Pronominal vs. determiner *wh*-words: evidence from the copy construction

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1 Introduction

Wh-copy constructions are interrogatives with copies of a *wh*-word in each of their CPs (as opposed to standard extraction, where there is only one *wh*-word and it's in the matrix CP). In some dialects of German, the copy construction is in free variation with standard extraction.

(1) a. Wen glaubt   John dass Mary getroffen hat?   *extraction*
         who believes J.   that M.   met   has
     b. Wen glaubt   John wen Mary getroffen hat?   *copy construction*
         who believes J.   who M.   met   has
         Who does John believe that Mary has met?   German

This paper presents an analysis of the copy construction that explains its similarity to extraction constructions while accounting for its incompatibility with *wh*+NP phrases. Essentially, *wh*-phrases without an NP complement can be copied because they're non-quantificational (introducing only a free variable into the derivation). *Wh*-phrases with an NP complement cannot be copied because these *wh*-phrases *are* quantificational, and interpreting them twice in the derivation leads to vacuous quantification.

I first describe the properties of the copy construction, focusing on its incompatibility with *wh*+NP phrases. I argue that the restriction on *wh*+NP phrases is not due to D-linking (Pesetsky 1987) or morphological heaviness (Nunes 1999). I then draw on arguments from Wiltschko's (1998) work on pronominal forms in German to argue that there's a semantic difference between *wh*-phrases that occur without an NP complement ('*wh*-pronominals') and *wh*-phrases that occur with an NP complement ('*wh*-determiners'). The former just introduce a free variable x into the derivation, while the

latter existentially quantify over a variable whose domain is additionally restricted by the NP complement. This claim is initially supported by the pattern of distribution between *wh*-phrases and the pronominals studied by Wiltschko and is bolstered by the distribution of the two types of *wh*-phrases in free relatives (Jacobson 1995, Caponigro 2002, 2004) and in a copy construction version of free relatives.

The core of the analysis explains how the difference in quantificational force between the two types of *wh*-phrases accounts for the incompatibility of *wh*-determiners in the copy construction. I argue (contra i.e. Felser 2004) that a copy construction is just an extraction construction with an overt, rather than covert, intermediate link in the *wh*-chain. When an intermediate copy is pronounced, it has the same semantics as its (pronounced) head-of-the-chain counterpart (type $\langle\langle e,t\rangle t\rangle$). When an intermediate copy is not pronounced, it has the same semantics as its (unpronounced) tail-of-the-chain counterpart (type $\langle e\rangle$).

When a *wh*-pronominal is pronounced twice in a copy construction, two co-referring individual variables are introduced into the derivation, which are later bound by a single existential quantifier (say, by existential closure). On the other hand, when a *wh*-determiner is pronounced twice, it introduces two individual variables bound by two different existential quantifiers. This vacuous quantification leads to an infelicitous semantics of the construction. The paper concludes by examining potential complications and consequences of the analysis.

2   Properties of the copy construction

2.1   The copy construction is like extraction

In some dialects of German, as well as in dialects of Afrikaans, Frisian, Romani and Hungarian, the copy construction is in free variation with standard extraction. The copy construction differs from extraction constructions in that it has, in addition to a *wh*-word in the specifier of the matrix CP, a copy of this same *wh*-word in the specifiers of intermediate CPs.

I give the two constructions in (1) the same gloss because they don't differ semantically: like extraction constructions, copy constructions elicit a single-answer response (which is to say they're not multiple-*wh*-questions).

The copy construction is multiply iterable, but optionally so (Höhle 2000, Andre Nuendel p.c.). So a multiply embedded *wh*-question may or may not have *wh*-words in each of its CPs.

(2)   a.   *Wen* glaubt John dass Hans meint dass Mary getroffen hat?
      b.   *Wen* glaubt John *wen* Hans meint dass Mary getroffen hat?
      c.   *Wen* glaubt John *wen* Hans meint *wen* Mary getroffen hat?
      d.   *Wen* glaubt John dass Hans meint *wen* Mary getroffen hat?   German

However, the two (or more) *wh*-words in the copy construction are in the same

wh-chain, which means that they differ in structure and meaning from the ones in sentences like *Who wins depends on who enters the race.*[1]

2.2   The copy construction is not like *wh*-scope-marking

The copy construction crucially differs from *wh*-scope-marking constructions, which also happen to occur in some German dialects (although independently of the copy construction). I will address *wh*-scope-marking here only to show that it differs significantly from the copy construction and is therefore not relevant to the discussion at hand. I direct interested readers to Lutz, Müller & von Stechow 2000.

(3)   Was glaubt John wen Mary getroffen hat?   *scope-marking*
       what believe J.   who M.   met   has
       Who does John believe that Mary has met?   German

        Whereas the copy construction has a copy of the same *wh*-word in the CP of the embedded and matrix clauses, *wh*-scope-marking constructions have a default *wh*-phrase (*was*, or 'what', in German, 'how' in other languages) in the CP of the matrix clause, while the meaningful *wh*-phrase is in the CP of the embedded clause.

    Scope-marking differs significantly from extraction and copy constructions. First, copy (and extraction) constructions, but not scope-marking constructions, allow for cross-clausal quantifier binding in sentences like *Where does every man think he will get a job?* (Dayal 1994). Second, copy and extraction constructions are ambiguous between an individual and pair-list reading in questions with a quantifier in the matrix clause, whereas *wh*-scope-marking constructions receive only the pair-list reading (Pafel 2000, Fanselow & Mahajan (2000)).[2]

    Thirdly, according to Dayal 2000, scope-marking constructions, but not extraction and copy constructions, are incompatible with de dicto/de re presuppositions in sequences like, "I know no one will volunteer. But who does Mary think will volunteer?". The same is true for consistent vs. inconsistent readings (as reported in Reis 2000): whereas the copy and extraction constructions can receive the "second source" reading crucial for the coherent reading of the sentence *Where does Mary believe John is more popular than he is?*, scope-marking constructions cannot.[3]

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[1]Thanks to an anonymous CSSP reviewer for bringing the potential confusion of these constructions to my attention.

[2]Felser 2004 (p. 557) reports, citing Pafel 2000, that the copy construction may not be able to receive an individual reading. But Pafel admits confusion about whether or not the copy construction can be interpreted in these constructions (p. 340). Since my informants can get both readings, and since Pafel admits that the individual reading is possible in some circumstances, I feel that my above claim is substantiated.

[3]Once again, this goes against the judgment reported in Felser 2004 (p. 557-8). She argues that the copy-construction equivalent of questions like *Where does Mary believe John is more popular than he is?* is infelicitous. This goes against my informants' reports of German (for *Wo glaubt Mary wo ist John populŁrer als er ist?* as well as reports of the behavior of the copy construction in Hungarian (Horvath p.c.). Additionally, Felser uses this data to argue that the intermediate copy in the copy construction needs to be interpreted for scope purposes. According to Reis' account, however, *wh*-scope-marking constructions don't interpret the intermediate copy as a *wh*-phrase in the same chain as the head *wh-*

To sum up, the copy construction is a clear variant of the extraction construction; *wh*-scope-marking constructions need to be analyzed in some other way due to their aberrant semantic properties. See Dayal (1994, 2000) for just such an analysis, triggered by the examination of *wh*-scope-marking constructions in Hindi.

I'd also like to point out that the copy construction different from the constructions in Poletto & Pollock 2004, which they refer to as '*wh*-doubling' (examples here from Illasi, a Verona dialect).

(4)   a.   S'   a-lo   fat   che?
           what has-he done what
           What has he done?
      b.   Ndo   e-lo   ndat endoe?
           where is-he gone where
           Where has he gone?   Ilasi, a Verona dialect

For starters, the two *wh*-phrases (the high and the low) usually take different forms, with the high *wh*-phrase behaving like a clitic. Secondly, the high phrase can be pronounced without the low phrase being pronounced, and vice-versa. These properties of *wh*-doubling, and more, are enough to separate the two constructions (although see 4.1 for one final mention of *wh*-doubling).

2.3   Ways in which the copy construction differs from extraction

Although the copy construction patterns very closely with extraction, it does differ from extraction in a few ways. Most notably, it is incompatible with *wh*+NP phrases.

(5)   a.   Welche Bücher glaubst du   dass sie gerne liest?
           which   book   believe you that she gladly reads
      b. *Welche Bücher glaubst du   welche Bücher sie gerne liest?
           which   book   believe you which book   she gladly reads
           Which book do you believe she gladly reads?   German

This restriction extends to all *wh*+NP phrases, including *what book* and *how many books*. But it is not related to D-linking (Pesetsky 1987):

(6)   Susie has only three dollars.

      a.   Wieviel   meint sie wieviel   das kostet?
           how.much thinks she how.much that costs
      b. *Wieviel   Geld   meint sie wieviel   Geld   das kostet?
           how.much money thinks she how.much money that costs?
           How much money does she think that costs?   German

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phrase, but rather as the head *wh*-phrase in the second of two sequential questions with the syntax of embedded questions (see Dayal 1994, 2000 for details of this approach).

The first sentence in (6) establishes that money, specifically Susie's three dollars, is contextually salient. Given this, (6-a) and (6-b) are equally D-linked. Despite this, the disparity between the *wh*-phrase and the *wh*+NP phrase remains.

Nor is the restriction related to phonological or morphological heaviness (contra Nunes 1999). Whereas *wh*+NP phrases are incompatible with the copy construction, most PP+*wh* phrases are not:

(7)   a.   Mit wem glaubst du mit wem Hans spricht?
             with whom believe you with whom H.   talks
             Who do you think Hans is talking with?
    b.   Auf wem   hat sie gesagt auf wem   er warten soll?
             on whom has she said   on whom he wait   should
             Who has she said he should wait on?   German

Although the *wh*+PP phrases in (7) *are* compatible with the copy construction, there are some *wh*+PP phrases that are not, for instance *unter wem*, although my informants differ on their judgment of i.e. *Unter wem glaubst du unter wem er am meisten leidet?*. This could indicate that morphological heaviness *does* play a role in the acceptibility of the copy construction, but the data in (7) indicate that it isn't the only factor.

Finally, unlike extraction constructions, copy constructions are incompatible with matrix negation.

(8)   a.   Wen glaubst du   nicht dass sie liebt?
             who believe you not   that she loves
    b.   *Wen glaubst du   nicht wen sie liebt?
             who believe you not   who she loves
             Who don't you believe she loves?   German

It's debated whether or not this restriction extends to negative quantifiers like *noone* and negative predicates like *doubts* (Felser 2004, Fanselow & Mahajan 2000, among others). The restriction on *wh*+NP phrases in the copy construction will be discussed throughout the paper, as it motivates the analysis. The restriction on matrix negation will be discussed in Section 5.2.

3   *Wh*-phrases and quantification

This section presents several arguments for the background assumptions required for the analysis. I'll first introduce the distinction between pronominal and determiner *wh*-phrases by drawing an analogy to work on German pronominals in Wiltschko 1998. Pronominal *wh*-phrases are ones where the *wh*-word does not take an NP complement; determiner *wh*-phrases do take NP complements.

I'll then introduce the idea that *wh*-phrases are not quantificational (specifically, they introduce free variables), based on some observations of the behavior of *wh*-phrases in free relatives (Jacobson 1995, Caponigro 2004). I'll argue that *wh*-pronominals

are not quantificational in just this way (they function as indefinites in the Heimian sense), while *wh*-determiners are quantificational (which is to say, they introduce a variable bound by an existential quantifier). This distinction is supported by, among other things, the fact that *wh*-pronominals are compatible with free relatives but *wh*-determiners are not. These assumptions play a crucial role in the analysis presented in Section 4.

3.1   A parallel with Germanic pronominals

Wiltschko 1998 looks at two types of pronominal forms in German; personal pronouns (*er*, *sie*, *es*) and d-pronouns (*der*, *die*, *das*). These pronominals sometimes can (9-a) but sometimes cannot (9-b) occur in the same environment.

(9) a. Maria hat ihn /den   gesehen.
         M.   has him /d-pron seen.
         Mary has seen him.
     b. Es /∗das   kam ein Mann zur   Tür   herein.
         it /d-pron came a   man to-the door herein.
         There came a man through the door.   German

    Wiltschko argues against the standard view that d-pronouns are transitive determiners and personal pronouns are intransitive determiners. She concludes that d-pronouns are full DPs containing an empty NP while personal pronouns are the "mere spell out of phi-features, i.e. an instantiation of AgrD, rather than an instantiation of D" (p. 148).

    This difference in lexical status affects the internal semantics of personal pronouns and d-words. Wiltschko quotes Longobardi 1994: "Determiners are semantically understood as operators binding a variable, whose range is always the extension of the natural kind referred to by the head noun" (p. 633).[4]

    Wiltschko's proposal takes two types of words thought to be determiners and argues that one type, personal pronouns, are not in fact determiners. I extend this conclusion to *wh*-words; of the two sorts of *wh*-words thought to be quantificational (those taking NPs and those not taking NPs), only one type, those taking NPs, is in fact quantificational. *Wh*-pronominals, then, are non-quantificational assemblies of features.

    If this were true, d-words (by virtue of having determiners) and *wh*-pronominals (by virtue of being pronominal non-determiners) would be in complementary distribution, as would personal pronouns and *wh*-determiners. This seems to be the case,

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[4]Wiltschko explains the fact that d-prons never occur with NPs by arguing that d-prons, by virtue of their status as strong arguments, are able to license empty NPs. She demonstrates this distinction with a discussion of Dutch strong and weak determiners (p. 161). This poses a question for the present analysis: if an empty NP can fulfill this requirement for an NP position, why do *wh*-determiners always need an overt NP? I strongly suspect that one could successfully argue that *wh*-determiners in German are weak arguments, as opposed to their d-pron counterparts. However, this argumentation is beyond the scope of this paper.

for the few available tests[5] (Wiltschko 1998: 146):

(10)   a.   Nimm das Buch, das   /∗was du willst.
            take   the book d-pron /what you want.
            Take the book you want.
      b.   Nimm, was /∗das   du willst.
            take,   what /d-pron you want.
            Take whatever you want.   German

So we have a pronominal paradigm on which to build a distinction between *wh*-pronominals and *wh*-determiners: the former, as a bundle of phi- and *wh*-features, is non-quantificational. The latter, because they're operating over a range restricted by the NP complement, are quantificational.

Before we see how this works in extraction and copy constructions, I'll present some evidence from the behavior of *wh*-words and phrases in free relatives to bolster the idea that *wh*-pronominals are not quantificational and *wh*-determiners are.

3.2   A parallel with free relatives

This section draws on work on free relatives[6] like Jacobson 1995, Dayal 1995 and Caponigro 2002, 2004 to argue that a) *wh*-phrases that occur in free relatives aren't quantificational, and b) since *wh*-determiners, as they're defined above, do not occur in free relatives, there is no reason to extend this generalization to them. It implicitly assumes that, all things being equal, it's desirable to have a theory that gives *wh*-phrases in free relatives and *wh*-phrases in interrogatives the same semantics.

First, Jacobson (1995) and Dayal (1995) note that *wh*-phrases in free relatives behave more like plural definites than quantifiers both in their distribution (11) and in their ability to receive either universal and existential readings, depending on the sentence (12):

(11)   I don't like everything/*what/*the things Sue ordered but I like most of them.

(12)   a.   I ordered what he ordered for dessert. (=the thing he ordered)
         b.   Do what the babysitter says. (=everything the babysitter says)

Jacobson proposes that *wh*-phrases aren't quantificational in free relatives. Caponigro (2002) expands on this claim, arguing based on crosslinguistic data that *wh*-phrases just introduce free variables, with restrictions on the predicate correlating to the particular *wh*-phrase ('animate(x)' for *who*, 'location(x)' for *where*, etc.). These free vari-

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[5]These examples involve *wh*-words in free relatives. Although I've mainly discussed interrogative *wh*-words so far, I'll demonstrate in Section 3.2 that these generalizations extend to *wh*-words in free relatives too.

[6]For the purposes of this paper, I'll ignore $-ever$ free relatives ('I ate whichever food John cooked'). These constructions seem to have significantly different semantics due to the contribution of *-ever*: it signals the speaker's ignorance and patters strongly with universal, rather than existential, quantifiers. These constructions therefore do not provide a good environment for the investigation of the meaning of *wh*-phrases. See Dayal 1997 and von Fintel 2000.

ables are later bound by non-DP quantifiers or lambda-abstraction (whereas indefinites, which are analyzed by Heim (1982) as introducing free variables, can be bound by higher DP quantifiers in i.e. donkey-anaphora sentences).

Now the question is, given our distinction above between *wh*-pronominals and *wh*-determiners, can this analysis of *wh*-phrases as non-quantificational be extended to *wh*-determiners? It seems like it cannot. *Wh*-determiners, but not *wh*-pronominals, are straightforwardly incompatible with free relatives:

(13)   a.   I ate what John cooked.
         b.   *I ate which food John cooked.[7]

So it seems that our motivation for thinking of *wh*-pronominals as non-quantificational, specifically their behavior and distribution in free relatives, cannot be extended to *wh*-determiners.

I mentioned above that the arguments from free relatives can be extended to our investigation of the copy construction only if we believe there is a parallel between *wh*-phrases as they occur in free relatives and *wh*-phrases as they occur in interrogatives. This belief is supported by the novel fact that the copy construction is available in free relatives in those dialects that allow for them in interrogatives.

(14)   a.   Ich traf wen John meint wen Mary liebt.
            I   met who J.   thinks who M.   loves.
            I met who John thinks Mary loves.
         b.   *I traf welche Person John meint welche Person Mary liebt.
            I met which   person J.   thinks which   person M.   loves.
            I met who John thinks Mary loves.   German

Just as in the interrogative form of the copy construction and the non-copy-construction form of free relatives, *wh*-determiners are incompatible in the copy construction form of free relatives.

I conclude this section having substantiated the distinction between *wh*-pronominals, *wh*-phrases without NP complements, and *wh*-determiners, those that occur with NP complements. The argument stems from a similar distinction made by Wiltschko 1998 with respect to pronouns, and is bolstered by the distribution of *wh*-phrases in similar constructions. I've also argued that there's a semantic difference between the two types of *wh*-phrases: *wh*-pronominals introduce free variables (along with a property 'animate,' etc.), which is later bound by non-DP quantifiers or lambda-abstraction (see Caponigro 2002). *Wh*-determiners, on the other hand, existentially quantify over the individual variable they introduce, and this variable is further restricted by the NP complement to the *wh*-phrase.

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[7]This construction is possible in some languages, none of which are Germanic, and none of which allow the copy construction (see Caponigro 2004 for an indepth crosslinguistic survey of free relative constructions).

The next section outlines how these distinctions account for the properties of the copy construction.

4   The analysis

The analysis takes for granted that extraction and copy constructions differ only with respect to the fact that the former don't spell out intermediate copies while the latter do. The idea is that if a copy is pronounced it has the same semantics as the (pronounced) head of a chain is, and if it is not pronounced, it has the same semantics as the (unpronounced) tail of a chain is (i.e. as a variable of type $\langle e \rangle$).[8]

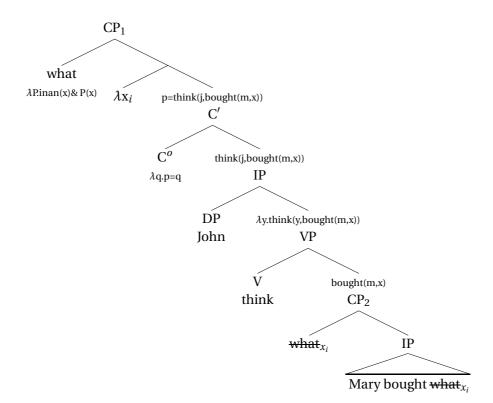## 4.1   The semantics of *wh*-pronominals

I'll first demonstrate how the semantics of *wh*-pronominals works, first in a standard extraction construction and then in a copy construction. Below are the two meanings of the word *what* as it occurs as a *wh*-pronominal (15-a) and a *wh*-determiner (15-b).

(15) a. $[\![what_1]\!] = \lambda P.\text{inanimate}(x) \,\&\, P(x)$ *(wh-pronominal)*
   b. $[\![what_2]\!] = \lambda Q \lambda P \exists x.\text{inanimate}(x) \,\&\, Q(x) \,\&\, P(x)$ *(wh-determiner)*

(16) is a derivation of an extraction construction with a *wh*-pronominal. (17) is a derivation of a copy construction with a *wh*-pronominal. I'll show that a derivation of a *wh*-pronominal extraction construction, given existential closure is just the same as a standard Hamblin semantics of questions, and that the derivation of a *wh*-pronominal copy construction, given existential closure, differs from extraction only insignificantly.

(16)   *What* in extraction constructions:
   a. What does John think Mary bought?
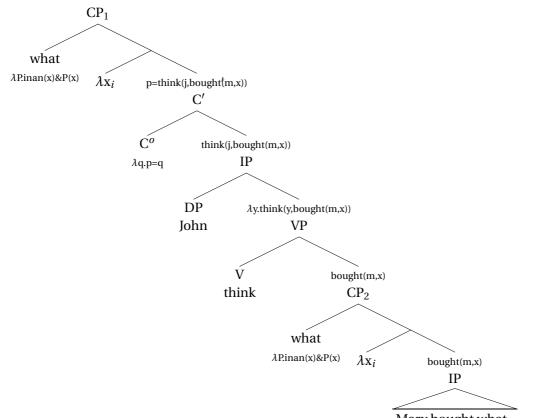   b. $\lambda p \exists x.\text{inanimate'}(x) \,\&\, p = \text{think'}(j, \text{bought'}(m,x))$

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[8]Such an analysis requires a novel view about the interaction between LF and PF. I cannot offer a proposal here but rather direct the readers to papers that have tried to address this tension in other phenomena: Bobaljik 2002 and Sauerland 1998, among others.

CP$_1$

what
λP.inan(x) & P(x) λx$_i$ p=think(j,bought(m,x))

C′

C^o think(j,bought(m,x))
λq.p=q IP

DP λy.think(y,bought(m,x))
John VP

V bought(m,x)
think CP$_2$

~~what~~$_{x_i}$ IP

Mary bought ~~what~~$_{x_i}$

The tail of the *wh*-chain and the intermediate *wh*-copy are both interpreted as *x*, an individual variable of type ⟨e⟩, because they are unpronounced in an extraction construction. These variables are lambda-abstracted over right before their moved counterpart, the overt *what* in the specifier of CP, is interpreted. These are all standard moves. Finally, the head of the chain, the pronounced *what*, introduces the same individual variable *x* along with the property *inanimate*. At the end of the derivation in (16), we have two coreferring unbound variables *x*,[9] which are both bound by existential closure at the end of the utterance (see Caponigro 2002 for alternative ways of binding these variables).

(17) *What* in copy constructions:
  a. What does John think Mary bought?
  b. λp∃x.inanimate'(x) & p=think'(j,inanimate'(x) & bought'(m,x))

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[9]...and an unbound *p* variable: to simplify the type of the *wh*-phrase, I've removed a λp argument from its meaning, and am attributing lambda-abstraction over *p* to context at the moment. The reader may adjust for this on his own by thinking of the meaning of *what* as λPλp.inanimate'(x) & P(x).

In (17), the tail of the chain is interpreted as x, just as it was in (16). The difference is that the intermediate copy has the same semantics as the head of the chain. This means that it, too, introduces the property *inanimate* along with the unbound variable x. But at the end of the derivation, there (again) remains three unbound coreferring x variables, and they are bound by a single existential quantifier.

Close comparison of (16) and (17) shows that the two differ only in that (17), the copy construction derivation, has an additional 'inanimacy' property in the scope of the belief operator. It's not clear that this is a significant difference; standard analyses of extraction don't require that (for instance) John think of x that x is a person, but it's not clear that they shouldn't. The *wh*-phrase originates under the scope of the belief operator, so it stands to reason that the *wh*-phrase reflects the belief state, rather than the real world.[10] This means that the additional 'inanimacy' property embedded under the belief operator is interpreted, but somewhat redundantly.

Interestingly, this analysis, unlike other copy construction analyses, can account for why the tail of the chain is never pronounced in these constructions:

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[10]I presented several speakers (English and German) with a scenario in which John thinks Mary kicked Bob, where Bob is an actual person in the real world, but John thinks Bob's a dummy. When asked which question sounds better, *Who does John think Mary kicked?* or *What does John think Mary kicked?* (and their corresponding copy constructions), my informants were divided and unconfident. This stresses to me that an i.e. 'animacy' property embedded under the bridge verb is inconsequential.

(18)   *Wen glaubt   John dass/wen Mary getroffen wen hat?
       who believes J.   that/who M.   met   who has?
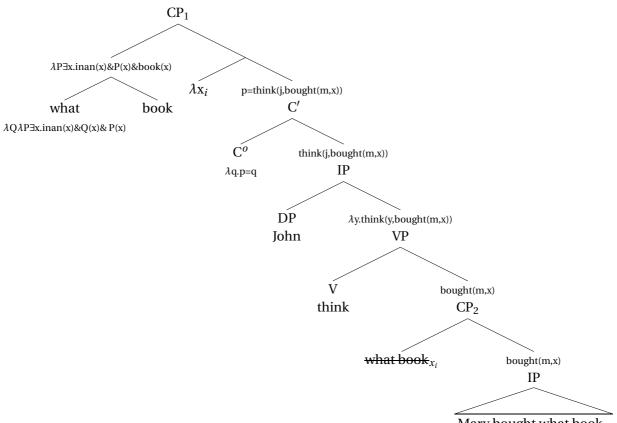   *Who does John believe Mary has met?*   German

If the tail of the chain in (18) were pronounced, it would be of type $\langle\langle e,t\rangle t\rangle$, and couldn't properly combine as the argument of the VP *met*.[11] Also, recall the Italian *wh*-doubling data in (4); although this construction differs significantly from the copy construction, it's interesting to note that even these constructions don't spell out the tail of the *wh*-chain: "...there are good reasons to believe that the 'strong' wh-form at the right edge of the sentence is not standing in an in situ position within IP" (Poletto & Pollock 2004: 257).

4.2 The semantics of *wh*-determiners

We've seen that it's because *wh*-pronominals introduce a free variable, rather than quantify over the variable, that allows for them to be overtly iterated in the copy construction. This section demonstrates that it's the downfall of *wh*-determiners that they introduce a quantifier into the derivation, which leads (in the case of iteration) to vacuous quantification. I'll start by showing that our conception of *wh*-determiners doesn't pose a problem for their use in an extraction construction.

(19)   *What*+NP in extraction constructions:

    a.   What book does John think Mary bought?
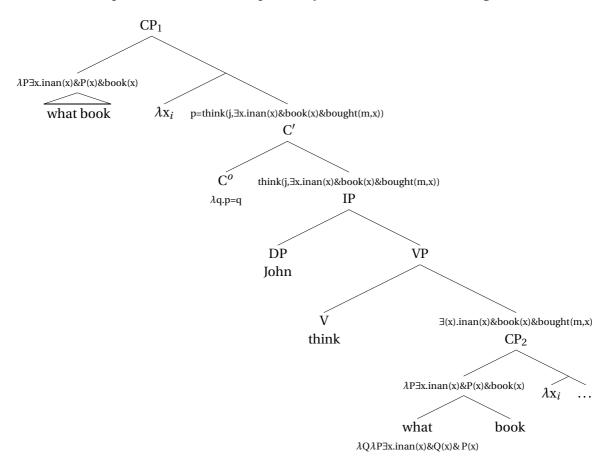   b. $\lambda p\exists x.\text{inanimate'}(x)\ \&\ \text{book'}(x)\ \&\ p=\text{think'}(j,\text{bought'}(m,x))$

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[11]As Roger Schwarzschild and Angelika Kratzer (p.c.) independently point out, this doesn't work as cleanly for subject *wh*-phrases; no type mismatch results from *met John* having an $\langle\langle e,t\rangle t\rangle$ subject. However, it's not immediately obvious that subject tails of a chain, as opposed to object tails, *can't* be spelled out; one could argue, for instance, that since spelling out a subject tail would result in a repetition of the *wh*-word ('Who does John think who who Mary met?'), there's a phonological restriction against realizing both copies overtly. However, the details aren't crucial for the core of my proposal, for which the above restriction against pronouncing the tail of a chain is only an added bonus, so I'll leave them aside.

CP$_1$

λP∃x.inan(x)&P(x)&book(x)

λx$_i$ p=think(j,bought(m,x))

what   book   C$'$

λQλP∃x.inan(x)&Q(x)& P(x)

C^o think(j,bought(m,x))

λq.p=q   IP

DP λy.think(y,bought(m,x))

John   VP

V   bought(m,x)

think   CP$_2$

~~what book~~$_{x_i}$ bought(m,x)

IP

Mary bought ~~what book~~$_{x_i}$

This works much like (16) above; the tail and the intermediate copy, because they're not pronounced, are interpreted as individual variables. The head of the chain introduces a third coreferring variable in addition to an existential quantifier which binds all three. The semantics of (19) is identical to those of (16), it just doesn't rely on existential closure. The semantics of *what*+NP in the copy construction, however, are a different matter entirely:

(20) *What*+NP in copy constructions:

    a. *What book does John think what book Mary bought?

    b. λp$\exists$x.inan(x) & book(x) & p=think'(j,$\exists$x.inan(x) & book(x) & bought(m,x))

    In (20), the tail of the chain, as always, contributes a free individual variable to the derivation. The intermediate copy is interpreted with the meaning of a *wh*-determiner, however, which means that it existentially binds both the individual variable it introduces and the one introduced by the tail of the chain. This means that the head of the chain, which introduces a second existential quantifier, can bind only the individual variable it introduces, leading to vacuous quantification.

    This analysis, in which a *wh*-pronominal can be spelled out as an intermediate copy but a *wh*-determiner cannot, is further supported by a dialect-specific version of the copy construction in which a *wh*-determiner heads the *wh*-chain and a coreferring *wh*-pronominal is spelled out as the intermediate chain link:[12]

(21) Welche Person glaubt   John welche Mary getroffen hat?
      which person believes J.   which M. met   has?
      Which person does John believe Mary has met?

    Although this data requires a separate story about how *welche Person* and *welche*, two non-identical *wh*-phrases, can be in a single *wh*-chain, it suffices to show that the

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[12]Thanks to Hedde Zeijlstra for this data.

ability of a wh-phrase to be an overt intermediate copy in the copy construction has entirely to do with whether or not it takes an NP complement.

5 Consequences

The main claim of this paper, of course, is that *wh*-phrases are quantificational when they take an NP complement and non-quantificational when they don't. When a *wh*-phrase is quantificational, it cannot be copied; when a *wh*-phrase is non-quantificational, it can be.

This next section explores consequences of such an analysis. It starts by addressing the copyability of *how many* constructions: if the *many* in *how many* is quantificational, why can it be copied?[13] It moves on to address a robust difference between extraction and copy constructions: the former, but not the latter, allows matrix negation.

5.1 *How many* constructions

Crucial to this section is the perhaps surprising grammaticality of the following:

(22) Wieviel   meint sie wieviel   das kostet?
      how.much thinks she how.much that costs
      How much does she think that costs?   German

The reason this might be surprising, given the above analysis, is because standard theories of *how many* constructions analyze *many* [14] as an existential quantifier over individual variables, specifically pluralities (and, usually, *how* as an existential quantifier over degree variables). This sort of analysis is defended in Romero 1998 and Hackl 2000 and used in Cresti 1995 and Fox 1999.

(23) $[\![many]\!] = \lambda P \lambda d \lambda Q \exists X.P(X) \, \& \, Q(X) \, \& \, |X|=d$

This sort of analysis, very briefly, is motivated by two sorts of considerations: 1) arguments in Bresnan (1973) that *more* in comparative constructions is historically derived from the morphemes *much* and *−er*, and 2) observations that, for instance, since *too* and *how* in the phrases *too many* and *how many* are quantifiers over degree variables, there must be some morpheme lower than *too* and *how* that quantifies over the individual variable *X* and attributes a degree to the size of the plurality. Given these two considerations, it seems useful to attribute the meaning in (23) to *many*. If this is the case, then *many* is quantificational, and its copyability in (22) poses a problem for the analysis presented above.

However, there are several reasons to think that the meaning in (23) *shouldn't* be associated with the word *many* (and that *many* is instead a predicate over sets of de-

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[13]Thanks to Veneeta Dayal for posing this question.

[14]I'll collapse discussion of *many* and *much* in this section, treating them as different only in the count/mass specification of their NP complement. See Rett 2005 for further argumentation.

grees: see Schwarzschild 2002). I'll present two here for consideration, and direct interested readers to Rett 2005. First, data from French *combien* split-NP constructions (Obenauer 1984, de Swart 1992):

(24) a. Combien de livres faut-il   que vous lisiez? $\exists x \gg \Box$
          how.many of books it's.necessary that you   read

     b. Combien faut-il   que vous lisiez de livres? $*\exists x \gg \Box$
          how.many it's.necessary that you   read of books
          How many books must you read?   French

Both of the *how many* constructions in (24) can get a reading where the necessity operator takes wide scope with respect to $\exists x$, the reading where the requirement is that you read three books, any three books (think of the requirements for a speed-reading class, as opposed to those of a class on a particular topic). However, only (24-a) can get the reading where $\exists x$ scopes outside of the necessity operator ('There are three books such that you have to read them,' think of a class on Alexandre Dumas).

However, the two constructions differ only in the position of the NP *books*; the morpheme *many* , assuming that it's associated with the *wh*-phrase *combien*, is pronounced high with respect to the necessity operator in both sentences. Since the data in (24) show that the relative location of the pronunciation of the NP is enough to effect the relative location of interpretation of the individual quantifier, there is reason to believe that this quantifier is associated with the NP (or some morpheme more closely connected to the NP) rather than to the morpheme *many*.

A second reason for divorcing the existential quantifier from the morpheme *many* comes from languages in which the *many* in *how many* is optional (the example below is Romanian; this is also possible in Macedonian and Bulgarian).

(25) a. Cîte   femei ştie?
          cît-Fpl women know.3sg

     b. Cît de multe   femei ştie?
          cît of many-Fpl women know.3sg
          How many women does he know?   Romanian

The monomorphemic *how many* form in (25-a) demonstrates that no overt *many* is needed to ask a *how many* question in Romanian (and, of course, there are lots of other languages whose *how many* phrase doesn't involve a compositional *many* or *much*). However, it's possible in the construction in (25-b), and its inclusion slightly changes the semantics of the sentence (adding a sense of maximality, among other things: see Rett 2005) (showing that it's not present even covertly in (25-a)).

The fact that *many* is optional in *how many* constructions in Romanian indicates that it is not responsible for existentially quantifying over *x*; if this were the case, *x* would be unbound in (25-a), leaving it ungrammatical. See Rett 2005 for an analysis of the meaning of *many* that accounts for its optionality in (25) in addition to its semantic influence in (25-b).

This section has shown that there's more than enough reason to believe that the existential quantifier over individuals is not correlated with the word *many*. This means that its iteration in (22) is unproblematic for the above analysis.

5.2 Negation

The copy construction is incompatible with matrix negation, a fact which has in the past been attributed to movement violations over negative islands.

(26)   a.   Wen glaubst du nicht dass sie liebt?
            who believe you not that she loves

        b.   *Wen glaubst du nicht wen sie liebt?
            who believe you not who she loves
            Who don't you believe she loves?   German

Since extraction and copy constructions do not differ in the above analysis on the type of movement they employ (successive-cyclic v. across-the-board) and since, contra Felser 2004, I do not consider the higher copy to be the operator and the lower to be its restrictor, I cannot appeal to negative islands to explain the ungrammaticality of (26-b).[15]

I'd like to note only that the class of verbs that allow for the copy construction ('bridge verbs': *think*, *believe*, and a few others) correspond for the most part to neg-raising verbs, and to also suggest that non-neg-raising predicates (for instance, factive verbs) are generally ungrammatical with matrix negation in interrogative constructions (from Dayal 2000):

(27)   *Wohin bedauerte sie dass Hans ging?
      where regretted she that H. went
      Where did she regret that Hans went?   German

6 Conclusion

The fundamental claim of this paper is that *wh*-phrases quantify over an individual variable when they occur with an NP complement and introduce a free individual variable when they do not occur with an NP complement. I've tied this claim strongly to similar ones with respect to pronominals in German (Wiltschko 1998) and free relatives crosslinguistically (Jacobson 1995). I've demonstrated how it accounts for the copy construction data: *wh*-pronominals are copyable, while *wh*-determiners are not, the latter because they lead to vacuous quantification. This claim is additionally supported by the fact that *wh*-determiners are incompatible with free relatives (and the copy construction version of free relatives) and by the fact that *wh*-determiners are permissible in the copy construction when the intermediate copy is a *wh*-pronominal.

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[15]Nor can I appeal to a method of subextraction as in Rizzi & Schlonsky 2004, because it would require analyzing the top copy as an expletive, as was originally proposed in Cheng 2000.

Two consequences of the analysis are 1) further motivation for analyzing the word *many* in *how many* constructions (presumably the *viel* part of *wieviel*) as non-quantificational, and 2) reason to think that the restriction on negation is not syntactic (i.e. doesn't have to do with movement restrictions across negative islands). Furthermore, the analysis, which calls *wh*-determiners but not *wh*-pronominals quantificational, contrasts dramatically with the analysis of D-linked (usually *wh*-determiner) phrases as non-quantificational (Pesetsky 1987). Some work will need to go into reconciling the two approaches.

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