

A faint, light-colored line drawing of the Tsinghua University Gate serves as a background for the slide. The gate is a large, classical-style archway with two main pillars and a central arch. Above the arch, the Chinese characters '清華大學' (Tsinghua University) are visible. The drawing is centered and occupies most of the slide's background.

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Monotonic Opaqueness in Deontic Contexts

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Monotonicity is one of the fundamental properties that many valid inferences depend on. For example:

- (1) Some dogs are black. So some animals are black.
- (2) None of my family members smokes. So none of my parents smokes.

- If $Q_M[A_1, \dots, A_i, \dots, A_m]$ and $A_i \subseteq A'_i \subseteq M^{n_i}$; then $Q_M[A_1, \dots, A'_i, \dots, A_m]$, where $1 \leq i \leq k$.
- If $Q_M[A_1, \dots, A_i, \dots, A_m]$ and $A'_i \subseteq A_i \subseteq M^{n_i}$; then $Q_M[A_1, \dots, A'_i, \dots, A_m]$, where $1 \leq i \leq k$.

Some: $\uparrow [Mon] \uparrow$ No: $\downarrow [Mon] \downarrow$

Not All: $\uparrow [Mon] \downarrow$ Every: $\downarrow [Mon] \uparrow$

- In intensional contexts, some verbs and modalities create ambiguities in their containing sentences when the syntactic object of these verbs or modalities consists in a determiner followed by a nominal, which leads some problems, such as the failure of equivalent substitution(see [Quine, 1956]).
- We have found that in a deontic context, such ambiguity can also lead to failure of monotonicity.

- (3) a. Some murderers were arrested by Lisi. So some people were arrested by Lisi.
b. * Some murderers ought to be arrested by Lisi. So some people ought to be arrested by Lisi.

- (4) a. Some doctors benignly deceive their patients. So some doctors deceive their patients.
b. * Some doctors ought to benignly deceive their patients. So some doctors ought to deceive their patients.

To analyze its underlying causes, we adopted Gibbard's idea about normative judgement. According to Allan Gibbard,

- Questions about normative judgments are questions about the rationality of some types of sentiment.
- Thinking something rational is accepting norms that permit it.

In this way, a deontic proposition, like 'A ought to B', can be regarded as a factual proposition when we evaluate it with regard to a normative system.

Back to (3)b (under the unspecific reading):

- “Lisi arrest some people” is an event which is really different from the event “Lisi arrest some murderers”
- “Some people” denote objects unspecifically. So we cannot say the event “Lisi arrest some people” is accepted in a given normative system.
- The event “Lisi arrest some people” is not deontically true.

The basic idea is:

- We introduce two sorts of new variables into the first-order modal language: event variables and norm variables which represent events and norms in the domain respectively.
- Define a new component of the model: a normative system. By this component, we can correspond a formula to the event it represents, and then judge whether the event is accepted by each norm.
- If it is accepted, we say this event ought to be done, i.e., the ought-formula is true in this model. Otherwise, it is false.

A DEON_E model \mathcal{M} is defined as a quintuple $\langle \mathcal{W}, h, \mathcal{D}, \mathcal{I}, \mathcal{N} \rangle$.

Definition (Normative System \mathcal{N})

A normative system \mathcal{N} is a tuple $\langle N, E, G, f \rangle$, where

- N a non-empty set of norms.
- E a non-empty set of events.
- G a non-empty set of functions. Each element of G is a function $g_i : E \rightarrow D, 1 \leq i \leq n$.
- A function $f: N \times E \rightarrow \{1, 0\}$ assigns 1 or 0 to an event according to a norm.

Definition (Truth Condition)

- $\mathcal{M}, w \Vdash_v O\phi$ iff for every $w' \in h(w)$ and every term t_i in ϕ , there is an e , $g_i(v(e)) = v(t_i)(w')$ and $\mathcal{M}, w' \Vdash_v \phi$; and for every n , $f(v(n), v(e)) = 1$.

Example:

$\mathcal{M}, w \Vdash_v O(\exists x(M(x) \wedge A(lx)))$ iff for every $w' \in h(w)$ and every term t_i in $\exists x(M(x) \wedge A(lx))$, there is an e , $g_i(v(e)) = v(t_i)(w')$ and $\mathcal{M}, w' \Vdash_v \exists x(M(x) \wedge A(lx))$; then for every n , $f(v(n), v(e)) = 1$.

- The monotonic opaqueness in epistemic contexts and compare it with the deontic ones.
- Model changes in monotonic inferences
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THANK YOU!