Head-movement and allomorphy in children's negative questions

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Many English-speaking children, once they are regularly using subject-AUX inversion, produce occasional errors like (1): negative *n't* questions with a 'doubled' auxiliary (henceforth **2AuxQ**s):

(1)　a.　Why <u>does</u> Superman <u>does</u>n't wear Underoos on his bottom? (3;03)　(MacWhinney 2000)
　　　b.　Why <u>did</u> you <u>did</u>n't know? (3;08)　(Kuczaj 1977; abe126)
　　　c.　What <u>do</u> we <u>do</u>n't have that we can make? (3;09)　(Kuczaj 1977; abe135)

Compared to the adult questions in (2), 2AuxQs seem to involve a **failure to raise *n't* to C**, so that *n't* gets stranded and eventually rescued by a copy of the auxiliary (3). See Guasti et al. 1995, Hiramatsu 2003, Xu & Snyder 2011, Zuckerman 2001, for precedent for this basic idea.

(2)　a.　Why doesn't Superman wear Underoos on his bottom?
　　　b.　Why didn't you know?
　　　c.　What don't we have that we can make?

(3)　a.　*Adult q:* Why did**n't** [TP you *t* know]?　　b.　*2AuxQ:* Why did [TP you *did***n't** know]?

But *why* does Neg-to-C fail? Previous accounts disagree here, and none are quite satisfactory: they either fail to explain important facts, or rely on unmotivated assumptions about differences in the child's grammar (see §1). This paper aims to fill this gap.

NEW OBSERVATIONS (§2): I look at a range of negative questions in CHILDES and show that:
　　(i)　2AuxQs never occur in tag questions, positive-bias *yn*-questions, or *why -n't* proposals, but only in information-seeking questions with 'true' sentential negation—supporting the idea that Neg-to-C failure is at work here;
　　(ii)　2AuxQs *do* occur in inner-negation *yn*-questions, where Neg-to-C isn't even expected (e.g. *Do I don't need socks?*)—suggesting that Neg-to-C failure is only part of the story.

PROPOSAL (§3): I argue that 2AuxQs involve two independent errors, both well-precedented:
　　(i)　a **planning** error (raising T to C without raising Neg to T first)
　　(ii)　an **allomorphy** error (overgeneralization of *n't* (vs. *not*))

1.　PREVIOUS APPROACHES TO 2AUXQS

While 2AuxQs are rare in spontaneous-speech corpora (Stromswold 1990), Guasti, Thornton & Wexler (1995, henceforth GTW) show that children do produce them in appropriate contexts, e.g.:

(4)　Puppet:　I heard the snail doesn't like to eat some things. Ask him what.
　　　(*Target:*　What don't you like to eat?　*2AuxQ*: What do you don't like to eat?)

All 10 of GTW's participants (3;08-4;07) produced at least some 2AuxQs in such contexts, 5 of them ≥45% of the time.

GTW attribute their findings to a general syntactic ban on raising Neg out of TP (cf. (3b)); this ban is initially adopted as a UG option (and continues to hold in languages like Paduan) but is overridden in English in the face of counterevidence in the adult input, *viz.* questions like (2).

- Zuckerman (2001:ch8) offers an alternative explanation that has similar effects to GTW's: children prefer to leave Neg in TP because it is 'more economical' than raising Neg to C.

But Hiramatsu (2003) raises a serious problem for GTW and Zuckerman: a <u>mismatch between children's grammaticality judgments and what they actually produce</u>.

- Three of her four participants (4;0-5;0) who *produced* 2AuxQs >80% of the time *rejected* 2AuxQs like (5a) ≥75% of the time in a judgment task. On the other hand, they overwhelmingly *accepted* adultlike AUX*n't*-initial questions like (5b)—which would be unexpected if they were using a grammar that banned Neg-to-C.

   (5)   a.   Why did Bert didn't cook the eggs?   *(rejected)*
         b.   Why didn't Big Bird brush the dog?   *(accepted)*

Xu & Snyder (2011) therefore characterize 2AuxQs as performance errors (an idea I am sympathetic to in spirit; see §3). But the particular type of error they posit—misanalyzing *n't* as a *specifier* of NegP, so that it is ineligible for head-movement—is to my knowledge unprecedented.

In a similar vein, Hiramatsu argues that 2AuxQs have constituent negation, with Neg as a vP *adjunct*—rendering Neg-to-C head-movement structurally impossible. But again, the assumption that these children merge Neg *n't* in a different structural position from adults is unmotivated. There is no independent reason why children this age would overuse constituent negation—particularly in contexts like (4) where they they have just heard an adult modeling *sentential* negation (with *do*-support).

When GTW (231) elicited **negative declaratives**, children produced adultlike forms 'without exception'; they did not produce e.g. (6)a, which might be expected if Neg were a vP adjunct. Nor do children (to my knowledge) produce overregularized contractions like (6)b in 2AuxQs, which might support the idea that *n't* had not been fully incorporated (affixed) via head-movement.

   (6)   *You [vP not [vP like pizza]]
         *Why do you [du]n't like pizza?

An important note on *not*. All four of the above proposals agree that there is *something* problematic for children about raising *n't* to C. However, as they all also recognize, there's a way to leave Neg in TP while retaining grammaticality—by spelling out Neg as *not*.

(7)   a.   Why did [TP you **not** know]?   b.   What do [TP you **not** like to eat]?

GTW show that children who produce 2AuxQs also sometimes produce questions like (7). But why don't kids *always* solve the Neg-to-C problem with e.g. (7), instead of resorting to 2AuxQs?

As recognized by Zuckerman (2001:159), 'the explanation seems to be related to the children's preference for the contracted form of negation.' Importantly, this <u>over-preference for *n't* must be an independent problem; the Neg-to-C problem alone cannot explain 2AuxQs</u>. This generalization plays an important role in my proposal in §3.

(8) GENERALIZATION: 2AuxQs involve the co-occurrence of **two independent problems**: (i) a Neg-to-C raising problem and (ii) an over-preference for *n't* (vis-à-vis *not*).

2. NEW FACTS

I begin with two observations, supported by CHILDES data (MacWhinney 2000), that have been overlooked in previous work.

Observation 1: 2AuxQ errors are unattested in tag questions, positive-bias *yn*-questions, and *why -n't* proposals (9)—a surprising gap given how frequent these are in discourse (Table 1).

(9) a. *Positive-bias* yn-*questions:* Ow, doesn't that hurt?
       Unattested: Ow, does that doesn't hurt?
  b. *Tag questions:* A tricycle has a back, doesn't it?
       Unattested: A tricycle has a back, does it doesn't?
  c. Why-n't *proposals:* Why don't we play a game, ok?
       Unattested: Why do we don't play a game, ok?

Table 1. Abe's inverted negative questions (2;6-5;0) (data from Kuczaj 1977)

	n (%)	2Aux
AUX*n't*-initial *yn*-questions	88 (52%)	--
Tag questions	26 (15%)	0
Why-don't proposals	7-22[1] (4-13%)	0
Other (e.g. (1)b,c)	<u>34-49 (20-28%)</u>	5
	170 (100%)	

Holmberg (2016:ch4.8) suggests that *n't* in (9)a,b is not actually merged TP-internally, but rather heads a functional projection *above* TP, in the C-domain. Among other things, this would explain why (9)a,b cannot be answered in a way that 'confirms' TP-internal negation (10):

(10) a. Doesn't that hurt?   A: Yes, you're right, it {does / *doesn't}.
     b. A tricycle has a back, doesn't it?   A: That's right, it {does / *doesn't}.

It is quite plausible that *n't* in (9)c, too, is interpreted outside of TP. Negative *why* questions normally entail an entire negative TP, but *why -n't* proposals do not (11).

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[1] Fifteen of Abe's *why-don't* questions are ambiguous between information-seeking and proposal readings. Diagnostics for distinguishing proposals from info-seeking questions include the *okay?* tag, NPIs and PPIs (e.g. *Why don't we <u>ever</u> go to the movies?* can only be info-seeking), the use of stative or non-agentive verbs (e.g. *Why aren't you a teacher?* can only be info-seeking), and the use of simple-present tense alongside punctual adverbs (*Why don't we eat now?* can only be a proposal). When none of these diagnostics are present (e.g. *Why don't we play in the kitchen?)*, the question is ambiguous between info-seeking and proposal readings.

(11) a. Why don't cats like chocolate?
          [CP why **NEGi** [TP cats ~~**NEGi**~~ like chocolate]] (⇒ 'Cats don't like chocolate')
      b. Why don't we play a game, ok?
          [CP why-**NEG** [TP we play a game]] (⇏ 'We don't play a game')

Observation 1 serves as additional support for (3)b, the basic idea that 2AuxQs are at least partly attributable to a failure to raise Neg through T to C. However…

Observation 2: Some 2AuxQs occur in contexts where Neg is not even expected to raise out of TP in the first place—namely, 'inner-negation' *yn*-questions, where negation has TP-internal scope. Many English speakers avoid raising Neg to C here, instead leaving Neg down below spelled out as *not* (Sailor 2003, *pace* Ladd 1981).

(12) a. I don't like him; do you not like him either?
      b. I don't like him; [%]don't you like him either?

But some 2AuxQs have inner-negation *yn*-question readings. In (13), for example, Abe (3;06) has just said that he didn't like the spooky parts of the show and is now asking his dad if he also disliked them. An adult counterpart to the 2AuxQ in this context would be (14).

(13) FAT: did you like that show we went to see?
      CHI: (ex)cept <I didn't> I didn't like the spooky parts.
      FAT: which parts were spooky?
      CHI: the cougar part and the cougar part.
      FAT: those were spooky parts huh?
      CHI: **did you don't like the spooky parts?**
      FAT: I don't like spooky parts.
      CHI: did you when you were a little kid?
      FAT: what?
      CHI: did you when you were a little kid?
      FAT: did I like (th)em then?
      CHI: uhhuh.
      FAT: nope

(14) Did [TP you **not** like the spooky parts (either)]? (*cf.* [%]Didn't you like the spooky parts either?)

More inner-negation *yn*-2AuxQs, produced by my daughter (5;0-5;1):

(15) a. Do we don't need to lock it [the car]? (already walking away from car)
      b. Do I don't need to wear socks? (already putting on shoes over bare feet)
      c. Do we don't really need our little things [headlights] on? (on a sunny day)
      d. Do they [cats] normally don't drink? (previously was told that cats don't drink much)

Again, the adult counterparts to these 2AuxQs—*in these contexts*—would not have Neg-to-C:

(16) a. Do we not need to lock the car? (*cf.* [#]Don't we need to lock the car?)
      b. Do I not need to wear socks? (*cf.* [#]Don't I need to wear socks?)
      c. Do we not really need our headlights on? (*cf.* [#]Don't we really need our headlights on?)
      d. Do they normally not drink? (*cf.* [#]Don't they normally drink?)

Observation 2 shows that 2AuxQs cannot be *solely* attributed to Neg-to-C failure; rather, there must be an additional problem at work. As suggested in (8), I believe this additional problem is children's over-preference for *n't* (as opposed to *not*).
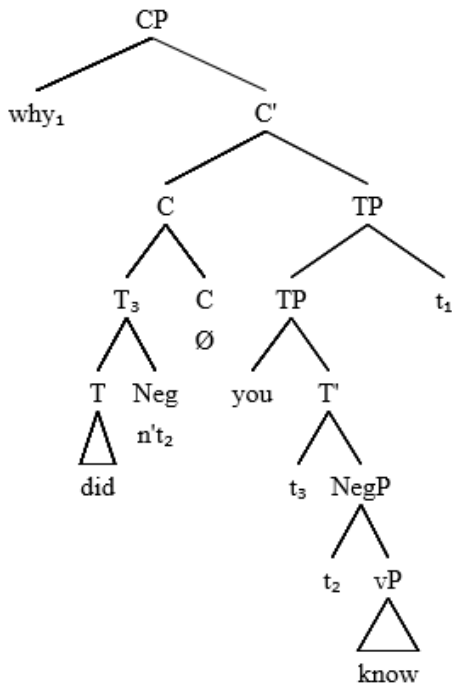
3. ANALYSIS

I propose that 2AuxQs involve two **independent** errors:
  (i) a **planning** error (raising T to C without raising Neg to T first)
  (ii) an **allomorphy** error (overgeneralization of *n't* (vis-à-vis *not*))

Let's begin with the syntax I am assuming for two types of adult negative questions—a negative *why* question with *n't* (17)a and an inner-negation *yn*-question with *not* (17)b:

(17) a. Negative *why* question   b. Inner-negation *yn*-question
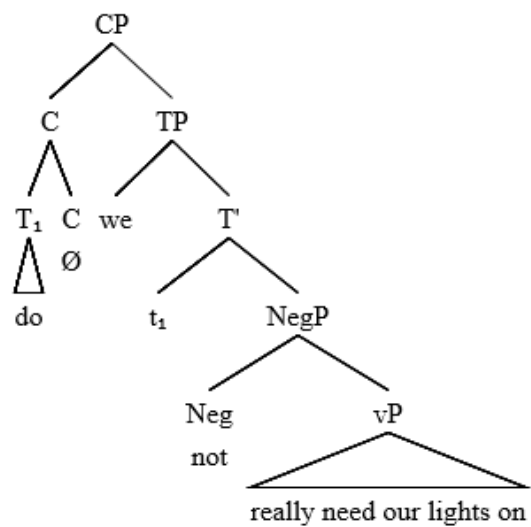
I have adopted the following assumptions here (among others):
  a. NegP is a functional projection between TP and vP;
  b. *n't* and *not* are allomorphs of Neg (see (18));
  c. Neg ordinarily raises to T in (17)a but stays *in situ* in (17)b;[2]
  d. T obligatorily raises to C in English direct questions (yielding subject-AUX inversion);
  e. When bound T is prevented from combining with *v*, dummy verb *do* is inserted.

(18) [+NEG] ↔ **n't** / X⊕__ ('iff Neg is affixed to X, where X is phonologically overt')
              not (elsewhere; the default)

___
[2] A full account of why Neg-to-C is dispreferred in inner-negation *yn*-questions is beyond the scope of this paper. One possibility, building off Romero & Han 2004, might be that raising Neg to C would allow Neg to scope over a VERUM operator in C, yielding an undesired reading. See e.g. Pak 2017.

Now let's consider what happens in a 2AuxQ. Given the production/judgment mismatch revealed by Hiramatsu, I agree with Xu & Snyder that 2AuxQs involve a **performance**-related problem. But I appeal to a more general type of error than theirs—namely, a **planning** error.

Speakers sometimes begin uttering sentences before they are fully planned (Kroch 1981, Phillips & Lewis 2013, etc.). I believe that in the 2AuxQ in (17)a, the <u>child begins uttering *Why did…*, raising T-to-C, without planning far enough ahead to realize that Neg needs to be raised to T first.</u> Neg then gets 'stranded' within TP.

(19)　　a.　[$_{CP}$ why [$_C$ [$_T$ did$_i$]] [$_{TP}$ …
　　　　　b.　…[$_{TP}$ you　t_i [$_{NegP}$ **!Neg** …

Why would these questions be difficult for children to plan? We saw in §2 that 'true' negative questions—i.e. questions where *n't* surfaces in C but is unambiguously interpreted within TP— are less common in discourse than they appear at first sight (Table 1). Moreover, Neg to C requires *iterative* head-movement—Neg to T, then T to C—which may well stymie a child who has only recently mastered subject-AUX inversion (T-to-C).

The derivation in (19) could be 'rescued' by the allomorphy rule (18), which would insert *not*:

(20)　　[$_{CP}$ why [$_C$ [$_T$ did$_i$]] [$_{TP}$ you t_i [$_{NegP}$ **not** [$_{vP}$ know]]]]

But as is well known, children this age are still acquiring allomorphy rules for [PAST], [PL], [DEF], etc. (Yang 2016); here are some overgeneralization errors produced by Abe at 3;08-3;09.

(21)　　a.　Mommy *throwed* the card away.　　　　　　(Kuczaj 1977, abe 126)
　　　　　b.　We're gonna go to Texas and fly *a* airplane. (Kuczaj 1977, abe135)

The overuse of *n't* in 2AuxQs can also be analyzed as overgeneralization—treating *n't* as the default and *not* as the 'special case,' to be inserted iff Neg has stress or focus.

(22)　　[+NEG] ↔ **not** / ___[+FOC] (e.g. *I do nót like him*)
　　　　　　　　 n't (elsewhere; the default)

Children plausibly start with *n't* as the default because it is the more frequently occurring form in discourse (similar to *a* in (21)b; see Pak 2016). If a child with this allomorphy rule derives (19)b above, they will insert their default *n't* at Neg, a context where it has no host. As a last resort, the child either pronounces the lower copy of [$_T$ ~~does~~] or inserts a(nother) dummy *do* to support *n't*.

(23)　　[$_{CP}$ why [$_C$ [$_T$ **did**]$_j$] [$_{TP}$ you [$_T$ ~~**did**~~]$_j$ … [$_{NegP}$ [$_{NEG}$ **n't**] [$_{vP}$ know]]]]]

4.　SOME PREDICTIONS

Importantly, **the planning error (i) and the allomorphy error (ii) can occur independently**.

- It's possible for a child to fail at Neg-to-C (i) but then apply the adult allomorphy rule (ii), yielding e.g. (20). Evidence for this pattern (represented in the top-right cell in Table 2) is given in GTW, where 7 of 10 participants produced questions like (20) alongside 2AuxQs, two of them >20% of the time. Such questions, while grammatical, are nonadultlike, since adults overwhelmingly use *n't* in negative *why* questions (Pak 2017).

- Conversely, it's possible to commit the allomorphy error (ii) without the planning error (i). This explains why we find 2AuxQs in inner-negation *yn*-questions, where Neg-to-C isn't even the target (bottom-left cell in Table 2).

Table 2. Four possible patterns in the development of negative questions

| | | PLANNING | |
		+ *(adultlike)*	- *(non-adultlike)*
ALLOMORPHY	+	Why didn't you know? (17)a Do we not really need them? (17)b	Why did you <u>not</u> know? (17)a Do we not really need them? (17)b
	-	Why didn't you know? (17)a <u>Do</u> we <u>don't</u> really need them? (17)b	Why <u>did</u> you <u>didn't</u> know? (17)a <u>Do</u> we <u>don't</u> really need them? (17)b

My account explains why children overwhelmingly accept adultlike questions (*Why didn't Big Bird brush the dog?*) in Hiramatsu (2003)—Neg-to-C is fully grammatical for them, just difficult to execute in production.

The absence of 2AuxQs in tag questions, positive-bias *yn*-questions and *why -n't* proposals (§2, Observation 1) suggests that *n't* here is a functional head merged above TP, as independently proposed by Holmberg (2016). This XP head can get picked up in the course of T-to-C raising without the degree of forward-planning necessary in (17)a.

(24)   [CP [C [X [T **does**]j **n't**]i] [XP   [X [T ~~**does**~~]j ~~**n't**~~]i   [TP that [T ~~**does**~~]j [vP hurt]]]]]

5. CONCLUSIONS

Under my treatment, 2AuxQs arise from the confluence of well-established properties of English morphosyntax: the status of NegP, the *n't~not* alternation and affixhood of *n't*, and the restrictedness of serial head-movement, particularly Neg-to-C. The two errors that are responsible for 2AuxQs—planning and allomorphy—are both well-established, and this account correctly predicts that children may struggle with one, both, or neither type of error.

Taken together, Observations 1 and 2 (§2) show that 'true' negative questions with *n't* in C are less common than they appear at first sight: many questions with *n't* in C turn out not to have true sentential negation (Obs. 1; (24)), and some questions with true sentential negation don't allow Neg-to-C (Obs. 2; (17)b). This finding may have implications for English syntax beyond acquisition, perhaps shedding light on the (somewhat mysterious) absence of Neg-to-C in e.g.:

(25) a. How do you not love this movie?! (^(??)How don't you love this movie?!) (Pak 2017)
     b. No way does he not like you. (^(??)No way doesn't he like you.)
     c. Had I not seen you, I wouldn't have stopped. (*Hadn't I…) (Zuckerman 2001:30)

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