraa-MI uvanga. [= Anaana annuraa-si-junga.]
   mother dress-MI I/me/my/mine [= mother dress-PRSP-PAR.1sS]
   ‘Mom, dress I.’ [= Mom, I’m about to get dressed.’]
   (5SLI; 5;4; Crago & Allen, 2001, p. 95)

Overall, this child with SLI does not use the morphosyntactic devices of her language appropriately, which leads to utterances that seem more analytic than polysynthetic.

We turn now to verbal derivational affixes in typically developing children. Tense and aspect markers are among the first derivational affixes to appear. Future markers appear first, used as early as 2;0. These include the near future -langa- and –niaq- as well as prospective aspect -si- in Tarramiut, and the future -ssa- and inceptive aspect -ler- in West Greenlandic. Past-oriented aspect comes about the same time or slightly later in Tarramiut, with the affixes perfective -sima- and the terminative -jariiq- in Tarramiut, and -reer- ‘already’ and -nikuu- ‘have done’ in West Greenlandic. Past tense then emerges somewhat later, first appearing between 2;6 and 3;0, with the earliest affixes being recent past -kainnaq- and yesterday past

Also among the first verbal derivational affixes to appear are the negation marker -nngit- (for both languages), the politeness affix used to soften imperatives (-lauq- in Tarramiut, -niar- in West Greenlandic), and two deverbal affixes in Tarramiut (-uti ‘thing used for V’, -juq ‘that which’). Next to emerge, sometime between 2;0 and 2;6, are affixes that change the valency of the verb – specifically the causative -tit- and several denominalizing affixes (e.g. -u- ‘be’ and -liaq- ‘go to’ in Tarramiut, -u- ‘be’ and -nngor- ‘become’ in West Greenlandic), as well as the passive -jaq- in Tarramiut (but not West Greenlandic). Around 2;6-3;0, affixes that translate as complement-taking verbs in English start to come in. These include -guma- ‘want to’ and -nnguaq- ‘pretend to’ in Tarramiut, and -ruma- ‘want to’ and -sinnaa- ‘can’ in West Greenlandic. The habitual affix -sar- and the passive participle -saq- also appear around this stage in West Greenlandic.

Until around 3;0-3;6, development in verbal derivational affixes is most noticeable in the addition of new categories of affixes, as we have just seen. Beyond this point, development focuses on adding more affixes in each category to cover a wider range of meanings and functions. Fortescue and colleagues report 5-15 different productive verbal derivational affixes for the children 2;2-3;1, and 25-35 for the children aged 3;4-5;2.

6.2 Nominal Inflectional and Derivational Affixes

The first nominal inflections to appear around age 2;0 are the ergative -up / -p (primarily used at this age to mark possession in Tarramiut but to mark transitive subjects in West Greenlandic), the modalis -mik (used at this age to mark direct objects in Tarramiut, but instrumental case in West Greenlandic), and the first person singular (-ga) and plural (-kka) possessives. This is followed soon after by nominal inflections marking the other cases: locative (-mi), allative (-mut), ablative (-mit), equative (-titut) and vialis (-kkut). (Note that the absolutive singular morpheme is null, as is common in ergative languages, so its emergence is not visible.) While the first nominal inflections mark singular nouns and first person possessors, plurals and other possessors gradually appear as well. Fortescue and colleagues report three different productive nominal inflections for the child at age 2;2, and between 10 and 15 for the older children. It is not surprising that there are fewer nominal than verbal inflections used at this age given that there are many fewer nominal than verbal inflections in the language.
Nominal derivational affixes are also not particularly diverse. Children begin with adjectival markers such as ‘big, bad’ (-aluk in Tarramiut, -suaq in West Greenlandic) and ‘little’ (-apik in Tarramiut, -araq in West Greenlandic), as well as the affix -kkut ‘X and family’ in both languages. At later ages, a more varied range of adjectival markers emerges. Fortescue and colleagues report two to four different productive nominal derivational affixes for the children aged 2;2-3;1, and eight to ten affixes for the children aged 3;4-5;2.

The enclitics -lu ‘and’, question marker -li ‘where’, and reportative -guuq ‘it is said’ also appear early in both languages, the former two mostly on nouns and the latter mostly on verbs. These remain consistent throughout the ages covered in this chapter.

6.3 Relationship between Words

The relationships between words in Inuit languages are less important than in English, largely because much of the syntactic ‘action’ happens within words. By age three, however, children are beginning to produce some utterances with both main and subordinate clauses showing syntactic relationships. Some examples are in (10).

(10) a. U-na aniir-til-lunga
    this.one-ABS.SG be.outside-DS-ICM.1sS
    atjiliu-ri-ni-kainna-mi-ju-kualuk ilai?
    film-TR-ATP-PAST-also-PAR.3sS-pitiful TAGQ
    ‘When I was outside this pitiful person filmed me, right?’
    (Elijah 2;9; Allen et al., in prep)

b. Illa-ngaar-mat qia-voq.
    laugh-much-CTG.3sS cry-IND.3sS
    ‘She is crying because he is laughing so much.’
    (N 3;1; Fortescue & Lennert Olsen, 1992, p. 160)

c. Aalisagar-su-u(p) kee-qina-vaanga uunga-pallap-punga
    fish-big-ERG.SG bite-so.as.not.to-IND.3sS.1sO come.here-hurriedly-IND.1sS
    ‘I’m hurrying over here so the big fish won’t bite me.’
    (K 3;4; Fortescue & Lennert Olsen, 1992, p. 171)

d. Uanga taakkortai mikisuu-llunga neri-sar-nikuu-akka ilaa Nuka?
    I these.things be.small-CTM.1sS eat-HAB-PERF-IND.1sS.3sO TAGQ Nuka
    ‘When I was little I used to eat these, didn’t I, Nuka?’
    (A 4;7; Fortescue & Lennert Olsen, 1992, p. 18)
These structures require not only a good mastery of morphosyntactic features such as subordinate clause inflections, but also a relatively sophisticated level of cognition in order to understand and appeal to the conceptual and contingent relationships between clauses.

To this point, we have focused on the overall picture of children’s increasing facility with the morphological complexity of Inuit languages. We turn now to a more detailed view of three structures that reflect syntax involving valency changing within the word: noun incorporation, causative, and passive. We then highlight particularly complex utterances in which two or three of these structures appear within one word, and in which the word class changes at least twice within the word. The main goal in these sections is to show children’s adeptness with these complex morphosyntactic manipulations at a very young age.

7. Noun Incorporation

Noun incorporation (NI) is one of the most diagnostic structures of polysynthesis since it allows one word to contain both a verb and an object argument. In most polysynthetic languages, the verb can serve either as an independent root or as the host for an incorporated noun. In Inuit languages, however, verbs that allow incorporation are bound suffixes (Fortescue, 1994; Mithun, 2009). For some authors, this difference means that Inuit languages do not have true noun incorporation (e.g. Baker, 1996). However, we will refer to this structure as noun incorporation for the purposes of the present chapter.

Inuit-speaking children begin producing NI structures as early as two years of age, as exemplified in (11).

(11) a. Qaqqujar-tu-rumalli-paa!
   cracker-consume-yearn.for-oh.how.I
   ‘I yearn for munching crackers!’ (Elijah 2;9; Allen, 1996, p. 167)

b. Tuttu-siu-laal-qinuk?
   caribou-look.for-FUT-INT.1dS
   ‘Will we go look for caribou?’ (Paul 2;11; Allen, 1996, p. 167)

c. Quli-nngor-pa?
   ten-become-INT.3sS
   ‘Is it ten (o’clock)’? (L 2;2; Fortescue & Lennert Olsen, 1992, p. 145)

Allen (1996) reports that an average of 12% of verbal clauses in Tarramiut contain NI structures between the ages of 2;0 and 3;6. The four children in her study use a total of 17 different incorporating verb affixes, of which the most common are -u- ‘be’, -qag- ‘have’, -gi- ‘have as’, -liag- ‘go to’, -tuq- ‘consume’, -taaq- ‘acquire’, and -siuq- ‘look for’ are the
most frequent. Fortescue & Lennert Olsen (1992) report that the five children in their study of West Greenlandic, aged 2;2-5;2, used nine different incorporating verb affixes including the first four just listed for Tarramiut. Wilman (1988) reports that 23 different incorporating verb affixes are used by the six-year-olds in his study.

These NI structures are not simply memorized and reproduced as unanalyzed units by the children, but rather are used productively (Allen, 1996). This productivity is evidenced by children’s use in the same session either of one incorporating verb affix with two different incorporated nouns, or of a noun root both in an NI structure and in another structure with different morphology (e.g., case marking, adjectival marker). Productivity is also evidenced by children’s overuse and overgeneralization of NI in structures where adults would not use it, as in (12).

(12) a.  
\[ U-na \quad \text{sini-tu-alu-u-nngi-tuq.} \]
\[ \text{this.one-ABS.SG \ sleep-NOM-EMPH-be-NEG-PAR.3sS} \]
\[ \text{‘This one isn’t sleeping [= this one is not one who is sleeping].’} \]
\[ \text{(Louisa 3;2; Allen, 1996, p. 169)} \]

b.  
\[ Una \quad \text{sini-nngi-tu-aluk.} \]
\[ \text{this.one-ABS.SG \ sleep- NEG-PAR.3sS-EMPH} \]
\[ \text{‘This one isn’t sleeping.’} \]
\[ \text{(target utterance; Allen, 1996, p. 169)} \]

By age three, children are producing more complex NI structures. One type is double NI as shown in (13a), where a noun is incorporated into an incorporating verb affix (-qaq- ‘have’), which is then nominalized, and then this nominalized form is incorporated into another incorporating verb affix (-u- ‘be’). Another complex form is modifier stranding, where an incorporated noun (savik ‘knife’) is modified by a numeral or adjective outside the verbal word (imaaittunik ‘ones like those’), as shown in (13b). Fortescue & Lennert Olsen (1992) show stranding structures in the speech of only the oldest child, as shown in (13c). Here the modifier allanik ‘other’ modifies the noun root ini ‘place’.

(13) a.  
\[ \text{Namur-nik} \quad \text{piara-qar-suu-ngu-mmata.} \]
\[ \text{polar.bear-MOD.PL \ baby-have-HAB-be-CTG.3pS} \]
\[ \text{‘They have polar bear babies [= they are ones who have polar bear babies].’} \]
\[ \text{(Paul 3;3; Allen, 1996, p. 171)} \]

b.  
\[ \text{Maasiu-kkut} \quad \text{imaat-tu-nik} \quad \text{savi-qar-qut.} \]
\[ \text{Matthew-group \ thus-be-NOM-MOD.PL \ knife-have-IND.3pS} \]
\[ \text{‘Matthew and his friends have knives like that.’} \]
\[ \text{(Elijah 2;9; Allen, 1996, p. 172)} \]

c.  
\[ \text{Taava qimmi-t} \quad \text{toqu-gunik} \quad \text{alla-nik} \]
then dog-ABS.PL die-CND.4pS other-MOD.PL

ini-ssa-qa-ngin-namikkit.

place-FUT-have-NEG-CTG.4pS.3pO

‘So when dogs die, since they don’t have any other place for them …’

(P 5:2; Fortescue & Lennert Olsen, 1992, p. 205)

Parkinson (1999) conducted two experimental studies to test whether Kivalliq-speaking children understand the underlying syntax of NI or if they are simply attending to linear order of elements within the word. In the first study, he asked children to repeat sentences that contained NI with modifier stranding, as in (14). In the second study, he asked children to select a picture from an array of three pictures to match sentences that contained NI with modifier stranding, as in (15), as well as similarly complex sentences without noun incorporation.

(14) Jessica piggju-jur-mik qimmi-qaq-tur-mik

Jessica.ABS.SG strong-NOM-MOD.SG dog-have-NOM-MOD.SG

tautu-liq-tuq.

look.at-start-PAR.3sS

‘Jessica starts to look at one who has a strong dog / … at a strong one who has a dog.’

(Parkinson, 1999, p. 136)

(15) Qimmir-mik nahq-qaq-tur-mik aupaktu-mik tikkua-rit.

dog-MOD.SG hat-have-NOM-MOD.SG pink-MOD-SG point.to-IMP.2sS

‘Point to the dog with the pink hat / Point to the pink dog with the hat.’

(Parkinson, 1999, p. 168)

The NI sentences in both studies were constructed such that the modifier could be construed as modifying either the incorporated noun or the entire sentence. Several types of NI structures were used including ones where differences in number marking, plausibility of the adjective as a modifier, or difference in placement of the adjective forced only one of the two interpretations.

Children found the repetition task difficult and often simplified the sentences in their repetitions by either changing the word order or deleting words. However, they did not have more difficulty with NI sentences than with other complex sentences. Further, their differential behavior across the different types of NI structures showed that they have knowledge of the syntactic nature of NI and are not simply attending to the linear order of elements within the word. On the picture selection task, children selected the correct picture in 50% to 90% of instances depending on the child (chance is 33% or 66% depending on the
condition). Children performed slightly better on the NI sentences than on the non-NI sentences, suggesting that they had no problem interpreting the NI structures. Further, children’s performance improved significantly with age, especially on the more complex structures. Overall, Parkinson’s results indicate that children aged 4-6 years understand even difficult NI structures and interpret them syntactically.

8. Causative

Inuit languages have two types of causatives: a lexical causative and a morphological causative. In the lexical causative, exemplified in (16a), the causative meaning is inherent in the meaning of the verb. Lexical causative verbs often can also be expressed in the intransitive form without the causative meaning – termed the causative-inchoative alternation – as in *I emptied the bucket* vs. *The bucket is empty*. In the morphological causative, exemplified in (16b), the causative meaning is expressed by the causative morpheme *-tit- ‘CAUS*. This morpheme is suffixed to the verb stem and adds a valency of one to the verbal structure.

(16) a. *Una naavi-lagu?*
   this.one empty-IMP.1sS.3sO
   ‘Shall I empty this one?’
   (Tumasi 2;1; Allen 1998, p. 645)

b. *Panik itsiva-ti-tait.*
   daughter sit-CAUS-PAR.2sS.3sO
   ‘Daughter, you made it sit.’
   (Paul 3;3; Allen 1998, p. 661)

We focus here on the morphological causative since it is of particular interest regarding polysynthesis.

Allen (1996) reports that an average of 2% of verbal clauses in Tarramiut contain morphological causative structures between the ages of 2;0 and 3;6. The first morphological causatives first appear sometime between 2;0 and 2;10 (Allen, 1998). These first instances are typically imperative commands or optative first person suggestions, and often are missing either a verb root or an inflection. Example (17a) is a command missing the verbal inflection *-guk ‘IMP.2sS.3sO’, example (17b) is an optative first person suggestion missing the verb root, and example (17c) has both root and inflection.

   tea-consume-CAUS-POL
   ‘Let (her) have tea.’
   (Sarah 2;0; Allen 1998, p. 648)

b. *Ti-lau-lagit.*
CAUS-POL-IMP.1sS.2sO
‘Shall I make you do X.’ (Lizzie 2;7; Allen 1998, p. 649)
c.  
Sikituur-ti-lau-nnga.  
ride.skidoo-CAUS-POL-IMP.2sS.3sO
‘Let me ride the skidoo.’ (Elijah 2;0; Allen 1998, p. 655)

Structures without verb roots such as in (17b) occur at this age in contexts where the verb in a complete structure would take either a lexical causative or a morphological causative. This suggests that children at this age have mastered the concept of causation but are not yet sure which verb root requires which type of causative form. Although Tarramiut-speaking adults occasionally produce these rootless causatives, they are much more predominant among children. There is also some evidence that children are producing fixed forms rather than using the causative morpheme productively at early ages. For example, 11 of Elijah’s 13 causative productions at 2;0 use several different verbs with the same causative + inflection combination (-tilaunnga ‘IMP.2sS.3sO’), as in (17c).

Since all the morphological causatives used at this stage are either commands or first person optatives, this suggests that children may first assume that the causative morpheme is a required part of the form to be used in commands. Some evidence for this comes from the errors in one of the children studied by Allen (1998). This child correctly uses the causative morpheme -tit- in commands, but fails to use the causative morpheme in declaratives and questions that require it. An example of the latter is in (18a), with the target utterance in (18b).

(18)  
a.  
Ijukka-si-jara.  
fall-PRES-PAR.1sS.3sO
‘I’ll fall it.’ (Louisa 3;2; Allen 1998, p. 670)

b.  
Ijukka-ti-tara.  
fall-CAUS-PAR.1sS.3sO
‘I’ll make it fall.’ (target utterance; Allen 1998, p. 670)

Around age 3;0, children begin to use morphological causatives in a more adult-like fashion. This is signaled by children’s use of this structure with a wider variety of verb roots that are more consistently present in the utterances, as well as with inflections other than imperatives, such as indicative and interrogative, as exemplified in (19b). Children also begin to show signs of productivity. In particular, there are several examples of use of a given verb with the causative morpheme in a causative context, and without the causative morpheme in an inchoative context, indicating that the child understands the use of the causative
morpheme. In the example in (19), Louisa is afraid that she has banged the head of one of her
dolls. She asks her cousins the two questions in (19), appropriately using an intransitive
inflection for the inchoative (19a) and a transitive inflection for the causative (19b).

(19) a. **Niarqua-va?**
   bump.head-INT.3sS
   ‘Did it bump its head?’ (Louisa 3;6; Allen 1998, p. 662)

b. **Niarqua-ti-tara?**
   bump.head-CAUS-PAR.1sS.3sO
   ‘Did I make it bump its head?’ (Louisa 3;6; Allen 1998, p. 662)

Less detail has been published about the acquisition of morphological causatives in West
Greenlandic. No data is available on their frequency of use. However, several examples of
this structure are present in the published data starting at 2;3; none are present for the data at
2;2. Further, the morphological causative is reported to be productive at each of the reported
ages from 2;3 to 5;2 (Fortescue, 1985; Fortescue & Lennert Olsen, 1992). Interestingly, there
is no evidence from the data available that children learning West Greenlandic go through the
same early phase of fixed forms and restriction of the causative to command form as do
children learning Tarramiut. This may be related to the fact that the causative morpheme
cannot appear alone without a verb root in West Greenlandic as it can in Tarramiut (cf.
(17b)). Examples at the youngest ages in West Greenlandic are with declaratives, as in (20).

(20) a. **Uppi-ti-le-qa-akkit!**
   fall-CAUS-begin-INTENS-IND.1sS.2sO
   ‘I’m going to make you fall!’ (Aqissiaq 2;3; Fortescue, 1985, p. 108)

Not surprisingly, all 23 of the children in Wilman’s (1988) study are also using the causative
morpheme -tit- productively, with a total of 194 uses in 12341 utterances.

9. Passive
The passive in Tarramiut is formed by affixing the passive morpheme -jau- to a transitive
verb stem, which reduces the valency of the verb by one. Agents are expressed using allative
case. As in many other languages, expression of the agent is optional.

Allen and Crago (1996) report that an average of 3% of verbal clauses in Tarramiut
contain passive structures between the ages of 2;0 and 3;6. The first passives appear as early
as 2;0 (Allen & Crago, 1996). About 80% of the total number of passives in the data are short
passives, as shown in (21a), where the agent is not expressed. The remaining 20% are full
passives with overt agents, as in (21b). Most of the full passives are produced by the most precocious child.

    pull-PASS-want-PAR.1sS
    ‘I want to be pulled.’
    (Elijah 2;9; Allen & Crago, 1996, p. 142)

b. *Itsu-munga ai-jau-gavit.*
    that.one-ALL.SG get-PASS-CTG.2sS
    ‘You will be brought by that one.’
    (Louisa 2;10; Allen & Crago, 1996, p. 144)

The passive occurs with more than 30 different verb roots in the data reported by Allen and Crago (1996), showing that it is not restricted to a few fixed forms. Several examples explicitly illustrate the productivity of this structure. In example (22), for instance, Lizzie overgeneralizes the passive in an intransitive construction, which does not allow the passive. She utters (22) just as she slips on the polished wooden base of a bed frame. Since there is no agent of sliding, but rather the sliding occurs unintentionally, the passive cannot be used.

(22) *Siaqri-tau-vuq.*
    slide-PASS-IND.3sS
    ‘It was slidden.’
    (Lizzie 3;3; Allen & Crago, 1996, p. 140)

In example (23), Elijah alternates between a passive (19a) and a transitive (19b) use of the same verb root within the same conversation, illustrating his understanding of the difference between the two forms. In (23a) he reports to his mother that he will be filmed, while in (23b) he commands the photographer to film him.

(23) a. *Anaana atjiliur-tau-si-gama.*
    mother film-PASS-PRES-CTG.1sS
    ‘Mom, I’m going to be filmed.’
    (Elijah 2;5; Allen & Crago, 1996, p. 142)

    leave-FUT-CTG.2sS film-POL-IMP.2sS.1sO
    ‘Film me since you will leave.’
    (Elijah 2;5; Allen & Crago, 1996, p. 142)

It is striking that the passive is used so early and so frequently in Tarramiut. In languages like English, German, and Hebrew, the passive does not typically appear until around age 4, and even then is used infrequently. The early acquisition of the passive in Tarramiut is linked to three factors. First, it is more frequent in the input in Tarramiut (7.8 times per hour) than in English (1.1 times per hour; Allen & Crago, 1996). Second, the structure of the passive is not uncommon in Tarramiut; several other morphemes occur in the language with similar morphological properties and syntactic repercussions. However, the structure of the passive is
relatively uncommon in English, and thus learning the structural aspects presents a particular challenge to children. Interestingly, the passive is also used early and frequently in other morphologically complex languages where the passive occurs frequently in the input, such as Sesotho (Demuth, 1990) and K’iche’ Mayan (Pye & Quixtan Poz, 1988). Finally, Tarramiut relies heavily on valency reducing structures – passive, antipassive, and noun incorporation – as part of its trend away from using ergative structures (Allen, 2013). In Allen’s (2013, p. 94) analysis of children’s utterances with bivalent propositions (i.e. two implicit arguments) and third person subjects, the passive was used in 37% of cases and the ergative-absolutive structure in only 7% (antipassive was used in 22%, and noun incorporation in the remaining 34%).

In West Greenlandic, neither the actional passive with -neqar- nor the stative passive with -saa- appear in the child data until at least age 5;2. This is somewhat surprising in comparison with the early and relatively frequent use in Tarramiut. This may be because of the emergence of a pseudo-passive in West Greenlandic, which employs the causative morpheme -tit- used reflexively (Fortescue & Lennert Olsen, 1992, p. 156). This pseudo-passive appears in several utterances in the published data, including those shown in the conversation in (24).

(24) a. Pitu sul-luni-una toqu-soq-maa?
    Peter how-CTM.4sS-this.one die-PART-l.wonder
    ‘How was it now Pitu died? ’ (Mother; Fortescue & Lennert Olsen 1992, p. 155)
b. Billi-nut apor-til-luni.
    car-ALL.SG run.over-CAUS-CTM.4sS
    ‘By being run over by a car.’ (P 5;2; Fortescue & Lennert Olsen 1992, p. 155)
c. Igit-sil-luni.
    throw-CAUS-CTM.4sS
    ‘By being thrown out.’ (N 3;1; Fortescue & Lennert Olsen 1992, p. 155)

Wilman (1988) reports that the passive morpheme is used productively by all 23 children in his study, with a total of 413 uses in 12341 utterances.

10. Combining Valency Alternating Forms

Until this point we have seen examples of the use of individual morphemes with syntactic function. However, even young children are adept at combining these morphemes and functions within one word. This shows that they are able to manipulate multiple syntactic
functions within one word, and understand how these functions interact. We offer three different types of examples here.

Example (25) shows two utterances including noun incorporation combined with the causative – a simple noun in (25a) and a locative in (25b).

   gum-acquire-CAUS-POL-IMP.2sS.1sO
   ‘Give me gum.’ [= make me acquire gum] (Lizzie 2;10; Allen, 1996, p. 118)

b. *Ata-ngagu-ur-ti-tara.*
   under-VIA.3Ssg-go-CAUS-PAR.1sS.3sO
   ‘I made it go through underneath.’ (Paul 3;3; Allen, 1996, p. 108)

Some instances of the causative and passive within the same word also occur. However, it appears that this combination -titau- is an unanalyzed unit for at least some children at early stages (Allen, 1996). This unit is also often used without either a verb root or inflection, as in (26).

(26) *Aani-Ø-lu ti-tau-lau-juguk ilai?*
   Annie-ABS.SG-and CAUS-PASS-PAST-PAR.1dS TAGQ
   ‘Annie and I were made to, right?’ (Lizzie 3;3; Allen, 1996, p. 106)

There is some evidence that linguistically more advanced children are able to control scope effects of these two morphemes by strategically using morpheme ordering, as shown in (27). In (27a), Elijah uses the passive within the scope of the causative to show that a passive action is caused. In (27b), in contrast, he uses the passive outside the scope of the causative to show that the causation itself is passivized.

   hat-ABS.3Ssg remove-PASS-CAUS-ICM.XxS.3sO
   ‘Someone/thing caused his hat to be removed.’ (Elijah 2;0; Allen, 1996, p. 116)

b. *Allanguar-ti-tau-junga.*
   draw-CAUS-PASS-PAR.1sS
   ‘Someone is letting me draw.’ [= I am being made to draw] (Elijah 2;1; Allen, 1996, p. 116)

Combinations of noun incorporation and passive are also found, as in (28). Since the patient argument has already been incorporated into the verb, the benefactive argument is the only one available to be passivized.

(28) a. *Nilat-ta-tau-kainna-qita anaana kina-kku-nnut*
   ice-fetch-PASS-PAST-INT.1pS mother who-group-ALL.PL
‘Who were we fetched ice by, mother?’ (Elijah 2; 9; Allen & Crago, 1996, p. 146)

b. *Nasa-liur-tau-ngi-tunga.*
hat-make-PASS-NEG-PAR.1sS
‘I am not being made a hat for.’ (Elijah 2; 5; Allen & Crago, 1996, p. 146)

In only one utterance in the Tarramiut data does a child attempt to use all three of these valency-alternating operations within one word. The example is in (29a), with the target form in (29b).

mother money-PASS-CAUS-FUT-IND.1sS this.one-ALL.SG camera-ALL.SG
‘Mom, I cause to be monied … by this one … by the camera (operator).’
(Elijah 2; 9; Allen, 1996, p. 119)

b. … *kiinaujar-taar-ti-tau-niar-qunga …*
money-acquire- CAUS-PASS- FUT-IND.1sS
‘… I will be given [= made to acquire] some money …’
(target utterance; Allen, 1996, p. 120)

Here Elijah is trying to passivize a noun directly, instead of first incorporating it into a verb. He also mixes up the order of the passive and causative morphemes relative to the meaning he is trying to achieve.

The utterances presented in this section show that children at a relatively young age not only master individual valency changing processes, but also can coordinate two different processes within one word. This level of complex morphosyntactic manipulations at this age is very striking in comparison with the relatively less complex productions of similar-aged children learning an analytical language.

11. Changing Word Class within the Word

Another feature of the polysynthesis as realized in Inuit languages is that a word can change class two or more times within the word. In section 7 we saw several examples of noun incorporation, where a word that begins as a noun changes into a verb. It is also very common for a verb to change to a noun, as in (30).

taste.good-INTR.PART-MOD.PL
‘Things that taste good.’ (K 3; 4; Fortescue & Lennert Olsen, p. 166)

b. *Toqu-nikor-suq.*
die-one.that-big
‘Big one that has died.’ (K 3;4; Fortescue & Lennert Olsen, p. 175)

Much more striking from the point of view of polysynthesis, however, is when the word class changes more than once. Although no focused research on this has yet been reported, several examples are found in the data. The examples in (31) show words that change from verb to noun to verb. The verbal stem in (31a) is changed to a noun using the habitual suffix -suuq-, then back to a verb using the copula -u- (here in the allomorph -ngu-). The verbal stem in (31b) is changed to a noun using the nominalizing suffix -juq- (here in the allomorph -tu-), and then back to a verb using the copula -u-.

(31) a. Atjiliuriji-alu-ga
   photographer-EMPH-ABS.1Sg
   nitja-a-ti-tsi-suu-ngu-nngi-tu-aluk!
   make.sound-RPT-CAUS-ATP-HAB-be-NEG-PAR.3Ss-EMPH
   ‘My photographer isn’t one who puts the (TV’s) volume on.’ [= makes the TV make sound] (Elijah 2;9; Allen, 1996, p. 120)

   hurt-CAUS-that.which.EMPH-be-CTG.3sS
   ‘It is painful.’ [= it is a thing that causes hurt] (Paul 2;11; Allen et al., in prep)

Example (32) shows a word that changes from a noun to a verb to a noun to a verb. The nominal stem is changed to a verb using the copula -u-, then back to a noun using the nominalizing suffix -juq-, and finally back to a verb using the copula -u-.

   Napa-be-say-PASS-NOM-former-be-PAR.2sS  Taamisa-ALL.SG
   ‘You were called Napa by Taamisa.’ (Elijah 2;5; Allen & Crago, 1996, p. 144)

These types of utterances illustrate the flexibility that Inuit children display with morphosyntax at a relatively young age. They can not only change valency within one word as shown in the previous section, but can also change word class one, two, or even three times within a word.

12. Concluding Remarks

Learning a polysynthetic language poses significant challenges, many of them different from those encountered with other language types that are more commonly studied. Children must extract individual morphemes including noun and verb roots from a stream of speech in which morphemes rarely appear as separate words. Indeed, most words contain at least two morphemes and may contain as many as ten morphemes. Children must use the surrounding
syntactic information to identify the significance of the morphemes that are extracted, and manipulate word class changes and valency changes as many as three times within one word. And they must master hundreds of derivational and inflectional affixes along with their syntactic ramifications. This leads to a different trajectory of development than is the case for other language types, at least in the case of morphosyntax.

Children learning Inuit languages begin by producing one recognizable morpheme per utterance, usually somewhere between 1;0 and 1;6. From that point, their development is far more focused on morphology within words than on individual words. Inuit children between ages 2 and 6 years produce an average of 2.2 morphemes per word. Much of that complexity is focused on verbs, which start with two morphemes (root plus inflection), but gradually contain more derivational affixes between the root and inflection as the children’s language abilities increase. These affixes very often have syntactic functions including changing valency and taking verbal complements. Children become competent with this complex morphosyntax at an early age, producing productive causatives, passives, and noun incorporation structures as early as age two. Further, although they produce some overgeneralizations of morphophonological forms and syntactic patterns, they do not produce anything like the characteristic overgeneralization patterns found in English (e.g. of past tense -ed as in goed, or of plural -s as in foots). This presents a striking contrast to children learning English, who are still struggling with basic morphology at the same age. As Parkinson (1999, p. 108) notes, “there appears to be a principle whereby the more complex the morphological system of a language, the earlier it will be learned.”

One of the main goals of the field of language acquisition is to determine which patterns and mechanisms in language acquisition are universal to all children, and which are specific to individual languages or language typologies. Our findings show that children learning Inuit languages, and likely all polysynthetic languages, are focused on rapidly acquiring complex morphosyntax in a way that is not universal across all language types. This underlines the importance of studying the acquisition of languages of very different structures.

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References


The following abbreviations are used in glosses throughout this chapter:

Nominal case: ABS = absolutive; ALL = allative; ERG = ergative; LOC = locative; MOD = modalis; VIA = vialis.

Verbal modality: CND = conditional; CTG = contingent; CTM = contemporative; DS = different subject (for subordinate clauses); ICM = incontemporative; IMP = imperative; IND = indicative; INT = interrogative; PAR = participial (functionally equivalent to indicative in Tarramiut).

Word-internal morphology: ATP = antipassive; CAUS = causative; EMPH = emphatic; FUT = future; HAB = habitual; INTENS = intensifier; INTR = intransitive; NEG = negative; NOM = nominalizer; PART = participial; PASS = passive; PAST = past; PERF = perfective aspect; POL = politeness (preceding imperative); PRE = prefix; PRES = present; PRSP = prospective aspect; RPT = repetitive; TAGQ = tag question; TR = transitivizer.

Verbal inflection (e.g. PAR.3sS): 1 = first person; 2 = second person; 3 = third person; 4 = fourth person; X = any person (i.e. 1, 2, 3, or 4); s = singular; d = dual; p = plural; x = any number (i.e., singular, dual, or plural); S = subject; O = object

Nominal inflection (e.g. ABS.SG): SG = singular; DU = dual; PL = plural.

Possessed nominal inflection (e.g. ERG.3Ssg): 1 = first person possessor; 2 = second person possessor; 3 = third person possessor; 4 = fourth person possessor; S = singular possessor; D = dual possessor; P = plural possessor; X = any number (i.e., singular, dual, or plural); sg = singular possessum; du = dual possessum; pl = plural possessum.