c.
$$\cfrac{\cfrac{\cfrac{\cfrac{\cfrac{\cfrac{\cfrac{(18d) \quad s \Rightarrow s}{Y \bullet_r \Diamond_l(t \circ smiled) \Rightarrow s}\,/_rL \qquad John \circ (thinks \circ_{isl} s) \Rightarrow s}{John \circ (thinks \circ_{isl} (Y \bullet_r \Diamond_l(t \circ smiled))) \Rightarrow s}\,/_{isl}L}{John \circ (thinks \circ_{isl} ((Y \bullet_r t) \circ smiled)) \Rightarrow s}\,P1}{John \circ (thinks \circ_{isl} (\Diamond Y \circ smiled)) \Rightarrow s}\,P0}{John \circ (thinks \circ_{isl} (Qisl(np,s,s) \circ smiled)) \Rightarrow s}\,Lex}{John \circ (thinks \circ_{isl} (GQ \circ smiled)) \Rightarrow s}\,Lex \qquad GQ \Rightarrow GQ}{John \circ (thinks \circ_{isl} ((GQ/GQ \circ GQ) \circ smiled)) \Rightarrow s}\,/L$$

Where Y is $(s/_r(\Box np \backslash_r s))$.

d.
$$\cfrac{\cfrac{\cfrac{\cfrac{np \circ smiled \Rightarrow s}{\Diamond\Box np \circ smiled \Rightarrow s}\,\Box L}{(\Box np \bullet_r t) \circ smiled \Rightarrow s}\,P0'}{\Box np \bullet_r \Diamond_l(t \circ smiled) \Rightarrow s}\,P1'}{\Diamond_l(t \circ smiled) \Rightarrow \Box np \backslash_r s}\,\backslash_r R$$

6 Conclusion

Although a choice-function account is feasible under a multimodal regime, it seems that the idea of in-situ interpretation is problematic in that a) a clear separation between closure and descriptive content cannot be given an appropriate formal treatment and b) a ban on movement beyond islands is incorrect. We showed that once we give up in-situ interpretation, the scope of indefinites can be accounted for in a uniform way; the q(A,B,C)-connective accounts for the scope of both GQ's and indefinites. By adopting a definition of $shift = q(GQ, s, s)/N$ we explain the island-escaping behavior of indefinites, intermediate scope and double scope as well. On the basis of this we argued that choice functions are not necessary in the process of interpretation.

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A problem for choice functions: local presupposition contexts.

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Choice functions have been argued to yield the right truth conditions for interpreting island-embedded *which* phrases and indefinites in situ. This paper presents examples of local presupposition projection that challenge the current choice function approach, since these local presuppositional readings cannot be derived without also weakening the general truth conditions.

1. Background.

This paper is concerned with the LF- and semantic representation of in situ *which* phrases and indefinite Noun Phrases (NPs) like the ones in (1) through (4). The problem that these phrases present is how to derive their wide scope reading outside the island.

(1) Q: Who read every book that which philosopher wrote?
A: # Mary read every book that Bill Clinton wrote.
(2) Mary read every book that a certain philosopher wrote.
(3) Q: Who did not consider the possibility that which politician is corrupt?
A: # Max didn't consider the possilitity that James Dean is corrupt.
(4) Max didn't consider the possilitity that some politician is corrupt.

A first possibility is to propose that these phrases move outside the island at LF, assuming that LF *wh*-movement and QR of indefinites are island-insensitive. However, Ruys (1992, 1995) showed that the wide scope of these phrases is not gained through such movements, since such movements would wrongly allow for a distributive interpretation that island-escaping *wh*-phrases and indefinites do not have:

(5) If three relatives of mine die, I will inherit a house.[1]

a. √ Collective reading: "There are three relatives of mine such that, if each of them dies, I will inherit a house."

λw. $\exists X_e$ [three(X) & relatives-of-mine(X) & $\forall$w' accessible to w [(Dλz.z dies in w')(X) $\rightarrow$ I inherit a house in w']]

b. * Distributive reading: "There are three relatives of mine for each of whom it is true that, if (s)he dies, I inherit a house."

λw. $\exists$X [three(X) & relatives-of-mine(X) & (Dλz.$\forall$w' accessible to w [z dies in w'$\rightarrow$ I inherit a house in w']) (X)]

A second alternative is to interpret these phrases in situ and assume that the individual variable that they introduce is unselectively bound by a question operator or $\exists$-closure higher up in the tree. This would avoid the problems that the movement approach presents, but unfortunately it yields too weak truth conditions. As Reinhart points out, any non philosopher in the actual world w, --e.g. Bill Clinton-- satisfies the implication in (6) and, thus, his mere existence makes the sentence true in w. Similarly, any non politician in the actual world w about whom John did not consider the possibility that

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[1] *D* in (5) is the distributive operator.

(s)he is a politician in the actual world w --e.g. James Dean--, makes (7) true in w. The same reasoning can be applied to the questions in (1) and (3): the answers *Bill Clinton* and *James Dean* are wrongly predicted to be felicituos true answers for (1Q) and (3Q) respectively.

(6) a. Mary read every book that a certain philosopher wrote.

b. $\lambda w.\exists x\forall y$ [(y is a book that x wrote in w and x is a philosopher in w) $\rightarrow$ Mary read x]

(7) a. Max didn't consider the possilitity that some politician is corrupt.

b. $\lambda w.\exists x\neg$(Max considered the possibility in w that ($\lambda w'$. x is a politician in w & x is corrupt in w'))

We might be able to avoid the problem in (1) and (6) by invoking a semantic/pragmatic ban against empty restrictors (Strawson 1952), which is independently needed to predict the oddity of dialog (8). However, Cresti (1995) shows that this solution does not extend to cover (3) and (7), since in these cases the empty set (of possible worlds) is not in the restrictor of an operator. As (9) shows, the impossible proposition (the empty set of possible worlds) can perfectly be the argument of an attitude.

(8) Q: Who read every book that which philosopher wrote?

A: # Mary read every book that Socrates wrote.

(9) Shawn may be bad at math, but he didn't assume that 2 plus 2 equals 5.

In conclusion, neither the LF-movement analysis nor the standard unselective binding approach capture correctly the truth conditions of in situ *which* phrases and wide scope indefinites.

2. The choice function approach.

A third strategy is the choice function approach. This approach pursues the in situ line --thus avoiding the problems that the movement analysis has to face--, except that the *which* phrases and indefinite NPs at issue introduce not an individual variable but a choice function variable to be bound higher up. Choice functions have different semantic types for different authors (see Engdahl 1980; Kratzer 1995; Reinhart 1992, 1995, 1997; Winter 1997), but all the different implementations roughly share the following core idea:

(10) A function f is a choice function (CH(f)) if, for every set P in its domain, f(P) is a member of P.

Reinhart and Winter show that the problem of too weak truth conditions disappears for the examples (1)-(4) if we use choice functions. The examples (1)-(4) are now assigned the denotations (11)-(14). In (11) and (12), for instance, the in situ phrases *which philosopher* and *a certain philosopher* denote, for a given f, the individual f(philosopher), which, according to the description of choice function in (10), can only be an individual selected out of the set of (actual) philosophers, hence, an (actual) philosopher.[2]

(11) a. Who read every book that which philosopher wrote?

[2] Reinhart guarantees that the chosen philosopher is an actual philosopher (and not a philosopher at some other world) by giving choice functions the type <<s,et>,e> and requiring that f(P) $\in$ $^{\vee}$P for each P in the domain of f (except for the empty set).

b. {p: $\exists$g,f [CH(g) & CH(f) & true(p) & p = $\lambda w. \forall x$ [f(philosopher) wrote x in w $\rightarrow$ g(person) read x in w]]}

(12) a. Mary read every book that a certain philosopher wrote.

b. $\lambda w.\exists f$ [CH(f) & $\forall x$ [f(philosopher) wrote x in w $\rightarrow$ Mary read x in w]]

(13) a.Who did not consider the possibility that which politician is corrupt?

b. { p: $\exists$g,f [CH(g) & CH(f) & true(p) & p = $\lambda w. \neg$ (g(person) considered the possibility in w that ($\lambda w'$. f(politician) is corrupt in w'))]}

(14) a.Max did not consider the possibility that some politician is corrupt.

b. $\lambda w.\exists f$ [CH(f) & $\neg$[Max considered the possibility in w that ($\lambda w'$. f(politician) is corrupt in w']]

What happens, though, when the N(oun)-restrictor in the *wh*- or indefinite phrase denotes the empty set, as in (15)? How could a choice function possibly select an individual out of the empty set?

(15) a. Max checked every law that a certain American king had sanctioned.

b. $\lambda w.\exists f$ [CH(f) & $\forall x$ [(x is a law in w & f(American king) sanctioned x in w) $\rightarrow$ Max checked x in w]]

Two main strategies to handle empty N-restrictors are possible.

The first one is to consider that choice functions are partial functions and that the empty set is not in their domain. Then, in a world w where the set of American kings is empty, f(American king) is undefined for any f, which will make the implication in (15b) undefined for some values of x, and, as a result, will make the whole proposition (15b) undefined too.[3] That is, (15a) presupposes the existence of a non-empty set of American kings

The second possibility is to consider that a choice function is a total function and that it yields a falsifying object when the N-restrictor is empty, as in von Stechow (1996), Reinhart (1997) or Winter (1997). Let us take, for the sake of illustration, Winter's definition of a choice function:

[3] In Kleene's three-valued logic, the truth value of an implication with an undefined antecedent is true if the consequent is true and undefined otherwise. This means that, unless Max checked absolutely all the laws in w, there will be some values of x for which the implication within (15b) will be undefined. Assuming that $\forall$ amounts to multiple conjunction and $\exists$ amounts to multiple disjunction and assuming Kleene's three-valued system of connectives, we have that the universally quantified formula within (15b) is undefined for a world w with no American kings and so it is the whole proposition (15b).

(16) A function $f \in D_{<<et><et,t>>}$ is a choice function iff:

(i) for all $P \in D_{<et>}$ such that $P \neq \emptyset$, $\exists x_e[P(x) \& f(P)=\lambda A_{<et>}.A(x)]$ (i.e., f(P) is the generalized quantifier corresponding to some individual in P), and

(ii) $f(\emptyset)=\emptyset_{<et,t>}$ (the trivial generalized quantifier which does not include any set of individuals).

Assuming that there are no American kings in w, the definition (16) makes the antecedent of the conditional in (15b) false for any pair of f and x. Hence, the whole existential quantification is trivially true in w. That is, (15) is true in a world w where there is no American king.

Judgments about the truth conditions of (15) are subtle and it is not the aim of this paper to discuss which of the two alternatives is empirically more accurate. In the next section, we present some local presupposition examples and show that neither the partial choice function strategy nor an extension of the falsifying object strategy can account for them, hence posing a problem for the current choice function approach to *which* phrases and indefinites.

3. Local presupposition projection in the choice function approach.

The following examples involve local projection of the existence presuppositions triggered by the definite NPs *his dog* and *his younger sister*, namely the presuppositions "that there is a (unique) x that is his dog" and "that there is a (unique) x that is his younger sister". E.g., under its most normal reading, the sentence in (17) does not have the global presupposition that everybody owns a dog, but the existence presupposition locally projects within the restrictor of *every*. Similarly, in (18), the presupposition does not project globally but locally, within its nuclear scope of *every*.

(17) a. Lucie got mad at everybody$_1$ who mistreated his$_1$/her$_1$ dog (i.e., at everybody who owns a dog and mistreated it).

b. $\lambda w.\forall x$ [$\exists y$[y is x's dog in w & x mistreated y in w] $\rightarrow$ Lucie got mad at x in w]

(18) a. Mary didn't assume that every boy$_1$ in the class would bring his$_1$ younger sister --since she knows that not every boy in the class has a younger sister.

b. $\lambda w.\neg$[Mary assumed in w ($\lambda w'.\forall x$ [boy(x)(w') $\rightarrow \exists y$ [y is x's younger sister in w' & x brought y in w']])]

Parallel examples of local presupposition projection occur with *which* phrases (examples (19)-(20)) and with indefinites (examples (21)-(22)), too:

(19)Q: Who got mad at everybody$_1$ who mistreated which pet of his$_1$?

A: Lucie got mad at everybody who mistreated his/her dog (i.e., at everybody who owns a pet-dog and mistreated it).

(20) Q: Who didn't assume that every boy$_1$ in the class would bring which relative of his$_1$ --since that person knew that not every boy in the class has such a relative?

A: √ Mary didn't assume that every boy$_1$ in the class would bring his$_1$younger sister --since Mary knows that not every boy in the class has a younger sister.

(21) Lucie got mad at everybody$_1$ who mistreated a certain pet of his$_1$.

(22) Mary didn't assume that every boy$_1$ in the class would bring a certain relative of his$_1$.

These examples present a problem for the current choice function approach to *which* phrases and indefinites: we need to allow for these local presupposition readings, but neither the partial function approach nor an extension of the falsifying object approach can derive (19)-(22) without yielding too weak truth conditions.

Let us first look at the partial choice function line. The local presupposition reading of (21) could be represented as in (23b):

(23)a. Lucie got mad at everybody$_1$ who mistreated a certain pet of his$_1$.

b. $\lambda w.\ \exists f$ CH(f) & $\forall x$ [(f(pet of x) is defined & x mistreated f(pet of x) in w) $\rightarrow$ Lucie got mad at x in w]

The problem with the formula in (23b) is that it has too weak truth conditions, a problem that we already encountered in the unselective binding approach. First, let us take a partial choice function that systematically chooses people's dogs when it can and that is undefined when the argument set does not contain any dog. The existence of this function suffices to make the proposition in (23b) true in a world w where dogs are pets and where Lucie got mad at people who own a dog and mistreated it. The existence of the function $f_{his\ dog}$, hence, derives a possible local presupposition reading of (23a). However, also a function that systematically chooses people's uncles and that is undefined otherwise would make the proposition (23b) true in a world w where uncles are not pets, everybody mistreated all their pets and Lucie didn't get mad at anybody at all. This is so is because there is an f in w --namely, $f_{his\ uncle}$-- such that, for any x, $f_{his\ uncle}$(pet of x) is undefined, the antecedent of the conditional is always false and the implication is vacuosly true. That is, the sentence (23a) would be true even if Lucie did not care at all about pets.

The same problem of too weak truth conditions arises when the *wh*-phrase or the indefinite is in the nuclear scope of an operator. The proposition in (24b) wrongly yields the value true for a world w where every boy has relatives, where Mary assumes that every boy would bring all his relatives, where cats are not relatives and where Mary does not assume the impossible proposition. This is so because we can always find a partial choice function -- e.g. $f_{his\ cat}$-- for which the formula ($\lambda w'$. ...) stands for the impossible proposition.

(24)a. Mary didn't assume that every boy$_1$ in the class would bring a certain relative of his$_1$.

b. $\lambda w.\ \exists f$ CH(f) $\neg$[Mary assumed in w ($\lambda w'.\forall x$ [boy(x)(w') $\rightarrow$ f(relative of x) is defined & x invites f(relative of x) in w'])]

The same reasoning applies to the *which* phrase examples (19)-(20).

Let us now try to extend the falsifying object strategy to cover these cases. Take a choice function that systematically chooses people's dogs when it can and that yields the falsifying object when the argument set does not contain any dog. Under this value of *f*, the universally quantified formula within (23c) is true in a world w if, for every x, x did not have a pet-dog, or x had a pet-dog but did not mistreat it, or x had a pet-dog, x mistreated it and Lucie got mad at x. These are, indeed, the right truth conditions. However, we get parallel truth conditions for a function that systematically chooses people's uncles when it can and the falsifying individual otherwise. The mere existence of this function makes the proposition in (23c) true in a world w where nobody has pet-uncles, independently of Lucie having any concern about pet abuse. A similar case can be drawn for (24) and for the *which* phrase examples in (19)-(20).

(23) c. $\lambda w.\ \exists f\ CH(f)\ \&\ \forall x$ [x mistreated f(pet of x) in w $\rightarrow$ Lucie got mad at x in w]

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Descriptive pronouns in Dynamic Semantics*

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In this paper I argue for the existence of descriptive pronouns, and that the constraints for descriptive pronouns involve a notion of uniqueness, *not* one of *accessibility*. I also shown how such pronouns can be accounted for in dynamic semantics, and that with it we can account for many phenomena problematic for the standard dynamic account.

According to Gerath Evans (1977), pronouns should either be treated as bound variables or as *E-type pronouns*. Pronouns inside the smallest clause containing a quantified expression are treated as bound variables of quantification theory, while other occurrences of pronouns, so-called *unbound pronouns*, are treated as E-type pronouns referring to *all* the relevant objects by which the antecedent sentence is verified. Evans argued that an E-type analysis is needed for at least some occurrences of pronouns in order to interpret a sentences like *Tom owned some sheep and Harry vaccinated them* as saying that Harry vaccinated *all* sheep that Tom owned. Following Neale (1990), we can treat E-type pronouns as *descriptive pronouns*, going proxy for the description recoverable from the antecedent sentence. Thus, in a sequence of the form *Some S are P. They are Q*, the pronoun *they* is going proxy for the description *(all) the S such that P*.[1]

However, if we use the term *unbound pronoun* in the above sense, it seems that not all unbound pronouns can be treated as going proxy for the definite or universal noun phrase recoverable from the antecedent clause, and thus should be treated as E-type pronouns. For example in *Yesterday, some men came at the door. They were strangers*, we don't want to say that *they* needs to stand for all men that came at the door yesterday. If we want to say that the pronoun is going proxy for a description recoverable from its antecedent, the relevant description should not be definite or universal, but *indefinite*, like *Some men that came at the door yesterday*.[2] Something similar should be done to get the right reading of a discourse like *A man is walking in the park. He is whistling*, because the second sentence can be true if only one of the two men walking in the park is whistling. But claiming that the pronoun is an abbreviation of an *indefinite* description would be very implausible. Pronouns are (interchangeable with) *definite* expressions.

This doesn't mean that all unbound pronouns should be treated as E-type pronouns after all. Although the uniqueness presupposition can sometimes be explained away by domain selection, this cannot always be done as shown by donkeys in bishop clothing's: *If a bishop meets another man, he blesses him*.[3] If E-type pronouns are treated as *definite* descriptions, it seems to be impossible to select the domain in the correct way.

But if all occurrences of singular pronouns cannot be treated as definite descriptions that (in extensional contexts) refers to (all) *the* objects that verify their antecedent clauses, how then can a pronoun be treated as a definite expression?

The answer of proponents of DRT/FCS/DPL is familiar by now: treat anaphoric pronouns simply as bound variables, interpret indefinites dynamically such that they introduce new objects available for reference, and assure that in case of negation a universal quantification over assignment functions or sequences of individuals is involved. Anaphoric pronouns can be treated as definite noun phrases, because the possibilities with respect to which the pronouns are interpreted are made more fine-grained entities then possible worlds, namely, world-assignment pairs.[4]

* Thanks to Paul Dekker, Hans Kamp, and Ede Zimmermann for discussion.

1 This in distinction with Evans (1977) who argued that E-type pronouns *rigidly refer*.

2 See Sommers (1982).

3 Due to Heim (1990), and attributed to Kamp and Van Eijck.

4 Actually, I believe that most anpahorically used pronouns can be treated as definite noun phrases because they are *referentially* used, referring to the unique *speaker's referent* of its antecedent indefinite. In Van Rooy (1997a) it is shown that by means of *diagonalisation* and the use of *hypothetical* reference contexts such an analysis can be pushed much further than many have supposed, and that in fact this analysis is close to, although not identitical with, standard DRT/FCS/DPL. Also, it is this referential