Explaining why gonna precedes will in acquisition

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Introduction

The two English futures, *will* and *be going to (gonna)* are very similar in meaning, but have overlapping yet different distributions. Such an overlap presents interesting problems for acquisition: how does the child learn which form to use in which context? Are overlapping forms acquired at the same time, or is one acquired earlier than the other? One possibility is that the child initially maps overlapping elements into distinct, non-overlapping representations, perhaps driven by properties of the input. Another possibility is that properties of the lexical representations themselves aid (or impede) acquisition. For example, simpler representations may be learned before more complex representations, or representations requiring integration with context may be more difficult to master. In this paper we investigate the emergence of *will* and *gonna* in child spontaneous speech and tests three hypotheses which might account for the fact that productive use of *gonna* appears to precede productive use of *will*, a fact originally observed by Stephany (1986).

1 Linguistic Background

A number of accounts have been proposed which differentiate the meanings of the two English futures, the modal *will* and the "quasi-modal" *gonna*. Copley (2002) observes that *will* and *gonna* behave differently in an offering context, such as (1), with possible answers in (2).

(1)	Q	Can anyone provide food for tomorrow's colloquium?	
(2)	a.	I'll do it	(offer)
	b.	I'm gonna do it.	(*offer)

The request made in (1) presupposes that no one has planned to make food yet. (2a) is a valid response, affirming the presupposition, and committing the speaker to do what the questioner has asked. Copley points out that (2b) cannot have this reading. Instead a more natural reading is one where the speaker of (2b) rejects the presupposition of (1), leading to the inference that the speaker of (2b) was already planning on making food.

Based on this contrast, Copley proposes that *will* and *gonna* are similar in that they have an underlying modal future operator, which selects for a *vP* denoting a function from times to propositions, and existentially closes its time argument with a future time, and satisfies its world argument with all worlds compatible with the evaluation world up to a reference time (see denotation below). For Copley, the difference is that *gonna* includes a progressive operator scoping over FUT, while *will* consists only of FUT (for both, tense scopes over everything). We will refer to this account as the High Aspect Hypothesis.

(3) a. $\llbracket FUT \rrbracket = \lambda f_{\langle i,st \rangle} \lambda t \lambda w$. $\forall w_1 [w_1 \text{ agrees with } w \text{ up to } t \rightarrow \exists t_1 [t_1 > t \& f(w_1)(t_1)]$ b. $\llbracket P \rrbracket = \lambda f_{\langle i,st \rangle} \lambda t \lambda w$. $\exists t_1 [t_1 \subset t \& f(w)(t_1)]$ c. $\llbracket will \rrbracket = \llbracket FUT \rrbracket$ d. [[*gonna*]] = [[P]]([[FUT]])

This means that *will* denotes a proposition is true in all worlds branching from *now* (for present tense). By contrast, *gonna* denotes a proposition is true in all worlds branching from an interval which overlaps *now*, i.e., branching at and before *now*. So for the High Aspect Hypothesis, the "already" inference created by (2b) is due to the lexical semantic properties of *gonna*, namely the progressive operator scoping over FUT. The "offer" inference of *will* is outsourced to the pragmatics; the enriched meaning of (2a) being roughly "I'll do it (if you want me to.)" The parenthetical part of the meaning is critical for its interpretation as an offer, Copley argues, and the lexical semantics of *gonna* prevents this inference, since the early-branching interpretation created by the progressive operator results in the inference that the speaker would have made food even if no one asked. Since *will* has no early-branching, this offer-condition is not ruled out.

Another account, given by Klecha (2007), proposes the reverse case, that *gonna*, not *will*, is the unmarked future. Relying on the same underlying modal-future operator, Klecha proposes *will* differs from *gonna* by having a context-dependent accessibility relation, i.e., *will* quantifies over only salient worlds. We will call this the Context Contrast Hypothesis. While Copley does not explicitly argue against a context dependent relation for *will*, Klecha argues her high progressive operator for *gonna* is unnecessary. If *will* is context dependent, it will have the offer reading in an offer context. But critically *gonna* does not branch early – it is only that it is context-dumb; an overly strong quantifier for an offer. It cannot have the "if you want me to" meaning because it is straightforwardly a prediction about the future, regardless of context. Denotations for *will* and *gonna* are given in (4).

- (4) a. $\llbracket will \rrbracket = \lambda f_{\langle i,st \rangle} \lambda t \lambda w$. $\forall w_1 [salient(w_1) \& w_1 agrees with w up to t \rightarrow \exists t_1 [t_1 > t \& f(w_1)(t_1) \rrbracket$
 - b. $\llbracket gonna \rrbracket = \lambda f_{\langle i,st \rangle} \lambda t \lambda w$. $\forall w_1 \llbracket w_1 \text{ agrees with } w \text{ up to } t \rightarrow \exists t_1 \llbracket t_1 > t \& f(w_1)(t_1) \rrbracket$

The difference is not the presence of a progressive operator, but of a context restriction operator. These two theories differ in their predictions about the data in at least two ways. First, they predict different truth conditions for sentences in non-offer contexts, such as after commands or in discourse-initial uses. Second, as we shall see below, they make different predictions about the time course of acquisition of the two forms.

Two contexts in which the two hypotheses make different predictions are given below. (5) is for a discourse-initial context, such as one speaker walking into a room and immediately addressing the hearer. (6), due to Binnick (1972), is a context in which the speaker warns the hearer about going near a bomb.

(5) Immediately, upon walking into a room:a. I'm gonna go to lunch.b. # I'll go to lunch.

(6)	When the hearer approaches a bomb:	
	a. Don't go near that bomb! It's gonna explode!	(reading: no matter what)
	b. Don't go near that bomb! It'll explode!	(reading: if you go near it)

(5a) is a well-formed prediction about the speaker's lunch plans. (5b) is ill-formed. (6a) is a warning about a bomb with a lit fuse, whose explosion is inevitable. (6b) is a warning about a land-mine, which will only explode when tripped. If (6b) were uttered in the time-bomb scenario, it would break the Gricean maxim of informativeness. If (6a) were uttered in the land-mine scenario, it would be false (or the speaker would be predicting that the hearer would not heed his warning and is about to trip the explosive.)

The High Aspect Hypothesis does not seem to make the right predictions. It predicts (5b) should be well-formed, and perhaps predicts that (5a) should entail that the speaker made up his mind before coming into the room (or something along those lines.) It is also not clear why (6b) should have a conditional meaning and (6a) shouldn't.

The Context Contrast Hypothesis captures these data. If *will* requires salient worlds¹ in the discourse, then a discourse initial use is expected to be infelicitous (much like a discourse-initial use of a definite determiner) and *gonna* is expected to be acceptable if used as simple, if very strong, prediction. The bomb scenario is also captured; *gonna* is predicted to make a strong, unconditional prediction about the future, and *will* is predicted to only make a claim about salient worlds, here worlds where the speaker goes near the bomb (salient due to the preceding imperative). It is clear that the Context Contrast Hypothesis is capable of accounting for the adult language data, and it is unclear as to whether the High Aspect Hypothesis is.

2 Acquisition Background

Stephany (1986) using data from 8 children (Hildegard (Leopold 1949a, b); Adam, Eve and Sarah (Klima and Bellugi 1966; Bellugi 1971, 1974); Abe (Kuczaj and Maratsos 1975; Kuczaj and Daly 1979); Nina1 (Shephard, 1981) and Nina2 (Pea et al. 1982)) observes that *gonna* is acquired earlier than *will* (and other traditional modals). Valian (1991), in a study of children's use of null subjects in English and Italian looked for patterns in the emergence of modals (all forms of *can/will/shall/may*) and semi-auxiliaries (forms of *wanna*, *gonna*, and *hafta*). Valian concludes that there is no difference in first use of modals compared to semi-auxiliaries. In her data, (based on 2 sessions of child/adult talk from 21 American children in four MLU groups), she found that both modals and semi-auxiliaries constituted an almost equal percentage of the children's verb tokens (3% (14 tokens) and 5% (19 tokens) respectively.) However, in her Group II (mean MLU 2.49) semi-auxiliaries comprised 16% of the verb tokens, compared to only 6% for modals. This latter fact, and Stephany's data, suggest that productive use of *gonna* precedes productive use of *will*.

2.1 Hypotheses and Predictions

What might account for this developmental asymmetry? While the two forms do not have an overlapping syntactic distribution (*will* always appears with a bare VP, while *gonna* always appears with the auxiliary *be*) they do have a very similar semantic distribution. Given this fact, we develop three hypotheses that might account for the pattern.

¹"Salient worlds" here is not intended to mean worlds belonging to the context set, in the Stalnakerian sense, which supposes that there are always worlds in the discourse (e.g., Stalnaker 1999). Here "salient worlds" means worlds belonging to a special salience set, much like a salience set of entities for reference by a definite expression.

First, it is possible that properties of the input are responsible for the pattern. One of the most obvious candidates for an input effect would be the input frequency of the two forms. We will call this the *Input Frequency Hypothesis*. With respect to adult data, however, the frequencies of the two forms seem to militate against frequency as an explanation for the developmental pattern. Berglund (1997, 2000), in a study of the use of future forms in both written and spoken language corpora (British English), found that *will* forms (*will* and '*ll*) account for approximately 72% of future forms compared to forms of *going to* which amounted to approximately 20-25% (*shall* amounted to about 4%). The only difference between spoken and written corpora was the amount of *going to* vs. *gonna* forms, with the latter more frequent in the spoken corpus. Similarly, Poplack and Tagliamonte (2000) found 40% *will* compared to 34% *going to* in their sample of English spoken in Ottawa.

What is not known, however, is whether frequencies of *will* and *gonna* in child directed speech are substantially different from the adult corpora studied by Berglund. The Input Frequency Hypothesis predicts that adult use of *gonna* will exceed adult use of *will*, in child directed speech and that the relative proportions of *will* and *gonna* in children's speech will be equivalent to that of the child directed speech.

Another possible explanation for the developmental asymmetry might come from children initially misanalyzing *gonna* as something else. Since the unreduced form of *gonna*, (*going to*) has a progressive component, and all forms appear with the auxiliary verb *be*, it is possible that children initially treat *gonna* as some sort of progressive marker. We will call this the *Progressive Hypothesis*. The Progressive Hypothesis predicts that early uses of *gonna* might pattern like the use of the progressive. If this is correct, then *gonna* is predicted to be sensitive to the verbal aspect. In particular, it should be dispreferred with stative predicates.

Finally, we consider a hypothesis based on the lexical semantic analyses described above. It is clear that under Copley's analysis, (the High Aspect Hypothesis) *will* is lexically simpler than *gonna*, and therefore lexical complexity would not predict the developmental pattern. Furthermore, for Copley, *will* and *gonna* do not differ with respect to their use of modality or context integration. This would predict that they would appear at the same time as each other, contrary to fact. For Klecha, however, the only difference between *will* and *gonna* is their use of context integration (the *Context Contrast Hypothesis*). This would predict that *will* would be more difficult to acquire than *gonna*, since it is crucially context dependent, and using implicit contextual information has been found to be difficult for children (e.g. Drozd 2001; Drozd and Van Loosbroek 2004; Guerts 2003; Krämer 2002; Miller and Schmitt 2004).

3 CHILDES study

3.1 Methods

To test the three hypotheses, we conducted a CHILDES study (MacWhinney 1991) of 8 children using the following children: Abe (Kuczaj 1976), Adam (files 1-26) and Sarah (files 10-89) (Brown 1973), Allison (Bloom 1973), Mark, Naomi (Sachs 1983), Peter (Bloom 1970), Shem (Clark 1982) and 6 adults: Abe, Adam, Allison, Naomi, Mark, Sarah. Utterances were coded for the following factors, as shown in Table 1. Only data from Event Type and MLU are reported in this paper.

Factor	Values
Negation	will/gonna negated/not
Illocutionary Force	Question, Declarative, Exclamation
Event Type	State, Activity, Event
First mention	Follows previous will/gonna by same/different speaker
Person	1st, 2nd, 3rd
Adverb	explicit future adverb present/not present

Table 1: Coding Factors

To allow grouping of children by MLU, and because the MLU of file is variable, linear regressions were performed for each child's MLU. The predicted value based on the regression was used to code each file with respect to Brown's (1970) MLU based stages: **Stage 2:** 2.0–2.5; **Stage 3:** 2.5–3.0; **Stage 4:** 3.0–4.0; **Stage 5:** > 4. A breakdown of the number of tokens coded by child for both adults and children is given in Table 2 below.

		Name								
		Adam	Shem	Abe	Allison	Mark	Naomi	Peter	Sarah	Total
Adults	gonna	214		512	37		39		223	1025
	will	284		962	103		73		205	1627
	Total	498		1474	140		112		428	2652
Children	gonna	435	51	821	17	13	40	387	192	1956
	will	65	35	612	32	9	3	47	138	941
	Total	500	86	1433	49	22	43	434	330	2897

Table 2: Tokens coded per child

3.2 Individual patterns

Although not all children look identical, the following figures, which show Peter's (MLU 2.0-3.9) and Adam's (MLU 2.1-3.6) use of *will* and *gonna* show clearly that productive use of *gonna* precedes productive use of *will*. In both children, although there are instances of both *will* and *gonna* in the early files, the use of *gonna* rises steeply much earlier than that of *will* and exceeds the use of *will*, even though (as we shall see below) adults use more *will* than *gonna* overall.



3.3 Frequency of use of will and gonna

In order to test the Frequency Hypothesis, we analyzed the amount of *will* and *gonna* in adult child directed speech compared to the amounts for the children. The results of the overall use of *will* vs. *gonna* by MLU group are given in Table 3. Overall, children used *gonna* more frequently than *will* and adults used *will* more frequently than *gonna*. This difference was statistically significant ($\chi^2(1) = 464$, p < .000) When we look at child versus adult use of *will* and *gonna* by MLU group, we also see that the patterns of use are also different, as shown in Figure 4 and Figure 5. In each MLU group, the differences are also significant. (2.0-2.5 ($\chi^2(1) = 5.71$, p < .02); 2.5-3.0 ($\chi^2(1) = 14.54$, p < .001); 3.0-4.0 ($\chi^2(1) = 236.87$, p < .001); >4.0 ($\chi^2(1) = 152.27$, p < .001)).



Figure 3

MLU	Chi	ildren	Adults		
	Will	Gonna	Will	Gonna	
2.0-2.5	40	69	207	211	
2.5-3.0	102	221	69	68	
3.0-4.0	182	833	202	122	
> 4.0	616	833	962	512	

Table 3: Use of will and gonna by MLU

Children's Use of Will and Gonna by MLU



Figure 4

Adult Use of Will and Gonna by Child MLU 70 ■ WILL 62.3 GONNA 60 49.5 50.5 50.4_49.6 50 % of future use 37.7 40 34.7 30 20 10 0 3.0–4.0 MLU 2.5-3.0 2.0-2.5 > 4.0 Figure 5

The proportions of *will* vs. *gonna* in child directed speech are in the same direction as those reported by Berglund (1997, 2000) and match the proportions found by Poplack and Tagliamonte (2000). This clearly shows that the Input Frequency Hypothesis is not supported. Adults do not markedly change their relative frequencies of use of *will* and *gonna* when speaking to children. As a result, although *will* is more frequently used in child directed speech, *gonna* is more frequently used by children.

3.4 Use of *will* and *gonna* by event type

In order to test the Progressive Hypothesis, we coded all VP complements of *will* or *gonna* for event type. Following Verkuyl (1989, 1993) we divided VPs semantically into three types: states, activities (unbounded events) and events (bounded events). If children are using *gonna* as a simple progressive, they should avoid using it with stative predicates, since the progressive is not generally acceptable with states (e.g. **John is knowing the answer*). Examination of the data, however, shows this prediction to be unsupported. Children use both *will* and *gonna* with all event types, as shown in Table 4.

MLU		Events	States	Activities
2.0-2.5	W	19	11	10
	G	64	0	5
2.5-3.0	W	79	8	15
	G	138	18	65
3.0-4.0	W	99	11	72
	G	418	68	347
> 4.0	W	159	79	378
	G	93	108	632

Table 4: Use of will and gonna by event type

In order to compare children and adult's use of *will* and *gonna* with states compared to nonstates we combined the two lowest MLU groups, and collapsed all the Events and Activities into one group, as shown in Table 5.

MLU	gonna	will		
	A+E	S	A+E	S
2.0-3.0				
Children	272	18	123	19
Adults	261	18	211	65
3.0-4.0				
Children	765	68	171	11
Adults	115	7	160	42
>4				
Children	725	108	537	79
Adults	462	50	868	94

Table 5: Use of will and gonna with states and non-states

Chi-squared tests revealed an interesting pattern. For *gonna*, children in any MLU group and adults do not differ from each other. However, for *will*, the pattern was different: in MLU group 2.0-3.0 children used *will* more with events and activities than with states ($\chi^2(1) = 6.04$, *p*<.01) and the same pattern was found in MLU group 3.0-4.0 ($\chi^2(1) = 17.50$, *p*<.001). In the oldest MLU group (>4) the pattern not significant.

These results show that that the Progressive Hypothesis is unsupported, since children do use *gonna* with states, and their use of *gonna* with non-states compared to states is not different from adults. However, the fact that children and adults differ in their use of *will* with non-states and states in the earlier MLUs but not at the oldest MLU is consistent with the idea that productive use of *gonna* precedes productive use of *will*. Whereas the youngest children use *gonna* like adults, only the oldest children use *will* like adults.

4 General Discussion

The results of the CHILDES study confirms Stephany's original observations, and a closer look at both the child directed speech and the data from event type fails to find support for either the

Input Frequency Hypothesis or the Progressive Hypothesis. Furthermore, the fact that children's use of *gonna* at any MLU doesn't differ from adults when examined by aspectual class (states vs. non-states) but younger children's use of *will* is different from adults provides further support for the basic claim that productive use of *gonna* precedes productive use of *will*. Since neither of these two hypotheses can explain the developmental pattern, we are left with our third hypothesis, the Context Contrast Hypothesis. While not conclusive, the developmental facts are consistent with Klecha's (2007) analysis of *will* and *gonna*, which posits a context accessibility function as part of the meaning of *will*. By not having such an accessibility function, *gonna* is essentially simpler than *will*, and the fact that it precedes *will* developmentally is not surprising. Of course, only experimental data concerning early comprehension patterns of *will* vs. *gonna* will be able to test the hypothesis directly. We are currently pursuing this line of investigation.

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