

Negated speech acts and contracted intentional states

Berislav Žarnić

University of Split

berislav@ffst.hr

Plan of the talk

- To define the problem of two kinds of negation.
 - Speech acts with negated content.
 - Negated speech acts.
- To examine the possibilities of modeling their semantics using dynamic approach.
 - To compare AGM contraction and “downdate” functions.

Received view: 2 components

- "Received view" on:
 - Sentences.
 - 2 components: modal element (mood indicator) and sentence radical.
 - Speech acts (illocutionary acts).
 - 2 components: illocutionary force and propositional content.
 - Intentional states.
 - 2 components: attitude and propositional content.

Received view: direction of fit

- "Received view" on basic types of sentences, speech acts and intentional states with respect to their direction of fit.
 - Direction of fit.
 - Word (mind) to world fit.
 - Indicatives; assertions; beliefs.
 - World to word (mind) fit.
 - Imperatives; requests; desires.

Ways of negating

- “Two positions” for negation placement.
 - “External”: negated speech act.
 - “Internal”: speech act with negated content.

External

\neg_{EX}

Modal element

\neg_{EX}

Illocutionary force

Internal

\neg_{IN}

Sentence radical

\neg_{IN}

Propositional content

A historical example

The use of the imperative mood in colloquial language does not allow this important difference between $\sim I(x)$ and $I(\sim x)$ to be clearly marked. All imperatives in the grammatical sense are positive in the sense that they pose a positive factor of demand. For example, "Do not close the door!" can only mean $I(\sim x)$ not $\sim I(x)$. Only by using linguistically indicative mood the difference becomes apparent. For example, "It is your duty not to close the door" ($I(\sim x)$), and "It is not your duty to close the door" ($\sim I(x)$).

- Alf Ross (1941)

The distinction

- The distinction is clearly visible in Ross' quotation:
 - Negating propositional content (imperatives with "negative theme of demand").
 - Negating illocutionary force (imperatives with "negated factor of demand").
- Recently the distinction as it applies to indicatives has been discussed by Tappenden (1999):
 - [Internal negation] in a derivative sense to deny that S is the same as to assert that \sim S.
 - [External negation] in a non-derivative sense to deny that S is a distinctive and irreducible speech act.
 - ["commitment to the failure to obtain of the conditions that would have to obtain for S to be true"].

Connecting speech acts and sentence moods

- In typical cases.
 - Speech act of requesting is performed by uttering an imperative sentence.
 - Speech act of asserting is performed by uttering indicative sentences.
- We will apply a level of abstraction at which there is no difference between the logic of “saturated” natural language sentences (modal element + sentence radical) and the logic of speech acts (typically performed by uttering these sentences).

Modeling two types of negation

Dynamic semantics:

Updates

Downdates

Upgrades

Change semantics

- Dynamic semantics provides a powerful tool.
 - Basic idea: meaning of a sentence may be understood in terms of “changes” that its utterance brings about.
 - Changes in Hearer's informational state (e.g. Veltman, Groenendijk, Stokhof,...).
 - Changes in Hearer’s cognitive-motivational state (Žarnić, Mastop,...).
 - ‘Social changes’.
 - In group knowledge (van Benthem and Liu,2005).
 - In obligation patterns (Yamada 2005).

A simple case

- Meaning is not only a relation between a sentence and the world (including possible ones).
- Meaning is a result of an interpretation process.
- Interpretation is understood as an elimination process.
- The metaphor.
 - The interpreter entertains different candidate pictures of yet unknown situation, sentences are picture fragments, and interpretation consists of comparing picture fragments with candidate pictures and removing the non-fitting ones.
 - The number of remaining pictures measure the amount of information, the more pictures remain the less information a text conveys.
 - The residual pictures create a context for the next step in interpretation process.
 - The truth value of a sentence may be unsettled at a particular stage if the context contains both pictures having and pictures lacking the fragment.
 - Sentence being true in a context means that the context is not empty and that the sentence does not have a power to eliminate any picture from it.

Update semantics [F. Veltman]

A is a set of propositional letters, $W = \wp A$, $\sigma \subseteq W$, $0 = W$; $1 = \emptyset$

$$\sigma[p] = \sigma \cap \{w \in W \mid p \in w\}$$

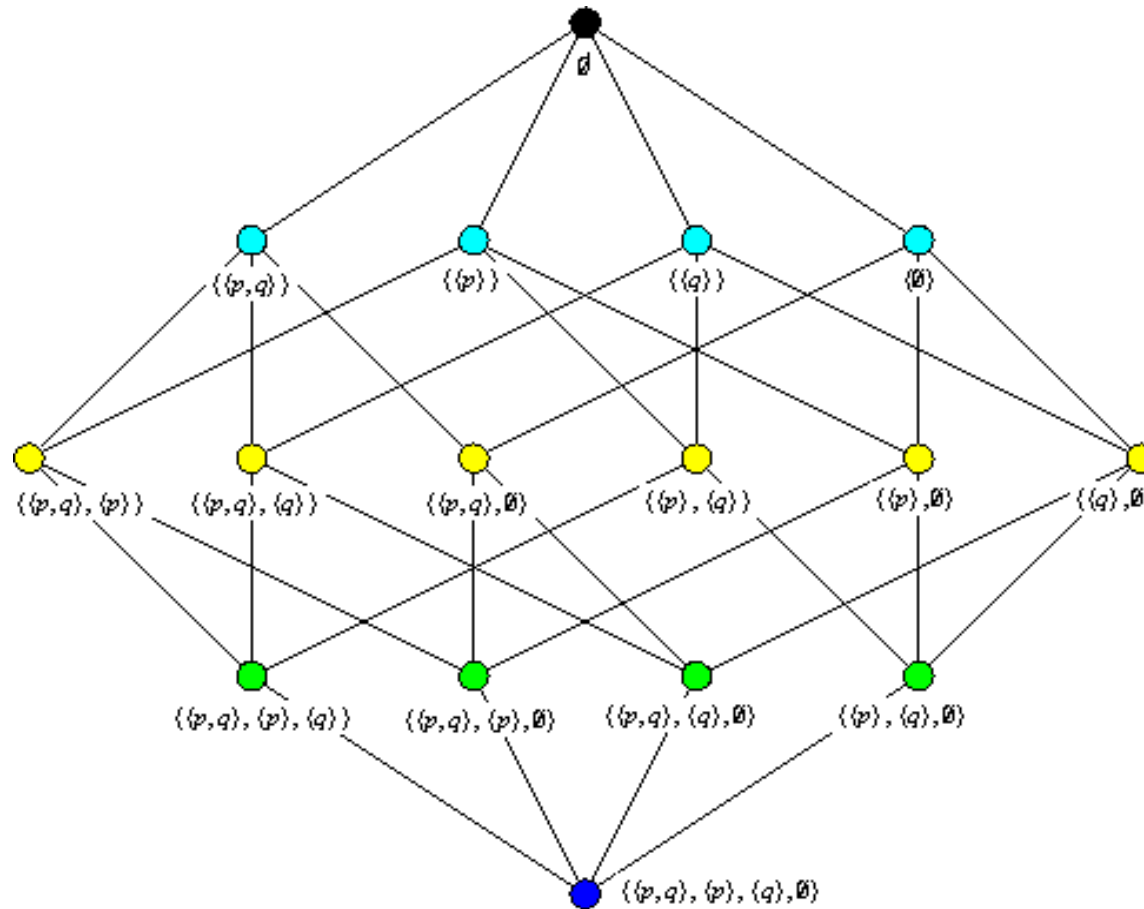
$$\sigma[\neg\varphi] = \sigma - \sigma[\varphi]$$

$$\sigma[\varphi \wedge \psi] = \sigma[\varphi] \cap \sigma[\psi]$$

$$\sigma[\varphi \vee \psi] = \sigma[\varphi] \cup \sigma[\psi]$$

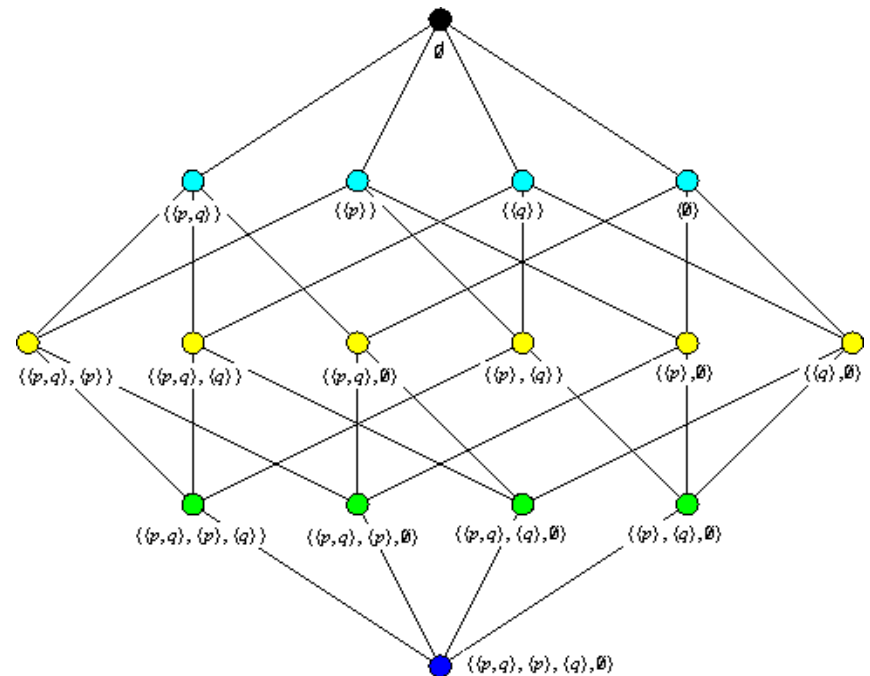
$$\sigma[\textit{might } \varphi] = \begin{cases} \sigma & \text{if } \sigma[\varphi] \neq 1, \\ 1 & \text{otherwise.} \end{cases}$$

2 letters example



Static value defined dynamically

	ACCEPTABILITY	ACCEPTANCE
$v(\varphi, \sigma)$	$[\varphi]^{Up} \sigma \neq \emptyset$	$[\varphi]^{Up} \sigma = \sigma$
1	Yes.	Yes.
n	Yes.	No.
0	No.	No.
b	No.	Yes.



Methodology

- It seems that the varieties of dynamic logical models and theories (e.g. discourse representation theory, AGM theory of theory change, dynamic doxastic logic, update semantics, game-theoretical semantics, dynamic epistemic logic etc.) do not figure as rival approaches, rather, they provide a rich framework for combining perspectives and approaches to the phenomena of intelligent cooperative interaction.
- It is a methodological ambition of this research to employ and combine different approaches (both static and dynamic), in particular static logics of preference, desire and action, with dynamic theories of belief revision, intention revision and update/upgrade semantics.

Negative act: denying

- Denying^{non-derivative} φ (external negation of assertion φ).
- Two options.
 - STRONG external-denial. Moving to a state where φ is not acceptable.
 - WEAK external-denial. Moving to a state where φ is not accepted.
 - In any non-absurd case, $\neg\varphi$ becomes (or remains) acceptable.

$v(\varphi, \sigma)$	$v(\neg\varphi, \sigma)$	$v(\varphi, \sigma[\varphi]^{S-Down})$	$v(\varphi, \sigma[\varphi]^{W-Down})$	$v(\neg\varphi, \sigma[\varphi]^{Any-Down})$
1	0	0	n	n
n	n	0	n	n
0	1	0	0	1
b	b	b	b	b

Negative act: underdetermination

- There is a number of functions that could do the job for both variants of external-denial.
- Methodological hint: look at another approach to the same problem.
- Dependence on “speech act with negated content”.
 - Negation of speech act with content φ must create a context in which speech act with content $\neg\varphi$ is possible.

AGM contractions: general condition

Definition *Let A be a set of sentences and α a sentence. The set $A \perp \alpha$ is the set such that*

$$B \in A \perp \alpha$$

if and only if

(i) $B \subseteq A$,

(ii) $\alpha \notin Cn(B)$,

(iii) there is no set B' such that

$B \subset B' \subseteq A$ and $\alpha \notin Cn(B')$.

Varieties of contractions

Maxichoice contraction:

$$K \dot{\div} \alpha = \gamma(K \perp \alpha)$$

Full meet contraction:

$$K \dot{\div} \alpha = \bigcap (K \perp \alpha)$$

Partial meet contraction:

$$K \sim_{\gamma} \alpha = \bigcap \gamma(K \perp \alpha)$$

Connecting AGM theory and update semantics

- Turn simple update model into a model for theory change.
 - Assign to each state (node) a “theory”.
 - Theory expansion becomes update function.
 - Theory contraction becomes downgrade function (but which out of many?).

A sketch

Definition A sentence φ is the "unique description" for the state σ iff (i) $\sigma[\varphi]^{Up} = \sigma$, and (ii) for any state $\sigma' \neq \sigma$ such that $\sigma'[\varphi]^{Up} = \sigma'$ there is a sentence ψ such that $\sigma'[\varphi]^{Up}[\psi]^{Up} = \sigma'$ and $\sigma[\psi]^{Up} \neq \sigma$.

- Constructing the "unique description".

Let $\sigma = \{w_1, \dots, w_m\}$ and $|A| = n$ where D is the set of propositional letters in the language under consideration. Get literals!

$$\lambda_j^i = \begin{cases} l_j & \text{if } l_j \in w_i \\ \neg l_j & \text{if } l_j \notin w_i. \end{cases}$$

Construct a "unique description" of σ (DNF)!

$$(\lambda_1^1 \wedge \dots \wedge \lambda_n^1) \vee \dots \vee (\lambda_1^m \wedge \dots \wedge \lambda_n^m).$$

Update and downdate system

- Veltman's update system can naturally be extended to include downdate functions.
- "Moving backwards" to an informational state in which negation of "contracted" sentence is feasible.
 - Retaining as much as possible from the "old" state.
 - Downdate function includes test: $\text{denial}^{\text{external}}$ will make no change if there is nothing to deny.

Definition Relation minD of minimal distance between different points with respect to proposition φ :

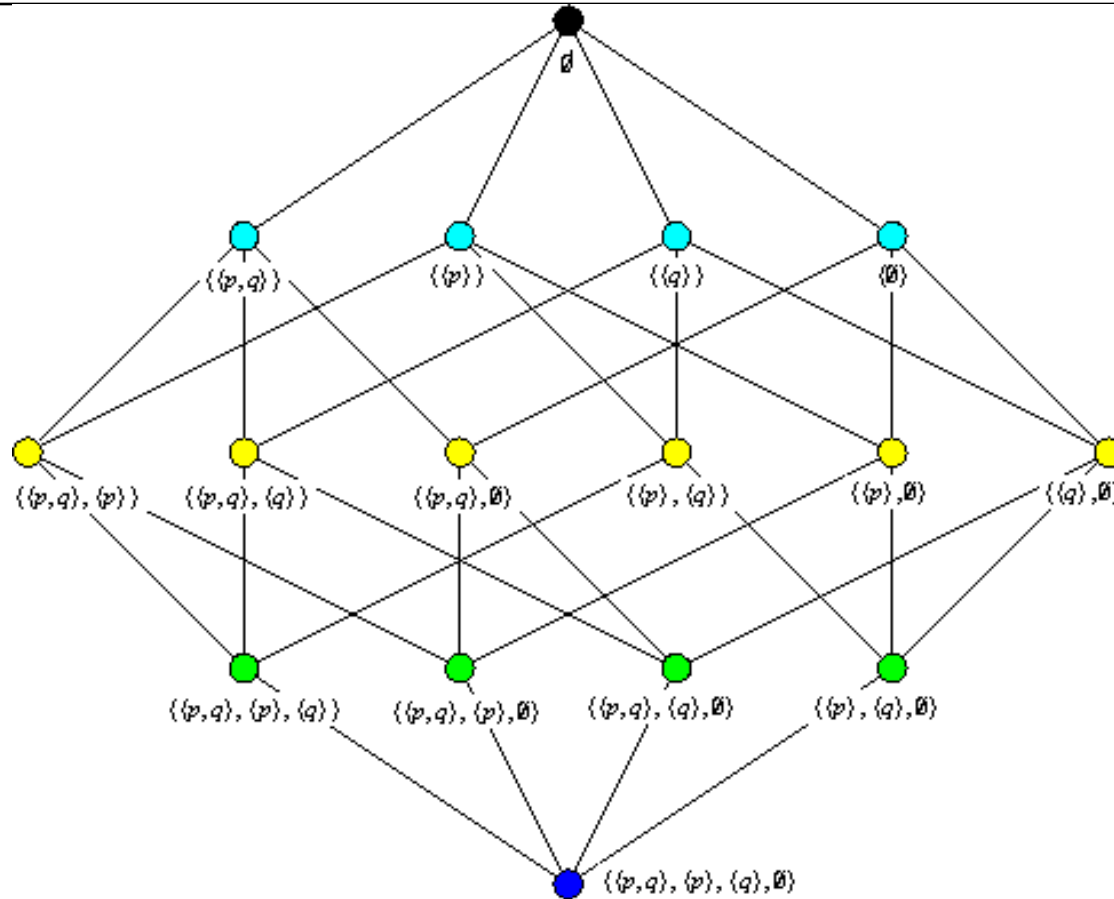
$$\text{differ}(\varphi) = \{\langle w, v \rangle \mid w \notin W[\varphi] \wedge v \in W[\varphi]\}$$
$$\text{minD}(\varphi) = \left\{ \langle w, v \rangle \in \text{differ}(\varphi) \mid \neg \exists z \exists u : \langle z, u \rangle \in \text{differ}(\varphi) \wedge |z \Delta u| < |w \Delta v| \right\}$$

Where Δ stands for symmetric difference.

Definition $|\varphi|_{\sigma}^{\text{minD}} = \{v \mid \exists w : w \in \sigma \wedge \langle w, v \rangle \in \text{minD}(\varphi)\}$

$$\sigma[\varphi]^{\text{down}} = \begin{cases} \sigma \cup |\neg\varphi|_{\sigma}^{\text{minD}} & \text{if } \sigma[\neg\varphi] = 1, \\ \sigma & \text{otherwise.} \end{cases}$$

An example: weak denial OR maxichoice contraction



Is it polite to deny what you said before?

- Following the lead of AGM perspective on contraction and “downdate” semantics, it follows that “external denial” introduces uncertainty into communication process.
 - After a sentence has been withdrawn (cancelled, externally negated), the Hearer’s mental state may change in many ways, different from Speaker’s preferred style of contraction.
 - There does not seem to be “unique correct” way of changing our beliefs after the Speaker has denied what he has previously said or implied.
- Due to the obstacles that contraction brings into the communication, the Speaker should apologize when s/he cancels what has previously been agreed upon.

A remark on metaphysics

- There is a tendency towards forgetting about psychological and social changes when thinking about “what there is”.
- Still, communication process, deliberation, acting, changing beliefs, revising intentions etc. are real (at least for some of us).
 - The “metaphysical” peculiarity of such “dynamic entities” is connected to the fact that they are “covered by the laws of logic” rather than by “laws of nature”.
 - Or, to put it in the other words, description of such phenomena can not be but normative.