Quantifiers with Split Scope

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ABSTRACT
Quantifiers in intensional contexts cause difficulty in explaining their scope phenomena in the standard linguistics. A strong quantifier has narrower scope than an intensional operator, but the nominal predicate has the *de re* interpretation, and an indefinite can have wide scope over an intensional operator over a syntactic island. In the paper, I propose a new way of interpreting a strong quantifier, assuming that a strong quantifier triggers the presupposition that there is a non-empty set determined by the nominal predicate. A presupposition tends to be projected over an intensional operator. This gives the effect that the nominal predicate gets the *de re* interpretation. On the other hand, the nuclear scope of the quantifier, together with the nominal predicate, determines another set in the local context, and the quantificational force is determined by the relation of the two sets. A weak quantifier is ambiguous, and it can be interpreted as triggering a presupposition, as a strong quantifier does. A quantifier in this use can be analyzed in the same way, but it leads to the effect that the quantifier, not just the nominal predicate, has scope over an intensional operator because of a semantic property of the quantifier. This new way of interpreting a quantifier is independently motivated by the observation that the two sets are referred to at a later discourse.

Keywords: quantifier, intensional context, split scope, presupposition

1. Introduction

A quantifier is a semantic operator that is interpreted with respect to another semantic operator, and the scope relation is generally captured by the syntactic structure in the standard semantics. This is also the case when a quantifier shows scope interaction with an intensional operator.

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(1) A student is thought to have stolen John's money.
$\lambda w \exists x[student(w)(x)\ \&\ \exists y[\forall w' \in think(w,y)[steal(w')(x,j's\ money)]]]$
$(think(w,y) = \{w' \in W \mid w' \text{ is compatible with what } y \text{ thinks in } w\})$

In the paper, I deal with intensional operators, hence non-actual possible worlds. To make this explicit, I will use variables for possible worlds as separate arguments. In (1) *A student* has wide scope over the verb *thought* in the surface structure and it gets the *de re* interpretation with wide scope over the intensional operator.

On the other hand, an indefinite can occur in an intensional context, having narrower scope than the verb *thinks* and getting the *de dicto* interpretation.

(2) John thinks that a student stole his money.
$\lambda w[\forall w' \in think(w,j)[\exists x[student(w')(x)\ \&\ steal(w')(x,j's\ money)]]]$

However, the interpretation of a quantifier does not depend on the surface structure. In (2), the indefinite can have wide scope over the intensional operator and get the *de re* interpretation. For this reading, we need an abstract structure called a Logical Form (LF):

(3) [[a student]$_i$ [John thinks that t_i stole his money]] (LF)
$\lambda w[\exists x[student(w)(x)\ \&\ \forall w' \in think(w,j)[steal(w')(x,\ j's\ money)]]$

In (3) the indefinite gets the *de re* interpretation. This explains how a quantifier can be interpreted with a different scope than the surface structure shows. This is the traditional way of dealing with quantifiers. See Montague (1973), May (1985), Huang (1995), Hornstein (1995) among others.

This standard syntax and semantics for quantifiers are not sufficient to deal with various interpretations of quantifiers. Some uses of quantifiers behave differently from the way the standard linguistics predicts. An indefinite can get the *de re* interpretation even when it has narrower scope than an intensional operator:

(4) Situation: Mary looks at the ten contestants and says 'I hope one of the three on the right wins.' She doesn't know those are my friends. (von Fintel and Heim 2011)
Sentence: Mary hopes that a friend of mine will win.

In this sentence *a friend of mine* does not have wide scope over *hope* in that for each hope-world of Mary's we can think of a different friend of the speaker's and hopes that he/she will win. Still the indefinite can have the *de re* interpretation. It can range over the speaker's friends in the actual world. I will call this phenomenon **split scope**. See Fodor (1970); Farkas (1981), Cresswell (1990), Ludlow and Neale (1991), Abusch (1994), Farkas (1997), Percus (2000), among others, for more discussions on this interpretation. This reading is not available in the standard semantics because it is not available even by a syntactic movement. We need a different tool to get this meaning.

These phenomena have been observed for a long time and there have been attempts to account for them. Some are successful only partially in that they can explain some cases but not others. Others are successful but need complex tools that have no psychological reality. In this paper I propose a more plausible analysis.

The paper is organized as follows. In Section 2, I consider more examples, and review previous analyses critically. In Section 3, I propose a new analysis of quantifiers and show how the analysis can explain the observations we make. I also show that the new analysis is independently motivated by some anaphorical phenomena related to quantifiers. In Section 4, I conclude the paper.

2. More Examples and Previous Analyses

2.1. Scope reconstruction

In regards to split scope, von Fintel and Heim (2011) proposed a solution resorting to what is called scope reconstruction. To deal with scope reconstruction, it is necessary to discuss the interpretation of a syntactic movement. Consider (5), which includes a universal quantifier, and its interpretation:

(5) John does not like every student.

$[_S$ [every student]$_i$ $[_S$ John does not like t_i]]

(6) $\lambda w[\lambda P[\forall x[student(w)(x) \rightarrow P(x)](\lambda x[\neg like(w)(j,x)])]$

$= \lambda w \forall x[student(w)(x) \rightarrow \neg like(w)(j,x)]$

The verb *like* is the semantic type of <e,<e,t>>, but *every student* is <<e,t>,t>. To resolve the type mismatch. The universal quantifier is quantifier-raised and has wide scope over negation at LF. The lower S is interpreted as a proposition but it becomes the type of <e,t> when it combines with the quantifier.1) Then the quantifier takes the lower S as the semantic argument. Then we get the meaning that John likes no student.

However, the intended meaning is that not every student is liked by John. To get this meaning, we could assume that in (5) the quantifier is raised to the VP, which is in the scope of negation, but this does not help in dealing with (4). Von Fintel and Heim (2011) call the reading in (4) the Third Reading and adopt scope reconstruction to explain it.

In scope reconstruction, it is assumed that the trace of the quantifier has the semantic type <<e,t>t> of a quantifier, not the type of e. See Cresti (1995), Sternefeld (2001) among others for more discussions of this way of interpretation. Then (5) can be interpreted as in (7):

(7) a. $[\![\text{like } t_i]\!] = \lambda w[\lambda x[g(i)(w)(\lambda w' \lambda y[like(w')(x,y)])]]$ (g: an assignment)

b. $[\![\text{John does not like } t_i]\!] = \lambda w \lambda x[\neg g(i)(w)(\lambda w' \lambda y[like(w')(x,y)])](j)$

$= \lambda w[\neg g(i)(w)(\lambda w' \lambda y[like(w')(j,y)])]$

c. $[\![[_S \text{ [every student]}_i \text{ } [_S \text{ John does not like } t_i]]]\!]$

$= \lambda w[\lambda Q[\neg Q(w)(\lambda w' \lambda y[like(w')(j,y)])](\lambda w'' \lambda P[\forall x[student(w'')(x) \rightarrow P(w'')(x)]])$

$= \lambda w[\neg \forall x[student(w)(x) \rightarrow like(w)(j,x)]]$

To interpret a trace, we need an assignment temporarily. In (7a), g(i) is the intensional meaning of a quantifier, which takes the meaning of a one-place predicate, which is derived from a two-place predicate by filling its logical subject temporarily. Then the lambda operator λx abstracts over the logical subject of the two-place predicate. Then we get a property of the logical subject. In (7b), it combines with the negation operator and becomes the meaning of a negative predicate. Then it takes 'j(ohn)' as the argument and becomes a proposition. In (7c), when the universal quantifier is interpreted, the lambda operator λQ abstracts over the meaning of the trace and becomes a property of quantifiers. This takes the meaning of the universal quantifier and becomes a proposition again. This leads to the reading in which the quantifier has narrower scope than the negation operator. Even if the quantifier is

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1) I will not deal with the negation operator, which can be interpreted differently, depending on which structure we assume of the sentence. But it is clear what the negative sentence means.

raised, scope reconstruction leads to the effect that the quantifier is interpreted in situ, nullifying the effect of quantifier raising.

Von Fintel and Heim (2011) use this idea in interpreting (4):

(8) $[_S$ [a friend of mine]$_i$ $[_S$ Mary hopes t_i will win]]

The trace is interpreted as ranging over intensional semantic entities denoted by quantifiers. Then the lower S is interpreted as a proposition, but it is converted to a property of quantifiers when the quantifier is interpreted so that it takes the meaning of *a friend of mine* as the argument. In this case, von Fintel and Heim (2011) assume that the interpretation does not really have the effect that the quantifier is interpreted in the position of the trace. The quantifier is interpreted with respect to the actual world, while the trace is in the scope of the verb *hope*. The meaning they intended is given in (9). The existential quantifier has narrower scope than the verb *hope*, but the descriptive content is interpreted with respect to the actual world w, rather than a hope-world w'.

(9) $\lambda w[\forall w'[w' \in \text{hope}(w,m) \rightarrow \exists y[\text{friend}(w)(x) \;\&\; \text{win}(w')(x)]]]$
(hope(w,m) = $\{w' \in W \mid w'$ is compatible with what Mary hopes in w$\}$)

But the reading von Fintel & Heim (2011) expected does not arise, if scope reconstruction strictly applies. The raised quantifier is interpreted in the actual world but the *de re* meaning cannot be incorporated directly into the position of the trace in the embedded clause. To show this, I will interpret (8) in the normal way, as in (10), where the meaning of each expression, including a quantifier, is given as an intensional one:

(10) a. $[\![$ a friend of mine $]\!] = \lambda w[\lambda P \exists x[\text{friend}(w)(x) \;\&\; P(w)(x)]]$
b. $[\![$ Mary hopes t_i will win $]\!] = \forall w' \in \text{hope}(w,m)[g(i)(w')(\lambda w'' \lambda x[\text{win}(w'')(x)])]]$
c. $[\![$ [[a friend of mine]$_i$ [Mary hopes t_i will win]] $]\!]$
$= \lambda w[\lambda Q[\forall w' \in \text{hope}(w,m)[Q(w')(\lambda w'' \lambda x[\text{win}(w'')(x)])]]$
$(\lambda w[\lambda P \exists x[\text{friend}(w)(x) \;\&\; P(w)(x)]])]$
$= \lambda w[\forall w' \in \text{hope}(w,m)[\exists x[\text{friend}(w')(x) \;\&\; \text{win}(w')(x)])]\;]$

In (10a), the quantifier *a friend of mine* is an existential quantifier. In (10b), the lower S denotes a proposition with the quantifier meaning g(i). When the existential quantifier is interpreted in (10c), the proposition is first converted to a property of quantifiers by abstracting over the possible values of g(i), and it takes the meaning of the existential quantifier as the argument. Note that a quantifier and its variable Q also have an intensional meaning. When Q takes the meaning of *a friend of mine* in Mary's hope context, it takes a possible world w' in the local context, not the actual world. (See $Q(w')(\lambda w''\lambda x[win(w'')(x)])$.) This has the effect that *a friend of mine* is interpreted with respect to a local context as if the quantifier were interpreted in the position of the trace. This is not what von Fintel & Heim (2011) intended.

To get the meaning they want, *a friend of mine* would have to be interpreted with respect to the actual world w* while the predicate P takes a different world w:

(11) $[\![$ a friend of mine $]\!] = \lambda w[\lambda P \exists x[friend(w^*)(x) \ \& \ P(w)(x)]]$

Then the rest of the interpretation would be as follows:

(12) $[\![$ [[a friend of mine]$_i$ [Mary hopes t_i will win]] $]\!]$

$= \lambda w[\lambda Q[\forall w'[w' \in hope(w,m) \rightarrow Q(w')(\lambda w''\lambda x[win(w'')(x)])]]$

$(\lambda w[\lambda P \exists x[friend(w^*)(x) \ \& \ P(w)(x)]])]$

$= \lambda w[\forall w'[w' \in hope(w,m) \rightarrow \exists x[friend(w^*)(x) \ \& \ win(w')(x)]]]$

Notice that the nominal predicate *friend.of.mine* takes the actual world w*, but the verb *win* takes w'. This is what they want, but it can be derived only when the raised quantifier gets a special interpretation. Scope reconstruction is supposed to lead to the same effect that the quantifier is interpreted in situ. Therefore, we should not resort to scope reconstruction in explaining split scope.

Lechner (2013) and Keine & Poole (2018) try to block reconstruction for world-variable binding somehow, but the restrictions are just arbitrary specifications. Moreover, there are cases where scope reconstruction is not possible. Indefinites and *wh*-phrases (existential quantifiers) can have scope over a syntactic island. And a universal quantifier does not have scope over a syntactic island, but the nominal predicate can get the *de re* interpretation. See Farkas (1981), Huang (1982), Fodor and Sag (1982), Ruys (1992), Abusch (1994), Reinhart (1997), etc.

(13) a. [If every rich relative of mine dies], I'll inherit a house. (Charlow 2019)

b. $\lambda w[\forall w'[w' \in ACC(w, \{w'' \in W \mid \forall x[rich.relative(w'')(x) \rightarrow die(w'')(x)]\})$

$\rightarrow \exists y[house(w')(y) \ \& \ inherit(w')(sp,y)]]]$

c. $\lambda w \exists X[\text{rich.relative}(w)(X)\ \&\ \forall w'[w' \in ACC(w, \{w'' \in W \mid \forall x[x \in X\ \&$
$\text{atom}(w'')(x) \rightarrow \text{die}(w'')(x)]\}) \rightarrow \exists y[\text{house}(w')(y)\ \&\ \text{inherit}(w')(sp,y)]]]$

(14) a. [If a rich relative of mine dies], I'll inherit a house.

b. $\lambda w[\exists x[\text{rich.relative}(w)(x)\ \&\ \forall w'[w' \in ACC(w, \{w'' \mid \text{die}(w''')(x)\}) \rightarrow$
$\exists y[\text{house}(w')(y)\ \&\ \text{inherit}(w')(sp,y)]]]]$

'There is a rich relative of mine, and if he/she dies, I will inherit a house.'

(15) a.

nwu-ka	cwuk-umyen	ney-ka	sangsok-ul	pat-nya?
who-nom	die-if	you-nom	inheritance-acc	get-int

b. $\lambda w \lambda p[\exists x[\text{person}(w)(x)\ \&\ p = \lambda w'[\forall w''[w'' \in ACC(w', \{w''' \mid \text{die}(w''')(x)\}) \rightarrow$
$\text{inherit.property}(w'')(x)]]]$

The antecedent clause of a conditional is a syntactic island and the indefinite and the *wh*-phrase in (14a) and (15a) get the scope they show in (14b) and (15b), without syntactic movement. This shows that indefinites and *wh*-phrases are not really quantifiers that take scope by movement. More interestingly, the nominal predicate of the universal quantifier in (13a) can have the *de dicto* interpretation, as in (13b), or the *de re* interpretation, as in (13c). The latter interpretation is more plausible. Still the quantifier itself does not have wide scope. In the three sentences, the nominal predicates all can have the *de re* interpretation, but the quantifiers show different scopes. These observations are not accountable by syntactic movement, and we need an additional mechanism.

2.2. Choice function

To explain the exceptional scopes of indefinites and *wh*-phrases, Winter (1997), Reinhart (1997), etc. assume that indefinites are not quantifiers but predicates and introduce the notion of choice function. This approach assumes the following:

(16) a. If an indefinite is used as an argument, a choice function variable is introduced so that it picks a member that has the property denoted by the predicate.

b. The choice function variable is existentially closed at any compositional level.

(f is a choice function: f(A) = a, where a is a member of a set A.)

With this approach assumed, (14a) is interpreted as follows:

(17) $\lambda w \exists f[CF(f) \;\&\; \forall w'[w' \in ACC(w, \{w'' \mid die(w'')(f(\{x \mid rich.relative(w'')(x)\}))\})$
$\rightarrow [\exists y[house(w')(y) \;\&\; inherit(w')(sp,y)]]]$
$= \lambda w \exists x[\forall w'[w' \in ACC(w, \{w'' \mid rich.relative(w'')(x) \;\&\; die(w'')(x)\}) \rightarrow$
$\exists y[house(w')(y) \;\&\; inherit(w')(sp,y)]]]$

Since f has wide scope over the condition, the indefinite has wide scope over the conditional. The problem is that even though the indefinite is interpreted as having wide scope over the conditional, the nominal predicate is interpreted with respect to the context for the antecedent clause of the conditional. This is not really the way that the indefinite has wide scope over the conditional in that the nominal predicate does not have the *de re* interpretation. This is not the meaning we want. We can say the same thing about (15a).

A more serious challenge of a scope phenomenon is that even if a quantifier cannot have scope over an intensional operator, the nominal predicate in the quantifier can have the *de re* interpretation. In (13a), for example, the universal quantifier in the antecedent clause has narrower scope than the conditional, but the nominal predicate that determines the quantification domain can have the *de re* interpretation. If the quantifier moved out of the conditional to get the *de re* interpretation, it would have wide scope over the conditional.

2.3. Variables for situations or worlds in NPs

Next consider a third proposal. To capture the split scope of nominal predicates, Percus (2000), Keshet (2010, 2011), Schwarz (2012), etc. propose to introduce a pronoun for a situation (as part of a possible world) in an NP so that the nominal predicate of the NP is interpreted with respect to the situation. A situation can be replaced with a possible world without much semantic difference. Keshet (2010) claims that a pronoun for a situation/world is introduced in a strong NP, but some indefinites also show the same exceptional behavior.

The actual value of a situation pronoun is determined by the binder of the pronoun in syntax. A binder can be introduced in any syntactic position that can bind the pronoun. In the interpretation below, I use a variable for possible worlds instead of situations so that we can compare the interpretation with others in the paper. Consider (4) again.

(18) a. Mary λw hopes(w) that λw' [a friend of mine w] will win(w')]

b. $\lambda w[\forall w'[w' \in hope(w,m) \rightarrow \exists x[friend(w)(x) \ \& \ win(w')(x)]]]$

The nominal predicate *friend of mine* is interpreted with respect to the actual world w, though the quantifier is interpreted in the hope context. This can explain how we get the meaning in which the whole indefinite can have narrower scope than the propositional attitude verb *hope* but the nominal predicate *friend of mine* gets the *de re* interpretation. On the other hand, what are involved in the event of winning in the hope context w' are semantic entities in w' which correspond to the speaker's friends in w. For a possible world w, there are many possible hope worlds w' of Mary's. Since the quantifier is interpreted in the hope context, the sentence asserts that for each of Mary's hope worlds w', there is an individual who wins in w' and who is a friend of the speaker's in w. Then the assertion is true in the case of (19). This is the split scope reading of the sentence.

(19) John is a friend of the speaker's in w and in some of Mary's hope worlds a semantic entity corresponding to John wins & Bill is a friend of the speaker's in w and in the rest of Mary's hope worlds a semantic entity corresponding to Bill wins.

This way of interpretation also explains the meaning of (13a):

(20) $\lambda w[\forall w'[w' \in ACC(w,\{w'' \in W \mid \forall x[rich.relative(w)(x) \rightarrow die(w'')(x)]\}) \rightarrow \exists y[house(w')(y) \ \& \ inherit(w')(sp,y)]]]$

The pronoun for the nominal predicate *rich relative of mine* is bound by λw in the main context, and it is interpreted with respect to the actual world. This interpretation looks as if it is exactly the intended meaning of the sentence.

However, there are three problems with this approach. First, only NPs show intensional independence. VPs and AdvPs are always interpreted with respect to the local context, as pointed out by Percus (2000, pp. 201-204). It does not yet explain why, as far as I know.

Second, if an NP had a syntactic argument for a situation/world, the argument would be realized in the structure of the NP. However, there is no evidence that there is a syntactic position for a situation/world argument in the structure of an NP. Moreover, its binder needs to be realized in the structure of a sentence. It is assumed that a binder of a pronoun for a situation can be freely introduced in a syntactic structure. But if there is a syntactic entity, it is expected that there is a syntactic restriction on it. If there is no syntactic restriction on the distribution of the binder, it is plausible that the binder is not syntactically motivated.

A third problem, which is more serious, is that the interpretation the analysis predicts is not what it intends to get. This analysis predicts the meaning of (14a) is (21). It is different from (14b). In (21), the existential quantifier occurs in the meaning of the antecedent clause. The analysis needs an additional process that moves it out of the antecedent clause. Moreover, the condition 'rich.relative.of.mine(w)(x)' is part of the meaning of the antecedent clause of a conditional. It is supposed to be a fact because it holds in the actual world. If it is a fact, it must not be part of the meaning of the antecedent clause.[2)]

(21) $\lambda w[\forall w'[w' \in ACC(w, \{w'' \in W \mid \exists x[rich.relative(w)(x) \;\&\; die(w'')(x)]\})$
$\rightarrow \exists y[house(w')(y) \;\&\; inherit(w')(sp,y)]]]$

'If I have a rich relative in the actual world & (s)he dies, I will inherit a house.'

This is related to the condition that semantic scope be reflected in the semantic representation. If this condition is not met, as in (20) and (21), the semantic representation is not well-formed.[3)] Even if we can get the formulas in (20) and (21) compositionally, we need additional interpretation rules for re-interpreting the formulas. I do not know what it means that a hope context or a non-factual hypothesis in the antecedent clause of a conditional includes conditions on the actual world.

I discussed three attempts to account for split scope of quantifiers in intensional contexts and point out their problems. The ideas of scope reconstruction and choice function are not empirically inadequate. The idea of a variable for situations/worlds might be able to account for split scope, but it is not clear why NPs, but not VPs or AdvPs, allow such a variable and how the derived representations are understood. I will propose an analysis resorting to a mechanism that is independently motivated and lacks such problems.

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2) We can say a similar thing about the meaning representation in (18b). We can ask whether it is a fact that there is a friend of the speaker's, when Mary hopes that there is a friend of the speaker's in the actual world and he/she will win. If it is a fact, it is supposed to be outside the scope of the verb *hope*. In this respect, (18b) is not the correct meaning representation.

3) In (20) and (21), the variable x ranges over abstract things that are defined across possible worlds. If x is defined as ranging over objects which are defined in a possible world, the formulations in (20) and (21) can be problematic because x can be free in the main context.

3. New Interpretations of Quantifiers

3.1 Strong vs. weak quantifiers

Strong and weak NPs are distinguished first by Milsark (1977). Here weak NPs are those that can appear in existential *there* constructions. In general, the meanings of strong NPs are captured by the ratio of the size of the set determined by the intersection of the restrictor and the nuclear scope to the size of the set determined by the restrictor, while the meanings of weak NPs are captured by the size of the former set.[4] One characteristic property of strong quantifiers is that they trigger the presupposition that there are semantic entities that satisfy the conditions imposed by the restrictor, i.e., the nominal predicates.

If the set determined by the restrictor is the empty set, the ratio of the two sets is meaningless. This is the reason that we need a non-empty set determined by the restrictor. Hence, we need to assume that a strong quantifier triggers a presupposition. There are non-proportional strong quantifiers, but they are not used in existential constructions, either, because the existence of the semantic entities determined by the restrictor is presupposed.

The basic idea of my analysis is that presuppositions tend to be projected to the main context. This explains why the nominal predicates tend to have wide scope, regardless of the scope of the quantifier itself. This allows us to explain split scope. To make this idea work, I propose a new semantics of quantifiers.

Basically, a strong quantifier introduces two sets by the restrictor and the conjunction of the restrictor and the nuclear scope, with the conditions in the restrictor presupposed. I reflect this explicitly by introducing variables for the sets:

(22) a. $[\![Q]\!] = \lambda w \lambda P \lambda Q[\text{«}\lambda w' \exists X[\#(X) \neq 0 \;\&\; \forall x[x \in X \leftrightarrow P(w')(x)]]\text{»} \;\&\; \exists Y[\forall y[y \in Y \leftrightarrow [y \in X \;\&\; Q(w)(y)]] \;\&\; R(\#(X))(\#(Y))]]$, where « ... » : a presupposition; #(X): the number of the members in X; R: a relation between #(X) and #(Y).

b. $[\![Q\,A\,B]\!] = \lambda w[\text{«}\lambda w' \exists X[\#(X) \neq 0 \;\&\; \forall x[x \in X \leftrightarrow [\![A]\!](w')(x)]]\text{»} \;\&\; \exists Y[\forall y[y \in Y \leftrightarrow y \in X \;\&\; [\![B]\!](w)(y)] \;\&\; R(\#(X))(\#(Y))]]$

c. $\lambda w[\text{«}\pi\text{»} \;\&\; \alpha] \Rightarrow \lambda w[\pi(w) \;\&\; \alpha]$ (presupposition accommodation)

4) Schwarz (2012) claims only strong NPs can include a pronoun for situations, and that they only show transparent interpretations of the nominal predicates in quantifiers. However, I pointed out that a use of a pronoun does not account for a transparent interpretation of the nominal predicate.

In (22a), X is the domain of quantification. We could assume that X is a sum individual and that this might be more natural, but I assume just for convenience that it is a set in (22a). X is determined by the restrictor, which is a nominal predicate. It is presupposed that a non-empty set X exists. Y is determined by the intersection of the sets determined by the restrictor and the nuclear scope. R(#(X))(#(Y)) expresses the quantificational force, i.e., the relation of the number of the set members determined by the intersection of the nuclear scope and restrictor to that of the set members determined by the restrictor.

A presupposition from an expression is passed up when a larger expression is interpreted. Since more than one presupposition can arise, it would be more plausible to collect presuppositions in a set. But for simplicity, I assume there is no other presupposition. Presupposition projection is discussed more extensively in Section 3.2, and at the moment, I mention that a presupposition is (satisfied at the local context, or) accommodated at some point of interpretation. If it is accommodated, it is incorporated in the meaning of a sentence by taking a possible world as the context for accommodation, as given in (22c).

This is illustrated in (23). It is presupposed that there is a set of semantic entities that satisfy the conditions denoted by the nominal predicate.[5] The presupposition is accommodated and the variable X in the scope of $\exists$Y is dynamically bound.[6] Consequently, the nominal predicate takes wide scope over the universal quantifier.

(23) $[\![\text{Every student laughed}]\!]$

$$= \lambda w[«\lambda w' \exists X[\#(X) \neq 0 \ \& \ \forall x[x \in X \leftrightarrow [\![\text{student}]\!](w')(x)]]» \ \& \\ \exists Y[\forall y[y \in Y \leftrightarrow [y \in X \ \& \ [\![\text{laughed}]\!](w)(y)]] \ \& \ \#(Y)/\#(X) = 1]]$$

$$\Rightarrow \lambda w[\exists X[\#(X) \neq 0 \ \& \ \forall x[x \in X \leftrightarrow [\![\text{student}]\!](w)(x)]] \ \& \\ \exists Y[\forall y[y \in Y \leftrightarrow [y \in X \ \& \ [\![\text{laughed}]\!](w)(y)]] \ \& \ \#(Y)/\#(X) = 1]]$$

In contrast, a weak quantifier does not trigger a presupposition as in (24). The set determined by A is not directly relevant, but it might be linguistically active, which will be discussed in 3.4. The only set relevant in the truth-conditions is the intersection Y of the two sets determined by A and B.

5) If a sentence with a universal quantifier is interpreted as a generic sentence, the predicted presupposition may not arise.

6) This is natural because presupposition projection is dealt with in dynamic semantics. However, I will not discuss precise processes of presupposition projection.

(24) $[\![Q\ A\ B]\!] = \lambda w[\exists Y[\forall y[y \in Y \leftrightarrow [\ [\![A]\!](w)(y)\ \&\ [\![B]\!](w)(y)]]\ \&\ P(\#(Y))]]$

This is illustrated in (25). Here Y is a set of students who laughed, and the students must not be the empty set. Since a weak quantifier triggers no presupposition, it is predicted that the nominal predicates in a quantifier in an intensional context get the *de dicto* interpretation.[7)]

(25) $[\![$ A student laughed $]\!]$

$= \lambda w[\exists Y[\forall y[y \in Y \leftrightarrow [\![\text{students}]\!](w)(y)\ \&\ [\![\text{laughed}]\!](w)(y)]\ \&\ \#(Y) \neq 0]]$

Note that the nominal predicate of a strong quantifier shows split scope. One main problematic case is that an indefinite can have scope over a syntactic island. For such a case, I claim that indefinites are ambiguous. This claim is not groundless. Fodor & Sag (1982) propose indefinites are ambiguous between specific and non-specific indefinites, and specific indefinites are referential. This idea is refuted by other linguists like Ruys (1992) and Abusch (1994). However, we can assume that indefinites are ambiguous in a different way. One indirect piece of evidence is that the same forms as weak quantifiers can have a transparent interpretation:

(26) Some members of congress knew each other in college. In fact, . . .

a. . . . three U.S. Senators were attending Harvard together in 1964.

b. #. . . there were three U.S. Senators attending Harvard together in 1964.

(Keshet 2008, adapted from Musan (1995))

Here the same expression *three US Senators* is used in (26a) to denote semantic entities at a different time from the time of attending Harvard, but it is used in (26b) to denote semantic entities at the same time as the time of attending Harvard. We can attribute this difference to the possibility of triggering a presupposition. In (26a), *three U.S. Senators* is used when it can be presupposed that there are US senators who were in the same college, but in (26b), the same expression does not generate a presupposition. Note that the presupposition in (26a) comes from the nominal predicate of the quantifier.

Moreover, it is observed in (4) that an indefinite in the embedded clause has narrower scope than the verb *hope* but the nominal predicate has the *de re* interpretation.

7) The distinction of strong/weak quantifiers is also consistent with the idea that a strong quantifier can include a pronoun for situations, or possible worlds, while a weak quantifier does not.

Therefore, we can assume that some symmetrical quantifiers, in contrast with (always presuppositional) strong quantifiers, are ambiguous between presuppositional and non-presuppositional quantifiers, and I propose the two meanings as follows:8)

(27) $[\![Q\ A\ B]\!] =$

a. $\lambda w[\exists Y[\forall y[y \in Y \leftrightarrow [\![A]\!](w)(y)\ \&\ [\![B]\!](w)(y)]\ \&\ P(\#(Y))]]$ (= (24))

b. $\lambda w[«\lambda w' \exists X[\#(X) \neq 0\ \&\ \forall x[x \in X \leftrightarrow [\![A]\!](w')(x)]]»\ \&$
$\exists Y[\forall y[y \in Y \leftrightarrow y \in X\ \&\ [\![B]\!](w)(y)]\ \&\ P(\#(Y))]]$

(27a) is the meaning of a symmetrical quantifier as a non-presuppositional one, and (27b) is that as a presuppositional one. When a presupposition is triggered, the set X needs to be a non-empty set. A strong quantifier was defined with a ratio of R(#(X))(#(Y)), but it is replaced with P(#(Y)) because a weak quantifier is symmetrical and the meaning is defined only with respect to the set determined by the conjunction of the restrictor and the nuclear scope.

The ambiguity of some weak quantifiers is illustrated in (28):

(28) $[\![$ A student laughed $]\!]$

$= $ (i) $\lambda w[\exists Y[\forall x[y \in Y \leftrightarrow [\![\text{student}]\!](w)(y)\ \&\ [\![\text{laughed}]\!](w)(y)]\ \&\ \#(Y) \neq 0]]$

(ii) $\lambda w[«\lambda w' \exists X[\#(X) \neq 0\ \&\ \forall y[y \in X \leftrightarrow [\![\text{student}]\!](w')(y)]]»\ \&$
$\exists Y[\forall y[y \in Y \leftrightarrow y \in X\ \&\ [\![\text{laughed}]\!](w)(y)]\ \&\ \#(Y) \neq 0]]$

We added the second interpretation, in which the nominal predicate triggers a presupposition. Then the nominal predicate can be interpreted with respect to the context in which the presupposition is accommodated.

3.2. Presupposition projection

I claimed that the nominal predicate of a quantifier may generates a presupposition

8) The indefinite in (4) can have wide scope over the verb hope in a different context. For the wide-scope reading, we need a third meaning of an indefinite, in addition to the meanings in (27):

i. (27c) $\lambda w[«\lambda w' \exists X[P(\#(X))\ \&\ \forall x[x \in X \rightarrow [\![A]\!](w')(x)]\ ]»\ \&$
$\forall y[y \in X \rightarrow [\![B]\!](w)(y)]]$

In this meaning, the quantificational force is part of the presupposition. But this is not the main issue of the paper, and I will leave it at that. The indefinite in (14a) can have wide scope, below I will explain how it can get wide scope reading without assuming the wide scope reading.

so that the quantification domain can be determined in a different context from the local one. Then the resulting meaning of a sentence with a quantifier is determined by the process of presupposition projection. Therefore, it is predicted that a presupposition-triggering quantifier leads to split scope.

In this subsection, I show that presuppositions are generally projected over intensional operators. A first example is given in (29). The utterance of the sentence triggers two presuppositions in the embedded clause. The most natural reading of this sentence is that Mary has a sister and she had been visiting Mary and John thinks that she stopped visiting Mary. This shows that if a presupposition is triggered in an intensional context, it tends to be projected over the context.

(29) John thinks that Mary's sister stopped visiting her.
Pres1: Mary has a sister. Pres2: Mary's sister had been visiting her.
⇒ Mary has a sister & her sister had been visiting her. John thinks her sister stopped visiting her.

Presupposition projection can also be observed in conditionals:

(30) a. If John stops smoking, he will get better.
⇒ John has been smoking & if John stops smoking, he will get better.
b. If John gets old, he will stop smoking.
⇒ John has been smoking & if John gets old, he will stop smoking.

In (30a), the aspectual verb *stop* in the antecedent clause triggers the presupposition that John has been smoking. The presupposition tends to be projected. In (30b), the same verb triggers the same presupposition, which is also preferably projected to the main context.

On the other hand, if the projection of a presupposition leads to inconsistency, it is incorporated in the local context:

(31) John thinks that Mary's sister stopped visiting her. But Mary does not have a sister.
⇒ John thinks that Mary has a sister & that her sister had been visiting her & John thinks that her sister stopped visiting her.

If Pres1 were projected to the main context, it would be incompatible with the second sentence. Therefore, Pres1 is incorporated in John's belief. Pres2 is dependent on Pres1, and if the latter is not projected, the former is not either. Therefore it is not a fact, but just what John thinks, that Mary's sister had been visiting her.

Even if a presupposition is projected over an intensional context, some counterparts corresponding to the semantic entities in the presupposition are involved in the local intensional context. In (29), when Pres1 is projected to the main context, a counterpart of Mary's sister is involved in the event of stopping visiting Mary. If not specified otherwise, it is supposed that John also thinks that Mary has a sister. We can say the same thing about Pres2. This does not belong to the linguistic area, as far as the current form of linguistics is concerned. It is just pragmatically implied.

Presupposition projection occurs along the projection path, which is the same as the accessibility path for anaphora. Therefore, a presupposition is accommodated in the position that can bind the original position, as discussed in van der Sandt (1992). For this reason, you might claim presupposition projection is anaphora resolution, as van der Sandt does, but it is not the case. Yeom (1998) claims that presupposition projection is a matter of information. In (32) the presupposition from the definite description *his wife* is not projected to the main context because it is implicated that John is possibly not married. The presupposition from *his wife* is not anaphoric to *John is married* because the latter does not introduce a discourse referent for *his wife*. Still the latter blocks the former from being projected. Similarly, in (33), the presupposition from *her sister* is not projected because John thinks Mary has a sibling. But the latter introduces no discourse referent for the expression *her sister*.

(32) If John is married, he will love his wife very much.

(33) John thinks Mary is not an only child. He thinks that her sister stopped visiting her.

Moreover, if presupposition projection were a kind of anaphora, it would be preferable for a pronoun to have a closer antecedent. However, a presupposition tends to be projected globally, as pointed out in Heim (1983) and van der Sandt (1992):

(34) If John is hungry, he will eat the pizza in the fridge.
   a. There is pizza in the fridge. If John is hungry, he will eat it.
   b. #If John is hungry and there is a pizza in the fridge, he will eat it.
   c. #If John is hungry, there will be a pizza in the fridge and he will eat it.

Here the sentence is interpreted as in (34a), not as in (34b) or (34c). I claim presupposition projection is related to informativeness. The reading in which a presupposition is projected is more informative than the one in which it is locally accommodated. See Yeom (1998) for more extensive discussion of informativeness.

I claimed that the nominal predicate of a strong quantifier is interpreted as a presupposition. Then it is predicted that the presupposition tends to be projected globally. We already saw that the nominal predicate of a strong quantifier in the antecedent clause of a conditional is projected to the main context in (13). It is more interesting to see a case where a presupposition that arises in the consequent clause of a conditional can be projected to the main context:

(35) If John has a hobby, he will devote every spare moment to it.
a. John has spare time & if John has a hobby, he'll devote every spare moment to it.
b. #If John has a hobby & has spare time, he'll devote every spare moment to it.
c. #If John has a hobby, he'll have spare time & devote every spare moment to it.

The nominal predicate *spare moment* causes the presupposition that there is spare time. Since having spare time does not depend on the condition of having a hobby, the presupposition is projected to the main context, as in (35a). The other readings are not readily accepted. Note again that (35a) is stronger than the other two readings.

Consider a case where a presupposition depends on the conditions in the antecedent clause of a conditional:[9)]

(36) If John finishes this job, he'll devote every spare moment to his hobby.
⇒ John has a hobby. {a, b, c}
a. #John has spare time. If he finishes this job, he'll devote every spare moment to it.
b. If John finishes this job & has spare time, he'll devote every spare moment to it.
c. If John finishes this job, he'll have spare time & devote every spare moment to it.

In the utterance context, it is assumed that John is doing a job which makes him

9) One anonymous reviewer says (36) roughly means that if John finishes this job, if he has spare time, he'll devote every spare moment to it. Roughly (p -> (q->r)) = ((p & q)-> r). Therefore, it is equivalent to (36b).

busy. Then the presupposition is not projected, and (36a) is not an available reading. (36b) and (36c) are considered possible readings. In (36b), having spare time is still a condition for the consequent clause. This implies that having spare time might not be a consequence of finishing the job. Therefore (36b) can be understood as describing the situation in which if John finishes the job, he might, or might not, get spare time and if he (finishes the job and) has spare time, he will spend every spare moment to his hobby. However, the intended meaning is that if John finishes the job, then he will (necessarily) get spare time and devote every spare moment to his hobby, as in (36c). Note that (36c) is stronger than (36b) (if we assume for convenience's sake that a conditional is like a material implication).

I showed a presupposition is projected along the projection path, which is identical to the accessibility path for anaphora, but that the preference of possible readings is determined by informativeness. Presupposition projection sends a semantic entity to a context from where it can bind the corresponding variable it originates from, without resorting to a syntactic movement. Thus it is not subject to a syntactic island.

3.3. Split scope

I gave new interpretation rules for quantifiers involving presuppositions in (22) and (27), and I also explain how presuppositions are projected. Now I can explain how the sentences in (4), (13) and (14) are interpreted. Consider (13) first:

(37) [If every rich relative of mine dies], I'll inherit a house.

a. $\lambda w[\forall w'[w' \in ACC(w, \{w'' |$
$«\lambda w''' \exists X[\#(X) \neq 0 \ \& \ \forall x[x \in X \leftrightarrow rich.relative(w''')(x)]]» \ \&$
$\exists Y[\forall y[y \in Y \leftrightarrow \ y \in X \ \& \ die(w'')(y)] \ \& \ \#(Y)/\#(X)=1]\}) \rightarrow$
$\exists z[house(w')(z) \ \& \ inherit(w')(sp,z)]]]$

b. $\lambda w[\exists X[\#(X) \neq 0 \ \& \ \forall x[x \in X \leftrightarrow rich.relative(w)(x)] \ \&$
$\forall w'[w' \in ACC(w, \{w'' | \ \exists Y[\forall y[y \in Y \rightarrow y \in X \ \& \ die(w'')(y)] \ \& \ \#(Y)/\#(X)=1]\})$
$\rightarrow \ \exists z[house(w')(z) \ \& \ inherit(w')(sp,z)]]]]$

(There are rich relatives of mine. If every one of them dies, I will inherit a house.)

c. $\lambda w[\forall w'[w' \in ACC(w, \{w'' |$
$\exists X[\#(X) \neq 0 \ \& \ \forall x[x \in X \leftrightarrow rich.relative(w)(x)] \ \&$
$\exists Y[Y \subseteq X \ \& \ \forall y[y \in Y \rightarrow y \in X \ \& \ die(w'')(y)] \ \& \ \#(Y)/\#(X)=1]\}) \rightarrow$
$\exists z[house(w')(z) \ \& \ inherit(w')(sp,z)]]]]$

(If there are rich relatives of mine & every one of them dies, I will inherit a house.)

The sentence is primarily interpreted with a presupposition, as in (37a). If the presupposition is projected, the sentence means that there are rich relatives of mine and if every one of them dies, I will inherit a house, as in (37b). If it is incorporated in the antecedent clause of the conditional, the sentence means that if there are rich relatives of mine and every one of them dies, I will inherit a house, as in (37c). Considering informativeness of the readings, (37a) is preferred, and it is exactly the reading in (13a).

Despite presupposition projection, a strong quantifier itself cannot have wide scope over an intensional operator, because the quantificational force, defined as a ratio between the two sets X and Y, stays in the scope of an intensional operator despite presupposition projection, as in (37b).

Next, consider (14), in which the indefinite has wide scope over the conditional. (38a) is the primary interpretation we can get by applying the rule of (27b):

(38) [If a rich relative of mine dies], I'll inherit a house.

a. $\lambda w[\forall w'[w' \in ACC(w, \{w'' \mid «\lambda w''' \exists X[\#(X) \neq 0\ \&$
$\forall x[x \in X \leftrightarrow rich.relative(w''')(x)]]»\ \&$
$\exists Y[\forall y[y \in Y \leftrightarrow y \in X\ \&\ die(w'')(y)]\ \&\ \#(Y) \neq 0]\}) \rightarrow$
$\exists z[house(w')(z)\ \&\ inherit(w')(sp,z)]]]$

b. $\lambda w[\exists X[\#(X) \neq 0\ \&\ \forall x[x \in X \leftrightarrow rich.relative(w)(x)]\ \&$
$\forall w'[w' \in ACC(w, \{w'' \mid \exists Y[\forall y[y \in Y \leftrightarrow y \in X\ \&\ die(w'')(y)]\ \&\ \#(Y) \neq 0]\}) \rightarrow$
$\exists z[house(w')(z)\ \&\ inherit(w')(sp,z)]]]]$

(There are rich relatives of mine and if one of them dies, I will inherit a house.)

c. $\lambda w[\forall w'[w' \in ACC(w, \{w'' \mid \exists X[\#(X) \neq 0\ \&$
$\forall x[x \in X \leftrightarrow rich.relative(w)(x)]\ \&$
$\exists Y[\forall y[y \in Y \leftrightarrow y \in X\ \&\ die(w'')(y)]\ \&\ \#(Y) \neq 0]\}) \rightarrow$
$\exists z[house(w')(z)\ \&\ inherit(w')(sp,z)]]]]$

(If there are rich relatives of mine and one of them dies, I will inherit a house.)

If the presupposition is projected as in (38b), the sentence means that there are rich relatives of mine and if one of them dies, I will inherit a house. This is the split scope reading. If it is not projected as in (38c), the sentence means that if there are rich relatives of mine and one of them dies, I will inherit a house. Here again (38b) is preferred to (38c).

The meaning of an indefinite is defined as the existence of a non-empty set determined by the conjunction of the restrictor and the nuclear scope. If a weak quantifier is presuppositional, the existence of the set X is presupposed, as in (38a). Even if the presupposition is projected, it does not change the scope of the indefinite because the quantificational force of a weak quantifier is the existence of a non-empty set of Y and it belongs to the conditions in the antecedent clause of a conditional. But we saw in (14b) that the indefinite can have wide scope. We could say that it simply gets the wide scope reading as given in fn 5. But pragmatically, the reading follows in that syntactic position.

Suppose X consists of three rich relatives, RR1, RR2, and RR3. Then the meaning of (14a) is like (39a). If (39a) is true, it is true that if RR1 dies, the speaker inherits a house, under the assumption that the antecedent clause of a conditional is downward-entailing, as in (39b).[10] We can say the same thing about RR2 and RR3. Therefore, we can say that for a rich relative x, if x dies, the speaker will inherit a house. We can get the wide scope reading.

(39) a. $\lambda w[\exists X[\#(X)\neq 0 \ \& \ \forall x[x\in X \leftrightarrow \text{rich.relative}(w)(x)] \ \&$
$\forall w'[w'\in ACC(w,\mathbf{T}) \rightarrow \exists z[\text{house}(w')(z) \ \& \ \text{inherit}(w')(sp,z)]]]]$
$\mathbf{T} = \{w\in W|\ \text{RR1 dies in } w\}\cup\{w\in W|\ \text{RR1 dies in } w\}\cup\{w\in W|\ \text{RR1 dies in } w\}$

b. $\lambda w[\exists X[\#(X)\neq 0 \ \& \ \forall x[x\in X \leftrightarrow \text{rich.relative}(w)(x)] \ \&$
$\forall w'[w'\in ACC(w,\mathbf{T}') \rightarrow \exists z[\text{house}(w')(z) \ \& \ \text{inherit}(w')(sp,z)]]]]$
$\mathbf{T}' = \{w\in W|\ \text{RR1 dies in } w\}$

(4) can be dealt with in a similar way to (37) because the nominal predicate has the *de re* interpretation but the quantifier itself has narrower scope than an intensional operator. We might expect that the indefinite pragmatically gets wide scope over the verb *hope*, as in (14b). However, we cannot get that reading. Even if Mary hopes one of my friends will win, it does not mean that she hopes that John, a friend of mine, will win.

10) It is well-known that the antecedent clause of a conditional is non-monotonic, as pointed out in Lewis (1973), but in ordinary cases, it behaves like a monotone-decreasing context.

3.4. Quantifiers and anaphora

New interpretations of quantifiers are proposed in the paper mentioning two sets involved in the meanings of quantifiers, but it is not proposed just to account for split scope. It is motivated by uses of pronouns. In using a quantifier, a pronoun in its scope is interpreted as a bound variable. In (40), the pronouns *his* and *their* are bound by the quantifiers *Every boy* and *Most doctors*. They range over each member in the quantification domains of the quantifiers.

(40) a. Every boy brought his girlfriend to the party.
  b. Most doctors treat their patients adequately.

On the other hand, it is also possible to use a pronoun outside its scope. In this case, the pronoun can refer to one of the three sets involved at a later discourse:

(41) Few women from this village came to the feminist rally. No wonder. **They** don't like political rallies very much.
(42) Few students came to the party. **They** had a good time.
(43) Few students came to the party. **They** were busy studying

In (41), the pronoun *They* refers to the whole set of women from the village. In (42), the same pronoun refers to the set of students who came to the party. It is a well-established generalization that a pronoun refers to one of the two sets. See Kamp & Reyle (1993), Corblin (1996), etc. In (43), the pronoun refers to the set of students who did NOT come to the party. This is called complement anaphora. See Nouwen (2003), Moxey & Sanford (1996), etc. for more discussions.

This implies that in using a quantifier, the three sets must be accessible in the discourse. This is what I am doing in the new analysis of quantifiers. In defining the meaning of a quantifier, I use (i) the set determined by the restrictor and (ii) the set determined by the conjunction of the restrictor and the nuclear scope. This explains the uses of the pronouns in (42) and (43), respectively. As for complement anaphora, the complement set is not overtly mentioned in the meaning of a quantifier. It should be derived as a separate process. This seems related to the fact that some linguists have difficulty in processing complement anaphora, and that some quantifiers with *a few*, *only a few*, etc. do not allow complement anaphora. Moxey & Sanford (1996:214) observes that complement anaphora is observed in monotone-decreasing quantifiers. The additional process makes it less acceptable.

4. Conclusion

NPs cause complexities in their interpretations than any other major phrases, and quantifiers are more difficult to deal with. In this paper, I dealt with scope phenomena of quantifiers and interpretations of nominal predicates in them. The difficulty lies in the split interpretation of the determiner and the nominal predicate. To deal with this problem, I split the meaning of a quantifier into the assertive part and presuppositional part. The analysis predicts that the scope of a quantifier is determined by the syntactic position, while the nominal predicate can be interpreted by presupposition projection.

In this analysis, I do not assume any syntactic element that is not motivated structurally. Instead, I assume variables for two sets and they are motivated for reference at the discourse level. Moreover, the semantic representations clearly reflect scopes of expressions.

References

Abusch, D. (1994). The scope of indefinites. *Natural Language Semantics*, *2*, 83-135.

Charlow, S. (2019). The scope of alternatives: indefiniteness and islands. *Linguistics and Philosophy*, *43*, 427-472.

Corblin, F. (1996). Quantification et anaphore discursive: la reference aux complementaires, *Langages* (Vol. 1 No. 23, pp. 51-74), Larousse, Paris.

Cresswell, M. J. (1990). *Entities and Indices*. Boston: Kluwer Academic Publishers.

Cresti, D. (1995). Extraction and reconstruction. *Natural Language Semantics*, *3*, 79-122.

Von Fintel, K., & Heim, I. (2011). *Intensional semantics*. MIT. Lecture notes for Advanced Semantics. MIT.

Farkas, D. (1981). Quantifier scope and syntactic islands. In R. Hendrick, C. Masek, & M. F. Miller (Eds.), *Papers from the 17th regional meeting of the Chicago Linguistic Society* (No. 17, pp. 59-66). University of Chicago: Chicago Linguistics Society.

Farkas, D. (1997). Evaluation indices and scope. In A. Szabolcsi (ed.), *Ways of scope taking* (pp. 183-215). Dordrecht: Kluwer.

Fodor, J. D. (1970). *The linguistic description of opaque contents* (Doctoral dissertation). Massachusetts Institute of Technology.

Fodor, J. D., & Ivan S. (1982). Referential and quantificational indefinites. *Linguistics and Philosophy*, *5*, 355-398.

Heim, I. (1983). On the projection problem for presuppositions. In M. Barlow, D. Flickinger, & M. Westcoat (eds.), *Second annual west coast conference on formal linguistics* (pp. 114-126).

Stanford University.
Hornstein, N. (1995). *Logical form: From GB to minimalism*, Oxford: Blackwell.
Huang, J. (1995). Logical form. In G. Webelhuth (ed.), *Government and binding theory and the minimalist program: Principles and parameters in syntactic theory*, Oxford: Blackwell.
Huang, C.-T. James. (1982). *Logical relations in Chinese and the theory of grammar* (Doctoral dissertation). Massachusetts Institute of Technology.
Kamp, H. & Reyle, U. (1993). *From discourse to logic*. Kluwer, Dordrecht.
Keine, S., & Ethan P. (2018). Interpreting long scrambling in Hindi-Urdu. *NELS* (Vol. 2, pp. 105-118).
Keshet, E. (2008). *Good intensions: Paving two roads to a theory of the De re/De dicto distinction* (Ph.D. thesis). Massachusetts Institute of Technology, Cambridge, MA.
Keshet, E. (2010). Situation economy. *Natural Language Semantics*, *18*.
Keshet, E. (2011). Split intensionality: a new scope theory of de re and de dicto. *Linguistics and Philosophy*, *33*, 251-283.
Lechner, W. (2013). Diagnosing covert movement: The Duke of York and reconstruction. In L. Cheng & N. Corver (Eds.), *Diagnosing syntax* (pp. 158-189). Oxford: Oxford University Press.
Lewis, D. (1973). *Counterfactuals.* Oxford: Basil Blackwell.
Ludlow, P., & Stephen, N. (1991). Indefinite descriptions: In defense of Russell. *Linguistics and Philosophy*, *14*, 171-202.
May, R. (1985). *Logical Form: Its structure and derivation*, Cambridge, MA: MIT Press.
Milsark, G. (1977). Towards the explanation of certain peculiarities of existential sentences in English. *Linguistic Analysis*, *3*, 1-29.
Moxey, L., & Sanford, A. (1996). Choosing the right quantifier: Usage in the context of communication, In T. Givon (ed.), *Conversation: Cultural, cognitive and communicative perspectives* (pp. 207-231). Amsterdam: J Benjamins.
Montague, R. (1973). The proper treatment of quantification in ordinary English. *Approaches to Natural Language*, *49*, 221-242.
Musan, R. (1995). *On the temporal interpretation of noun phrases* (Ph.D. thesis). Massachusetts Institute of Technology, Cambridge.
Nouwen, R. (2003). Complement anaphora and interpretation. *Journal of Semantics*, *20*, 73-113.
Percus, O. (2000). Constraints on some other variables in syntax. *Natural Language Semantics*, *8*, 173-229.
Reinhart, T. (1997). Quantifier scope: How labor is divided between QR and choice functions. *Linguistics and Philosophy*, *20*, 335-397.
Reinhart, T. (1998). Wh-in-situ in the framework of the minimalist program. *Natural Language Semantics, 6*, 29-56.
Ruys, E. (1992). *The scope of indefinites* (Doctoral dissertation). University of Utrecht Ph.D. thesis.
van der Sandt, Rob. (1992). Presupposition projection as anaphora resolution. *Journal of Semantics*, *9*, 333-377.
Schwarz, F. (2012). Situation pronouns in determiner phrases. *Natural Language Semantics*,

20, 431-475.
Sternefeld, W. (2001). Semantic vs. syntactic reconstruction. In C. Rohrer, A. Roßdeutscher, & H. Kamp (Eds.), *Linguistic form and its computation* (pp. 145-182). Stanford: CSLI Publications.
Winter, Y. (1997). Choice functions and the scopal semantics of indefinites. *Linguistics and Philosophy*, *20*, 399-467.
Yeom, Jae-Il. (1998). *A presuppositional analysis of specific indefinites: Common grounds as structured information states*. New York: Garland.

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