

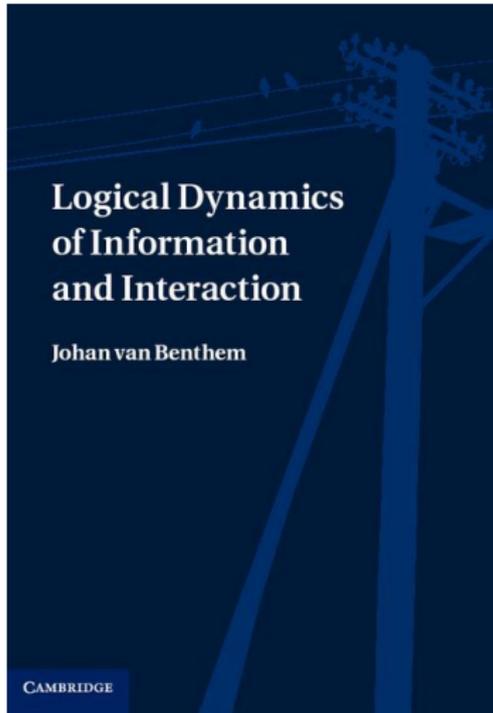
Logic in the Facebook Age

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Information and Knowledge



"Human life is a history of millions of actions flowing along with a stream of information. ... The higher-order knowledge about others is crucial to human communication and interaction in general"

Importance of Information

知彼知己，

百战不殆。

——《孙子兵法》

孙子，春秋末期军事家。后人尊称其为孙子、孙武子、兵圣、百世兵家之师、东方兵学的鼻祖。孙武的一生，除了其赫赫战功以外，更主要的是他给后人留下了不少珍贵的论兵、论政的篇章，其中尤以流传下来的《孙子兵法》最著名。这短短的13篇5000字，体现了孙武完整的军事思想体系。

陈鹤

Fish's Happiness



–Z: Look how happy the fish are just swimming around in the river.

–H: How do you know they are happy?
You are not a fish.

–Z: And you are not me. How do you know I don't know the fish are happy?

–H: Of course I'm not you, and I don't know what you think; But I do know that you're not a fish, and so you could not possibly know the fish are happy.

Dynamics of Information



Dynamic Epistemic Logic

A language for reasoning about knowledge change.

$K_a\varphi =$ *agent a knows that φ*

In state u , agent a knows that φ iff φ is a correct description of all states that a cannot distinguish from u

$[\!|\varphi]\psi =$ *after φ is announced, ψ*

After φ is announced, the states that are not correctly described by φ are no longer epistemic alternatives for any agent. ψ is then taken as a description of the revised scenario.

Suggestion and Preference Change



My friend says "Let's take a trip!"

Dynamic Preference Logic

A language for reasoning about preference change.

$P_a\varphi$ = agent a prefers that φ

$[\#\varphi]\psi$ = after φ is suggested, ψ

Social Relations

有朋自遠方來，不亦樂乎？

Isn't it delightful to have friends coming from afar?

The logic of *friends*

- A symmetric relation, not necessarily transitive.
- Privacy: access to information restricted to friends.
- Dynamics: post information; add new friends; delete old ones.

Distributed Knowledge



H. A. ...

Distributed Knowledge

I have a friend in Minsk, who has a friend in Pinsk, whose friend in Omsk, has friend in Tomsk, with friend in Akmolinsk. His friend in Alexandrovsk has friend in Petropavlovsk, whose friend somehow is solving now the problem in Dnepropetrovsk. (Tom Lehrer, Lobachevsky)

Degrees of accessibility of information:

- I know p
- I have a friend who knows p
- I have a friend who has a friend who knows p
- I am connected by friendship to someone who knows that p

Distributed Knowledge

- *I don't know whether p , but I have a friend who does.*

$$\sim(Kp \vee K\sim p) \ \& \ \langle F \rangle (Kp \vee K\sim p)$$

- *I know p , I have a friend who knows p , I have a friend who has a friend who knows p , etc.*

$$Kp, \ \langle F \rangle Kp, \ \langle F \rangle \langle F \rangle Kp, \ \text{etc.}$$

- *I am connected by friendship to someone who knows that p*

$$\langle F^* \rangle Kp$$

Peer Pressure



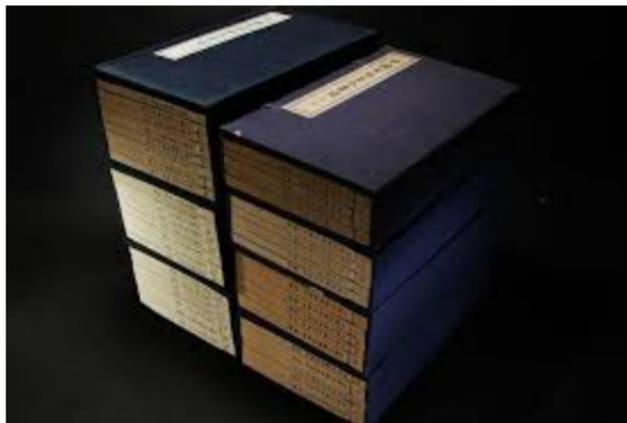
I prefer $\sim p$ but my friends all prefer p

Lesson from Chinese Classics



"A ruler has only to be careful of what he likes and dislikes. What the ruler likes, his ministers will practise; and whatever superiors do, their inferiors will follow."

Ancient Wisdom Encounters Modern Ideas



Handbook Project



Posted on January 18, 2013 by logic

Handbook of the History of Logical Thought in China

Aim and Scope

To provide (in English) a systematic overview and summary of research results on the history of logical thoughts in China, in order to

To appear 2016, Springer

Tsinghua-UvA JRC for Logic



Logic



*"Logic is a stance,
a modus operandi,
and perhaps a way
of life."*