Inversion

- In English, *only* auxiliaries invert with the subject in yes-no questions
- And in *wh*-questions
  - When will John leave? (cf. John will leave tomorrow, *Left John yesterday?)

Kuczaj & Maratsos (1983)

- Kids seem to learn auxiliaries one by one; they appear at different times.

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Kuczaj & Maratsos (1983)

- Each auxiliary seems be first used outside of inversion contexts, only later in inversions

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Kuczaj & Maratsos (1983)

- Only *correctly* inverted verbs (auxiliaries) appear in child speech (no inversion of main verbs)

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A famous non-result: SAI in YNQs before SAI in whQs

Adam: At a certain point, inversion appears in yes-no questions—but inversion with *wh*-questions is still infrequent. Soon afterwards, inversion is frequent for both types of questions.
A famous non-result: SAI in YNQs before SAI in whQs

- Problem is, seems to be true of Adam’s files, but not true generally…
- Several later studies with better sampling show no identifiable stage where yes-no questions invert while wh-questions don’t—in fact, even the frequency doesn’t go in one direction for all kids.

Stromswold (1990, table 5.5)
% of inversion WHQ vs. YNQ

<table>
<thead>
<tr>
<th>Child</th>
<th>WH</th>
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<tbody>
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<td>Adam</td>
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<td>96.6</td>
<td>Nathan</td>
<td>60.1</td>
<td>46.2</td>
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<td>Allison</td>
<td>85.7</td>
<td>100</td>
<td>Nina</td>
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<td>94.1</td>
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<tr>
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<td>97.6</td>
<td>Sarah</td>
<td>92.9</td>
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<tr>
<td>Naomi</td>
<td>96.2</td>
<td>94.2</td>
<td>Shem</td>
<td>95.6</td>
<td>79</td>
</tr>
<tr>
<td>MEAN</td>
<td>93</td>
<td>93.7</td>
<td></td>
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Doubling errors

- A double-auxiliary error, both an inverted and an un-inverted auxiliary:
  - Why did you did scare me?
  - How can he can look?

- A “double-tensing” error (where an auxiliary moves to I but the verb surfaces with tense).
  - What did you bought?
  - What did you did?

Nakayama (1987)

- The longer the subject is, the more likely a kid is to make a doubling error; the length of the VP makes no difference.
  - Is [the boy who is watching Mickey] is happy?

- Looks like blending, rather than the (more interesting) “loud trace” idea… Common error type:
  - Is [the boy who is watching M], is he happy?

Doubling errors

- Are the kids pronouncing a “loud trace” of (head-)movement? (Are they moving the auxiliary but failing to leave the trace unpronounced?) That would be interesting.

- Are they just forgetting what they are trying to say midway through and “blending” two structures? (one with and one without movement)

Inversion in negation

- Guasti, Thornton & Wexler (BUCLD 1995) looked at doubling in negative questions.

- Previous results (Bellugi 1967, 1971, Stromswold 1990) indicated that kids tend to invert less often in negative questions.
  - First: True?
  - Second: Why?
GTW (1995)

- Elicited negative questions...
  - I heard the snail doesn’t like some things to eat. Ask him what.
  - There was one place Gummi Bear couldn’t eat the raisin. Ask the snail where.
  - One of these guys doesn’t like cheese. Ask the snail who.
  - I heard that the snail doesn’t like potato chips. Could you ask him if he doesn’t?

GTW (1995)

- Kids got positive questions right for the most part.
  - 88% of kids’ wh-questions had inversion
  - 96% of kids’ yes-no questions had inversion
  - Except youngest kid (3;8), who had inversion only 42% of the time.
- Kids got negative declaratives right without exception, with do-support and clitic n’t.

GTW (1995)

- Kids got lots of negative wh-questions wrong.
- Aux-doubling
  - What kind of bread do you don’t like? (3;10)
- Neg & Aux doubling
  - Why can’t she can’t go underneath? (4;0)
- No I to C raising (inversion)
  - Where he couldn’t eat the raisins? (4;0)
- Not structure
  - Why can you not eat chocolate? (4;1)

GTW (1995)

- But kids got negative subject wh-questions right.
  - which one doesn’t like his hair messed up? (4;0)
  - ...as well as how-come questions.
  - How come the dentist can’t brush all the teeth? (4;2)
- Re: Not structure
  - Why can you not eat chocolate? (4;1)
  - Kids only do this with object and adjunct wh-questions—if kids just sometimes prefer not instead of n’t, we would expect them to use it just as often with subject wh-questions.

GTW (1995)

- So, in sum:
  - Kids get positive questions right
  - Kids get negative declaratives right
  - Kids get negative subject questions right.
  - Kids get negative how-come questions right.
- Kids make errors in negative wh-questions where inversion is required.
  Where inversion isn’t required (or where the sentence isn’t negative), they’re fine.

GTW (1995)

- The kids’ errors all seem to have the character of keeping negation inside the IP.
  - What did he didn’t wanna bring to school? (4;1)
  - What she doesn’t want for her witch’s brew? (3;8)
  - Why can you not eat chocolate? (4;1)
  - Why can’t she can’t go underneath? (4;3)
- GTW propose that this is a legitimate option; citing Paduan (Italian dialect) as a language doesn’t allow neg->C.
GTW (1995)

- Re: subject and how come questions...
- In a subject question, we don’t know that the subject wh-word got out of IP—maybe kids left it in IP... heck, maybe even adults do.
  - Who left?
  - *Who did leave?
- How come questions don’t require SAI in the adult language{./?}
  - How come John left?
  - *How come did John leave?

wh-questions more generally

- When is the earliest evidence that kids are using wh-words in an adult way?
- Is there a difference between subject and object wh-words as to which is used first?

Early, early wh-questions

- There may be an early “formulaic” stage where kids ask questions by just asking “Wh(’s) NP?”.
- O’Grady: “Because of their formulaic character, it seems reasonable to treat these utterances as instantiations of a simple template rather than the product of whatever mechanism forms wh-questions in the adult grammar.”
- But why? We already have lots of reason to think young kids know a lot about adult grammar by then... What is simpler about a “simple template”?

Early, early wh-questions

- Radford gives some examples (without any counts) of wh-questions with incorrect is even after kids have “mastered” subject-verb agreement: What color is these?
  - Is is a default form? Are we seeing a missing AgrSP?
- Radford also gives some examples of “inappropriate responses” to wh-object questions: What are you doing with him [=snake]?
  — Snake.
  - But how do we know that the kid isn’t just not interested in the question?

Wh-subjects and wh-objects

- Is there a difference in the timing of emergence between subject wh-questions and object wh-questions? In English, there is an apparent difference in complexity (“distance” of movement, SAI).
- Bottom line: There does seem to be a preference of some kind for subject wh-questions over object wh-questions.

Early, early, early wh-questions

- Seidl, Hollick, Jusczyk (ms.) looked at headturn preferences in really young kids.
- Minimizes demands of task
- Use looking preferences to “answer” wh-questions.
  - What hit the apple?
  - What did the apple hit?
  - Where is the apple?
Kids saw a little simplistic computer-generated movie where, e.g., a book hit some keys.

Then there were two screens presented side by side, one with a book displayed, one with keys displayed.
- What hit the keys? (book)
- What did the book hit? (keys)
- Where is the book? (book)

Graph shows differences (target minus non-target).

20-month-olds seemed quite capable of comprehending all three kinds.
15-month-olds couldn’t do objects; 13-month-olds couldn’t do any.

**Processing, structural distance**

- The distance between the base and derived positions for an object wh-word is greater than the distance between the base and derived positions for a subject wh-word.

  - What did [IP John [VP buy t_i]]?
  - Who [IP t_i [VP bought coffee]]?

**Hildebrand (1987)**

- Tested (fairly old) kids on a paradigm of wh-questions of varying “depth” to see if more embedded wh-words are harder.

  In a repetition task (4-10 year olds), it was almost uniformly true that the more deeply embedded the wh-word was, the more errors the kids made trying to repeat it.

**Processing, structural distance**

- Re: preference for subject wh-questions; perhaps kids are sensitive to the number of phrases a moving wh-phrase has to escape. This also makes other predictions:
  - What, will [IP Sue [VP read t_i]]?
  - What, will [IP Sue [VP talk [PP about t_i]]]?
  - What, will [IP Sue [VP read [NP a book [PP about t_i]]]]?

**But wait…**

- So kids make more errors extracting from more deeply embedded structures. Is this a fact about the acquisition of wh-movement? Or is it just a fact about language processing in general?

  - What do adults do?
  - My guess: Even for adults, the more complex structures are (marginally) harder to process. Certainly true for subject vs. object relative clauses (the man who _ left vs. the man who I met _).
Does child *wh*-movement obey the adult rules for *wh*-movement?

- When the kids ask *wh*-questions, what structures are they using? Are they like the adult structures? If not, how are they different? Are they performing movement? Are there traces? Do the movements obey constraints (e.g., *wh*-island, ECP, …)?

**Crain & Thornton (1991)**

- There are three guys in this story: Cookie Monster, a dog, and this baby. One of them gets to take a walk, one gets to take a nap, and one gets to eat a cookie. The rat gets to choose who does each thing. So one gets to take a walk, right? Ask Ratty who he wants.

- Kid: Who do you want to take a walk?

**The ECP and argument-adjunct asymmetries**

- Moving a *wh*-word out of a *wh*-island is better or worse depending on whether the *wh*-word is an argument (subject or object) or an adjunct.

  - *How did he ask [sub wh where to fix the car t ]?
  - What did he ask [wh how to fix t ]?

Do kids have *wh*-traces in their *wh*-questions?

- How do they perform on wanna-contraction?
  - Who do you want to help *t*?
  - Who do you wanna help *t*?
  - Who do you want *t* to help you?
  - *Who do you wanna / *t* help you?

- Crain & Thornton (1991) studied this…

**Crain & Thornton (1991)**

- The kids (2;10 to 5;5) all knew the wanna contraction rule…

- 59% of the time kids contracted to wanna with object questions (as allowed)

- 4% of the time kids contracted to wanna with subject questions (out for adult)

**De Villiers, Roeper, and Vainikka (1990)**

- [Kid takes a shortcut home, rips dress, that night, kid tells parent about dress]

  - When did she say *t* [she ripped her dress *t*]?
  - “at night” “that afternoon”

  - When did she say *t* [sub wh how she ripped her dress *t*]?
  - “at night” “that afternoon”

- 3-6 year-olds allow short and long distance questions for complement clauses, don’t like long distance adjunct questions out of *wh*-islands…
De Villiers, Roeper, and Vainikka (1990)

- And kids make the argument-adjunct distinction the ECP makes for adults:
  - No wh-island, arguments/adjuncts both take long distance interpretation about 30-40% the time
  - Argument wh-island, neither argument nor adjuncts can move out (2-8% LD)
  - Adjunct wh-islands, arguments can move out (30% LD) but not adjuncts (6% LD).

Again, kids have a lot right—but what do they have wrong?

- When kids make a mistake with a question like...
  - When did she say how she ripped her dress?
  - …it will often be that they answer something like “climbing over the fence”—answering the question How did she say t she ripped her dress? instead.

What are kids doing when they answer a medial wh-word?

- Are they answering the last wh-word they saw?
  - Kids don’t answer medial wh-words in yes-no questions.
    - Did Mickey tell Minnie what he bought?
  - Kids don’t answer wh-words in relatives.
    - How did you meet the man who sang?

German partial wh-movement?

- Was hat er gesagt [wie er das Kuchen machen kann]?
  - What has he said how he the cake make can’
  - ‘How did he say he could make the cake?’

- Are kids treating the upper wh-word like a scope marker? (Are they “speaking German”?)

German partial wh-movement?

- Kids have been observed to produce questions with an initial wh-word and an in situ wh-word (i.e. in its base position).
- What do you think what’s in her hat?
  - ‘What do you think is in her hat?’
- What do you think where the marble is?
  - ‘Where do you think the marble is?’

- More evidence is required to determine whether this should be considered to be parallel to German partial wh-movement…

Processing constraints?

- O’Grady suggests that another reason why kids might answer the intermediate wh-word is that they’ve already forgotten the matrix clause (citing Phinney 1981, who found that 3-year olds often delete the matrix subject and verb when repeating biclausal sentences).

- Kids don’t answer a medial wh-word in a yes-no question, though..?
Other constraints on *wh*-movement from 3-5 year olds

- They reject adjunct extraction from NP
  - *How, did the mother see [his riding $t_i$]?
- But they allow argument extraction…?
  - Who, did the mother show [his copying $t_i$]?
  - This is de Villiers’ example; seems ambiguous to me between extraction and non-extraction readings. Better might be *What did the mother show his eating?*
- They reject adjunct extraction from rel. clause
  - *How, did [the woman who knitted $t_i$] swim?*
- And reject extraction from temporal adjuncts
  - *Who did the elephant ask [before helping $t_i$]?*

That-trace?

- Who did the pig believe that swam in the pond?
  - Kids opt for the interpretation where the questions asks which, of the animals the pig believes, swam.
  - Kids don’t go at all for the interpretation which entails a violation of that-trace (the pig believed that who swam)

This is sort of mysterious, since languages differ as to whether they respect the that-trace filter.

Superiority 3-5

- Adults:
  - Who, $t_i$ slept where?
  - *Where, did who sleep $t_i$ ?*

- And the kids seem to have that down cold. (Kid: *It’s better if I start.*)

Grammar vs. Preferences

- These experiments are really testing preferences not grammaticality. If they prefer the that-less variant, we won’t see that-trace violations even if they are strictly grammatical for the kid.
- Just because a structure is dispreferred (for whatever reason—frequency, difficulty, etc.) does not mean that it is ungrammatical in the child’s grammar.
- Preferences are not the best route to discovering the properties of child grammar, though it’s hard to design grammaticality judgment experiments..

Questioning out of quotations

- Adult languages generally can not question out of a quotation:
  - *What, did the boy say “Can I bring $t_i$” ?*

- But English, French and German kids (3-6 years) seem to allow it.
- Why?
**Correlates to questioning out of quotations**

- Kids may not quite grasp the quotation yet.
- A significant proportion of kids around the same age range allow co-reference between a pronoun in the quotation and the subject:
  
  - “He, can sit here” said Mickey.

- Perhaps, it has more to do with the fact that it requires “getting into someone else’s head”…

**False beliefs**

- Kids before a certain age (usually before 4) seem unable to take another person’s perspective:

  - Little rabbit puts carrot in red basket, leaves. Mother rabbit comes in, moves carrot to blue basket. Little rabbit comes back. Where does he look for the carrot?

- Some kids will answer “the blue basket”—unable to see that the little rabbit shouldn’t have known.

**False beliefs & quotations**

- Those same kids who answered “blue basket” were also those who would do this:

  - Mother bought cake, but wanted to surprise girl. When asked, mother claimed to have bought paper towels.
  - What did Mother say she bought?

  - The “blue basket” kids answer “cake.”

**False beliefs & quotations**

- So, perhaps it is understanding what a quotation is that is allowing kids to extract from them—they treat a quotation as a regular clausal complement.

**Weak islands**

- In the adult language, there is a certain configuration which seems to create an island for movement of *wh*-adjuncts, which arguably has to do with the logical meaning.

  - *Coming by train* is a subset of the events *coming*.
  - *John said Mary was coming by train* implies *John said Mary was coming*.

**Weak islands**

- In *weak islands* the implication fails:

  - Negation:
    - John didn’t say Mary was coming by train.
    - John didn’t say Mary was coming.
  
  - Factivs:
    - John forgot Mary was coming by train.
    - John forgot Mary was coming.

  - With quantificational adverbs:
    - John often eats grapes with a fork.
    - John often eats grapes.
Weak islands

- And in those cases, you can’t extract *wh*-adjuncts in the adult language.
  - Why, did John say (*t*) that Mary left (*t*)?
  - Why, did John forget (*t*) that Mary left (*t*)?
  - Why, didn’t John say (*t*) that Mary left (*t*)?
  - Why, does John often say (*t*) that Mary left (*t*)?

Weak islands

- Four-year-olds have been observed to fail on the implication:
  - Jim forgot that his aunt was arriving by train, so he went to the bus station to pick her up... Did Jim forget that his aunt was coming?
  - —Yes!

- Guess: They haven’t gotten the implication pattern down for these non-monotonic-increasing environments.

Weak islands

- Now: If kids haven’t gotten the implication pattern, and if the implication pattern is implicated in the islandhood, do kids fail to observe weak islands just when they also fail on the implication pattern?

- Philip and de Villiers (1992) looked into this...

Philip and de Villiers (1992)

- Kids never allow LD association out of a *wh*-island (they obeyed the purely syntactic constraint).
  - “Why, did the mother ask [what he made *t*]?”

- The other facts were “generally in support” (de Villiers 1995) of the conclusion that where kids fail to make the inferences required by non-monotone-increasing environments, they also fail to treat them as movement islands.