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CHINESE CONDITIONALS AND THE THEORY OF CONDITIONALS*

As is well known, in conditionals and, more generally, in structures involving adverbs of quantification, indefinite NPs like *a cat* display a variable quantificational force. Within DRT this phenomenon is analyzed by assimilating indefinites to variables. Unlike other variable-like elements, however, indefinites cannot be anaphoric to something else. That is, one cannot say things like "a cat usually meows if a cat is hungry" meaning "a cat usually meows if it is hungry." This is generally explained in terms of a novelty condition: indefinites must introduce *novel variables*. Cheng and Huang (1996) discuss and analyze two types of Chinese conditionals in which wh-words display quantificational variability. In one type of conditional, their behavior is fully analogous to that of indefinites. In the other, they behave like indefinites in the antecedent, while in the consequent they must be interpreted as bound pronouns. Thus, in DR-theoretic terms, Chinese wh-words obey the novelty condition in the antecedent but not in the consequent of a conditional. This behavior is unexpected. The present paper addresses this issue. The main claim is that a certain version of Dynamic Semantics leads one to expect elements with exactly the properties of Chinese wh-words. In particular, Dynamic Semantics makes it possible to reverse, in a sense, the classic DR-theoretic strategy. One can view indefinites as existentially quantified terms: however, their existential force can be overridden by operators in their local environment that wipe out their existential force, as it were, and get them to act like variables. If one takes this line, the Novelty Condition becomes dispensable and the problem disappears. The behavior of Chinese wh-words is also compared to that of other elements analyzable as indefinite pronominals, such as *si* in Italian or *one* in English.

1. INTRODUCTION

Much recent work has been devoted to the study of indefinites, conditionals, and the so-called "quantificational variability effect" (QV-effect), that is, the capacity of indefinites to pick up their quantificational force from an adverb of quantification (or some other operator) present in their local environment. The intense study of these phenomena has led us to a better (though far from definitive) understanding of the empirical characteristics of these structures and to a variety of proposals of what brings them about. Among such proposals, especially influential have been at least the following: Discourse Representation Theory (DRT); a variety of situation based semantics combined with Evans-style (E-type) theories of pronouns; and Dynamic Semantics. In an important article, Cheng and Huang (1996) (henceforth, C&H) bring into this arena Chinese conditionals. On the one hand, they lay out in a remarkably clear way the main syntactic and semantic

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properties of these constructions. On the other, they bring these structures to bear upon current theoretical debates. They make, more specifically, a quite interesting proposal, namely, that one type of Chinese conditional (the so-called *ruguo* conditional) is an instance of situation based semantics cum E-type anaphora, while a second type (the so-called *bare* conditional) is an instance of unselective binding, in the spirit of DRT. In the present paper I would like to pursue C&H's proposal and address a number of important issues it raises from the point of view of a cross linguistic approach to semantics. Most current theories of indefinites are based on a "novelty condition" (that is, the idea that indefinites introduce "new" variables or discourse entities). As we will see in some detail, C&H's proposal arguably runs into problems in connection with the novelty condition. I will present a version of Dynamic Semantics that captures the quantificational variability effects without appealing to novelty. Such an approach turns out to predict the existence of constructions with the peculiar properties of Chinese bare conditionals. And in fact, as we will see, constructions very similar to Chinese bare conditionals are attested in typologically unrelated languages, such as Italian. As a corollary, a unified semantics for Chinese conditionals turns out to be possible (and indeed necessary). In contrast with this, DRT and its derivatives or situation based approaches can certainly be used to describe bare conditionals, but, unlike Dynamic Semantics, they all require construction-specific assumptions. Interestingly, we will see that C&H's specific insights on the nature of Chinese conditionals survive intact, in spite of the somewhat radical shift in the underlying semantic framework proposed here. This, in a way, gives even more force to their claim that Chinese conditionals are quite fundamental for our understanding of QV-effects and related phenomena.

Here is a look at how the present paper is organized. In Section 2, I will discuss current theories of the quantificational variability effect, which will set the stage for our discussion. In Section 3, I summarize C&H's paper and illustrate some questions I think emerge from it for a semantics that strives to eliminate language specific rules. Section 4 will be an elementary introduction to what we need to know about Dynamic Semantics; we will see there what predictions such a framework makes for indefinite pronouns. In Section 5, we come back to Chinese conditionals and show how once C&H's proposals are married to a dynamic approach to meaning and wh-words are analyzed as indefinite pronouns, not only a unitary theory of conditionals becomes possible, but also the questions raised in Section 3 find a satisfactory answer. Section 6 is devoted to the discussions of some loose ends, namely so-called asymmetric readings, which in Chinese

conditionals come about in interesting and novel forms, and existential constructions. Finally, in Section 7 various alternatives are discussed and some general conclusions are put forth.

2. Indefinites, Quantificational Variability and the Novelty Condition

In what follows, I will review some key background assumptions. As mentioned in Section 1, theories of quantificational variability of indefinites can be grouped into three main families: Discourse Representation Theory (DRT), situation based approaches, and Dynamic Semantics. These approaches of course borrow ideas and techniques from each other in ways that are sometimes difficult to tease apart. Nonetheless, they are driven by somewhat different inspiriting principles. In what follows, I will summarize the main features of each family of theories and discuss, in particular, the role the novelty condition plays in each of them. This will provide us with the main theoretical coordinates against which to try an assessment of the role of Chinese conditionals and of C&H's proposal.

Since the work of Frege and Russell, indefinites have been analyzed as existentially quantified terms. According to such an analysis, a sentence like (1a) is interpreted as shown in (1b), which seems to be intuitively right:

(1) a. A cat chased a mouse.
b. $\exists x \exists y$ [x is a cat and y a mouse and x chased y]

Generalized quantifier theory (Barwise and Cooper, 1981; and much subsequent work since) has basically stuck to this view. However, indefinites have also been observed to display varying quantificational force in a number of contexts, such as in generic sentences and in the presence of adverbs of quantification (Lewis, 1975). The following is a typical paradigm:

(2) a. A cat always/usually/never chases a mouse.
b. If a cat sees a mouse, it usually/always/never/chases it.
c. A cat is always/usually/never ferocious.
d. If a cat has long hair, it is always/usually/never ferocious.

In (2a) and (2c), indefinites occur in the main clause; in (2b) and (2d), they occur in the protasis of a conditional. (2a–b) illustrate the phenomenon of quantificational variability with episodic (stage level) predicates, while (2c–d) illustrate it with non-episodic (individual level) predicates.[1] A sentence like (2a) seems to say that all, most, or no cats chase mice, depending on which adverb of quantification we pick. Similarly for the other

examples. If indefinites are plain existentially quantified terms, how can they be affected by the presence of an adverb of quantification?

The DRT strategy (see for example, Heim, 1982, Chapter 2; or Kamp and Reyle, 1993) rejects the view that indefinites are specified as being existentially closed in the lexicon. They are, instead, more like variables. In the presence of an adverb of quantification (Q-adverb), they can get bound by it, thereby inheriting its quantificational force. If there is no Q-adverb around, they get existentially closed by default. To be more precise, we can think of Q-adverbs as binary propositional operators: ADV [ϕ][ψ]. The left argument constitutes the restriction, the right one constitutes the scope. There are two main questions that now arise. First, how are these arguments filled? Second, what does the Q-adverb operate on? What does it bind? We will now address these questions in turn.

Starting with the first question, in the presence of an if-clause (or a when clause), the answer is relatively straightforward: The if-clause is mapped onto the restriction, the main clause onto the scope. For example:

(3) always [if a cat sees a mouse][it chases it]

In the absence of an if-clause, in order to identify a restriction and scope for a Q-adverb we must fall back on something else. One possibility is resorting to some mapping principle. For example, Diesing (1992) proposes that the scope is the VP, while the restriction is the material outside of the VP. According to this criterion, a sentence such as (2c), repeated here as (4a), gets interpreted as (4b):

(4) a. A cat is rarely ferocious.
b. rarely [a cat][t is ferocious]

The mapping process can, of course, be affected by standard covert scope shifting operatios (such as NP fronting or reconstruction). For example, the most natural interpretation of (2a), repeated here as (5a), is the one represented in (5b):

(5) a. A cat always chases a mouse.
b. always [a cat_i a mouse_j] [t_i chases t_j]

Here the object has been raised at LF outside of the VP, where it gets caught by the Q-adverb. So (5a) winds up saying that for every cat and every mouse (in the appropriate, contextually-specified circumstances), the former chases the latter. The partitioning of the clause into a restriction and a scope is, in turn, linked to (in some cases, see for example, Berman (1991), identified with) presupposition accommodation and/or focusing. Typically, the material in the restriction is "topical" or "presupposed," while the

material in the scope provides new information and/or contains the focused elements.[2]

It should be added that in some cases, like (6a) below, there is nothing that can be mapped onto the restriction via overt or covert movement.

(6) a. It always rains.
b. always [C(s)][rains(s)]

In such cases, the restriction has to be contextually supplied (in the form of some salient proposition). For example, (6a) can be construed as being about nearby spatio-temporal locations, or something of the sort (as in (6b), where C is a variable whose value is filled by the context). Some theories (for example, Rooth, 1995; and von Fintel, 1994) take cases like (6) as basic. In the present work, we will be talking of the partitioning process in terms of scoping (in the spirit of Diesing). But all we have to say applies pretty much as is to focus/presupposition based theories of Q-adverbs.

Let us now turn to the question of what Q-adverbs bind. If they are viewed as sentential operators, they will have to bind variables occurring free in their restriction. One possible answer is that they basically don't care which variables they bind. They can unselectively bind any variable (over individuals or over events/situations) free in their restriction. Since indefinites are essentially variables, they will provide the right target for Q-adverbs. But now a question immediately arises. Contrast (2b), repeated here as (7a), with (7b):

(7) a. If a cat sees a mouse, it always attacks it.
b. If a cat sees him, it always attacks him.

Under any current theory, pronouns like *him* are semantically construed as variables. So in the case of (7b) we are dealing with something like:

(8) always [cat (x) $\wedge$ male(y) $\wedge$ x sees y][x attacks y]

How is the Q-adverb supposed to know which of the variables in its restriction to bind? Clearly we don't want the Q-adverb to bind the variable associated with *him*. Under no circumstance can (7b) mean "for any cat x and any male y such that x sees y . . ." Only variables associated with indefinites can be bound by Q-adverbs.

A related problem arises in cases of the following sort:

(9) I own a mouse and a cat.
a. If a dog sees a cat, it barks at it.
b. If a dog sees the cat/that cat, it barks in it.

In the context in (9), the indefinite *a cat* in (9a) cannot be construed as anaphoric to the cat I own, introduced in the previous context. The definites in (9b) can. One way of analyzing the anaphoric uses of definites is by assimilating them to variables. But such variables, as (9b) shows, typically cannot be bound by Q-adverbs. Facts of this sort have led many to assume that indefinites are subject to a novelty condition, while definites are subject to a familiarity condition. The exact formulation of such conditions is problematic (and we cannot consider here the technical problems). But the intuition is that an indefinite is associated with a "fresh" variable (that is, a variable whose index has not been used in the previous discourse), while a definite is associated with an "old" one. With this condition in place, it becomes easy to address the question of what Q-adverb bind: They bind only those variables in their restriction that are novel.

As is clear from these considerations something like the novelty condition is an essential part of the theory of quantificational variability just sketched. Once we say the reason indefinites give rise to such a phenomenon is that they are like variables, we have to immediately specify how they differ from other variables that are not subject to quantificational variability (or not in the same way). Summing up, the basic axioms of DRT are:

(10) a. Indefintes lack a quantificational force of their own. They get it either from existential closure or from a (possibly null) Q-adverb.
b. Lacking quantificational force, indefinites are assimilated to variables. They differ from other variables (pronouns, traces and other definite NPs) in that they introduce "novel" variables (the "Novelty Condition").
c. Q-adverbs split the clause into a restriction and a scope and bind the free (novel) variables in their scope.

The axioms in (10) are generally implemented via a set of construal rules that create tripartite structures, specify the domains over which the default existential closure applies, and appropriately index the binders (Q-adverbs, negation, the default existential operator, and so forth).

The situation-based approach to quantificational variability takes a prima facie very different tack (see for example Heim, 1990; or von Fintel, 1994). The basic idea is that Q-adverbs quantify exclusively over something like situations or events. We know, from examples like (6), repeated here as (11), that that has to be an option:

(11) a. It always rains.
b. always [C(s)][rains(s)]

It might be interesting to pursue the idea that this is in fact the *only* option. This means that all instances of quantificational variability are, in fact, instances of quantification over situations/events of the appropriate type. How can we extend the approach in (11) to other cases, such as those in (2)? Consider for example (2b), repeated here as (12a). Its interpretation might be something like (12b):

(12) a. If a cat sees a mouse, it usually chases it.
b. Most minimal situations s in which a cat sees a mouse are part of situations s′ in which the cat in s chases the mouse in s.

A first necessary step to make this fly is to quantify over *minimal* situations of the appropriate type, for otherwise we would not be counting the right entities. The second key ingredient is the assumption that pronouns are interpreted as descriptions in disguise (E-type pronouns). To get quantificational variability effects right (and avoid overly strong uniqueness presuppositions), such descriptions must be relativized to situation variables. For example, in (12a) we want to first pick situations s that contain just a cat seeing a mouse and nothing else. Then we check whether each such s is a part of a situation where the unique cat *in s* chases the mouse *in s*.

As is well known, depending on a variety of contextual factors, sentences like (12a) have a number of different "asymmetric" readings (with distinct truth conditions; see Kadmon, 1990). For example, (12a) can be construed as a quantification over mice-spotting cats (the so-called "subject asymmetric" reading) or as a quantification over mice (the "object asymmetric" reading). In DRT these readings can be obtained by quantifying directly over the targeted indefinite (and existentially closing the other). In a situation based approach, the only way of mimicking the effects of asymmetric quantification is to carve out smaller situations. For example, the subject asymmetric reading for (12a) can be given along the following lines:

(13) Most minimal situations s which contain a cat that are part of a situation in which the cat in s sees a mouse, are also part of a situation in which the cat in s chases the mouse it sees.

The point is that we want to count cats. So we must carve out minimal situations that contain cats and nothing else. This is what (13) does. What enables one to accomplish this is the underlying assumption that each predicate contains an implicit situation variable (that will eventually wind up either as bound by a Q-adverb or as existentially closed):

(14) A cat sees a mouse $\Rightarrow \exists x\, \exists y\, [\text{cat}_s(x) \wedge \text{mouse}_{s'}(y) \wedge \text{see}_{s''}(x, y)]$

Something like "$\text{cat}_s(x)$" says that x is a cat in s. For Q-adverbs to bind

the right variables, various strategies have been proposed. One way is using some scoping operation that pulls the relevant indefinite out (Heim, 1990). Another way is by resorting to pragmatics (von Fintel, 1994; uses "resource situations"). Yet another way is to construe indefinites as containing a situation variable with a uniqueness condition already built in (Percus, 1998).

Analogous options must be resorted to for sentences without an if-clause. For example, on a situation-based approach, a sentence like (15a) must be interpreted as (15b):

(15) a. A cat is rarely ferocious.
b. There are few minimal situations s containing a cat that are part of a situation s′ in which the cat in s is ferocious.

So here too the question of how suitably sized situations are carved out arises.

Prima facie it looks like situation based approaches do not need a novelty condition on indefinites. After all, indefinites are treated as existentially quantified terms, just as on the classical Russellian theory (the only difference being the presence of a situation variable). So consider for example the following sentences:

(16) a. I saw a cat. John too saw a cat.
b. I saw a cat. John too saw it.

Clearly, (16a) shares no reading with (16b). It may happen that the cat that I saw and the one that John saw turn out to be the same. But this is not (and cannot) be part of what (16a) says. In DRT, where indefinites are variables, one needs to make sure that the variables picked out by the indefinites in (16a) are not the same (or, equivalently, that the two indefinites are existentially closed independently of one another). On a situation-based approach, this follows automatically. Even if the two indefinites in (16a) happened to have the same index, each would come with its existential quantifier and hence their values would be set independently of each other. No novelty condition is necessary.

Or is it? As we saw in connection with (12a) pronouns (and definites in general) do contain situation variables. What prevents, then, a Q-adverb from binding a situation variable associated with a pronoun or some definite? To better see the problem, consider the following discourse:

(17) a. I own a cat.
b. If a dog sees it, it barks at it.
c. a dog sees it $\Rightarrow \exists x\ [dog_{s'}(x) \wedge see_{s''}(x, \iota y\ [own_s(I, y)])]$

Consider a discourse constituted by (17a–b). Sentence (17a) introduces a situation s in which I own a cat. A natural way to interpret the pronoun *it* in the protasis of the conditional in (17b), whose semantics is spelled out in (17c), would be as "the cat I own in s." Now the problem is: What prevents the (implicit) Q-adverb in (17b) from binding the variable associated with the pronoun? The result would be something like "most minimal cat-owning situations which are part of a situation where a dog sees the cat I own, are also part of situations in which the dog barks at the cat." But the conditional in (17b) doesn't have such a reading. So an analog of the novelty/familiarity condition might be needed after all even on a situation-based approach. And in fact, this is indeed the conclusion reached by some of the proponents of such an approach (see for example, von Fintel, 1994).

Summing up, a situation-based approach has the following features:

(18) a. Q-adverbs uniformly bind situation variables; situation variables of appropriate size must thus be carved out.
b. Pronouns are viewed as implicit descriptions (relativized to situations).
c. Each NP (including pronouns) contains situation variables. Something must ensure that only the situation variables associated with indefinites are typically bound by quantifiers (novelty?).

The third family of approaches relies on a different theory of meaning. The view of meaning dominant since the advent of modern semantics analyzes meaning in terms of informational content (typically, truth conditions relative to an assignment). DRT and the situation-based approach just considered adopt such a view. However, in recent years, on the basis of a variety of phenomena, a new approach has emerged, according to which meaning is best analyzed in terms of how sentences affect the information available to the illocutionary agents in the context. The meaning of a sentence becomes a function from information states (or contexts) into new information states. Such functions are called "information updates" or "context change potentials." For example, suppose we find out, in our current state, that a new student will arrive tomorrow. This will prompt us to update what we know by opening a new "file" or "address" or "discourse referent" together with the information that this new protagonist is a student and will arrive tomorrow. We can think of an information state as constituted of a sequence of indices (the indices of the active files) and a set of worlds (the worlds compatible with what we know). Novel

information constantly reshapes the sequence of indices and the set of worlds.

This view of meaning was put forth originally by Stalnaker (1978). Its first application to the study of anaphora can be found in Heim (1982, Chapter 3). The theory of indefinites developed by Heim is still based on the idea that indefinites introduce novel variables (just as in the static theory of Heim (1982, Chapter 2)). The basic axioms of the dynamic theory remain those in (10). But they are implemented in a different way. Rather than via a set of construal rules that set up logical forms that are then interpreted in terms of Tarskian recursion, construal rules are dispensed with altogether and LF-formulas get recursively associated with context change potentials. So, while in the static theory all the action takes place at the level of LF syntax, in the dynamic theory the action takes place at the level of LF semantics. Following the prevailing practice, I will use "DRT" to refer to *static* theories of indefinites while reserving the term "Dynamic Semantics" to theories where meaning is viewed as functions from contexts into contexts.

The phenomena to which dynamic theories have been applied are primarily two: presupposition projection, and indefinites and anaphora. Some authors in some works (see for example, Heim, 1992; and von Fintel, 1994) adopt the dynamic view for presupposition projection but not for anaphora. According to such works, while LF formulas are interpreted as context change potentials, information about indefinites and pronoun binding is *not* coded as part of what the context specifies. That is to say, contexts are viewed as sets of worlds (*not* as sets of world assignment pairs) and context change potentials do not manipulate assignments. From the point of view of anaphora and the QV-effect (the effect that interests us here) such theories remain, thus, static.

It obviously isn't easy to choose between the static and they dynamic approach to indefinites (or, for that matter, among any of the theories of quantificational variability summarized here). Various arguments in favor of one or other have been put forth in the literature. I believe that Chinese conditionals provide us with new relevant evidence that may help us choose among various approaches. In particular, since the birth of dynamic theories of anaphora, new approaches to indefinites have been developed that have abandoned the axioms in (10). More specifically, the dynamic system of Groenendijk and Stokhof (1990, 1991), further elaborated in Chierchia (1992, 1995a), enables one to go back to the original Russellian conception of indefinites as (dynamic) existential terms and to do away with the novelty condition altogether. Such a theory, which we will sketch informally in Section 4, makes simple and detailed predictions concerning the exis-

tence and properties of indefinite pronouns. We will try to make a case that wh-words in Chinese conditionals are exactly this kind of element. It is now time to turn to the Chinese facts.

3. CHENG AND HUANG (1996)

In the present section I will first present the generalizations and theory put forth by C&H. My attempt will be to be as faithful to their article as possible in a brief summary. But clearly I will be unable to do justice to all of the points they make. Then I will discuss some possible problems with C&H's proposals (on the background of the debate reviewed in Section 2).

3.1. *The structure of Chinese conditionals*

C&H argue that two types of conditional structures have to be recognized in Chinese, "bare conditionals" and *dou-* and *ruguo*-conditionals. Let us describe them in turn. In ruguo-conditionals, a subordinating word *ruguo* 'if' introduces the antecedent; in *dou*-conditionals there is no *ruguo*, but one finds instead the overt quantifier-like element *dou* 'all' in the main clause. Bare conditionals, in contrast, lack both. They can optionally have a 'then' (*jiu*) in the consequent clause. Furthermore, they are also characterized by the presence of one or more wh-words in the antecedent clause; each such wh-word has to be matched by an equal wh-word in the consequent. The wh-words in the consequent cannot be replaced by any kind of anaphoric element (pronoun, gap, or definite description). The following examples illustrate these properties.

(19) shei xian jinlai, wo xian da shei.
who first enters I first hit who
'If X enters first, I hit X first'

(20) * shei xian jinlai, wo xian da ta/[e]/ na-ge-ren.
who first enters I first hit him/[e]/ that-CL-person

(21) shei yan shei, shei jiu xiang shei.
who plays who who then resemble who
'If X plays the role of Y, X then will resemble Y'

The main properties of bare conditionals are thus summarized by C&H:

(22) a. The donkey anaphor must take the form of a wh-word.
b. The donkey wh-word [in the consequent clause] must be identical to the wh-word in the antecedent clause.

c. There must be an element in the consequent clause referring back to the wh-word in the antecedent clause (C&H, p. 132).

This behavior contrasts sharply with that of *dou-* and *ruguo*-conditionals. They too can have one (or more) wh-words in the antecedent, but such wh-words need not have an anaphoric element referring back to them in the consequent clause. If they do, the anaphoric element *cannot* itself be a wh-word. One has to resort to either a pronoun or a gap (that is, a null pronoun) or a description. The following example illustrates the phenomenon with a *ruguo* conditional.

(23) * ruguo ni kandao shei, qing jiao shei lai jian
if you see who please tell who come see
wo.
me
'If you see someone, please ask him/her to come see me.'

(24) ruguo ni kandao shei, qing jiao tal/[e]/
if you see who please tell him/[e]/
na-ge-ren lai jian wo.
that-CL-person come see me
'If you see someone, please ask him/her/that person to come see me.'

It is perhaps worth adding that donkey conditionals of the familiar type are rendered as *ruguo*-conditionals in Chinese:

(25) ruguo you ge laoshi you ge congming de
if have CL teacher have CL intelligent DE
xuesheng, ta tongchang hui peiyang ta.
student, he usually will foster him
'If a teacher has an intelligent student, he will usually foster him.'

We see that a very interesting pattern emerges. Why do wh-words have to occur in pairs in bare conditionals but cannot do so in *ruguo*-conditionals? And why do wh-words take on the role of indefinites in conditionals to begin with? There are both similarities and differences with the corresponding English structures. Ideally, one would like a uniform account for both languages, the differences between them being reduced to lexical properties of the items involved. C&H indeed succeed in this task. Let us see how.

First, following Kratzer (1981) and much subsequent work, they assume that the basic role of the antecedent clause of a conditional is to restrict a (possibly null) quantificational element of some kind, such as an adverb of quantification or a modal. Thus the semantics of conditionals brings about tripartite structures of the type discussed in Section 2.

Second, wh-words in questions have an existential import. This paves the way for them to play the role of indefinites also in conditionals. The hypothesis C&H adopt in this connection is that wh-words are, in Chinese, polarity items subject to a formal licensing condition, a hypothesis supported by previous research on the topic (see in particular, Cheng, 1995). More specifically, the question-forming operator and the connective *ruguo* are proper licensers for wh-words.

The question that now arises is what happens in bare conditionals, where there is no *ruguo* to license the wh-words. Here the licensing must be done by something else. C&H's idea is that what does the licensing in this case is the (possibly null) quantifier that operates on them. Accordingly, the LF of a sentence like (19) above, repeated here as (26), will be as in (27a) and its interpretation will be as in (27b):

(26) shei xian jinlai, wo xian da shei.
who first enters I first hit who

(27) a. NEC_i [who_i first enters][I hit who_i first]
b. $\forall x$ [x enters first][I hit x first]

NEC in (27) is a null modal that licenses the wh-words and is semantically interpreted as a universal quantifier (see Heim, 1982). In the presence of an overt quantificational adverb (for example, *tonghang* 'usually'), the latter will act as a licenser. The reason why there must be a wh-word in the consequent clause follows, according to C&H, from the ban against vacuous binding, for without such a wh-word, the variable in the antecedent would not be matched by a variable in the consequent. The reasons why the variable in the consequent could not be anything else but a wh-word are varied. I will summarize them only very briefly. If we try to realize the variable as a pronoun, we have to figure out what binds it. It can be either the NEC or the wh-word in the antecedent. But the latter does not c-command the pronoun (or, more generally is not "accessible" to the pronoun; see Higginbotham, 1980). And direct binding by the NEC would make the pronoun a resumptive one. But resumptive pronouns are not attested in Chinese. If we try to realize the pronoun as a gap, we would obtain something similar to a parasitic gap construction. Such a construction requires a form of parallelism that would be violated if we had a

wh-word in the antecedent and a gap in the consequent (see Safir (1985)). Finally, if we have a definite description in the consequent clause, it would have to be assimilated to a variable; but since non-pronominal definite NPs are R-expressions, they cannot. So we are left with wh-words in both clauses as the only option.

Let us now turn to *ruguo* conditionals. Here the wh-words are licensed not by the quantificational adverb but directly by *ruguo*. The wh-words retain, in this case, their existential meaning. This is shown by the fact that they can co-occur with the particle *you* that is compatible only with indefinites. Hence, the adverb of quantification cannot bind the wh-words (since they are already existentially closed). It can only bind the event/situation variable. It follows, in turn, that the anaphoric elements in the consequent clause cannot be variables directly bound by the adverb of quantification, for they would have no matching variable in the restriction (resulting in vacuous binding). This means, in turn, that the anaphoric elements in the consequent will not be wh-words interpreted as variables; such elements will have to have a more indirect link with their antecedent, one that is not an instance of binding. The strategy that grammar arguably makes available is the E-type strategy, where the anaphoric element is interpreted as a description. We thus derive the fact that in *ruguo* conditionals the anaphoric elements in the consequent clauses will have to be either overt descriptions or covert ones, that is, pronouns (phonologically realized or null) interpreted a la Evans. Accordingly, the semantics of a sentence like (24) above, repeated here as (28a) will be as in (28b):

(28) a. ruguo ni kandao shei, qing jiao ta/[e]/
if you see who please tell him/[e]/
na-ge-ren lai jian wo.
that-CL-person come see me

b. ∀s [s a situation in which you see someone] [make s part of a situation s′ in which *the person you saw in s* comes and sees me]

The part italicized in (28b) is the one corresponding to the anaphoric element.

Finally, let us consider *dou*-conditionals. The element *dou* is generally analyzed as a universal quantifier, whose restriction is provided by the constituent to its left. C&H argue that the antecedent clause in a *dou*-conditional is an embedded question. As evidence, they cite the fact that *ruguo* cannot occur in the antecedent clauses of *dou*-conditionals, while an overt interrogative conjunction (*bulun* 'regardless of') can:

(29) bulun ni jiao shei jin-lai, wo dou jian
regardless you ask who come-in I all see
ta.
him/her

'Regardless of who you ask to come in, I will likewise see him/her.'

Questions are interpreted as sets of propositions (see Hamblin, 1973). Such a set of propositions provides an appropriate restriction for *dou*. So the semantics of (29) can be informally characterized as follows:

(30) For every proposition p of the form "you ask x to come", I will see the agent of p

This analysis explains rather directly what licenses the wh-words in the antecedent clause (viz., the question forming operator) and why the anaphoric element in the consequent must be an overt or an E-type description.

In the structures considered so far, wh-words appear to be in complementary distribution with other kinds of anaphoric elements. There are also some cases of apparently free alternations between the two. C&H analyze them partly as cases of structures that are ambiguous between bare and *ruguo* conditionals (since *ruguo* is generally optional) and partly as cases of "mixed" licensing, where one wh-element is licensed by *ruguo* and the other by the quantificational adverb. In what follows, we focus on canonical bare conditionals and canonical *ruguo*-conditionals. If C&H are right on *dou*-conditionals and on the mixed cases, what we have to say will extend to them as well.

There are other interesting properties of conditionals in English that it is useful to check contrastively with their Chinese counterparts. For example, as is well known (see for example, Chierchia, 1992, 1995a) and references therein), donkey pronouns display alternations between ∀- and ∃-readings, best exemplified by the salient readings of (31a) and (31b) respectively:

(31) a. Everyone who has a dime will put it in the meter. (∃-reading)
b. Everyone who had a slave owned his offsprings. (∀-reading)

Sentence (31a) requires only that a dime be put in the meter; sentence (31b) instead says that for every slave x, someone who owned x also owned x's offsprings. Similar cases can be set up for conditionals. C&H claim that in bare and *dou*-conditionals, donkey anaphors get only the ∀-inter-

pretation, while in *ruguo*-conditionals both readings are possible. Finally, the proportion problem. As mentioned in Section 2, conditionals can be construed as having "asymmetric" interpretations with distinct truth conditions. C&H claim that all of the Chinese conditionals considered so far allow for asymmetric interpretations. The proportion problem seems to cut across the various constructions.

What we have said can be summarized as in the following table:

(32)

Type/Example	Donkey Anaphor	∀-reading	∃-reading	Asymmetric Reading	QVE
a. Bare conditionals *Who marries who, who usually likes who.*	wh	yes	no	yes	yes
b. *Ruguo*-conditionals *If who marries who, he/she usually likes that person.*	pronouns, gap, or definite description	yes	yes	yes	yes
c. *Dou*-conditionals *(Regardless) who marries who, he/she all like that person.*	pronoun, gap, or definite description	yes	no	yes	yes

As we saw, C&H manage to reduce this array of properties to a simple hypothesis: In *ruguo-* and *dou*-conditionals, the quantificational adverb binds the event/situation variable and the anaphoric elements in the consequent clause are instances of E-type anaphora, while in bare conditionals the quantificational adverb directly binds the wh-words, which are thus interpreted as variables. The latter is a genuine case of unselective binding, DRT-style. While this explains a lot, there are a number of problems it raises that are worth addressing.

3.2. *Some problems*

One open issue has to do with the distribution of asymmetric readings. As we shall see, such distribution does not follow smoothly from C&H's proposal; we shall devote Section 6.1 to its discussion. Here, we will focus

instead on two other problems that are of a more general nature, as they seem to be inherent to central features of DRT and situation based approaches.

The first problem has important empirical consequences and has been pointed out by Satoshi Tomioka.[3] As we know from Section 2, DRT makes essential use of a novelty/familiarity condition. If wh-words in Chinese conditionals are genuine indefinites, they ought to be subject to the novelty condition. This is indeed so for occurrences of wh-words in the antecedent of a conditional. In such a position they have an existential import (in *ruguo* conditionals) or are bound by Q-adverbs (in bare conditionals), which is just what would follow under the assumption that they introduce novel variables. But things are different for wh-words in the consequent of bare conditionals. Here, they *must* be anaphoric to the previous occurrences of wh-words. So, here is the problem. Chinese wh-words must introduce a *novel* variable in the antecedent of a bare conditional but a *familiar* one in the consequent. They must be subject to the novelty condition in the antecedent of a conditional (and in questions) and to the familiarity condition in the consequent. This is unlike any other NP. It is unlike any other NP, in that novelty and familiarity are generally absolute, not context dependent properties. And it is unlike any other NP for the specificity of the environment that triggers novelty versus familiarity. Any combination different from the one pointed out above would result in massively wrong predictions. For example, if wh-words could be associated with an old variable in the antecedent of a conditional, we could get a case such as the following:

(33) A student$_i$ walked in. If who$_i$ walks in, I will greet who.

Such a sentence would wind up with the wrong meaning, namely "a student walked in; if he walks in, I greet him." Similarly, it is crucial that the wh-words in the consequent of a conditional (like sentence (21) above) be interpreted as familiar variables. Otherwise the sentence would get the wrong interpretation.[4] Of course we can describe the facts by means of the following stipulation:

(34) a. Wh-words must introduce a *novel* variable in the antecedent of a conditional.
b. Wh-word must introduce a *non-novel* variable in the consequent of a conditional.

But then we no longer have a predictive theory of indefinites. For example, should we expect there to be a language where the environments triggering novelty are the reverse of those found in Chinese?

One way out might be to forget about DRT and simply say that wh-words happen to be ambiguous. In questions and in *ruguo* conditionals they are existentially quantified terms. In bare conditionals they are variables in need of a binder. However, this hypothesis would completely miss an important point that C&H's approach tries to capture: The alternation of wh-words between an existential meaning and that of a variable bound by a quantificational adverb is typical of indefinites. DRT is designed to capture precisely such an alternation and has a kind of explanation for it. On the ambiguity thesis, it is completely accidental that the role of variables in bare conditionals is played by the same element that we see acting as a genuine indefinite in other contexts. What one would like to have is a uniform lexical meaning for wh-words and then a general account of where they wind up having which quantificational force and where they wind up being interpreted anaphorically. So, C&H's appeal to DRT is well motivated. But then we are stuck with the peculiar behavior of wh-words vis-a-vis the novelty/familiarity condition.

The second point is more conceptual in nature. I will present it only in highly impressionistic terms. C&H propose a situation-based approach for *ruguo*-conditionals, and a DR-theoretic one for bare conditionals. As we know from Section 2, most versions of DRT (and of dynamic binding) also admit quantification over situations or events. And in so far as pronouns are concerned, most DR-theoretic or dynamic approaches adopt a "mixed strategy" where some donkey pronouns are bound and others are unbound elliptic descriptions.[5] So, it would seem that C&H's proposal is on a par with many other current proposals. However, it is not clear to me that this is really so. No full fledged situation-based approach to the QV-effect also buys into the view that indefinites are variables. And for good reasons. The apparatus of situation-based approaches to the QV-effect simply has no use for the idea that indefinites are variables. If I may resort to an admittedly tendentious biological metaphor, having both a DR-theoretical (or dynamic) approach and a situation based one for QV-effects would be like having an organism with fully operational branchiae next to fully operational lungs. Such life forms, though not unattested, appear to be clearly disfavored in evolution. How likely is it that Universal Grammar is equipped with two nearly equivalent apparatuses for giving rise to QV-effects?

In fact, if C&H analysis is correct, wh-words in bare conditionals would be perhaps the only case of indefinites-as-variables attested in the languages of the world. This is so because in *ruguo* conditionals one only binds situations; the same presumably would hold of, say, the English counterpart of *ruguo* conditionals (if-clauses). But then we never see genuine alterna-

tions of quantificational force in one and the same item. On the one hand we have wh-words (and other indefinites) in *ruguo* conditionals, which are lexically specified as being existentially closed. On the other we have wh-words in bare conditionals, which are lexically specified as variables. But this boils down, then, to the ambiguity thesis again.

Now I believe that these problems (the status of wh-words vis-a-vis the novelty/familiarity condition and the simultaneous existence of two mechanisms for QV-effects) can be addressed and, arguably, solved simultaneously, while preserving almost verbatim C&H's main insights. In what follows I will first sketch a version of Dynamic Semantics and then discuss some predictions it makes.

4. The ABC of Dynamic Binding

I will begin by giving the essentials of a version of Dynamic Semantics, which I call "Dynamic Binding." I will keep the discussion at a totally informal and even somewhat sloppy level (see Chierchia, 1992, 1995a for formalizations). Then I will discuss the predictions that this approach makes concerning indefinite pronouns.

4.1. *Indefinites*

The main idea in dynamic semantics is that the meaning of a sentence is to be thought of as a function from information states into new information states. Information states are modeled as worlds (those where, for all we know, we might be in) plus a set of active indices ("files" or "discourse referents"); the latter act as hooks on which information about individuals gets hanged. Indefinites change our information states by prompting the activation of indices. For example, upon finding out that a grocery store will be opened tomorrow in our neighborhood, we would activate a certain index i and attach to it the information that it is a new grocery store in our neighborhood. What this does is validate in a natural way the following schema:

(35) $[\exists x \Phi] \ \& \ \Psi \leftrightarrow \exists x[\Phi \ \& \ \Psi]$

The schema in (35) is the main characterizing law of dynamic semantics.[6] It says that an existential quantifier in virtue of its meaning extends its binding potential beyond its syntactic scope. Here is an illustration:

(36) a. A man walks in. He is wearing a hat.
b. [$\exists$x [x is a man & x walks in]] & x is wearing a hat
c. $\exists$x [x is a man & x walks in & x is wearing a hat]

(36a) is interpreted in the usual way, namely as (36b). In this representation, the last occurrence of *x* (which corresponds to the pronoun *he*) is not syntactically bound by the quantifier corresponding to *a man*, that is, is not c-commanded by it. Yet, given the new way of interpreting indefinites, the last occurrence of *x* is semantically bound, that is, its value depends on the value of *a man*. As such, (36b) comes out as equivalent to (36c). It is an instance of the schema in (35), the main law of Dynamic Semantics. All other properties of the system follow from the dynamic character of indefinites. The relevant definitions of binding that we adopt are the following:

(37) a. A syntactically binds B in a LF α iff A c-commands B in α and is coindexed with it.
b. A semantically binds B in a LF α iff the semantic value of B depends on the semantic value of A.[7]

4.2. *Other quantifiers and relative clauses*

Indefinites aside, quantifiers are usually interpreted as requiring a restriction and a scope, as in the following schema.

(38) a. Q [A][B]
b. every [man][runs]

The restriction is the left argument, the scope the right one. Moreover, natural language quantifiers are all conservative, viz. they validate the following schema.

(39) a. Q[A][B] ↔ Q[A][A & B]
b. every[man][runs] ↔ every[man][is a man & runs]

This is all standard. But now see what happens once we move to a dynamic setting. Suppose an indefinite is embedded in the restriction of a quantifier, as in the following schema:

(40) Q [A] [B]
. . . an X . . .

Because of conservativity, this is equivalent to:

(41) Q [A][B] ↔ [A] [A & B]
. . . an X . . . . . . an X . . . . . . an X . . .

But in the right argument we have an instance of the schema in (35)–(36). The indefinite in A, though not having B in its syntactic scope, will be able to reach into it. This is virtually all there is to donkey dependencies in relative clauses. Here is a concrete illustration.

(42) a. every [man that has a donkey][beats it]
b. every [man that has a donkey]
[is a man that has a donkey & beats it][8]

So determiners are viewed, as is customary in Generalized Quantifier Theory, as conservative relations between properties: The common noun provides the restriction, and the c-command domain of the NP provides the scope. Because of conservativity, switching to a dynamic setting automatically takes care of donkey anaphora in relative clauses, along the lines illustrated in (42).

4.3. *Adverbs of quantification*

As we saw, conditionals provide restrictions for adverbs of quantification. Now, the dynamic character of indefinites enables them to act as if they were variable in the presence of Q-adverbs. Adverbs of quantification, in their search for something to bind, can, as it were, simply "wipe out" existential quantifiers.

Let me show how an existential quantifier can be compositionally eliminated in a dynamic setting.[9] Starting out with something like (43a), the standard interpretation of a sentence like "a man is blond," the elimination of the existential quantifier proceeds in three easy steps.

(43) a. $\exists x$ [x is a man & x is blond]
b. [$\exists x$ [x is a man & x is blond] & x = y]
c. $\exists x$ [x is a man & x is blond & x = y]
d. y is a man & y is blond

Simply add to (43a) an equation of the form x = y, as in (43b). In virtue of (35), x is caught by the existential quantifier; and (43b) is equivalent to (43c). But (43c), in virtue of standard logical principles, is equivalent to (43d). The existential quantifier has gone. In its place we find a variable, ready to be bound. This operation has come to be known in the literature as Existential Disclosure (see Dekker, 1993). Existential Disclosure applies only to indefinites by virtue of their open character. No other determiner can be compositionally wiped out in the semantics.

Under this hypothesis, the logical form of a sentence like (44a) will be (44b):

(44) a. If a man is blond, he is usually from the north.
b. MOST$_i$ [a man$_i$ is blond] [he$_i$ is usually from the north]
c. MOST (λx_i [x_i is a man & x_i is blond], λx_i[x_i is from the north])

"Usually" means essentially "most" plus disclosure (marked as an index on it). This index stands semantically for a *pair* of disclosure operators; one operates on the restriction, the other on the scope. Disclosure operators can be thought of, essentially, as λ-abstractors. When the index "i" is attached to a pronoun, the disclosure operator boils down to just the ordinary λ-abstractor familiar from introductory semantics textbooks. When "i" is the index of an indefinite, the disclosure operator wipes out the existential quantifier and abstracts over the variable left behind. If "i" is on some other NP, which is neither a pronoun nor an indefinite, we will get something uninterpretable, due, say, to some version of the usual ban against vacuous binding (see Chierchia, 1995a, Chapter 3). So, assuming that an adverb of quantification can be freely indexed in the lexicon, its meaning comes out as:

(45) For any A, B
usually$_i$ [A][B] = [MOST $\underline{\lambda} x_i$ [A] $\underline{\lambda} x_i$[B])

The underlined λs are the pair of disclosure operators that *usually$_i$* comes equipped with. In the general case, an adverb of quantification can carry more than one index. When this option is chosen, it will disclose and bind more than one indefinite. It is also possible (sometimes even necessary) for an adverb of quantification to disclose the event or situation variable associated with the verb. This must happen, in particularly, when no indefinite is present.

(46) a. If John sings, he is usually happy.
b. usually$_e$ [$\exists$e John sings$_e$][$\exists$e′ e $\leq$ e′ & he is happy$_{e'}$]

Formula (46b) says that most singing events by John are parts of events (states, actually) of John being happy.

Summing up, we assume Q-adverbs are freely indexed by disclosure operators. Independent principles then determine when such indexing results in a well-formed formula. For one thing, the index has to be that of an indefinite. Moreover, the disclosed indefinite has to be topical, that is, it must be possible to construe it as (part of) the discourse topic. Obviously, a lot more needs to be said and done. But the basic idea should be clear enough.

Is Existential Disclosure a trick? No more than ordinary λ-abstraction. In a static setting, the λ-operator enables us to go from formulae to predicates. For example:

(47) $\text{blond}(x) \Rightarrow \lambda x\ \text{blond}(x)$

In a dynamic setting, it turns out to be possible to extend abstraction to existentially quantified terms, because of the open character of existential quantifier. That's all there is to it.

In conclusion, the meaning of an adverb of quantification is that of an ordinary determiner, only combined with disclosure operators and generalized to n-ary cases. An adverb of quantification chooses freely how many and which variables to bind. If it doesn't find the right ones, the result will be uninterpretable because of independent principles.

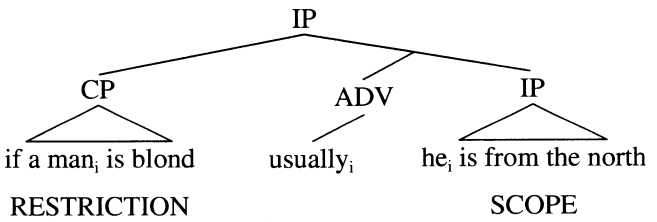
4.4. *The LF syntax of partitioning*

The above semantics enables us to make a very simple hypothesis on the Logical Form of sentences with adverbs of quantification. Typically the basic position of the quantificational adverb is somewhere in the main clause:

(18) If a man is blond, he is usually from the north.

Usually needs two (clausal) arguments. Where can it find them? Well, we can simply move and adjoin it to IP (or somewhere to the left periphery of the clause). Then its right most argument (its scope) can be identified with its c-command domain, as it standard for other operators. Its left argument (its restriction) will be what locally c-commands the Q-adverb (its Spec, in a multiple Spec system such as the one outlined in Chomsky, 1995).

(49)



In the spirit of much recent work, it is plausible to maintain that in its movement, the adverb is attracted to some clause-initial topic position (perhaps by the need to check some feature of the disclosure operator associated with it). The Q-adverb combines with its two arguments one

at a time, via functional application. The steps of the derivation are as follows:

(50) a. $\lambda B \lambda A.\text{usually}_i[A][B]$ (he_i is from the north)
= $\lambda A.\text{usually}_i[A][\text{he}_i \text{ is from the north}]$

b. $\lambda A.\text{usually}_i[A][\text{he}_i \text{ is from the north}]$ (a man_i is blond)
= $\text{usually}_i[\text{a man}_i \text{ is blond}][\text{he}_i \text{ is from the north}]$

So at the level of the syntax of LF, we only have binary branching structures, consistent with what is currently known about this level of representation. Tripartite structures, such as the bottom line of (50b), arise only as part of the interpretive procedure, as it were. For convenience, though, we will keep referring to LFs such as (49) with the label "tripartite structure." The process of partitioning is achieved, in the present approach, by an independent mechanism: movement to some suitable clause-initial site. It requires no construction specific rules (as in DRT) or domain conditions (such as Diesing's mapping hypothesis, which governs the domain of existential closure). If we are lucky and we've done things right, the lexical meaning of quantificational adverbs and universal semantic rules such as functional application are all that is needed to suitably partition the clause.[10]

This approach extends straightforwardly to cases where there is no overt restriction. Let me briefly illustrate how. Consider the following examples from Rooth (1995):

(51) a. A 'u' usually follows [$_F$ a 'q']
b. [$_F$ A 'u'] usually follows a 'q'
where [$_F$] indicates focal stress.

The stress pattern in (51a) marks *a* '*u*' as (part of) the novel information and *a* '*u*' as topical. A natural context for (51a) would be constituted by the question "what does a u usually do?" The sentence is interpreted as saying that most *u*s follow a *q*s (which is false). The stress pattern in (51b) marks *a* '*u*' as focal and *a* '*q*' as topical. A natural context for (51b) would be constituted by the question "what usually follows a *q*?" This sentence is interpreted as saying that most *q* are followed by *u*s (which is true). The LFs corresponding to (51a–b) will be, respectively:

(52) a. a 'u_i' usually_i [t_i follows a 'q']
b. a 'q_j' usually_j [a 'u' follows t_j]

In (51a) *a* '*u*' is the restriction of *usually* (which means the same as *most*). It is interpreted as $\exists x[u(x)]$ and disclosed in the usual manner.[11] A '*q*'

remains, instead, in the scope, where it stays existentially closed. So the sentence winds up saying that most *u*s follows *q*. In (51b) *a* '*u*' is reconstructed back into Spec VP and *a* '*q*' is scoped out. So it is the latter that will be disclosed, and the former will be interpreted existentially. The interpretive procedure is driven by the same principles we see at work with if-clauses: The indefintes that get disclosed are the topical ones.

4.5. *Eliminating the novelty/familiarity condition*

Many dynamic theories of anaphora retain the novelty condition (see for example, Heim, 1982, Chapter 3; Dekker, 1996; Krifka, 1998). However, as argued in Chierchia (1995a,b) it turns out to be possible to do away with novelty altogether (with a little help from the binding theory). The effects of the novelty condition can be derived at no cost. Let us see how.

There are essentially two contexts for which novelty appears to be necessary. The first is constituted by conjunctive contexts, like (16a) above, repeated here:

(53) I saw a cat_i. John too saw a cat_i.

On the indefinites-as-variables approach, we need to make sure either that the two occurrences of *a cat* get associated with distinct variables or else that they are existentially closed independently of each other. The latter condition is automatically satisfied on our approach. The two occurrences of *a cat* come with an existential quantifier each. Hence, even if we picked the same variables, their values would be set independently of each other. When this happens, as in (53), only the second occurrence of *a cat* remains "active," while the first gets shut off. So we go on with:

(54) It_i was black.

It$_i$ can only be interpreted as the cat John saw. The first occurrence of *a cat* in (53) can remain active only if it is assigned a different index from the second occurrence.[12] So the effects of novelty are obtained at no cost here. This extends to all contexts based on conjunction, including for example, relative clause versions of donkey dependencies. Consider:

(55) a. Every farmer that owns a donkey beats a donkey.
b. Every farmer that owns a donkey is *a farmer that owns a donkey* and *beats a donkey*.

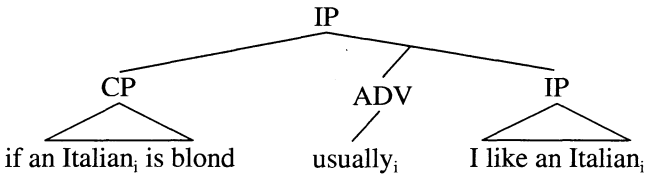
Because of conservativity, (55a) is analyzed as (55b). The underlined portion is a conjunctive context, just like (53). Consequently, here too the value

of the two indefinites will be set independently (even if they happen to have the same index). In standard DRT we would have to appeal to novelty to ensure this result.

The second crucial class of cases for novelty is in presence of an adverb of quantification. Here is an example:

(56) a. If an Italian is blond, I usually like an Italian.

b.



c. If an Italian is blond, I usually like him.

Nothing prevents the two indefinites in (56a) from being coindexed, giving rise to the LF in (56b). The disclosure operator will then apply to the restriction and the scope with respect to the i-th variable. As a result, the sentence winds up being interpreted just like (56c). But (56a) doesn't have such a reading. So it looks like we need something like novelty here, in order to rule in the LF in (56b). This would void getting rid of novelty for the conjunctive cases of any interest.

Here is where the Binding Theory (BT) might step in. Consider the following sentences:

(57) a. Yesterday at the party, a friend of mine liked a friend of mine a lot.
b. A friend of mine wanted badly to meet a friend of mine.

The indefinite NPs in (57a–b) admit of a referential interpretation, but cannot be construed as coreferential. (57a), for example, cannot be interpreted as saying that a friend of mine liked him- or herself a lot. Generally, it is assumed that this is taken care of by Principle C of BT. Such a principle rules out the LF in (58):

(58) * a friend of mine$_i$ liked a friend of mine$_i$

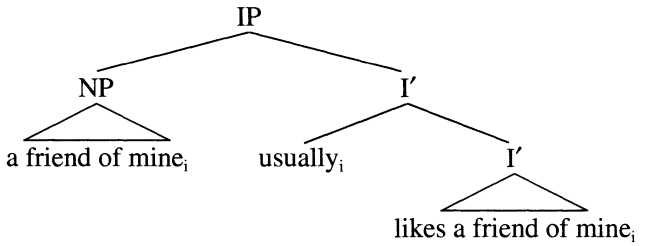
There are of course many issues surrounding the interpretation of Principle C, which we cannot possibly address here. Let us assume the ungrammaticality of (58) indeed succeeds in ruling out the unwanted coreferential interpretation for (57a). Compare now the sentences in (57) with those below:

(59) a. A friend of mine usually/rarely/never likes a friend of mine.
b. A friend of mine usually/rarely/never wants to meet a friend of mine.

The only difference between (59) and (57) is in the presence of an adverb of quantification (which, as usual, induces the QV-effect). The sentences in (59) are grammatical, but not on the reading where one indefinte binds the other. For example, sentence (59a) cannot mean that most/few/no friend of mine likes himself. Why? Presumably the same principle that rules (58) out, will also rule the following out:

(60) a.* a friend of mine_i usually_i [likes a friend of mine_i]

b.



However, while in (57a–b) the quantificational force of the indefinite comes from its lexical meaning, in (59a–b) it comes from the Q-adverb. The subject indefinite by itself cannot semantically bind anything in the presence of a Q-adverb. What actually does the binding is the pair ⟨a friend of mine_i, usually_i⟩, where *a friend of* mine_i gets the subject theta role and constitutes the restriction, while the Q-adverb provides the quantificational force. It might be reasonable to build this into the definition of binding along the following lines:

(61) An argument A binds B iff:
A and B coindexed and either (i) A c-commands B or (ii) A is coindexed with a Q-adverb C that c-commands B.

Part (i) of (61) corresponds to the canonical cases of binding (i.e., examples like (58)); part (ii) of (61) corresponds to cases involving Q-adverbs (like those in (60)). This enables one to unify case (58) and case (60). What goes wrong in both cases is that an R-expression gets bound. Summing up so far, it seems reasonable to maintain that just as Principle C of BT rules out a coreferential interpretation in cases like (57), it will also rule out a "co-variant" interpretation in (59), where an adverb of quantification is present. The slight (?) modification of the notion of binding in (61) is one way of achieving this.

Let us now go back to structures with overt if-clauses, like (56a) above, repeated here.

(56) a. If an Italian is blond, I usually like an Italian.
b. [if an Italian_i is blond] usually_i [I like an Italian_i].

Here too the quantificational force of the indefinite *an Italian* comes from the Q-adverb. And here too, in order to guarantee this, the indefinite *an Italian* in the if-clause and the Q-adverb must be coindexed. But then, by definition (61), the second occurrence of *an Italian* in (56b) winds up (A-)bound. The first occurrence of *an Italian* binds the second through the Q-adverb. The semantic relationship between the Q-adverb and the first indefinite (the binder) is identical in (56) and (59). The only difference lies in the distance between them. While still fairly local, it is a bit greater in (56) than in (59).[13]

There might be independent reasons to modify the notion of (syntactic) binding along the lines in (61), having to do with the behavior of long distance reflexives. As is well known (see for example, Giorgi, 1984), in languages like Italian, long distance reflexives, among other things, must have a structurally projected binder (see the ungrammaticality of (62a), where such a condition is not met). However, (suitable) indefinites in conditionals do qualify as proper binders for long distance reflexives (see (62b)).

(62) a.*il proprio padre entro'.
the self father walked in

b. Se uno$_i$ sbaglia, di solito$_i$ sono i propri$_i$ genitori ad accorgersene per primi
'If one does something wrong usually it is SELF's parents that notice is first.'

This behavior is expected only if we adopt a definition of binding in the spirit of (61), according to which the subject of the if-clause binds the long distance reflexive through the Q-adverb.

While the details of this proposals might well be improved by further work, the intuition behind it should be pretty clear, and, I believe, sound. What is wrong with (56a) and (59a–b) is that a non-pronominal NP gets bound. The structural parallelism between (57) and (59) is hard to miss. Also hard to miss is the fact that the semantic relationships between the indefinites and the Q-adverb are identical in (56) and (59). The modification of BT necessary to rule (56a) out seems to be quite minor, both formally and substantially.

It is worth noticing that cases like (56) and (59) could also be ruled out in terms of the BT within static DRT. But in such a framework, we would still be stuck with the conjuctive cases (53) and (55). The novelty condition would still be necessary to account for them. Only in a dynamic setting ruling out (56) and (59) via BT enables one to get rid of novelty altogether.

We now have an explanation of why indefinite NPs like *an Italian* give rise to QV-effects, but are never anaphoric: They give rise to QV-effects because their dynamic character enables them to be turned into variables (in the semantic sense; not in the syntactic one). They are never anaphoric because they are R-expressions (they have a lexical content incompatible with their being anaphoric). The novelty-familiarity condition appears as an artifact of DRT.

4.6. *Further consequences*

The framework sketched in the previous sections, (in particular, the elimination of the novelty condition) has several consequences. Here we will consider two of them, as they may be of importance in testing the coherence and scope of the proposed framework. One has to do with backwards anaphoric dependencies, the second with the treatment of definities. (Readers who are not concerned by this and want to get back to Chinese may safety skip this subsection.)

Starting with backwards anaphoric dependencies, consider the following sentence:

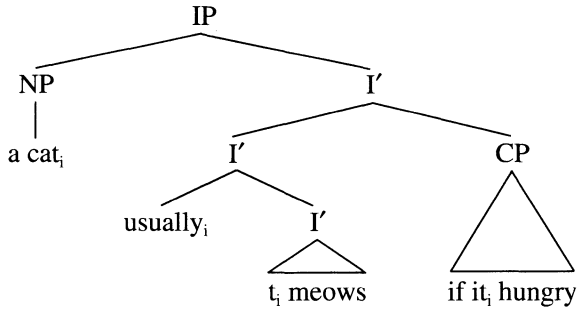
(63) a. If it is hungry, a cat usually meows.
b. [[if it_i is hungry] $usually_i$ [a cat_i meows]]

If the Logical Form of (63a) is anything like (63b), we have a problem. According to our proposal, in (63b) $\langle it_i, usually_i \rangle$ binds *a* cat_i, an R-expression. Hence the sentence ought to be ungrammatical. But it isn't.

The LF in (63b) is indeed ruled out (by principle C).[14] Since (63a) is grammatical, this means it must have a different analysis. What can it be? Consider sentence (64a), which is like (63a) except that the if-clause is adjoined to the right. Simplifying somewhat, the structure of (64a) is presumably something like (64b).

(64) a. A cat usually meows if it is hungry.

b.



While many details of structure (64b) may be refined, some of its features are fairly clear. In particular, that the subject in (64b) is higher up than the right adjoined if-clause is shown by the robust principle C effects that structures of this kind give rise to (see Reinhart, 1983):

(65) * He_i sings if $John_i$ is happy.

Notice that according to our partitioning algorithm, in (64) the Q-adverb's scope is [t_i meows], while the restriction is constituted of the subject plus the if-clause. This correctly assigns to (63) the following interpretation:

(66) Most cats that are hungry meow.

Now we also have an answer to the puzzle of where sentences like (62a) come from. They must be derived from structures like (64), where the if-clause is adjoined to the right. In general, backwards anaphoric dependencies in left adjoined if-clauses must be derived through fronting of right adjoined if-clauses. It is the only way, in the present framework, to get the right binding relationship.

If this is so, one ought to find reconstruction effects in left adjoined if-clauses. This is indeed what happens. Consider the following contrast:

(67) a. If it_i spots a $mouse_j$, a cat_i attacks it_j.
a′. A cat_i attacks it_j if it_i spots a $mouse_j$.

b. * If it_i spots a $mouse_j$, it_j runs away from a cat_i.
b′.* It_j runs away from a cat_i if it_i spots a $mouse_j$.

Sentences (67a–b) contain cataphoric donkey pronouns. Hence, by our approach, they must be derived via leftward movement of a right adjoined if-clause. But while the source of (67a), namely (67a′), is grammatical, the source for (67b), namely (67b′), is not, as it violates principle C. Whence the ungrammaticality of (67b). Thus our approach correctly predicts the existence of reconstruction effects in left adjoined if-clauses with backwards anaphoric dependencies.[15]

A further consequence of the present approach has do to with anaphoric readings of definite NPs such as the following:

(68) If a painter lives in a village, the village is usually pretty.

Here *the village* seems to act as a variable, bound by *a village* in the if-clause. And this is indeed how definites are treated in some versions of DRT (Heim, 1982). However, in BT terms, definites are surely R-expressions and hence they cannot be (syntactically) bound. So on our approach, something like (69) would be ruled out:

(69) [[if a painter lives in a village$_i$] usually$_i$ [the village$_i$ is pretty]]

But then how are anaphoric uses of definites going to be accounted for?

One possible line on this is to start out from the classical Fregean line, whereby definites are analyzed in terms of the ι-operator, and modify it a bit, in order to accommodate context dependency. As is widely acknowledged, the overt descriptive content of a definite is generally incomplete, and the context has to supply information relevant to filling in the missing parts. This seems to be necessary in view of a variety of phenomena, such as, for example, the so called anaphoric associative uses of definites, illustrated below (from Heim, 1982):

(70) a. Every boy read a book and wrote to the author.
b. $\forall x$ [boy(x) $\rightarrow$
$\exists y$ [book(y) $\wedge$ read(x, y) $\wedge$ wrote(x, ιz [author(z, y)])]]

Here *the author* must be construed as *its (the book's) author*, where the implicit pronoun is bound by *a book*, as shown in (70b). Thus, we must assume that the definite *the author* contains an implicit variable, which is either bound by a suitable antecedent or whose value is otherwise supplied by some object salient in the context (see for relevant discussion, Partee, 1989; and references therein). Now whatever is at work in cases like (70) extends naturally to structures like (68), that is, the anaphoric uses of definites in conditionals. In particular, the definite description *the village* is understood as "the village he (the painter) lives in." This can be formally expressed as follows:

(71) ιx [village(x) $\wedge$ live in (y, x)]

The implicit pronoun variable in (71) can of course be bound by a Q-adverb. Thus, for example, the subject asymmetric reading of (68) can be informally rendered as follows:

(72) Most painters that live in a village are such that the village they live in is pretty.

In other words, definite descriptions may contain in their structure hidden parameters (something like null pronominal elements), which can be bound like regular pronouns. This (however one wants to implement it) is the source of their anaphoric uses. Definites as such are never directly bound (being R-expressions).

4.7. *A prediction: Indefinite pronouns*

Ordinary indefinites like *a man* are R-expressions, because they are built out of fully specified common nouns like *man*. But it is certainly conceivable to have an indefinite term X whose sortal restriction is left largely for the context to specify. Such an indefinite in combining with a predicate would have the following interpretation:

(73) X runs = some unspecified human runs
$\approx \exists x[C_{human}(x) \wedge run(x)]$

The expression C_{human} in (73) can be thought of as a predicate variable sortally restricted to humans. A term such as X in (73) would be an indefinite whose content (restriction) is contextually specified (with the help of featural information concerning (in)animacy, gender, etc.), much like that of pronouns. X would be, thus, an indefinite pronoun. Such an element is not only expected to exist, but, in the framework of Dynamic Binding, it is expected to have very precise properties. Let us see what they are.

First, in ordinary episode contexts such as (73), an indefinite pronoun, if allowed, will have an existential reading (close to *someone* or *something*). This is just what being an indefinite means.

Second, existentially quantified terms have an open character, which enables them to be the target of Q-adverbs. So indefinite pronouns can be the target of disclosure of Q-adverbs. Moreover, since they are pronominals, they are predicted to be grammatical in the following configuration:

(74) a. [if X_i is happy] usually$_i$ [X_i sings]
b.*If a man$_i$ is happy, a man$_i$ usually$_i$ sings.

If in configuration (74a), X_i is a non pronominal, the sentence will be ungrammatical, because of Principle C (see 74b). However, if X_i in the configuration in (74a) is an indefinite pronoun, then the structure ought to be grammatical, and it should mean something like:

(75) Most y [y is C_{human} and y is happy][I talk to y]

So, the first occurrence of X_i in (74) will pick its quantificational force from the Q-adverb. The second occurrence of X_i will be anaphroic to the first.

Third, indefinite pronouns will be unable to be c-command bound. Thus, something of the following sort will be ungrammatical:

(76) * NP_i . . . X_i . . .
where NP_i is non-pronominal (like *every man*) and c-commands X_i

The reason why this is out is that an indefinite pronoun is existentially closed. Hence it cannot be bound unless its existential quantifier is wiped out. But this happens only in the context of Q-adverbs (in which case, the indefinite pronoun will have to be anaphoric to a compatible element in the restriction).

Fourth, outside of Q-variability contexts, an indefinite pronoun cannot be anaphoric to itself. Relevant contexts are the following:

(77) a. X plays and X wins
b. X thinks that X is mistreated

The reason is the same as in the previous case: Each occurrence of X is existentially closed. Each inexorably comes with its existential quantifier (and there is no Q-adverb around). The only possibly of linking up the occurrences of X in (77) is by setting the implicit restriction to the *same* property (or set). For example, something like (77a) can at best mean: Some human (from a contextually specified group) plays and someone (from the same group) wins. In other words, any kind of anaphoric link in structures like (77) will have to be indirect and pragmatically driven.

Of course, there might be a wide range of conditions under which an indefinite pronoun might be licensed. But however this happens, we expect to find at least the properties mentioned above and summarized below:

(78) Properties of indefinite pronouns:
a. Existential interpretation in episodic contexts
b. Can be targeted for disclosure by Q-adverbs (hence, QV-effects in the antecedent of a conditional and anaphoric uses in the consequent)
c. No c-command binding
d. No (or only loose) anaphoric links among indefinite pronouns.

It should be clear that if Dynamic Binding works as spelled out above, then an indefinite pronoun *must* have the properties listed in (78). They all follow from (i) the fact that indefinites are existentially quantified; (ii) the fact that existential quantifiers can be disclosed; and (iii) the fact that pronominals are not subject to Principle C. The first two facts are central to any version of Dynamic Semantics. The third is central to the (Novelty condition free/BT driven) version of Dynamic Semantics adopted here.

5. Back to Chinese

By this point, the reader might have figured out what we will say about conditionals in Chinese. Essentially, we can lift wholesale C&H's proposal. But in the novel semantics set up here, its arguably problematic features just vanish. I will first discuss what happens by marrying C&H's analysis with Dynamic Binding and argue that wh-words in Chinese are indefinite pronouns. Then I will discuss other structures from other languages that can be viewed as indefinite pronouns and observe that they indeed have properties similar to those of wh-words in Chinese bare conditionals.

5.1. *Chinese conditionals and Dynamic Binding*

Recall that the main aspects of C&H's proposal are (i) wh-words are polarity items; and (ii) their licensers include the question forming operator, the element *ruguo*, and quantificational adverbs. Let us see how their proposal carries over to the system outlined in Section 4.

Beginning with *ruguo*-conditionals, they have the same LF syntax and the same semantics as English conditionals, the only difference being that *ruguo*, but not *if*, can license wh-words. The meaning of wh-words is basically identical to that of indefinites. Consider the following example.

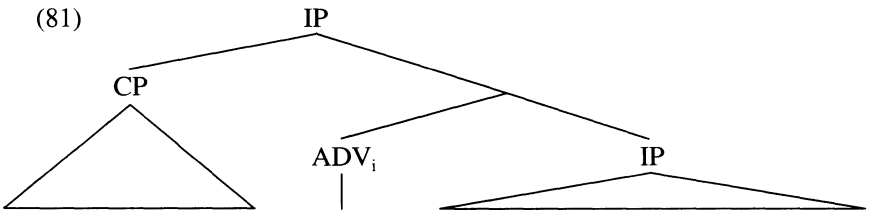
(79) ruguo shei yan shei, ta tongchang jiu hui
if who play who, s/he usually then will
xiang nei-ge-jiaose.
resemble that-CL-role
'If X plays the role of Y, then X will usually resemble the role of Y'

The two wh-words in (79) are licensed by *ruguo*. As pointed out by C&H, this sentence has various readings just like its English counterpart:

(80) If someone plays someone's role, he usually will resemble his/her role.

Depending what is taken to be the topic and other properties of the context, one can quantify over the first indefinite, over the second one, over the event-argument, or over some combination thereof. On our approach this comes down to different choices in how *tongchang* 'usually' is indexed. Here is, for example, the LF of the subject asymmetric reading.

(81)



It might be worth going through, in semi-formal terms, the derivation of the meaning of (81). Let us start by the meaning of the main components of (81), namely the CP, the main clause and the quantificational adverb, respectively:

(82) a. ruguo clause: $\exists x_i \exists x_j$ [x_i plays the role of x_j]
b. main clause: [x_i resembles x_j's role]
c. usually$_i$ = MOST $\underline{\lambda} x_i$[A] $\underline{\lambda} x_i$[B]

The quantificational adverb takes (82a–b) as its arguments:

(83) MOST($\underline{\lambda} x_i \exists x_i \exists x_j$ [x_i plays the role of x_j], $\underline{\lambda} x_i$[x_i resembles x_j's role])

The disclosure operator wipes out the existential quantifier on the subject wh-word. Thus we get:

(84) MOST($\underline{\lambda} x_i \exists x_j$ [x_i plays the role of x_j], $\underline{\lambda} x_i$[x_i resembles x_j's role])

In this formula, the pair of disclosure operators $\underline{\lambda}$ bind all occurrences of 'x_i', while $\exists$ binds all occurrences of x_j, (including the one in the right argument, because of conservativity; see (39) above). Here is an informal rendering of the truth-conditons of (81):

(85) Most people that play someone's role are people that play someone's role and resemble that role.

This is just what we need for the subject asymmetric reading. Other readings can be obtained by indexing the quantificational adverb in some other way. If we happen to pick indices that don't correspond to any wh-word in the clause (or to the event-variable), the sentence would be uninterpretable.

According to this analysis, wh-words are indefinites and, like other indefinites, have uniformly an existential reading. This is consistent with the possibility of the existential particle *you* showing up in *ruguo* conditionals. And like other indefinites, wh-words can act as variables in the presence

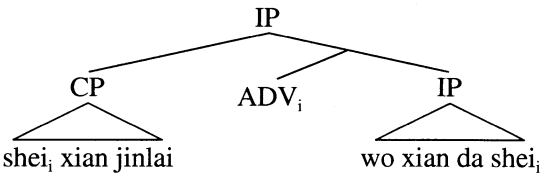
of quantificational adverbs. However, wh-words cannot occur in the consequent of *ruguo*-conditionals because, as argued by C&H, there is nothing there to license them (the scope of *ruguo* is just the antecedent clause). So, basically, *ruguo*-conditionals work just like their English counterparts, modulo the polarity character of wh-words in Chinese.

Let us turn now to bare conditionals. C&H propose that the licensing of wh-words in bare conditionals is done by the adverb of quantification itself. Their intuition is that the adverb of quantification operates on both the antecedent and the consequent clause and hence can, in principle, license wh-words in both constituents. This seems just right. In our framework, we can say that what does the licensing is the disclosure operator associated with the quantificational adverb. Such an operator corresponds to *pairs* of λ-abstractors. Consider again the following sentence:

(86) shei xian jinlai, wo xian da shei.
who first enters I first hit who
'If X enters first, I hit X first'

The LF of (86) will be:

(87)



In the structure (87), the adverb of quantification happens to be null. Now, in virtue of the semantics we have sketched, (87) is interpreted as follows:

(88) EVERY $\underline{\lambda}x_i$ [$\exists x_i$ x_i first enters] $\underline{\lambda}x_i$ [$\exists x_i$ I hit x_i first]

The index on the adverb in (87) stands for a pair of disclosure operators, as (88) illustrates. The wh-words are interpreted in the usual way, as existentially quantified. But the disclosure operators wipe out the existential quantifier both in the restriction and in the scope. The truth conditions associated with (88) will be: For every x, if x enters first, I first hit x.

More explicitly, we can imagine a licensing mechanism of the following sort. An adverb of quantification (or, more precisely, a disclosure operator associated with it, represented by an index) can be either [+ affective] or [– affective]. A [– affective] quantificational adverb cannot license wh-words. A [+affective] quantificational adverb *has* to license wh-words. When it licenses wh-words, it licenses them in pairs, since the quantificational adverb operates on both the restriction and the scope. This means that, for example, the second *shei* in (86) cannot be replaced by any other

anaphoric element, for otherwise the disclosure operator (the index *i*), which must be marked as [+affective] to be able to license something in the antecedent, would be left with nothing to license in the consequent. This could be spelled out further, but I will refrain from doing so here, as the basic idea is sufficiently clear.

C&H observe further that a wh-word occurring in the consequent must be identical with the wh-word in the restriction.

(89) * ni xihuan shei wo jiu piping shenme ren.
you like who I then criticize what person
'If you like X, I will criticize X'

They propose that this might be due to a strong interpretation of Safir's (1985) "Parallelism Constraint on Operator Binding." This seems very plausible. We saw why a Q-adverb must license wh-words in pairs; we may assume that the PCOB further guarantees that they are licensed in *identical* pairs.

Let us now address the issue of the problematic behavior of wh-words in bare conditionals with respect to the novelty/familiarity condition. As you might recall, the problem with C&H's proposal was that wh-words (as indefinites) can be exempt from the novelty condition only in the consequent of bare conditional (and in fact in that environment, they must be). On our approach, we don't have to worry about novelty. The question we should ask is, rather, what is the status of wh-words vis-a-vis BT? Are they R-expressions or are they pronominals? The traditional view of wh-words regards them as interrogative *pronouns*. On our approach it has to be that way, if structures like (87) are to be grammatical.

As discussed above, we expect indefinite pronouns (no matter how they are licensed) to have a certain clustering of properties. Quantificational variability effects such as those in (86) are of course the hallmark of indefinite pronouns. But there are other concomitant properties one should find. One property was the existential interpretaion in episodic contexts. This is amply shown by *ruguo* conditionals. We also expect that indefinite pronouns cannot be c-command bound. And it is easy to see that this is so for Chinese wh-words:

(90) Meige ren dou shuo [ta/pro/*shei hen xihuan Lisi]
'Every man all say he/pro/who very like Lisi.'

Here the wh-word, pronominal just like *ta* or *pro*, could in principle be c-command bound. But (90) is ungrammatical with *shei*, and for at least two reasons. First, *shei* is not properly licensed. Second, even if it was, it could not be anaphoric because it is interpreted as an existentially quantified

term (no disclosure operator is present in (90)). The final property we expect to find is that an indefinite pronoun cannot (or can only loosely) be anaphoric to itself. Thanks to the particular licensing conditions for wh-words in Chinese, facts come out with glaring clarity. Consider the following contrast:[16]

(91) a. Shei$_i$ bu haohao zhaogu ziji, shei$_i$ jiu dui-bu-qi
who not well take-care self who then do-wrong
ta$_i$-de fumuquing.
he-Gen parents
'Whoever does not take good care of himself does a wrong thing to his parents.'

b.*Shei$_i$ bu haohao zhaogu ziji, shei$_i$ jiu dui-bu-qi
who not well take-care self who then do-wrong
shei$_i$-de fumuqing.
who-Gen parents

Sentence (91a), in which the pronoun *ta* is anaphoric to a wh-word is grammatical. But if we try to replace *ta* with a wh-word (anaphoric to the first), the result is ungrammatical, as (91b) illustrates. Why? If an indefinite pronoun could be anaphoric to a previous occurrence, then we might expect the first occurrence of a wh-word, in the consequent of (91b), can be licensed by the disclosure operator while the second occurrence might be licensed by being anaphoric to the first one. But as we know an indefinite pronoun *cannot* be anaphoric to another occurrence of an indefinite pronoun. Each occurrence comes with its existential quantifier. Disclosure can wipe out only one. The second cannot be wiped out by the *same* operator, and hence it cannot be construed as anaphoric to the first.[17] Consequently, anaphoric uses of wh-words are doomed (unless, of course, they are anaphoric to a wh-word in the antecedent clause).

5.2. *Other instances of indefinite pronouns*

If this account of bare conditionals in Mandarin Chinese is on the right track, we should find other pronominal indefinites in the languages of the world, with properties similar to those of wh-words in bare conditionals. This expectation is borne out. In Chierchia (1995b), I discuss the case of so-called impersonal *si* in Italian and argue that it is, in fact, a pronominal indefinite. Its behavior turns out to be remarkably similar to that of Chinese wh-words in bare conditionals. In what follows I briefly illustrate this point.

Impersonal *si* is a subject clitic with an indefinite meaning (something like 'someone' or 'people'). Here is an illustration:

(92) a. Si e' bevuto molto vino ieri.
Si PAST drink much wine yesterday
'People drank a lot yesterday.'

b. Si beve molto vino da queste parti.
Si drinks much wine around here
'People drink a lot of wine around here.'

Si, being a clitic, is hosted in some appropriate functional projection of the clause (see Cinque, 1988). (92a) is episodic and says that some unspecified group of people drank a lot. (92b) is generic and says that (all) people around here in general drink a lot. We notice that in episodic contexts, *si* is interpreted existentially. The switch in quantificational force from episodic to generic is typical of indefinites and is due to the presence of a Generic operator Gn, which acts just like a (modal) Q-adverb. In Chierchia (1995b), it is proposed that *si* introduces a distinguished variable (ranging over groups of humans) and existentially closes it.

It is easy to see that Itality *si*, even though subject to totally different licensing conditions than Chinese *shei*, does have the properties we expect indefinite pronominals to have. In particular, c-command binding is impossible:

(93) a.* La $gente_i$ pensa che si_i sia bevuto troppo
The people thinks that si PAST drink too much
ieri.
yesterday
'$People_i$ think $they_i$ drank too much yesterday.'

b. La $gente_i$ pensa che si_j sia bevuto troppo
The people thinks that si PAST drink too much
ieri,
yesterday
'People think that people drank too much yesterday.'

(93a) is ungrammatical on the reading shown there. That is, *si* cannot be interpreted as a variable bound by the higher NP *la gente* 'people' (in spite of the semantic compatibility of the meaning of *si* with the meaning of *la gente* 'people'). The reason for this is that no disclosure operator is present in (93a). Notice, however, that *si*, unlike wh-words in Chinese, is

not a polarity item. It needs no licenser. Hence, sentence (93b), which is identical to (93a) except that *si* in not understood as bound (as the gloss indicates), is perfectly grammatical. Thus we have a minimal contrast with Chinese sentences like (90). Such a sentence with a wh-word is out because no licenser is around. But we also hypothesized that even if the wh-element was somehow licensed in (90), an anaphoric reading would be impossible. Italian enables us to test, and confirm, this hypothesis.

Also, the anaphoric dependence of *si* from another occurrence of *si* is at best pragmatically driven. Consider:

(94) Si e' pensato che si sarebbe fatto un picnic.
Si thought that si would have had a picnic
'People thought that one would have had a picnic.'

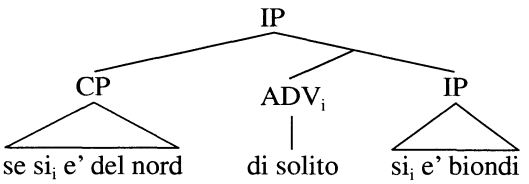
The interpretation of (94) is compatible with a situation in which the one who does the thinking also has the picnic (for some x, x thought that x would have a picnic). But it certainly doesn't force it (and various contextual factors may play a role in favoring or disfavoring such construals).

What happens, finally, in conditionals? What one would expect. The pronominal character of *si* enables it to be bound. Conditionals come with a Q-adverb that carries disclosure operators. Such operators can wipe out the quantifier associated with *si*. Hence a reading anaphoric to a compatible element is expected to be possible. Here is a relevant example:

(95) se si e' del nord di solito si e' biondi.
if si is from the north usually si is blond
'Most people from the north are blond.'

Sentence (95) says that most people from the north are blond. The LF and interpretation of sentence (95) is fully parallel to (86):

(96) a.



b. MOST $\underline{\lambda}x_i$ [$\exists x_i$ x_i is from the north] $\underline{\lambda}x_i$ [$\$x_i$ x_i is blond]

Here too *si* is interpreted as existentially closed. But the adverb of quantification, looking for variables to bind, discloses it and, in the consequent, enables it to be anaphoric to (bound by) the first occurrence of *si* in the antecedent. Thus *si* behaves identically to wh-words in Chinese, the dif-

ferences between them being reducible to independent factors, namely (i) the fact that *si* is a clitic restricted to the subject position, and (ii) the fact that it is not a polarity item.

English *one* also is a good candidate to being an indefinite pronoun, though there are some differences with Italian *si*. While Italian *si* is plural and can occur in both generic and episodic context, *one* is singular and is disallowed in episodic contexts:

(97) * Yesterday, one won.

As an out of the blue utterance, (97) is ungrammatical. So English *one*, unlike Italian *si*, seems to be licensed only by the generic operator. Other than that, their properties prima facie appear to be pretty similar.

So we see that there seems to be a steady crosslinguistic pattern of indefinite pronominals. They differ in licensing conditions but appear to have the expected properties in common. Chinese wh-pronouns turn out to be in good company.

Summing up, we have adopted the bulk of C&H's proposal and couched it within a Dynamic Semantics framework. This allows us to have a uniform approach to both bare and *ruguo* conditionals, while addressing in an arguably principled matter the problem of why wh-words act as familiar variables in such a restricted range of contexts. In our set up, wh-words are uniformly interpreted as being existentially quantified. *Ruguo* conditionals are analyzed in the same terms as their English counterparts, modulo the fact that wh-words are polarity items and *ruguo* is among their licensers. As for bare conditionals, again following C&H, we maintain that wh-words can also be directly licensed by quantificational adverbs (and more specifically by the disclosure operators associated with them). The difficulty the novelty condition caused within a DR-theoretic approach disappears, under the plausible hypothesis that wh-words are pronominals. In fact, the existence and behavior of indefinite pronominals is expected on the present theory. Their properties are (i) existential meaning; (ii) quantificational variability; (iii) anaphoric behavior in the consequent of a conditional; (iv) non-anaphoric behavior everywhere else. Such properties are instantiated not only by wh-words in Chinese bare conditionals but by other seemingly unrelated indefinite pronominals such as impersonal *si* in Italian.

6. Further Issues and Loose Ends

In the present section, I would like to address some further questions. In particular, I'd like to say something on asymmetric readings and existen-

tial constructions in conditionals, even though I have nothing even remotely resembling a definitive solution to the problems these topics raise.

6.1. *Asymmetric readings*

C&H point out that all kinds of Chinese conditionals admit symmetric and asymmetric readings. For *ruguo*-conditionals, this is expected. They have the same semantics as their English counterparts and whatever mechanism one adopts to deal with the latter will extend to the former. This is of course true for C&H's original proposal, for our proposed modification of it, and for any alternative one would care to pursue.

The case of bare conditionals is more challenging. It is not obvious how asymmetric readings are to be obtained. Consider:

(98) shei yan shei, shei tongchang jiu xiang shei.
who play who, who usually then resemble who
'If x plays the role of Y, then usually X will resemble Y'

The representation of (98) according to C&H would be:

(99) $\text{MOST}_{i,j}$ [who_i play who_j][who_i will resemble who_j]

In this representation the wh-words are interpreted as variables. On the basis of standard semantic assumptions, the Logical Form in (99) would give rise to the symmetric reading. What assumptions would have to be made, within C&H's approach, to obtain asymmetric readings? I can think of two possibilities. The first requires two moves on the LF in (99): (i) closing existentially one of the two wh-words in the restriction; and (ii) ensuring, then, the proper anaphoric linking:

(100) MOST_i $\exists_j$ [who_i play who_j][who_i will resemble the role(s) x_i plays]

The LF in (100) gives the correct truth conditions for the subject asymmetric reading (the object asymmetric one would be obtained by switching around the indices on MOST and $\exists$). What one has to do is make sure that the second *who* in the consequent, that we want to be anaphorically related to the existentially closed *who* in the restriction, is properly interpreted. In (100), I have replaced the second *who* in the consequent with a description that ensures a proper anaphoric link, which amounts to treating who_j in the consequent as an E-type pronoun. This is necessary, since who_j in the antecedent is existentially closed and hence unaccessible. A solution along these lines has been proposed in Kadmon (1990).[18] Its draw back is that it makes appeal to totally ad hoc construal rules. Moreover, the wh-

words in the consequent would have to be treated partly as variables and partly as descriptions.

The second possibility involves giving different truth conditions for MOST. For example:

(101) a. $\text{MOST}_{i,j}$ [who_i play who_j][who_i will resemble who_j]
b. (a) is true iff
for most x_i such that for some x_j, x_i plays x_j's role,
for all x_j such that x_i plays x_j, x_i resemble x_j

In (101a), we mark the asymmetric reading by writing the "main" index ("the boss," in Kadmon's terms) in boldface. In (101b) we give, informally, an idea of what the truth conditions for (101a) would look like. A solution along these lines has been proposed in Root (1986) and Rooth (1987). It involves complicating the semantics of quantifiers a bit.[19]

What happens on our approach? The situation is essentially similar to C&H's. The indices on the quantificational adverbs (necessary to license the wh-words) correspond to disclosure operators. Under standard assumptions, this means that the reading we get for a sentence like (98) corresponds to the one represented in (99), that is, the symmetric one. Asymmetric readings could be obtained by complicating the semantics for quantifiers along the lines just discussed in connection with (101).

However, there is yet another way to go, which exploits the fact that wh-words in English as in Chinese, in spite of being morphologically singular, admit of a plural interpretation.[20] This can be seen from the fact that a wh-question can have plural answers:

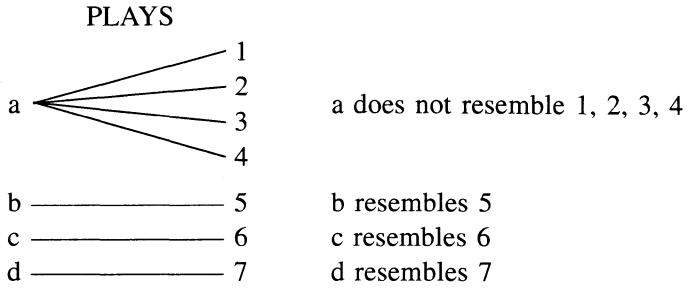
(102) a. Who broke the window? Those kids
b. Nahaizi-men

Based on facts such as these, Dayal (1992) and Krifka (1992) argue the quantifier associated with the wh-word must be able to range over pluralities. The semantic neutrality with respect to numbers of Chinese wh-words leaves us a certain freedom in determining whether we quantify over singularities or over pluralities. This enables us to mimic the effects of asymmetric quantification. Consider the following two logical forms:

(103) a. $\text{MOST}_{x,Y}$ [x plays Y][x resembles Y]
b. $\text{MOST}_{X,y}$ [X plays y][X resemble y]

In (103) capital variables range over pluralities, lower case ones over singularities. What (103a) says is this: most pairs $\langle x, Y \rangle$, such that x is an actor and Y are all the roles x plays, are such that x resembles Y. To see what effects this has, consider a situation of the following type:

(104) Actors characters



If we count pairs of singular entities, then the sentence comes out false (four our of seven pairs that satisfy the restriction fail to satisfy the scope). But if we count pairs ⟨x, Y⟩, where the first is a singular entity and Y is a (maximal) plural entity, then only one pair (⟨a, {1, 2, 3, 4}⟩) fails to satisfy the scope. Hence on the reading in (103a) the sentence comes out true, which is what we would want for the subject asymmetric reading. The same goes, mutatis mutandis, for (103b), which is thus adequate as a representation of the object asymmetric reading. Symmetric readings come about either via quantification over the event variable or via quantification over n-tuples of singularities. This solution is crucially made available by the semantic characteristics of wh-words. It is implausible for conditional structures involving NPs that are semantically singular (like ordinary singular indefinites in English).

Summing up, given what C&H propose (or given the way I have suggested to modify their proposal) it is not obvious how to obtain asymmetric readings in bare conditionals. We have considered in this section a number of ways of doing so. The most viable appear to be two. One is to complicate the semantics of quantifiers. The other relies on the fact that wh-words tolerate a plural interpretation. By picking out singularities or lumping them together we can obtain the various readings we want.

6.2. *Existential constructions*

C&H observe that the existential particle *you* (see Huang, 1987; for an analysis) can occur in *ruguo* conditionals, a fact which confirms the existential character of wh-words in such structures:

(105) ruguo you shei qiao men, ni jiu jiao ta jin-lai.
if have who knock door you then ask him come in

'If someone knocks at the door, you'll ask him/her to come in.'

Interestingly, existential *you* is ungrammatical in bare conditionals:

(106) *you shei yan shei, you shei jiu xiang shei
have who play who have who then resemble who

How is this contrast to be understood? If wh-words are ambiguous between an indefinite interpretation and being genuine variables, then the contrast is to be expected. Wh-words in *ruguo*-constructions are indefinites, and hence compatible with existential constructions. But wh-words in bare conditionals are variables, and, as we know on independent grounds, genuine variables are out in existential structures. Consider the following contrast, discussed in Heim (1987):

(107) a. There is no perfect relationship.
b.*No perfect relationship is such that there is it.

What happens on our approach, where wh-words are uniformly interpreted as indefinites? Is it equally possible to give a plausible account of the contrast between (105) and (106)? Let us see. Indefinites can be disclosed by Q-adverbs. In *ruguo* conditionals, whether an indefinite is targeted by disclosure or not depends on the reading one wants to get. In bare conditionals, wh-words *must* be disclosed, because they are licensed by the disclosure operator associated with the Q-adverb. However, existential disclosure is a compositional operation that applies to the meaning of the if-clause. It follows that when *you* is processed, the wh-word hasn't been disclosed yet (it is still an indefinite). If the definiteness effect, as seems plausible, is computed locally (when *you* combines with the rest of the clause), then it should be satisfied at the stage of the derivation when it is checked. The fact that at a successive stage the wh-word is turned into a variable shouldn't have any consequence. But then why is *you* out in (106)? It looks as if a straightforward account based on the fact that wh-words in bare conditionals are variables is not available to us.[21]

There is, I believe, a plausible alternative account for the ungrammaticality of (106). The point is this. Disclosure requires topicality. An indefinite can be disclosed only if is topical. But there-sentences are prototypical thetic sentences. This means that they lack a topic. The indefinite in a existential sentence, if anything, is part of the novel/focal information. Hence, if an indefinite in a there-sentence gets disclosed, a presupposition clash is bound to arise. On the one hand, the indefinite must be topical; on the other hand it cannot be.

While this seems plausible and might even be right, I am not ready to give a precise implementation of it. The implementation will depend on the details of the semantics of existential sentences, a complex and not fully

understood subject. An easy way to execute the idea in the present set up is to give a semantics of existential sentences that deactivates the index associated with the indefinite (Rooth (1995) has suggested on independent grounds that indices of indefinites which are part of the focus get deactivated). That way when the disclosure operator comes in, it will find nothing there to disclose.

Be that as it may, a consequence of this view is that indefinites in existential sentences cannot be disclosed. This in turn means that whatever QV-effect one gets in such constructions (and one does get them; see, for example, sentence (108)) must be due to quantification over the event/situation variable:

(108) If there is a man in charge, he is usually/often/never Italian.

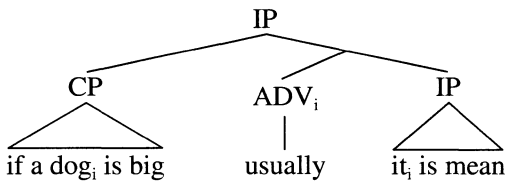
It is hard, though, to give conclusive evidence that this must be so (see von Fintel, 1994, pp. 173ff; for relevant discussion).

In conclusion, we have considered the distribution of existential *you* in Chinese conditionals. We have come to the conclusion that there is an incompatibility between disclosure and *you*, presumably due to a presupposition clash. As a consequence, adverbial quantification in existential sentences must operate on the event/situation variable. But many issues remain open.

7. Comparisons and Conclusions

Let us summarize the essence of the proposal developed here. Indefinites are uniformly interpreted as existentially quantified terms. Q-adverbs associate with disclosure operators which target (topical) indefinites, turning them into variables. The LF of a conditional is as follows.

(109)



We have extended BT so as to say that in (109) the pair ⟨a dog$_i$, usually$_i$⟩ binds the pronoun it$_i$. This enables us to do away with the novelty condition, for if in place of *it$_i$* we had an R-expression, we would have a principle C violation. Structures such as those in (109) are interpreted compositionally via functional application. ADV$_i$ first applies to the IP yielding:

(110) λA $MOST_i(A, it_i \text{ is mean})$

The result applies to the CP. The function in (110) 'remembers' which index is being bound, because the semantic recursion is defined over functions from assignments into meanings of the appropriate type (as in Montague, 1970).

Such an approach predicts the existence and properties of indefinite pronouns (indefinites with a minimal, largely context-dependent lexical content). They are:

(111) a. Existential interpretation in episodic contexts
b. Can be targeted for disclosure by Q-adverbs (hence, QV-effects in the antecedent of a conditional and anaphoric uses in the consequent)
c. No c-command binding
d. No (or only loose) anaphoric links among indefinite pronouns

Structures with exactly these properties appear to be attested, Chinese wh-words being an example. Following C&H, wh-words are taken to be subject to licensing in Chinese; in particular, they can be licensed by (i) *ruguo*, or (ii) the disclosure operator. This, together with the semantics just sketched, predicts their distribution and interpretation.

In so far as I can see, other available theories of quantificational variability do not predict the existence and properties of indefinite pronouns. They can of course accommodate such creatures by modifying suitably some of their axioms.

Take DRT and its current heirs. It is based on a simple claim: Indefinites are like variables; the way in which they differ from "real" variables is because of novelty. In this set up, indefinite pronouns may be described as entities generally associated with novel variables *except* that the consequent of a conditional (where they can be anaphoric to similar pronouns occurring in the antecedent). What features of DRT might lead one to expect creatures with such curious properties?

We also noted that our use of BT can not be readily united with DRT, even if one wanted to. For one thing the compositional interpretation of the relevant structures requires a semantic recursion different from the one generally associated with DRT. Moreover, in DRT the novelty condition would still be needed to distinguish among cases like these:

(112) a. A cat walked in. A cat walked out.
b. A cat walked in. It then walked out.

Consider next a situation-based approach. In such an approach indefinites

are always associated with an existential quantifier (just as on our approach). The QV-effect is captured by quantifying over situations of the appropriate size. *Ruguo* conditionals are no problem for such a strategy. The main problem clearly is to account for the existence of indefinites that can (as *si* in Italian) or must (as *shei* in Chinese wh-words) be construed anaphorically in the consequent of conditionals. Consider again (98) above, repeated here.

(113) shei yan shei, shei tongchang jiu xiang shei.
who play who, who usually then resemble who
'If X plays the role of Y, then usually X will resemble Y's role'

On a situation-based approach, quantification here has to be over situations in which someone plays someone else's role. How can the wh-words in the consequent be interpreted? One possibility is to interpret them as E-type pronouns:

(114) Most minimal situations s [s is a situation in which someone plays someone else's role][s is also part of a situation where *the person who does the playing in s* resembles *the role s/he plays in s*]

This amounts, then, to a version of the ambiguity hypothesis. Wh-words are interpreted as indefinites in the antecedent, but as pronouns in the consequent. Another possibility one might try, building on a proposal by von Fintel (1994), is restricting quantification in the scope also to *minimal* situations satisfying the consequent:

(115) Most minimal situations s [s is a situation in which someone plays someone else's role] [s is also part of a minimal situation which someone plays someone else's role]

Reference to minimal situations in the consequent guarantees, in essence, that each pair of someone playing someone else's role is also a pair in which someone resembles someone else's role. In this way, wh-words could be uniformly interpreted as indefinites. However, the truth conditions in (115) are not quite right. There is no guarantee that, given a pair $\langle x, y \rangle$, x resembles y's role, rather than y resembling x's role.[22] Moreover, as von Fintel himself points out, whatever strategy we adopt in (113), we have to make sure it doesn't apply to ordinary indefinites (that normally lack anaphoric readings). Thus ordinary indefinites must be subject to something like novelty. But this then brings back in the problems we encountered with DRT.

In conclusion, it just isn't clear how indefinite pronouns could be accom-

modated on a pure situation-based approach, let alone why they have the properties they in fact have.

Take finally a dynamic approach which maintains a version of the novelty condition (as in Heim, 1982, Chapter 3). Clearly such an approach will meet many of the same problems as classical DRT. A recent such approach has been developed in Krifka (1998). While I cannot do justice to the complexity and richness of Krifka's approach within the limits of the present paper, let me give a brief indication of how his proposal works and why I doubt that it can help in connection with the problem at hand. Krifka maintains that indefinites are generally subject to novelty. However, there are also what he calls "non-novel indefinites." Indefinites that are marked as non-novel *presuppose* the familiarity of their index. If a non-novel indefinite occurs in the restriction of a Q-adverb, is presupposition is automatically accommodated, which means, in essence, that such an indefinite will be bound by the Q-adverb. If one takes such a line, one then needs an account of why ordinary indefinites don't have anaphroic uses in the consequent of conditionals or in conjunctive structures such as:

(116) a.*If a cat is hungry, I usually feed a cat.
b.*A cat was hungry, and I fed a cat.

By making the second occurrence of *a cat* in (116a–b) non-novel, an option that should be freely available, one ought to obtain a perfect sentence, contrary to what happens. Krifka proposes a pragmatic story to rule such an option out. He suggests that since that after all pronominals are better designed for anaphoric uses than indefinites, use of indefinites where a pronominal could be used triggers an implicature of disjointness, which is responsible for the oddity of sentences like (116a–b).

Where would indefinite pronouns fit in a theory of non-novel indefinites like Krifka's? Once more, it is not clear. One possibility might be to say that indefinite pronouns are indefinites that *must* be marked as non-novel. Whenever they occur, they must carry such a feature. Since there is no choice here, they would have to be admitted in structures like (116a). But this would predict them to be acceptable also in structures like (116b). And this we don't want. As we saw from both Italian and Chinese, indefinite pronouns basically don't admit of anaphoric uses outside of the consequent of conditionals. So we would have to say that indefinite pronouns must be marked as non-novel when they occur in the antecedent or consequent of a conditional, but cannot be marked as non-novel anywhere else. But this would be just a statement of the facts. It is hard to see how it could be derived in a principled manner.

Not surprisingly, conditionals give rise to a rich and complex phenomenology. We are certainly quite far from anything like a complete understanding of their structure. But there are a number of properties they have (especially pertaining to their interaction with QV-effects) that we begin to understand better. And bringing in data and generalizations from less familiar languages is vital if we want to make any progress. C&H's contribution is a fundamental one in this respect, both for the clarity of the pattern they individuate and for the insights on the theory of conditionals they offer. I have tried to show here that in their data and in their proposal one can find evidence of a quite crucial kind in favor of a novelty condition free version of dynamic semantics.

NOTES

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[1] The terminology *individual level* versus *stage level* and the phenomena associated with it is due to Carlson (1997). This distinction has been the object of intense study recently, stimulated mostly by Diesing (1992) and Kratzer (1995).

[2] Many authors have discussed the role of focus and presuppositions in adverbial quantification. For a recent discussion, which contains also a short history of the problem and a good bibliography, see Krifka (1998).

[3] Satoshi Tomioka discussed the problem in his comments to Jim Huang's presentation at the workshop on Semantic Variation, held at the LSA Summer Institute in 1997. A closely related problem arises with so called impersonal *si* in the Italian and is addressed in Chierchia (1995b). The problem was also noted and discussed in unpublished work by Jo-wang Lin. Lin (1996) develops an approach to conditionals in Chinese different from both C&H's and from the one developed here.

[4] An anonymous referee suggests, as a possible way out, adopting the following typology:

(i) indefinites: variables, subject to novelty
(ii) pronouns: variables, subject to familiarity
(iii) wh-indefinites: variables, not subject to novelty

But a moment's reflection suffices to reveal that no approach of this sort can possibly work. If wh-indefinites are not subject to novelty, that is, if they can always be anaphoric, then nothing should prevent them from being anaphoric in the *antecedent* of a conditional. But as we know from the discussion in the text, this never happens. And, by the same token, if they can sometimes be novel, nothing should prevent them from *not* being anaphoric in the consequent of a conditional. But, again, this does not happen.

[5] For example, Chierchia (1992, 1995a) is an approach of such a kind.

[6] One anonymous referee claims that there are dynamic theories that do not take (35) as their core notion. S/he quotes in this connection "von Fintel, Percus and Heim's more recent works (as well as Chapter 3 of her dissertation)." The referee might have in mind works such as von Fintel (1994), Percus (1998) and possibly Heim (1992). But as pointed out in

Section 2, these works are not dynamic in the relevant sense (context change potentials are not viewed as operating on assignment functions). As for Heim (1982, Chapter 3), which is a dynamic theory in the relevant sense, the referee is simply wrong. Heim's file change semantics does validate the equivalence in (35), modulo, of course, the trivial difference that Heim interprets LF directly, without the help of a logical language. See, in particular, Heim (1982, pp. 327–337).

[7] More rigorously, one can say that an element x_i is semantically bound in a domain A iff the semantic value of A does not depend on $g(x_i)$, where g the value assignment to variables. See Heim and Kratzer (1997, pp. 115ff.).

[8] It may look like this definition yields only the $\exists$-reading of indefinites. However, it is also possible to obtain the $\forall$-reading in much the same way. See Kanazawa (1994) on this.

[9] By "compositional" I simply mean here that "wiping out" a quantifier in a formula ϕ is an operation on the denotation of ϕ, not on the syntactic form of ϕ. In the text I give a procedural illustration of the operation, because that generally makes it easier to present and to grasp. But such a choice is motivated only for illustrative purposes. See Dekker (1993) and Chierchia (1995a, Chapter 2) for technical details.

[10] Asymmetric readings are obtained by disclosing an indefinite (which has to be topical). For example the subject asymmetric reading of (i) would be as shown in (ii):

(i) If a painter lives in a village, it is usually pretty. (Kadmon 1990)

(ii) [[if a painter$_i$ lives in a village$_j$] usually$_i$ [it$_j$ is pretty]]

The LF (ii) is interpreted as follows, where $\underline{\lambda}$ is the disclosure operator:

(iii) most ($\underline{\lambda}x_i$ [a painter$_i$ lives in a village$_j$], $\underline{\lambda}x_i$[it$_j$ is pretty])

Notice that on the right hand side of *most* in (iii) we have what looks like vacuous binding. However, recall that by conservativity (iii) is equivalent to:

(iv) most ($\underline{\lambda}x_i$ [a painter$_i$ lives in a village$_j$], $\underline{\lambda}x_i$[a painter$_i$ lives in a village$_j$ and it$_j$ is pretty])

In (iv) the disclosure operator binds a variable in both the restriction and the scope. So no problem with vacuous binding arises.

[11] Strictly speaking, an indefinite is interpreted as a generalized quantifier:

(i) $\lambda P\ \exists x\ [cat\ (x) \wedge P(x)]$

I assume that there is an automatic type adjusting operation that turns (i) into (ii):

(ii) $\exists x\ [cat\ (x)]$

See Chierchia (1995a, Chapter 3) for details.

[12] This feature of Dynamic Predicate Logic (Groenendijk and Stokhof, 1990, 1991) and related systems is known as the downdating effect, and is sometimes regarded as problematic. See Dekker (1996) for discussion. From the point of view of our present concerns, it turns out to be a desirable feature.

[13] Notice that Principle A of BT remains unaffected by our modified definition of binding. In particular, a sentence like

(i) *If an Italian is blond, I usually like himself.

would be ruled out in the usual way by the fact that the binder of *himself* is not in the proper local relationship with the reflexive. The position of the Q-adverb (which, at LF, may or may not be in the same local domain as the reflexive, depending on further assumptions) is not relevant, given the definition of binding we are adopting. Similar considerations apply, mutatis mutandis, to Principle B.

[14] In fact, as it turns out LF (63b) is out independently of Principle C. Assuming (63b) to

be grammatical, given the way the disclosure operator works, the restriction of the Q-adverb would come out as:

(i) $\lambda u_i\ [u_i = x_i \wedge \text{hungry}(u_i)]$

The property in (i) has as its extension in every possible world a singleton (whatever x_i denotes). Arguably, properties of this sort are not good restrictions for quantifiers (other than the definite article). The ban against properties of this sort as quantifier restrictions is discussed in Chierchia (1992, pp. 175 ff.). So even if (63b) was allowed by the syntax, it would be ruled out in the semantics.

[15] For extensive discussion of these and related constructions, see Chierchia (1995a, Chapter 3). For an alternative view, see Krifka (1998).

[16] Thanks to Jo-wang Lin for bringing the relevant facts to my attention.

[17] This is an immediate consequence of the downdate property (see Section 4.5 and footnote 13 above). When two existential quantifiers with the same index occur, the second disactivates the first.

[18] Notice that the number-neutral character of the E-type interpretation correctly ensures that the sentence winds up meaning "most actors taht play some role resemble (all) the roles they play." That is, the wh-pronouns receive the $\forall$-interpretation, which is what C&H claim. Jim Huang (p.c.) also suggest a further possibility that could achieve the same effects, namely introducing two separate Q-adverbs that separately bind the two wh-words.

[19] In Chierchia (1995a, pp. 111 ff.) I argued against this way of proceeding, in the hope that a simpler solution was within reach. But whether that is so remains to be seen.

[20] The solution does not hinge on Dynamic Binding per se and is equally available on C&H's approach. It is based on ideas put forth independently in Berman (1987) and Reinhart (1987).

[21] This problem was pointed out to me by Jo-wang Lin.

[22] This is an instance of the problem of symmetric predicates. See Heim (1990) for discussion.

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