Grammatical restrictions on focal alternatives Klaus von Heusinger & Edgar Onea University of Stuttgart

0. Introduction

In the framework of Alternative Semantics (Rooth 1985, 1992) focus generates alternatives to the focused expression which are relevant at the level of focus interpretation (focus sensitive particles, question answer-pairs, contrast etc.).

We use the following notation conventions: if φ is an expression, by $\|\varphi\|^{O}$ we mean the ordinary semantic value of φ and by $\|\varphi\|^{A}$ we mean the alternative semantic value of φ . If φ is a focused expression, we note it as φ_{F} . In calculating $\|\varphi\|^{A}$ the following rules are crucial:

(1) a. $\|\varphi\|^{O} = \|\varphi_{F}\|^{O}$ b. $\|\varphi\|^{A} = \{\|\varphi\|^{O}\}$ (this is the singleton set consisting of the ordinary meaning) c. $\|\varphi_{F}\|^{A} = D_{type (\|\varphi\|O)}$ (this is the alternative-set, containing elements of the same type)

In addition we will need a composition rule:

(2) $\begin{aligned} \|\alpha \ \beta\|^{\circ} &= \|\alpha\|^{\circ}(\|\beta\|^{\circ}) \\ \|\alpha \ \beta\|^{\scriptscriptstyle A} &= \{ \ \alpha'(\beta') \ | \ \alpha' \in \|\alpha\|^{\scriptscriptstyle A}, \ \beta' \in \|\beta\|^{\scriptscriptstyle A} \} \end{aligned}$

We illustrate the mechanism on a simple example in (3) in which Alternative Semantics is a powerful model of the semantic effect of the association of *only* with focus. Hereby we assume an interpretation rule for only as a VP operator: $||only VP||^{O} = \lambda x$ [$||VP||^{O}$ (x) & $\forall P \in ||VP||^{A} P(x) \rightarrow P = ||VP||O|$. Note that there is no type-restriction on x.

It is being standardly assumed that the alternative semantic value of a sentence like *Peter invited* [*Sue*]_F. includes all contextually relevant individuals in our discourse universe, without any gender restriction:

(4) ||Peter invited $[Sue]_F ||^A = \{invited (Peter, x) | x \in D_e\} = \{Peter invited Sue, Peter invited Kate, Peter invited John...\}$

While of course in order to derive the right meaning for sentences containing exclusives and other expressions associating with focus, one has to contextually restrict the alternative set, and hence e.g. a gender restriction may arise. But crucially this restriction is at the discourse level and not at the sentence level.

In this talk we discuss new data from Romanian involving the presence or absence of clitic doubling which seem to involve an additional restriction on the alternative set concerning gender at the sentence level. This will be integrated in a more general discussion about how different non-focused expressions, operators behave in alternative semantics.

1. The Romanian data

1.1. Differential object marking and clitic doubling in Romanian

In Romanian definite direct objects can or even must be marked with the differential object marker pe depending on animacy and referentiality: while in prototypical cases [+human] and [+definite] direct objects are marked with pe, [-human] or [-definite] direct objects are mostly not marked. If a direct object is marked with pe it is mostly also marked with a clitic pronoun agreeing in person, number and gender with the direct object. The distribution can be observed in the contrast between (5) and (6). Note that the direct object is human in (5) and non-animate in (6).

(5) a.	[+def] [+]	human]			[+CL] [+DOI	[]	
	Mihai	l		-a	văzut pe	profesorul	de franceză.
	Michael	CL.MASC	C.3.SG	has	seen DOM	the teacher.MASC	of French
	Michael l	has seen the	e French	teache	r.		
b.	[+def] [+ł	numan]			[-CL] [+DOM	4]	
	??Mihai		văzut	ре	profesorul	de fran	ceză.
	Michael	has	seen	DOM	the teacher.M	IASC of Fren	ich
	intended	reading: M	lichael l	nas seen	the French tea	acher.	
с.	[+def] [+ł	•			[-CL] [-DOM		
	[?] Mihai				orul	de franceză.	
					cher.MASC	-	
	Michael	has seen th	e Frenc	h teache	er.		
(6) a.	[+def] [-ł	numan]			[-CL] [-DOM	[]	
	Mihai	а	văzut	caietu	l	de franceză.	
	Michael	has	seen	the co	pybook.MASC	C of French.	
	Michael l	has seen the	e French	1 copybo	ook.		
b.	[+def] [-h	uman]			[+CL] [+DOI	[]	
	# Mihai	l		-a văzu	t pe caietul	de	franceză.
	Michael	CL.3.SG.I	MASC	has see	n DOM the co	pybook.MASC of	French.
	intended	reading: M	ichael h	as seen	the French cop	ybook.	

In Romanian the direct object can be both post-verbal as shown in (5) and (6) and pre-verbal as shown in (7). While clitic doubling is strictly correlated to the object marker *pe* if the direct object is post-verbal, for pre-verbal direct objects clitic doubling is possible even in cases in which *pe*-marking is excluded, e.g. if the direct object is non-human but definite.

(7) a.	[+def] [-human]		[+CL] [-DOM]		
	Caietul	de franceză	<i>l</i> -	am	văzut.
	The copybook.MASC	C of French	CL.3.SG.MASC	have.1.SG	seen
	I have seen the French	h copybook.			
b.	[+def] [-human]		[+CL] [+DOM]		
	#Pe caietul	de frai	iceză l	-am	văzut.
	DOM the copybook.	MASC of Free	nch CL.3.SG.MASC	C have.1.SG	seen
	intended reading: I ha	we seen the Fr	ench copybook.		

c.	[+def] [-human]		[-CL] [-DON	Л]
	^{??} Caietul	de franceză	am	văzut.
	The copybook.MA	SC of French	have.1.SG	seen
	intended reading: I	have seen the Fi	rench copyboc	ok.

1.2. Information structure and word order in Romanian

In Romanian the information structurally unmarked word order is SVO as shown in (5). However topicalisation can be marked with left dislocation (8a) and focus can be marked by intonation (8b) or by intonation and word order (8c):

(9) a.	Ce s-a întâmplat cu n	nașina?						
	What happened with the car?							
	Maşina	am	lovit	-0.	$O_T V$			
	The car.FEM	have.1.Sg	crashed	CL.3.SG.FEM				
	As for the car	, I have crashe	d it.					
b.	Ce ai lovit, mașina sc	u autobuzul?						
	What did you crash, t	the car or the b	us?					
	Am	lovit	[maşina] _F .		VO_F			
	have.1.Sg	cashed	the car.FEM					
	I crashed the	car.						
с.	Ce ai lovit, mașina sc	u autobuzul?						
	What did you crash, t	the car or the b	us?					
	[Maşina] _F	am	lovit	-0.	O_FV			
	the car.FEM	have.1.SG	crashed	CL.3.SG.FEM				
	I crashed the car.							

Note that in example (8) we have suppressed the subject due to the fact that in the case of left dislocation of the direct object the subject needs to be inside the VP in order not to be information structurally marked. We will not discuss this further complication here. If topicalisation and left-dislocated focus co-occur, an information structurally marked word order arises in which word order does not mark semantic roles any more as shown in (9):

(9) a.	Neutral word order:			Su	ıbject	Verb	Object
	Petru a	văzut	-o pe	e M	aria.		
	Peter has	seen	CL.3SG.FEM D	OM M	ary		
	Peter has seen	Mary.					
b.	Word order marked f	or infor	mation structure:	Тс	opic	Focus	Verb
	Petru	pe	Maria a	vă	zut -c).	
	[Peter] _T	DOM	[Mary] _F ha	as se	en C	L.3.SG.F	FEM
	Peter has seen	n Mary.					

If for instance both arguments are indefinites and non human neither "pe" nor clitic doubling can occur. If in this case word order b. is chosen the semantic roles must be disambiguated by the context. The same happens if the arguments are non human and definite but have the same gender: in this case there is no "pe" but there is clitic doubling, however clitic doubling cannot disambiguate the arguments because it could in principle agree with both of them.

1.3. Clitic doubling, gender and focus

In the following we will be discussing only [+definite], [-human] direct objects like *the book*, *the car* etc. The reason for this is that we are interested in subtle but very interesting contrast in the distribution of clitic doubling with pre-verbal direct objects, but if the direct object is [+human] and pre-verbal clitic doubling is obligatory because it is triggered by *pe*-marking and if the direct object is [-definite] (or [-specific]) clitic doubling is excluded:

The following remarks hence only apply to [+definite], [-human] DOs.

While clitic doubling is obligatory if the direct object is topicalised, if the pre-verbal direct object is focused, clitic doubling may sometimes be left out as shown in the contrast between (10) and (11):

- (10) Topicalised DO
 - a. *Bila* roşie bila albă a atins -o. the ball.FEM. red the ball.FEM white has touched CL.3.SG.FEM The white ball touched the red ball.
 b. #*Bila* roşie bila albă a atins the ball.FEM. red the ball.FEM white has touched.

intended reading: The white ball touched the red ball.

- (11) Focused DO
 - a. *Bila* roşie bila albă a atins -o. the ball.FEM. red the ball.FEM white has touched CL.3.SG.FEM The red ball touched the white ball.
 b. [?]Bila roşie bila albă a atins the ball.FEM. red the ball.FEM white has touched. The red ball touched the white ball.

Note that (11a) seems preferred to (11b), however for some speakers (11b) seems acceptable while for others it is marginal or dispreffered. As opposed to this (10b) is completely out for most speakers.

The exact factors facilitating the omission of the clitic if the direct object is focused are not totally clear to us but the tendency seems to be as follows:

	+CL ←	→ -CL
i.	animate subject	non animate subject
ii.	direct object highly affected	direct object less affected
iii.	non-modified direct object	modified direct object
iv.	subject and object have different gender	subject and object have the same gender
v.	the contextually available alternatives to focus	the contextually available alternatives to
	have the same gender	focus have different gender

We assume that factors *i-iii* are connected to the notion of transitivity (Hopper & Thompson 1980) and, more generally speaking, the force of the connection between verb and direct object. Transitivity has already been argued to be relevant for differential object marking in Romanian and it seems that the use of clitic doubling spreads along similar scales as differential object marking. Factor *iv* seems to be related to the disambiguation of semantic roles: if the subject and the direct object have different gender and clitic is present, the

semantic roles are disambiguated, however, if the subject and the object have the same gender, clitics do not overtly contribute to the disambiguation of the semantic roles and hence seem more likely to be left out.

Factor v is to be discussed in the following, i.e. why is it the case that in an appropriate context, (12) is for many speakers more acceptable than (13):

Context (12) and (13):

Two maids whose job is to wash every piece of clothes in a hotel by hand and therefore are very much interested in anything that may happen to clothes in that particular hotel, are vividly discussing an accident in the kitchen:

- Q: Ce a murdărit supa vărsată, bluza sau pantalonul bucătăresei? What did the spilled soup dirty, the blouse or the trousers of the cook?
 A: Supa vărsată bluza bucătăresei a murdărit, şi nu pantalonul. soup.FEM spilled blouse.FEM cook has dirtied, and not trousers.MASC
 - The spilled soup dirtied the blouse of the cook and not the trousers
- (13) Q: Ce a murdărit supa vărsată, bluza sau fusta bucătăresei? What did the spilled soup dirty, the blouse or the skirt of the cook? A: [?]Supa vărsată bluza bucătăresei a murdărit, şi nu fusta. soup.FEM spilled blouse.FEM cook has dirtied, and not skirt.FEM The spilled soup dirtied the blouse of the cook and not the trousers

In particular we interpret the difference in the acceptability between (12) and (13) not only as the conditions for the omission of clitic being fulfilled but rather as a deterioration of the acceptability of the use of clitic if the alternatives have different gender than the focused element.

A pilot experiment¹ that we have conducted on 28 native speakers using the method of magnitude estimation indicates a similar tendency:

	[same gender]	[different gender]
[+cl]	16,2	6,2
[-cl]	-30,2 (cf.13)	-7,1 (cf. 12)

Note that the acceptability of the lack of clitic doubling increases over if the contextually available alternatives have different gender and at the same time the acceptability of the presence of clitic seems to deteriorate according to these data. Hence the phenomenon we are dealing with seems to be, that the presence of clitic in case the contextually available alternatives have different gender violates a rather week constraint. We attempt to analyze this effect in the framework of Rooth (1992).

2. An additional grammatical restriction on focus alternatives?

Summary:

The very general rule of creating alternative needs additional restrictions. These restrictions have different causes: the context, the lexical semantics of the predicates (selectional restrictions) and the properties (or features) of functional elements such as definite article (see von Heusinger 2007) or clitic pronouns. Intuitively speaking the

¹ The results are unfortunately not very clear due to some problems in the experimental design. We are setting up a new follow up experiment at this stage.

presence of clitic doubling imposes a gender-restriction on the alternatives to the focused expression. We will assume that this restriction is not a singular phenomenon in Romanian, but is similarly present in the case of selectional restrictions imposed by certain verbs even though in those cases this restriction cannot lead to linguistically observable effects. While we will analyze the two phenomena similarly the crucial difference is that clitic pronouns do not trigger presuppositions in alternative semantics but only conventional implicatures that are weaker and can be cancelled relatively easily.

2.1 Background-restrictions

According to Rooth (1992) in question-answer pairs $\langle \phi_1, \phi_2 \rangle$ focus interpretation introduces a variable C which is presuppositionally restricted to the Hamblin semantic value of the question as shown in (14):

(14) Q: Who did John marry? $= \varphi_1$ A: John married [Mary]_F. $= \varphi_2$ $\|\varphi_1\|^0 = \{$ John married Mary, John married Anne, John married Jeanette ... $\}$ $\|\varphi_2\|^0 =$ John married Mary $\|\varphi_2\|^A = \{$ John married $x|x \in D_e \}$ $\sim C: C \subseteq \|\varphi_2\|^A, \|\varphi_2\|^0 \in C, \exists p[p \neq ||\varphi_2||^0 \land p \in C]$ the presupposed variable $\|\varphi_1\|^0$ satisfies the conditions on C, it is an available discourse antecedent.

This kind of analysis alone will obviously not yield any explanation of the phenomenon described above in the Romanian data. However, intuitively one can argue that just as in the case of clitic doubling in Romanian the predicate *marry* imposes restrictions on the alternatives to *Mary*, since John can only marry human females aged above a certain age limit etc. We shall not call these restrictions presuppositions but backgrounded information (Geurts 2002) and underline them in the notation, but it is crucial to note that they have important things in common with presuppositions as shown in (15):

- (15) a. If John married the professor, I must pay Jack a dollar.
 - \rightarrow The professor is female.
 - b. Perhaps John married the professor.
 - \rightarrow The professor is female.

Likewise the restrictions imposed by clitics seem to be not part of the proffered meaning and hence we treat them also as backgrounded material. The restrictions imposed by the predicate *marry* and the restrictions regarding gender imposed by clitic doubling can be treated similarly.²

One way to treat the problem would be, to assume that *marry* imposes a type restriction, hence female adults would be simply a special type, whereas male adults are another type etc. but note that in this case the types would not be a partition of the discourse universe since many individuals would have to show up in different types (cf. John saw [Marry]_F). Note that this would also solve the clitic-problem.

 $^{^2}$ While the same intuition is behind this parallelism, namely that backgrounded material restricts alternatives, the crucial difference is, that verbal restrictions cannot lead to noticeable linguistic effects with regard to focus interpretation.

Another way to treat the problem would be, to assume that backgrounded material is part of the focus frame and hence part of alternative propositions. This is trivial for (14) as shown in (16) but it does solve the clitic-problem as shown in (17):

- (16) Q: Who did John marry? $= \varphi_1$ A: John married [Mary]_F. $= \varphi_2$ $||\varphi_1||^O = \{$ John married Mary, John married Anne, John married Jeanette ... $\}$ $||\varphi_2||^O =$ John married Mary $||\varphi_2||^A = \{$ John married x $\land \underline{\text{female } x \land \underline{\text{human } x} \land \underline{\text{old-enough } x} \mid x \in D_e \}$ $\sim C: C \subseteq ||\varphi_2||^A, ||\varphi_2||^O \in C, \exists p[p \neq ||\varphi_2||^O \land p \in C]$ the presupposed variable $||\varphi_1||^O$ satisfies the conditions on C, it is an available discourse antecedent.
- (17) Q: What did the soup dirty, the trousers^{MASC} or the blouse^{FEM}? $\|\varphi_1\|^0 = \{\text{The soup dirtied trousers, The soup dirtied the blouse}\}\$ A: The soup dirtied the [blouse]_F. $\|\varphi_2\|^0 = \text{dirtied (tx [soup x], tx [blouse x])} \xrightarrow{\text{FEM(tx [blouse x])}^3}$ $\|\varphi_2\|^F = \{\text{The soup dirtied x} \land \overrightarrow{\text{FEM(x)}} \mid x \in D_e\}\$ $\sim C : C \subseteq \|\varphi_2\|^F$, $\|\varphi_2\|^0 \in C$, $\exists p[p \neq ||\varphi_2||^0 \land p \in C]$ the presupposed variable $\|\varphi_1\|^0$ does not satisfy the conditions on C, since *The soup dirtied the trousers* \notin C hence $\|\varphi_1\|^0$ is not a good antecedent for C.

This solution has the big advantage that it does not change anything in the theory of alternative semantics: we only added the backgrounded information to the truth conditions and the mechanism works as usual. The disadvantage is that (16) does not exclude say an one year old male elephant named Jumbo from the alternatives to Mary, which is not very intuitive, but again this is not necessary in the mechanism.

An alternative solution is to postulate special semantic rules for backgrounded material in alternative semantics:

Loosely based on Geurts (2002) we argue that backgrounded material includes presuppositions but is not restrained to them and has the property that it floats towards higher levels of discourse representation according to the Buoyancy Principle:

(17) *The Buoyancy Principle*

Backgrounded material tends to float up towards the main DRS.

In particular backgrounded material behaves like a condition on discourse referents in general and tends to float with them to the level of discourse representation where the discourse referent is established. Now, in generating alternatives, the discourse referent is actually established at the restrictor level: hence we assume the following principle:

(18) The Backgrounded Material Principle (BMP)

If there is non focused, non restrictive, backgrounded, material predicated over the referent introduced by a focused expression, this information will end up in the restrictor of the focus alternative value.

If φ is an expression such that $\|\varphi\|^{O} = \lambda\beta [P(\beta) \wedge \underline{Q(\beta)}]$, then

- a. $\|\boldsymbol{\varphi}[\boldsymbol{\alpha}]_{F}\|^{O} = P(\|\boldsymbol{\alpha}\|^{O}) \wedge \underline{Q(\|\boldsymbol{\alpha}\|^{O})}$
- b. $\|\boldsymbol{\varphi}[\boldsymbol{\alpha}]_{F}\|^{A} = \{P(X) \mid X \in \|\boldsymbol{\alpha}_{F}\|^{A} \land Q(X)\}$

³ The predicate FEM refers to a set of individuals that are referred to by expressions having a feminine feature.

This mechanism deals with example (16) as shown in (19):

(19) John married $[Marry]_{F} = \varphi$ $\|\varphi\|^{O} = John married Mary$ $\|John\|^{A} = \{John\}$ $\|married\|^{A} = \{\lambda x \lambda y \underline{human}(x) \land \underline{human}(y) \land \underline{female}(y) \land marry(x,y)\}$ $\|Mary\|^{A} = \{x | x \in D_{e}\}$ $\|married Mary\|^{A} = \{\lambda x married (x,y) \land \underline{human}(x) | y \in D_{e} \land human (y) \land female (y)\}$ $\|\varphi\|^{A} = \{John married x | x \in D_{e} \land human (x)\}$ $\sim C : C \subseteq \|\varphi\|^{A}, \|\varphi\|^{O} \in C, \exists p[p \neq \|\varphi\|^{O} \land p \in C]$

In this case any non human, non female alternative is ruled out from the compositional rule and hence our alternatives satisfy the verbal restrictions at the sentence level. Analogously, this applies to (17) as well, and includes the FEM predicate into the restrictor of the alternatives.

The advantage of this approach is that it is somewhat more intuitive and includes a special treatment of backgrounded material, but the disadvantage is that it complicates alternative semantics without solving any problem that the original theory could not solve.

2.2. Clitic doubling and familiarity

The exact semantic import of clitic doubling (in Romanian and other languages) is a complicated matter:

While clitic pronouns can be used as anaphoric expressions saturating a predicate, in the case of clitic doubling additionally a full NP or a full pronoun is present in the same semantic role as shown in the contrast between (23a) and (23b):

(23) a.	Petru	1	-a	văzut.		
	Peter	CL.3.SG.MASC	has	seen.		
	Peter h	nas seen him.				
b.	Petru 1		-a	văzut	pe	Ion.
	Peter C	CL.3.SG.MASC	has	seen	DOM	John
	Peter h	nas seen John				

As discussed in von Heusinger & Onea (2007) for Romanian, where it has been modeled as speaker anchoring of indefinites, i.e. as epistemically specific indefinites, and Alexiadou (2006) for Greek, both cross linguistically as in the specific case of Romanian, clitic doubling seems to express some kind of familiarity of the direct object to the speaker, as shown in (24). Note that the semantic difference is between (24a) and (24b) is very subtle:

(24) a. Petru l			-a	văzut	pe	un	băiat.
Peter CL.3.SC	G.MAS	С	has	seen	DOM	a	boy
Peter has seen	n a boy.					(boy: s	specific, high familiarity)
b. [?] Petru a	văzut	pe	un	băiat.			
Peter has	seen	DOM	а	boy			
Peter has seen	n a boy.					(boy: s	specific, low familiarity)

But at the same time clitic doubling also seems related to verbal semantics modifying aspectual properties as shown in the contrast between (25a) and (25b). Note that in both cases clitic doubling is preferred but in (25b) the lack of clitic doubling is not grammatical while in (25a) the lack of clitic doubling is acceptable.

(25) a.	[?] Petru Peter		vazut seen	1	un a	baiat. boy		
	Peter h	as seen	a boy.					low affectedness
b.	*Petru	a	batut		pe	un	baiat.	
	Peter	has	beaten	up	DOM	a	boy	
	Peter h	high affectedness						

These high differences in the semantic effects of clitic doubling are partly due to the fact that clitic doubling is a new phenomenon in Romanian (with definite direct objects since 1900, with indefinite direct objects since 1950). It can be conceived as a language change phenomenon and basically we can assume that clitic doubling is spreading along similar lines as differential object marking in Romanian. Hence in different types of sentences it has different triggering conditions and different degrees of grammaticalization.

We will not give a complete semantic analysis of clitic doubling. For details cf. e.g. Klein (2007) who analyzes clitics as anaphoric expressions or Dobrovie-Sorin (1994). But whatever analysis clitic doubling may get, a backgrounded predicate restricting the gender of the direct object must be included into the analysis anyway: in cases in which clitics saturate the verbal predicate for the semantic role of the direct object this is part of a presupposition, otherwise it is probably very similar to verbal selectional restrictions we have encountered by *marry*.

The crucial difference is however, that clitic doubling has a much weaker effect on alternative semantics. If clitic doubling would compositionally restrict the alternatives then the contrast between (12) and (13) would on the one hand be much clearer and on the other hand generalize to human definite direct objects etc.

Accordingly we argue that at the level of ordinary meaning clitic doubling contributes a selectional restriction with regard to the gender of the direct object and additional backgrounded material (which we have simply ignored here), but at the level of alternative semantics it restricts the alternative set of the direct object only with the strength of a conventionalized implicature. In particular the strength of this implicature seems to depend on the degree of grammaticalization we encounter and many other factors.

Hence our analysis of the sentence (12) in English translation, and assuming that a clitic has been added, can be summarized as follows:

(26) Q: What did the soup dirty, the trousers^{MASC} or the blouse^{FEM}? A: The soup dirtied the [blouse]_F. $\|\phi_1\|^0 = \{\text{The soup dirtied trousers, The soup dirtied the blouse}\}$ $\|\phi_2\|^0 = \lambda y \lambda x \text{ [dirtied } (x,y) \wedge \underline{FEM}(y)\text{] (tx [soup x]), (tx [blouse x])}$ $\|\phi_2\|^A = entailed meaning: \{\text{The soup dirtied x } x \in D_e \}$ $implicated meaning: \{\text{The soup dirtied x } x \in D_e \wedge FEM (x)\}$ $\sim C : C \subseteq \|\phi_2\|^A, \|\phi_2\|^0 \in C, \exists p[p \neq \|\phi_2\|^0 \wedge p \in C]$ the presupposed variable

Note that $\|\phi_1\|^O$ only violates an implicature and hence can be canceled. This explains why on the other hand clitic may be left out under the described conditions and why on the other hand the use of clitic is still acceptable (and in most of the cases) preferred.

3. Summary

In this talk we have shown an effect of interaction between alternative and ordinary meaning in the framework of Rooth (1992) and discussed different ways to model the phenomenon. While it is crucial that backgrounded material shows specific behavior in Alternative Semantics, the question which model is to be preferred requires further investigation.

4. References

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