

## How is contraction not possible here?

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### 1. Introduction: Another kind of *how*-question

Typically, *how*-questions are assumed to involve *wh*-movement of an adjunct denoting manner or instrument (1a)-(1b). However, English *how*-questions can also have a very different, largely unnoticed interpretation: they can be used (rhetorically) to express extreme surprise that the proposition under *how* holds at all (1c). I will refer to these ‘propositional’ *how*-questions as **PHQs**, and to the more familiar manner and instrument *how*-questions collectively as **MHQs**.

- 1) How did John fix that chair?
  - a. Very slowly and carefully. (manner, MHQ)
  - b. With a hammer. (instrument, MHQ)
  - c. I know! I didn’t think he could fix anything! (propositional, PHQ)

My goal here is to provide an analysis of PHQs that accounts for their principal semantic, syntactic and morphological properties, focusing in particular on negation in PHQs.

### 2. Distinguishing manner/instrument MHQs from propositional PHQs

While many *how*-questions, like (1), are ambiguous between MHQ and PHQ readings, MHQs and PHQs can be distinguished by at least four properties.

First, PHQs can be used with all kinds of stative predicates, while MHQs cannot – presumably because manner/instrument modifiers are incompatible with states (Smith 1991:ch3, Katz 2000). For example, while *fall asleep* in (2) denotes a change of state, *be asleep* in (3) denotes a simple state (reinforced by the adverb *still*, which is used only with stative predicates (Katz 2000)). Correspondingly, the MHQ reading is available in (2) but not in (3).

- 2) How did Sarah fall asleep?
  - a. By counting sheep. (MHQ)
  - b. I know – she was so wired at bedtime! (PHQ)
- 3) How is Sarah still asleep?
  - a. #By keeping her blinds closed. (#MHQ)
  - b. I know – it’s been ten hours now! (PHQ)
- 4) *More examples of unambiguous PHQs with statives:*
  - a. How is that restaurant still open? (It’s 2:00a.m.!)
  - b. How do you hate this song? (It’s got such great lyrics!)
  - c. How has it already snowed six times? (It’s only October!)
  - d. How is Bill no longer the chair of Linguistics? (I thought he had a 6-year term.)
  - e. How are you still working on that paper?
  - f. How is anyone happy with these results?

Second, there is a difference in intonation: while *how* can be de-accented in a MHQ, it must bear pitch-accent in a PHQ:

- 5) a. { Hów / hòw } did Sarah fall asleep?  
b. { Hów / ?\*hòw } is Sarah still asleep?

Third, PHQs are fully compatible with sentential negation, showing none of the weak-island effects induced by negation in MHQs (Abrusán 2008, Ross 1984, Kuno & Takami 1997, etc.):

- 6) How did John not fix that chair?  
a. #With a hammer. / #Carefully. (#MHQ)  
b. I know! It looked like such a simple job! (PHQ)
- 7) a. How is that restaurant not open yet? (all PHQs)  
b. How do you not love this song?  
c. How has it not snowed at all this winter?  
d. How is Bill not the chair of Linguistics anymore?

Oddly, however, while PHQs freely allow negation, they resist Neg-contraction to *n't*:

- 8) a. ?\* How isn't that restaurant open yet?  
b. ?\* How don't you love this song?  
c. ?\* How hasn't it snowed at all this winter?  
d. ?\* How isn't Bill the chair of Linguistics anymore?

Some speakers that I have consulted reject sentences like (8) outright; others find them marginally acceptable. All have agreed, however, that there is a clear contrast in acceptability between the *how*-questions in (8) and the *why*-questions in (9), where Neg-contraction is fine:<sup>1</sup>

- 9) a. Why isn't that restaurant open yet?  
b. Why don't you love this song?  
c. Why hasn't it snowed at all this winter?  
d. Why isn't Bill the chair of Linguistics anymore?

The contrast between (7) and (8) (and between (8) and (9)) presents an interesting puzzle: Given that there's no problem with negation *per se* in PHQs, why should it matter if the Neg morpheme is reduced to *n't* or spelled out as *not*? I'll offer the following explanation:

- 10) **Proposal:** The problem arises when Neg raises to C. Raising allows Neg to undesirably scope over a VERUM operator in C that is responsible for the PHQ's unique semantics.

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<sup>1</sup> There is at least one other type of *how*-question, distinct from both PHQs and MHQs, which I have provisionally coined the 'metalinguistic *how*-q': e.g. *How is John a good husband?* (= 'How can you say that John is a good husband?'). These questions are interpreted as challenges to another speaker's use of a word or phrase (imagine scare quotes around *a good husband*); crucially, unlike PHQs they do not presuppose the proposition under *how*. I leave their analysis for future work, but an initial observation is that they seem to allow Neg-contraction more freely than PHQs do.

### 3. Analysis

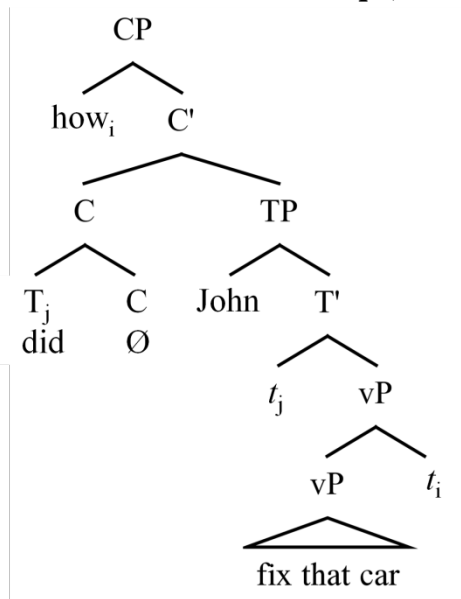
Let's start by establishing a baseline syntax for MHQs. I'll assume, fairly uncontroversially, that manner/instrument modifiers are adjoined low, at the vP level; i.e., they modify predicates rather than propositions (Katz 2000; Thomason & Stalnaker 1973). In the MHQ in (11)a, correspondingly, *how* is initially merged as a vP adjunct and moves to Spec,CP.

Now consider the PHQ in (11)b. Notice two key differences between the MHQ and the PHQ:

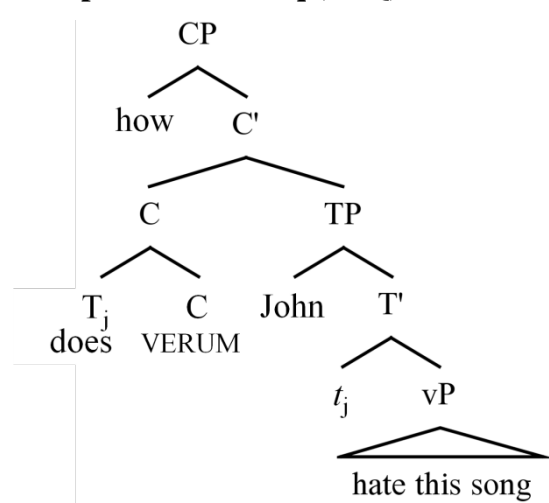
- The PHQ has a covert semantic operator, VERUM, in C.
- PHQ *how* is initially merged in Spec,CP.

I provide arguments for each of these claims in §3.1 and §3.2.

#### 11) a. Manner/instrument *how*-q (MHQ)



#### b. Propositional *how*-q (PHQ)



**3.1 Why VERUM?** Let's start with the question: What exactly does a PHQ mean? As an initial observation, the PHQ in (12) simultaneously achieves both (12)-i and (12)-ii:

- 12) How do you hate this song?
- acknowledges the truth of the proposition *You hate this song*
  - expresses extreme surprise at the truth of the proposition *You hate this song*

A PHQ is arguably an attempt to resolve an *internal epistemic conflict* (cf. Romero & Han 2004): the speaker previously believed that *p* was nearly impossible, and now must recognize the certainty of *p*. The implicit question is ‘What caused such an unlikely reversal?’ – a question with an existentialist flavor that usually ends up being interpreted rhetorically.

I propose that the PHQ's interpretation comes about via the combination of *how<sub>P</sub>* (propositional *how*) in Spec,CP and a covert VERUM operator in C.

- 13)  $[[\text{how}_p]]^2 = \lambda r. \text{What is the } q \text{ such that CAUSE}(q,r)?$   
 (where ‘cause’ means ‘provide sufficient condition for’ (Tsai 2008))
- 14)  $[[\text{VERUM}]] = \lambda p. \text{It is for-sure that } p \text{ should be added to the Common Ground (CG)}$   
 (Romero & Han 2004) (CG is the set of propositions that participants in a conversation assume to be true.)
- VERUM, according to Romero & Han 2004, is a conversational epistemic operator that asserts the speaker’s certainty that a proposition should be added to CG (similar to *really* in Sarah *really is still asleep*).
  - Suppose that the purpose of VERUM in the PHQ is to rule out the possibility that there is some mistake about the truth of  $p$ . This could be the source of the ‘extreme surprise’ interpretation of a PHQ: The addition of VERUM to  $p$  yields an implicature that  $p$  is particularly unlikely or hard to believe (otherwise VERUM would be unnecessary information, per Grice’s (1975) Quantity-2 maxim).
- 15)  $[[\text{how}_p \text{ VERUM } p]] = \text{‘What is the } q \text{ such that } q \text{ caused it to be for-sure that } p \text{ should be added to CG?’}$

**3.2 PHQ *how* starts in Spec,CP.** As noted in (12)-i and (13), PHQ *how* combines with and presupposes a *complete* proposition, with no missing arguments or other gaps. By assuming that PHQ is initially merged in Spec,CP, we account for this observation as well as the following:

- PHQ *how* always takes scope over sentential negation, while MHQ *how* is interpreted under negation and is correspondingly subjected to weak-island effects (see (6)-(7)).
- 16) PHQ:  $[_{CP} \text{how} \text{ does } [_{TP} \text{John } [_{NegP} \text{not } [_{VP} \text{love this song } ]]]]$  HOW > NEG  
 i. = ‘I am surprised that John does not love this song.’  
 ii. *presupposes* ‘John does not love this song.’
- 17) #MHQ:  $[_{CP} \text{how}_i \text{ did } [_{TP} \text{John } [_{NegP} \text{not } [_{VP} \text{fix that car } \text{how}_i]]]]$  NEG > HOW  
 i. = ‘What is an instrument/manner that John didn’t use to fix the car?’  
 ii. *does not presuppose* ‘John did not fix the car.’
- PHQ *how* always takes scope over subjects, including quantified subjects.
- 18) a. How is only one child asleep? *presupposes* ‘Only one child is asleep.’  
 b. How is nobody asleep? *presupposes* ‘Nobody is asleep.’
- While MHQs with universal quantifiers allow ‘family of questions’ readings, PHQs do not. In the MHQ in (19), *everyone* c-commands the trace of the vP-adverb *how*, enabling a

<sup>2</sup> I distinguish  $how_p$  (PHQ *how*) from  $how_M$  (manner/instrument *how*), which combines with predicates rather than propositions. An interesting question is whether  $how_p$  ever occurs in contexts other than PHQs in English (i.e. without VERUM). One possibility is that  $how_p$  without VERUM is realized as (part of) *how come*; compare *How come Sarah’s still asleep?* to the PHQ *How is Sarah still asleep?* I leave this possibility open for future work; see Tsai 2008, Collins 1991 for treatments of *how come*.

family-of-questions response (May 1985). In the PHQ in (20), however, *how* is never c-commanded by *everyone*, and no family-of-questions reading is possible.

19) Q: **How<sub>i</sub>** did **everyone** [<sub>VP</sub> get to sleep **how<sub>i</sub>**]? (MHQ)  
 A: John counted sheep, Mary listened to soft music, Sam drank warm milk...

20) **How** is [<sub>TP</sub> **everyone** still asleep]? (PHQ)  
 = 'I am surprised that everyone is still asleep.'  
 ≠ 'I am surprised that John is still asleep, I'm surprised that Mary is still asleep, I'm surprised that Sam is still asleep...'

- PHQ *how*, unlike MHQ *how*, does not allow (attempted) *wh in situ* in an echo question – as expected, if PHQ *how* does not move from a clause-final position in the first place.

21) a. John fixed the car *how*? (MHQ)  
 b. #You hate this song *how*? (PHQ)

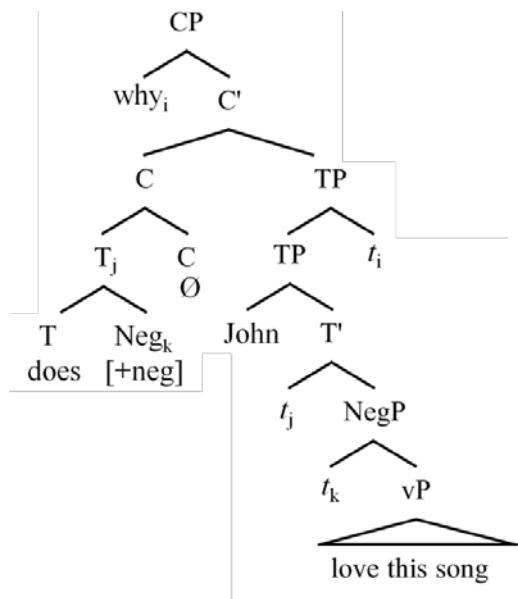
**3.3 Now, why no Neg-contraction?** With these ingredients in place, we can propose an answer to the question posed in §2, paraphrased below:

- 22) **Question:** Given that sentential negation is freely permitted in PHQs, why does it matter if Neg is contracted to *n't* or spelled out as *not*?
- How does John not love this song?
  - ?\* How doesn't John love this song?
  - cf.* Why doesn't John love this song?

I assume that there are two basic steps to deriving a question with *n't* like (22)c:

- **Step 1 (Syntax):** Neg raises to T and then to C by syntactic head-movement ((23)a).
- **Step 2 (PF):** [+NEG] is spelled out as *n't* by the allomorphy rule in (23)b.

23) a. Cyclic head movement (Neg to T to C) in a negative *why*-question



b. Vocabulary Insertion for [+NEG]:

[+NEG] ↔ **n't** / X+\_\_

**not** (elsewhere)

(where 'X+Y' means 'X is left-adjacent to Y within the same (M-)word' (Embick 2010))

Now let's consider negative PHQs. First, notice that in an embedded PHQ, where Neg raises only to T, *n't* is fine:

24) I want to know [CP **how** [C VERUM] [TP John [T **does** [**n't**]]] [NegP *t<sub>i</sub>* [VP love this song ]]]

What this suggests is that the problem with (22)b is not the spellout of Neg as *n't* (Step 2), but rather has to do with Step 1, the raising of Neg to C – where VERUM is.

Romero & Han (2004) argue that when Neg raises to C<sub>[VERUM]</sub> in an English negative *yes/no* question like *Isn't Jane coming?*, an ambiguity results (see Ladd 1981 for this observation):

25) Isn't there a vegetarian restaurant here? (Ladd 1981, Romero & Han 2004)

[CP [C [T is<sub>i</sub> [Neg n't<sub>j</sub>]] VERUM ] [TP there *t<sub>i</sub>* [NegP *t<sub>j</sub>* [VP a vegetarian restaurant here ]]]]

a. Q > NEG > VERUM > *p*

'It's not for-sure that we should add to CG that there's a veg. restaurant here;  
'it is for-sure that we should add to CG that there's a veg. restaurant here.'

b. Q > VERUM > NEG > *p*

'It is for-sure that we should add to CG that there's not a veg. restaurant here;  
'it is not for-sure that we should add to CG that there's not a veg. restaurant here.'

VERUM, according to Romero & Han, accounts for the **bias** in English negative *yes/no* questions. Reading (a) is intended in a context where the speaker is biased towards believing that there *is* a vegetarian restaurant nearby (e.g. (26)a), while (b) is intended in a context where the speaker is biased towards believing that there is *not* a vegetarian restaurant nearby (e.g. (26)b).

- 26) a. A: Let's get something to eat.  
B: Okay, isn't there a vegetarian restaurant around here? Moosewood or something?  
b. A: I know you don't eat meat, so we'll have to take a taxi to dinner.  
B: Oh really, isn't there a vegetarian restaurant around here?

If Romero & Han are correct that Neg and VERUM interact in this way when Neg raises to C, then we have a plausible explanation for why Neg-to-C is inhibited in PHQs:

27) **Neg-to-C is dispreferred in PHQs because it creates an undesired scopal ambiguity.**

a. *Intended:* how<sub>P</sub> > VERUM > NEG > *p*

'What is the *q* such that *q* caused it to be **for-sure** that **~p** should be added to CG?'

b. *Unintended:* \* how<sub>P</sub> > NEG > VERUM > *p*

'What is the *q* such that *q* caused it **not** to be **for-sure** that **p** should be added to CG?'

If Neg is left *in situ* below C<sub>[VERUM]</sub>, this ambiguity is avoided.

28) [CP how [C [T does<sub>i</sub> ] VERUM] [TP John *t<sub>i</sub>* [NegP **not** [VP love this song ]]]] VERUM > NEG

#### 4. Further support, implications, and directions for future work

- **Support from negative MHQs:** Recall that in manner/instrument *how*-questions (MHQs), *how* is initially merged as a vP adjunct and there is no VERUM in C. We also saw that negative MHQs are subjected to weak-island effects (29). But as noted by Kroch 1989, these weak-island effects can be removed by contextual conditions (30):

- 29) A. How did John not fix that chair? B. # With a hammer.  
 30) John tried everything! The real question is: how *didn't* he fix the chair?

Notice that Neg-contraction is fine in (30). This is just what we expect under the current analysis, since there is no VERUM to inhibit Neg-to-C raising in MHQs.

- My approach to PHQs suggests that the scopal interactions that appear to apply between Neg and VERUM in *yes/no* questions (Romero & Han 2004) apply across contexts, as expected. A question for future work is whether a similar analysis could be extended to other contexts where Neg-contraction is disfavored, e.g. Neg-inversion and V1 conditionals:

- 31) a. No way does John not like Mary.  
 b. \*No way doesn't John like Mary.  
 a. Had I not been there, I wouldn't have met you.  
 b. \*Hadn't I been there, I wouldn't have met you.

- The current analysis is also very much in line with previous observations that English *n't* is fundamentally different from 'other clitics,' e.g. *'ll*, *'ve* (Zwicky & Pullum 1983). Crucially, I have argued that *n't* attaches to its host by *syntactic head-movement* rather than by local rebracketing in a postsyntactic PF component (Embick & Noyer 2001, Mackenzie 2012). Given that *n't* is syntactically derived, its semantic effects seen here are unsurprising.

## Acknowledgements

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## Another kind of *how*-question

Typically, *how*-questions query MANNER or INSTRUMENT. But some English *how*-questions have a very different interpretation – they express extreme surprise that the proposition under *how* holds at all.

- 1) a. How is Sarah still asleep?
- b. How do you hate this song?
- c. How has it already snowed six times?
- d. How is Bill no longer the chair of Linguistics?

Manner/instrument <i>how</i> -question (MHQ)	Propositional <i>how</i> -question (PHQ)
How did John fix that chair? A1: Very carefully. ( <i>manner</i> ) A2: With a hammer. ( <i>instr.</i> )	How did John fix that chair? A: I know! I didn't think he could fix anything!

PHQ *how* freely combines with statives and other predicates that are incompatible with manner/instrument modifiers. (Smith 1991, Katz 2000).

- 2) a. How did Sarah fall asleep? (✓PHQ, ✓MHQ)
  - b. How is Sarah still asleep? (✓PHQ, \*MHQ)
- cf. Sarah { ✓fell / \*is } asleep by counting sheep.

PHQ *how* cannot be de-accented.

- 3) a. { **How** / How } did she fall asleep? (MHQ)
- b. { **How** / \*How } is she still asleep? (PHQ)

PHQs are fully compatible with negation, unlike MHQs, which are subjected to weak-island effects (Abrusán 2008, Kuro/Takami 1997, Ross 1984, etc.).

- 4) How did John not fix that chair?
  - a. # With a hammer. / # Very carefully. (MHQ)
  - b. I know! It looked like such a simple job! (PHQ)

But PHQs resist Neg-contraction to *n't*, showing a clear contrast with e.g. *why*-questions, where Neg-contraction is fine.

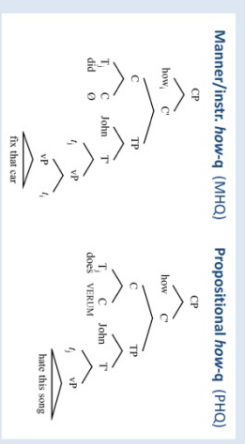
- 5) a. How {is/ isn't/ no/ ?\*isn't/ isn't/ } open yet?
- b. How {do you not/ ?\*don't/ you } love this song?
- c. How {has it not/ ?\*hasn't it } snowed yet?
- 5) a. Why isn't/ isn't/ Chill's open yet?
- b. Why don't/ don't/ you love this song?
- c. Why hasn't/ isn't/ snowed yet?

# How is contraction not possible here?

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Proposal: PHQs, unlike MHQs, have...

- how initially merged in Spec,CP
- a covert VERUM operator in C



## What does a PHQ mean?

i. PHQ acknowledges the truth of the complete proposition *p* (maximal TP, with no gaps) under *how*

- 6) How did everybody behave?
    - a. John behaved very well, Mary behaved okay, Sam was awful. (MHQ)
    - b. I know! I thought at least one kid would have problems. (PHQ)
- Family-of-questions reading is only possible in (a), where *everybody*-c-commands trace of *how* (May 1985).
- In (b), *Everybody behaved* is a complete proposition.

ii. At the same time, PHQ expresses extreme surprise at the truth of *p* (*?I thought p was nearly impossible!*)

Proposal: PHQs are the source of this 'extreme surprise.' Romero/Han 2004: VERUM is an epistemic operator in C, sometimes contributed by *really* (She *really* is asleep). [VERUM] =  $\lambda p$ . It is for-sure that *p* should be added to the Common Ground (CG)

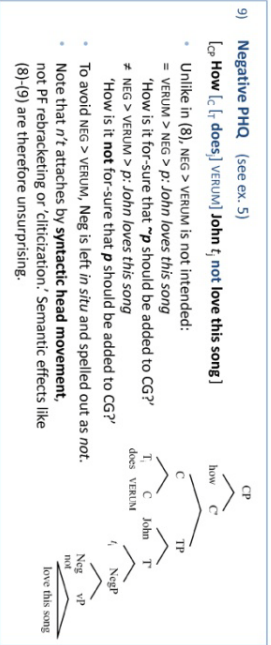
- In a PHQ, VERUM could serve to rule out the possibility that there's some mistake about the truth of *p*. Including VERUM creates an implicature that *p* is particularly unlikely or hard to believe.
- **how > VERUM > p** = 'What causes it to be for-sure that *p* should be added to CG?'

## Negation, contraction and VERUM

- 7) Negative *why*-question (see ex. 5f)
  - Why [<sub>CP</sub> [<sub>C</sub> t<sub>i</sub> does] [<sub>TP</sub> John<sub>i</sub> t<sub>i</sub> love this song] t<sub>i</sub>]
  - Step 1: Neg raises to T and then to C.
  - Step 2: Neg is spelled out as *n't* iff it is a sub-word.
  - No VERUM in C, so everything is fine.

- 8) Negative *yes/no*-question (Romero/Han 2004)
  - [<sub>CP</sub> [<sub>C</sub> t<sub>i</sub> do] [<sub>TP</sub> [NEG] VERUM] you t<sub>i</sub> love this song]
  - Steps 1-2 proceed as in (7).
  - Negative *yn*-question has VERUM in C
  - Neg incorporation into C allows NEG > VERUM: 'It is for-sure that we should add to CG that you love this song; it's not for-sure that we should add to CG that you love this song; Q > NEG > VERUM creates bias (speaker already believes you love this song)'

- 9) Negative PHQ (see ex. 5)
  - How [<sub>CP</sub> [<sub>C</sub> t<sub>i</sub> does] VERUM] John<sub>i</sub> t<sub>i</sub> not love this song]
  - Unlike in (8), NEG > VERUM is not intended: = VERUM > NEG > *p*: John loves this song
  - 'How is it for-sure that "p should be added to CG?'
  - # NEG > VERUM > *p*: John loves this song
  - 'How is it not for-sure that *p* should be added to CG?'
  - To avoid NEG > VERUM, Neg is left in situ and spelled out as *not*.
  - Note that *n't* attaches by syntactic head movement, not PF rebracketing or 'citicization'. Semantic effects like (8)-(9) are therefore unsurprising.



10) Embedded negative PHQ  
I want to know [<sub>CP</sub> how [<sub>CP</sub> VERUM] John<sub>i</sub> t<sub>i</sub> does [<sub>TP</sub> Neg n't<sub>i</sub>] t<sub>i</sub> love this song]

- Notice that *n't* is fine here – because no Neg to C, so no danger of NEG > VERUM.
- Step 1: Neg raises to T and stops there.
- Step 2: Neg is spelled out as *n't* (as in (7)).
- It's Neg-to-C raising that causes problems in (5)/(9), not contraction *per se*.

- 11) Negative MHQ (see ex. 4)
  - # [<sub>CP</sub> How<sub>i</sub> [<sub>C</sub> t<sub>i</sub> did] [<sub>TP</sub> [NEG] n't<sub>i</sub>] John<sub>i</sub> t<sub>i</sub> fix that chair] t<sub>i</sub>]
  - Trace of *how* under Neg correlates with weak-island effects: # 'What's a manner/instrument that John didn't use to fix the chair?'
  - When island effects are removed by context (Kroch 1989), Neg-contraction is fine, as expected (no VERUM here!)
  - John tried everything! The real question is, how didn't he fix the chair?