ESSLLI 2003
Vienna

DRT: AN UPDATED SURVEY

Ágnes Bende-Farkas, Josef van Genabith, Hans Kamp
agnes/hans@ims.uni-stuttgart.de, josef@compapp.dcu.ie

Lecture V: Information Structure in DRT

Plan:

1. Overview, background, ...
2. Focus: the core data;
3. Previous analyses of Focus;
4. Focus in DRT.

1 Introduction, Some Background

Information packaging (Chafe (1976)): syntactic, phonological (or morphological) means to mark givenness, saliency, contrast, ... At the time: it was thought that variation in information packaging does not affect truth conditions.

(1) a. Mary got injured when she wrecked her car.
b. When she wrecked her car Mary got injured.

Focus: a feature that marks contrast (among contextually salient alternatives), corrections .... In English Focus is marked by prosodic prominence and a rise-fall intonation contour. (Lx examples: capitals optionally followed by \, or $[\mathrm{X}]_F$.)

(2) a. Ede likes ESPRESSO. b. EDE likes espresso.
c. Ede LIKES espresso.

Information Structure: a level of pragmatic-semantic representation fed by 'LF'-semantics, prosodic and morphological information.

Analysis at the IS level: a structured representation with distinguished slots, or niches, for expression with a given (discourse) role or function.

Aim_1: derive some of these roles and their side-effects on meaning from the overall properties of such representation.

Aim_2: study interactions with 'traditional' objects: variable binding, quantifiers, temporal interpretation...

The following Hungarian and German sentences are meant to illustrate the kind of IS articulation we have in mind:

(3)

Mari-nak	VIRÁG-O-T	adott János.
M-Dat	FLOWER-Acc	gave John
Topic const.	Focus const.	

(4) $\underbrace{\text{Mari-nak}}_{\text{Topic}}\ \underbrace{\text{VIRÁGOT adott János}}_{\text{Focus (on entire } VP\text{)}}$

(5)

Mari-nak	A KERT-BŐL	hozott virágot János.
Mary-Dat	THE GARDEN-FROM	brought flower-Acc John
Topic	Focus	Background

So, we take the IS representation of a sentence to be first divided into Topic slot and something else (Comment, say). The Comment part is further partitioned into Background and Focus:

(6) $\langle Topic, \langle Background, Focus \rangle\rangle$

NB: Not all sentences have Topicalised or Topic-marked constituents. Focus-marking on the other hand is obligatory in languages like English, German or Dutch.

Another kind of Topic: Contrastive Topic. Marked with stress and a fall-rise intonation contour. (Lx notation: capitals followed by /, or $[\mathrm{X}]_{CT}$, or simply $[\mathrm{X}]_T$.)

(7) ALLE/ Politiker sind NICHT\ korrupt.
ALL/ Politicians are NOT\ corrupt.
"Not all politicians are corrupt".

NB: (7) refutes the claim that information packaging has no semantic effects: the unstressed variant of this sentence only has the reading where the universal quantifier outscopes negation (*For every politician x it is the case that x is not corrupt*).

Contrastive Topics have often been compared to Focus because they too mark contrast with contextually salient alternatives. This implies that they will not be treated on a par with non-contrastive Topics. The IS model we assume will therefore contain a distinguished Topic slot, and the remainder of the sentence will be partitioned further, in order to accommodate Contrastive Topics, Focus and Background:

(8) $\langle \underbrace{Topic,}_{\text{optional}}\ \langle \underbrace{Topic_C,}_{\text{optional}}\ \langle \underbrace{Focus, Background}_{\text{oblig. in English, German, ...}} \rangle\rangle\rangle$

2 The Main Data on Focus

2.1 Contrast

Focus is often used to contrast (the denotation of) the Focus-marked constituent with its contextually salient alternatives. This contrast often has other implications, enabling the speaker to use the sentence as an implicit speech act:

(9) a. I_F am writing to *YOU*, doesn't this tell enough?
b. I am WRITING$_F$ to you, doesn't this tell enough?

(Tatyana's letter to Onegin; Pushkin)

(10) a. He'd kill$_{(F)}$ us if he had the chance. being threatened
b. HE'd kill US if he had the chance. instigation to murder

2.2 Question-Answer Congruence

In (felicitous) answers to (implicit) questions, Focus corresponds to the *wh*-phrase from the question. In these cases the answer is said to be *congruent* to the question. E.g. in the table below, answer *c* is congruent to question *a*, but not to *b*. (Continuous lines indicate congruent question-answer pairs, dotted lines indicate inappropriate pairs.)

(11)
a. What does Mats like? b. Who likes Chardonnay?
c. Mats likes CHARDONNAY d. MATS likes Chardonnay

Hypothesis (cf. e.g. Rooth): the non-Focus part of the sentence (or, by what we get by abstracting a variable of the type of Focus) has to correspond to the (LF) of the question. (In fact, this relies on a rather tight syntax–semantics correspondence.)

2.3 Focus and Truth-Conditions

The following are a few well-known minimal pairs that differ minimally in focussing. Almost all of them will be presented without any comments. Try to devise scenarios in which one member of the pair is true and the other is false.

(12) a. Dogs must be CARRIED.
b. DOGS must be carried.

(13) a. In St. Petersburg, officers always escorted BALLERINAS.
b. In St. Petersburg, OFFICERS always escorted ballerinas.

(14) a. John also bought flowers for MARY.
b. John also bought FLOWERS for Mary.

(15) a. John only introduced BILL to Sue.
b. John only introduced Bill to SUE.
c. John only introduced BILL to SUE.

NB1 The domain of *only* may be restricted by explicit or implicit means. For instance, (15a) may answer either of the following questions, and then its truth-conditions may well vary, depending on what set or collection serves as a domain for *only*.

(16) a. Whom did John introduce to Sue (at yesterday's party)?
b. Which of his class-mates did John introduce to Sue?

NB2 The questions answered by (15) need not contain *only*. Hence, question-answer congruence does not involve a full match between the question and the non-Focus part of the answer.

3 Previous Analyses of Focus

Krifka (1996): theories of Focus and Focus-sensitive operators can be classified according to what information they access directly:

- Accessing both Background and Focus: Structured Meanings frameworks (Stechow (1996), Krifka (1992a));
- accessing the Background only: in situ Binding Semantics (Wold (1996));
- accessing Focus only: 'replacive' theories that rely e.g. on unification (Gardent and Kohlhase (1996), Pulman (1997));
- accessing neither: Alternative Semantics (Rooth (1985), Rooth (1992), Rooth (1995), Rooth (1996)).

3.1 Alternative Semantics

In Alternative Semantics (AS) Focus is marked in syntactic trees but **not** in the translation language. Expressions are assigned **two** semantic values: an ordinary semantic value and a Focus semantic value.

Focus semantic values are sets of alternative values to the ordinary ones s.t. the ordinary value itself is a member.

Focus-sensitive operators operate on Focus semantic values (better said, they relate Focus semantic values and ordinary semantic values), s.t. the Focus-marked constituent contributes only indirectly to determining the domain of these operators.

For instance, for *John only introduced BILL to Sue* the alternatives *only* operates on are alternatives to the VP *introduce Bill to Sue*, and not alternatives to *Bill*. The Focus-marked *NP Bill* has an indirect restricting role.

Informal sketch of composing Focus semantic values for *John introduced BILL to Sue*:

Notation: $F_X :=$ the Focus semantic value of X; $O_X :=$ the ordinary semantic value of X. The relevant variable is enclosed in a circle.

(17) a. $F_{introduce}$: $\{O_{introduce}\}$;
b. $\triangleright F_{Bill}$: D_e (the domain of individuals);
c. $F_{introduce \ \ Bill_F}$: $\{\lambda y.\lambda z.[\![introduce]\!](u)(y)(z) \mid u \in F_{Bill}\}$;
d. F_{Sue} : $\{O_{Sue}\}(=\{s\})$;
e. $F_{introduce\ Bill_F\ to\ Sue}$: $\{\lambda z.[\![introduce]\!](u)(s)(z) \mid u \in F_{Bill}\}$;
f. F_{John} : $\{O_{John}\}(=\{j\})$;
g. $F_{John \ \ introduce \ \ Bill_F \ \ to \ \ Sue}$: $\{[\![introduce]\!](u)(s)(j) \mid u \in F_{Bill}\}$;

In prose: the Focus semantic value of *John introduce(d) BILL to Sue* is the set of propositions of the form *John introduce(d)* **u** *to Sue*, where **u** is an element of the Focus semantic value of *Bill*.

Similarly, the Focus semantic value of *John introduce(d) Bill to SUE* will be $\{[\![introduce]\!](b)(u)(j) \mid u \in F_{Sue}\}$. That is, this will be a set of propositions of the form *John introduce(d) Bill to* **v**, where **v** is an element of the Focus semantic value of *Sue*.

Only is defined as a VP-adverbial that relates the Focus semantic values of the VP to the ordinary value. For instance, *John only introduced BILL to Sue* will say that the only contextually salient **property** John has is having introduced Bill to Sue — it will not say that the only **person** John introduced to Sue is Bill.

Half-formally:

(18) $[\![John\ only\ VP]\!]_O = [\![John\ VP]\!]_O \wedge \forall q \in Alt([\![John\ VP]\!]) : ^{\vee} q \rightarrow q = [\![John\ VP]\!]_O$

The set *Alt* is a set of propositions that is assumed to be supplied by context, such that the Focus semantic value $[\![John\ VP]\!]_F$ is a subset of *Alt*.

The restriction on q, i.e. that it be an element of some set *Alt*, is necessary, considering that from *John only introduced BILL to Sue* we do not want to conclude e.g. that John does not have the property of being self-identical.

It is desirable that set of propositions *Alt* should be derived from, or related to, the set of alternatives 'generated' by the Focus-marked constituent. In the original version of Alternative Semantics this is not possible, since *only* and its domain do not access Focus.

Wrong predictions: suppose that the question under discussion is *Which of his male colleagues did John introduce to Sue?*. Then *John only introduced BILL to Sue* counts as a true answer, even if there are also women whom John introduced to Sue.

(**NB**, this is another example of a mismatch between the syntactic form of the question and that of the answer. Note also that *Bill* needs to be bridged to the *NP his colleagues*.)

3.2 Structured Meanings Approaches

Some references: von Stechow (1981), von Stechow (1989), Stechow (1991), Jacobs (1983), Jacobs (1984a), Jacobs (1984b), Jacobs (1988), Jacobs (1991), Krifka (1992a), Krifka (1992b), Krifka (1993), Krifka (1996).

<u>Structured meanings:</u> partitioning sentence material and re-composing it in a manner that is orthogonal to syntax-driven semantic constituency and semantic composition.
Motivation: certain operators may need to access parts of the sentence that would otherwise be inaccessible.

Structured meanings for Background–Focus articulation: the unaccented part of the sentence (minus Focus-sensitive operators) is composed into a function (the Background) that expects an argument of the type of the Focus. Focus-sensitive operators operate on ordered pairs that consist in a Background and a Focus. (Multiple Foci, as in *John introduced BILL to SUE* are composed into one Focus too, just in case they are accessed by the same operator.)

(19) $\underbrace{\text{John introduced}}$ $\underbrace{\text{Bill}}$ $\underbrace{\text{to Sue}}$

$\langle$ *Background*, *Focus* $\rangle$

(20) a. John introduced BILL to Sue.
b. $\langle \lambda x.[introduce(x)(s)(j)]\ ,\ b \rangle$ — NP of type e;
c. $\langle \lambda \mathcal{Q}.[\mathcal{Q}(\lambda x.[introduce(x)(s)(j)])]\ ,\ \lambda P.[P(b)] \rangle$ — NP Gen. Quant. type.

Complex Focus: $n \geq 2$ Focus-marked expressions that associate with the same operator.

(21) a. John introduced BILL to SUE.
b. $\langle \lambda x \bullet y.[introduce(x)(y)(j)]\ ,\ b \bullet s \rangle$ list type $e \bullet e$

Multiple Focus: $n \geq$ Focus-marked expressions that associate with different operators:

(22) Mary even$_1$ only$_2$ gave [a little vase]$_2$ to [her mother]$_1$.

Only quantifies over Background–Focus pairs. Alternatives are introduced by Focus itself. In (23) the relation $\approx$ stands for *is comparable to, is an alternative to.* It is shorthand for an appropriate contextual mechanism that provides the domain of the universal quantifier over alternatives.

(23) $Only(\langle B, F \rangle) \leftrightarrow B(F) \wedge \forall X.[X \approx F \wedge B(X) \rightarrow X = F]$

(24) a. John only introduced BILL to Sue:
b. $Only(\langle \lambda x.[introduce(x)(s)(j)]\ ,\ b \rangle) \leftrightarrow$
c. $introduce(b)(s)(j) \wedge \forall x.[x \approx b \wedge introduce(x)(s)(j) \rightarrow x]$

If there is no overt Focus-sensitive operator in the sentence, a covert illocutionary operator (e.g. *ASSERT*) is assumed to apply to the Background–Focus structure, yielding a complete sentence (Jacobs (1984a)).

4 Focus in DRT

4.1 Background

This section builds on Kamp (t.a.) and Kamp, Bende-Farkas and Riester (2003). Background: project on Information Structure at the IMS (Hans Kamp, BFÁ, Arndt Riester). It is not the first analysis of Focus in DRT (or Dynamic Semantics in general). Some references:

- Vallduví (1992), Dekker and Hendriks (1994), Dekker and Hendriks (1996);
- Krifka (1992a), Krifka (1992b); Krifka (2001),
- Kuhn (1995);
- Rooth (1995);
- Kruijff-Korbayová and Kruijff (1997), Kruijff-Korbayová (1998);
- Umbach (2002).

Taking a **step back**: MOTIVATIONS of a DRT analysis of Focus:

1. Focus introduces a set of alternatives; this information has the status of a presupposition; hence, presupposition justification is necessary;
2. it can be argued that the Background too is presupposed:

   (25) a. Phoebe believes that a man broke into her garden.
   b1. She thinks that he took her prize zucchini.
   b2. She thinks that HE took her prize zucchini.

   (25b2) seems to presuppose at least that Phoebe's prize zucchini had gone missing. (If this is the case then part of the meaning of *take* has to be accommodated, viz it is new information that the zucchini disappeared because of a stealing event.)

   (The difference between (25b1-b2) was pointed out at the summer school by Ágnes Sándor (p.c.).)

3. interactions with other presupposition triggers:

   Here is an example that is not entirely appropriate, since it appears that the source of the oddness is *too* itself, not its interaction with *only*:

   Scenario: Mary went hiking in the Austrian Alps. She invited Anna, Barbara, Cæcilia and Diana,

(26) a. #but only ANNA came too.
b. but only ANNA went along.
c. #and ANNA went too.

More suitable examples could be of the following type:

(27) a. #Only MOSCOW is the capital of Russia.
b. #Only MARY is the tallest girl in class.

4. appropriate Focus placement is relevant for discourse coherence (cf. (11), esp. for theories of discourse structure that rely on a hierarchy of questions (Roberts (1996));

5. Focus placement may correlate with novelty and familiarity (Kuhn (1995), Krifka (2001), Schwarzschild (1999), Umbach (2002)).

Aims and Methods

Central aim of this analysis: account for the context-sensitivity of the alternatives introduced by Focus by means of anaphora resolution. Background: integration of presuppositional information with Background-Focus structures.

Hybrid approach that yields an ordered pair of propositions: alternative propositions and the 'Focus' proposition (the ordinary representation of the sentence). These are constructed from the representation of the Focus-marked constituent and by abstracting a variable (of the appropriate type) from the 'ordinary' representation of the sentence.

Such a Focus frame–Focus structure is another instance of a *preliminary representation* (first encountered in the analysis of presuppositions). These preliminary representations are converted into 'final' representations by (*i*) resolving the preupposition involving the set of alternatives and (*ii*) applying a Focus-sensitive operator (this may be a covert $ASSERT$ operator in case the sentence contains no *overt* operator).

Focus frame–Focus pairs will be 'decoded' according to the template in (28):

(28) $$\boxed{\left\langle \lambda\beta.\,[K_{restrictor}\ ]\ ;\ K_{\textit{Focus-frame}}\ ,\ \lambda\beta.\,[K_{restrictor}\ ;\ K_{Focus}]\ ;K_{\textit{Focus-frame}} \right\rangle}$$

In (28) $K_{restrictor}$ is the DRS that contains the alternative set presupposition. This information is taken to restrict the Focus variable β. (Restricting β to be a member of the alternative set, usually written as $C^{(\prime)}$.) The Focus frame conveys the usual 'Background' or p-set information, according to standard practice.

The novelty of this approach is that the second member of this structure is not Focus itself but another set of propositions. This too is restricted by the information in the restrictor-DRS. In addition, it is further restricted by Focus information. That is to say, in the case of *John introduced BILL to Sue* it will be a set of propositions of the form $\lambda\beta.[\beta \in C' \wedge \beta = b \wedge introduce(j, \beta, s)]$.

Although Focus is not accessed directly by Focus-sensitive operators (this could be called a 'sincle-access' approach), and these operators relate propositions, alternative propositions are built up by means of the alternatives introduced by Focus. That is, contextual restrictions of, say, the type of entities, are passed on to the level of propositions.

4.2 Worked-out Examples and What They Mean

(29) a. John invited Bill, George and Harry to the party.
b. He only introduced BILL to Sue.

Representation of (29a) — context for the representation of (29b) (assuming that the presuppositions of the proper names and the definite have been dealt with).

(30)
$$\boxed{\begin{array}{c} j\ \ b\ \ g\ \ h\ \ X\ \ p^{=1}\ \ e\ \ t \\[4pt] J(j)\ \ B(b)\ \ G(g)\ \ H(h) \\ X = b \oplus g \oplus h \\ party(p) \\ e \subseteq t \prec n \\ e\colon invite(j, X, p) \end{array}}$$

Notation: X is a collective discourse referent; it is the individual sum of the referents b, g, h. It is assumed for simplicity's sake that Bill, George and Harry were invited *as a group*.
Representing (29b):

(31)
$$\boxed{\begin{array}{c} u\ \ s \\[4pt] male(u)\ \ u = j\ \ S(s) \\[4pt] \Bigg\langle \Bigg\langle \Bigg\{ \underbrace{\boxed{\begin{array}{c} \underline{C'}\ \alpha \\[4pt] C'(\alpha) \\ C'(b)\ \ b\#\alpha \end{array}}} \Bigg\}\ ,\ \lambda\beta.\boxed{\begin{array}{c} \beta \\[4pt] C'(\beta) \end{array}} \Bigg\rangle\ ,\ \underbrace{\boxed{\begin{array}{c} t'\ \ e' \\[4pt] e' \subseteq t' \prec n \\ e\colon intr(u, \beta, s) \end{array}}}\ ,\ \underbrace{\boxed{\beta = b}} \Bigg\rangle \end{array}}$$

Over-all schema:

(32)
$$\boxed{\Big\langle \langle \{\ K_{Restrictor}\ \}\ ,\ \lambda\beta.K_{\beta}\ \rangle\ , K_{Focus\ frame}\ , K_{Focus}\ \Big\rangle}$$

The Focus–Focus frame division is in fact a tripartite division into a Restrictor presupposition, a Focus-frame (=Background) and Focus. It is presupposed that there is an alternative set C' that has to find an antecedent in context; the discourse referent α contributed by the Focus-marked constituent is to be part of C', and C' contains at least one other element distinct from α. (The relation # is the mereological part-of relation, subsuming $\in$ and $\subseteq$.)

λ-abstraction serves to 'extract' a variable, and thus to yield the Focus-frame. The Focus-frame will correspond to a set of propositions that satisfy the precondition of the Restrictor (in virtue of condition $C'(\beta)$, where β is the abstracted variable).

Another set of propositions is yielded when the Focus–frame is further restricted with conditions from the Focus-DRS. This has been schematised in (28), repeated in (33) below. This schema is meant to show how the restrictor and the abstractor 'distribute' over DRS-es, and how the Focus-DRS serves to further restrict the Focus-frame (yielding the second member of the pair). ((33) is to be taken as an aid elucidating (31), because in *this form* it involves requantification (because of having the restrictor DRS twice over).)

(33) $$\boxed{\left\langle \lambda\beta.\,[K_{restrictor}\ ]\ ;\ K_{Focus\text{-}frame}\ ,\ \lambda\beta.\,[K_{restrictor}\ ;\ K_{Focus}]\ ;K_{Focus\text{-}frame} \right\rangle}$$

Returning to the representation of (29b): Resolving <u>C'</u> to "$\in \{b, g, h\}$" yields (34):

(34) $$\boxed{\begin{array}{c} u\ s \\ male(u)\ \ u = j\ \ S(s) \\ \left\langle \left\{ \lambda\beta.\boxed{\begin{array}{c} \beta \\ \beta \in \{b, g, h\} \end{array}} \right\} ,\ \boxed{\begin{array}{c} t'\ e' \\ e' \subseteq t' \prec n \\ e\text{: } intr(u, \beta, s) \end{array}} ,\ \boxed{\beta = b} \right\rangle \end{array}}$$

Applying *only* to the structured representation in (34) ($\forall p.p \rightarrow p = \varphi$ being replaced with $\nexists p\colon p \wedge p \neq \varphi$):

(35)
$$\begin{array}{|c|}\hline u \; s \; e' \; t' \\ \\ male(u) \;\; u=j \;\; S(s) \\ e' \subseteq t' \prec n \\ e'\colon introduce(u,b,s) \\ \\ \neg \begin{array}{|c|}\hline \beta \; e'' \; t'' \\ \\ e'' \subseteq t'' \prec n \\ e''\colon introduce(u,\beta,s) \\ \beta \in \{b,g,h\} \quad b\#\beta \\ \hline \end{array} \\ \\ \hline \end{array}$$

Informal characterisation of *Only*: operates on an ordered pair $\langle P, Q\rangle$, where P, Q are sets of propositions s.t. $Q \subset P$. $Only(\langle P, Q\rangle)$ true iff

1. $\forall q \in Q\colon q$ true;
2. $\forall p \in P \setminus Q\colon p$ false.

Remarks:

NB1: *Only* operates on higher order objects, as in Alternative Semantics, but

NB2: there are direct, straightforwardly established contextual links at the level of the Focus-marked expression, as in Structured Meanings analyses;

NB3: why the second argument of *only* is a <u>set</u> of propositions:

(36) John only lifted THE PIANO AND THE CONTRABASS.
$\models$ John lifted the piano.
$\models$ John lifted the contrabass.

Excursus: other entailment patterns:

(37) Only FEYNMAN is playing drums in the park.
$\models$Only A PHYSICIST is playing drums in the park.
$\not\models$Only FEYNMAN is making music in the park.

Only cannot undergo quantifier absorption:

(38) a. John sang only AN ARIA only IN THE BATHTUB.
b. $\not\models$ John only sang AN ARIA IN THE BATHTUB.

4.3 Focus vs Focus Phrases

A kind of Pied Piping: in cases of narrow Focus we take the larger constituent to contribute to the

(39) a. John has a RED car.

b.
$$
\begin{array}{|c|}
\hline
j \\[4pt]
J(j) \\[4pt]
\left\langle \left\langle \left\{ \begin{array}{|c|} \hline \underline{\mathcal{C}'}\ P' \\ \hline \mathcal{C}'(P) \\ \hline \end{array} \right\}, \lambda P'. \begin{array}{|c|} \hline P'\ x \\ \hline car(x) \\ \mathcal{C}(P) \\ P\#P' \\ \hline \end{array} \right\rangle, \begin{array}{|c|} \hline s \\ \hline n \subseteq s \\ s\colon have(j,x) \\ P'(x) \\ \hline \end{array}, \begin{array}{|c|} \hline \\ \hline P' = red \\ \hline \end{array} \right\rangle \\
\hline
\end{array}
$$

Claim: Focus-sensitive operators in fact associate with constituents (so-called Focus phrases) of which the Focus-marked constituent may be a proper part. Main argument:

(40) Only $[[\text{MY}]_F$ mother$]_{FP}$ sent cookies.

(Krifka (1996), Heim–von Fintel)

(40) says that the only person who sent cookies is the speaker's mother. It **<u>does not</u>** mean that the only person whose mother sends cookies is the speaker. (Suppose that the speaker has several siblings who are in the alternative set for *MY*.)

(41)
$$
\begin{array}{|c|}
\hline
x \\[4pt]
sp(x) \\[4pt]
\left\langle \left\langle \left\{ \begin{array}{|c|} \hline \underline{\mathcal{C}'}\ r \\ \hline C'(r) \\ C'(x) \\ r \neq x \\ \hline \end{array} \right\}, \lambda y. \begin{array}{|c|} \hline y\ z \\ \hline m\text{-}of(z,y) \\ C'(z) \\ \hline \end{array} \right\rangle, \begin{array}{|c|} \hline e\ t \\ \hline e \subseteq t \prec n \\ e\colon send\text{-}cookies(y) \\ \hline \end{array}, \begin{array}{|c|} \hline \\ \hline m\text{-}of(x,y) \\ \hline \end{array} \right\rangle \\
\hline
\end{array}
$$

In (41) Focus (narrow Focus on *my*) only serves to introduce (individual) alternatives and restrict alternative propositions. The propositions themselves are obtained by abstracting over the variable corresponding to the Focus phrase.

In a similar vein:

(42) John only believes that MARY was at the party.

John's only *belief* concerning attendance at the party: *Mary was at the party.* Here we take the Focus phrase to be the subordinate clause.

(43) John believes that only MARY was at the party.

An interesting case: the *of*-phrase in (44) is like an aboutness Topic, but it has a Focus discourse function and associates with *only*:

(44) John only believes of/about MARY that she was at the party.

(Based on a Japanese example by Portner and Yabushita.)

4.4 Hungarian Focus

It is shown in this part how the DRT-based analysis of English Focus can be enriched with independently motivated elements in order to handle crosslinguistic variation (viz Hungarian Focus).

The designated preverbal Focus position in Hungarian is used to mark question-answer congruence and contrast, as in English. Focus-marking in the two languages different in that expressions in the Hungarian Focus position are are *maximal* and the Focus-frame is quite robustly presuppositional (hence the paraphrase with English it-clefts).

(45) a. János MARIT$_F$ mutatta be Katinak.
John Mary-Acc$_F$ showed+Def3Sg PV Cathy-Dat.
"It was Mary whom John introduced to Cathy."

b. János KATINAK$_F$ mutatta be Marit.
John Cathy-Dat$_F$ showed+Def3Sg Mary-Acc.
"It was to Cathy that John introduced Mary."

c. Katinak JÁNOS$_F$ mutatta be Marit.
Cathy-Dat John$_F$ showed+Def3Sg Mary-Acc.
"It was John who introduced Mary to Cathy."

Our analysis for Hungarian Focus builds on the analysis of English Focus; in addition, the Focus frame part of the representation has the status of a presupposition, and the Focus-DRS contains abstraction (maximality). Such a modular approach is independently motivated by the syntactic analysis of Horvath (2002): It is argued in that paper that Hungarian has non-syntactic, i.e. purely prosodic Focus-marking (as shown in (46). This type of Focus-marking shows none of the characteristics of 'Hungarian Focus'. The conclusion drawn by Horvath is that these characteristics, notably, maximality, are due to the presence of a covert maximality operator 'residing' in preverbal position. If a Focus-marked expression is moved to that position, it acquires exhaustive interpretation; it it doesn't it doesn't.

(46) Q: Kit hívtál meg?
Who-Acc called-2Sg PV?
"Whom did you invite?"
A1: JÁNOST$_F$ hívtam meg.
John-Acc$_F$ called-1Sg+Def PV.
"It was John I invited."
A2: Meg-h´ívtam (például) Jánost.
PV-called-1Sg+Def (for-instance) John-Acc.
"I've invited JOHN (for instance)."

References

Bende-Farkas, Á., Kamp, H., Krause, P. and Riester, A. (eds): 2002, *Information Structure in Context. Workshop Proceedings*, IMS Stuttgart University, Stuttgart.

Chafe, W.: 1976, Givenness, Contrastiveness, Definiteness, Subjects, Topics and Point of View, *in* C. Li (ed.), *Subject and Topic*, Academic Press, New York.

Dekker, P. and Hendriks, H.: 1994, Files in Focus, *in* E. Engdahl (ed.), *Integrating Information Structures into Constraint-based and Categorial Approaches*, number R1.3.B in *Dyana-2 Delverable*, ILLC.

Dekker, P. and Hendriks, H.: 1996, Links without Locations: From Cards to Boxes, *in* P. Dekker and M. Stokhof (eds), *Proceedings of the 10th Amsterdam Colloquium*, ILLC, Amsterdam.

É.Kiss, K. (ed.): 1995, *Discourse Configurational Languages*, Oxford University Press, New York.

Gardent, C. and Kohlhase, M.: 1996, Focus and Higher-Order Unification, *Proceedings of COLING*, Copenhagen.

Göbbel, E.: 1995, Focus Movement in Romanian, *Proceedings of the Amherst Workshop on Focus*, University of Massachusetts, Amherst.

Horvath, J.: 2002, Interfaces vs the Computational System in the Syntax of Focus, *in* H. Bennis, M. Everaert and E. Reuland (eds), *Interface Strategies*, Holland Academic Graphics, pp. 183–200.

Jacobs, J.: 1983, *Fokus und Skalen. Zur Syntax un Semantik von Gradpartikeln im Deutschen*, Niemeyer, Tübingen.

Jacobs, J.: 1984a, Funktionale Satzperspektive und Illokutionssemantik, *Linguistische Berichte* **91**, 25–58.

Jacobs, J.: 1984b, The Syntax of Bound FOcus in German, *in* W. Abraham (ed.), *Groninger Arbeiten zur Germanistischen Linguistik 25*, Groningen, pp. 172–200.

Jacobs, J.: 1988, Fokus–Hintergrund-Gliederung und Grammatik, *in* H. Altmann (ed.), *Intonationsforschungen*, Niemeyer, Tübingen.

Jacobs, J.: 1991, Focus Ambiguities, *Journal of Semantics* **8**, 1–36.

Kadmon, N.: 2001, *Formal Pragmatics*, Blackwell Publishers, Oxford.

Kamp, H.: t.a., A DRT-based Treatment of the Focus-Frame—Focus Division and Its Presuppositions: Some Cases Discussed in Rooth (1996), *AIMS/IMS Working Papers*, IMS, Stuttgart University.

Kamp, H., Bende-Farkas, Á. and Riester, A.: 2003, Four formalisms, one example. Ms, IMS Stuttgart.

Krifka, M.: 1992a, A Framework for Focus–Sensitive Quantification, *in* C. Barker and D. Dowty (eds), *Proceedings of SALT 2*, Ohio State University, Columbus.

Krifka, M.: 1992b, A Compositional Semantics for Multiple Focus Constructions, *in* J. Jacobs (ed.), *Informationsstruktur und Grammatik*, Westdeutscher Verlag, Opladen, pp. 17–53. also in: Moore, S. and A. Wyner (eds.) Proceedings of SALT 1. 1991.

Krifka, M.: 1993, Focus and Presupposition in Dynamic Interpretation, *Journal of Semantics* **10**, 269–300.

Krifka, M.: 1996, Frameworks for the Representation of Focus, *in* G.-J. Kruijff, G. Morrill and R. T. Oehrle (eds), *Proceedings of the Conference on Formal Grammar*, FOLLI, Prague.

Krifka, M.: 2001, Non-Novel Indefinites in Adverbial Quantification, *in* C. Condoravdi and G. R. de Lavalette (eds), *Logical Persoectives on Language and Information*, CSLI Publications, Stanford.

Kruijff-Korbayová, I.: 1998, *The Dynamic Potential of Topic and Focus*, PhD thesis, UFAL, Prague.

Kruijff-Korbayová, I. and Kruijff, G.-J. M.: 1997, Topic–Focus Articulation in SDRT, *Proceedings of the 11th Amsterdam Colloquium*, ILLC, Amsterdam.

Kuhn, J.: 1995, *On intonation and interpretation in context — is there a unitary explanation for focus and deaccenting?*, Master's thesis, IMS, Stuttgart University. *http://uts.cc.utexas.edu/ jonask/

Pulman, S.: 1997, Higher Order Unification and the Interpretation of Focus, *Linguistics and Philosophy* **20**, 73–115.

Roberts, C.: 1996, Information Structure in Discourse: Towards an Integrated Formal Theory of Pragmatics, *in* J. H. Yoon and A. Kathol (eds), *Papers in Semantics*, Vol. 49 of *OSUWPL*, The Ohio State University Department of Linguistics, Columbus, Ohio.

Rooth, M.: 1985, *Association with Focus*, PhD thesis, UMass at Amherst.

Rooth, M.: 1992, A Theory of Focus Interpretation, *Natural Language Semantics* **1**, 75–116.

Rooth, M.: 1995, Indefinites, Adverbs of Quantification, and Focus Semantics, *in* G. Carlson and F. J. Pelletier (eds), *The Generic Book*, The University of Chicago Press, Chicago, pp. 265–299.

Rooth, M.: 1996, Focus, *in* S. Lappin (ed.), *The Handbook of Contemporary Semantic Theory*, Blackwell, Oxford.

Schwarzschild, R.: 1999, Givenness and AvoidF, and Other Constraints on the Placement of Focus, *Natural Language Semantics* **7**.

Stechow, A.: 1996, Focusing and Backgrounding Operators, *in* W. Abraham (ed.), *Discourse Particles*, John Benjamins, Amsterdam.

Stechow, A. v.: 1991, Current Issues in the Theory of Focus, *in* A. v. Stechow and D. Wunderlich (eds), *Semantik/Semantics: An International Handbook of Contemporary Research*, De Gruyter, Berlin and New York, pp. 804–825.

Umbach, C.: 2002, Focus in Complex Definite *NP*s: Restriction of Alternatives by Bridging Antecedents, *in* Bende-Farkas, Kamp, Krause and Riester (2002).

Vallduví, E.: 1992, *The Informational Component*, PhD thesis, University of Pennsylvania.

von Stechow, A.: 1981, Topic, Focus and Local Relevance, *in* W. Klein and W. Levelt (eds), *Crossing the Boundaries in Linguistics*, Reidel, Dordrecht, pp. 95–130.

von Stechow, A.: 1989, Focusing and backgrounding operators, *Arbeitspapier der Fachgruppe Sprachwissenschaft 6*, Universität Konstanz.

Wold, D.: 1996, Long Distance Selective Binding: The Case of Focus, *in* T. Galloway and J. Spence (eds), *Proceedings of SALT VI*, CLC Publications Cornell University, Ithaca NY.