Why there was no success in resolving Jörgensen's Dilemma

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SOCREAL 2013
25 - 27 OCTOBER
HOKKAIDO UNIVERSITY
SAPPORO, JAPAN

Outline

1. Introduction to the problem
2. Approaches
3. About methodological difficulties
4. How to get over the methodological difficulties
5. Rules for imperatives

Jörgensen's dilemma

"So we have the following puzzle: According to a generally accepted definition of logical inference only sentences which are capable of being true or false can function as premises or conclusions in an inference; nevertheless it seems evident that a conclusion in the imperative mood may be drawn from two premises one of which or both of which are in the imperative mood".

Jorgensen, J., Imperatives and Logic, Erkenntnis, 7, 1938. P. 290.

Some classical examples

(1) Keep your promises!
This is a promise of yours.
∴ Keep this promise.

(2) Love your neighbor as yourself!
Love yourself!
∴ Love your neighbor.

(3) Take all the books off the table!
Foundations of Arithmetic is on the table.
∴ Take Foundations of Arithmetic off the table!

Basic definitions

- "By the word imperative I understand imperative sentences which I define as sentences in which the main verb is in the imperative mood".

Jorgensen, J., Imperatives and Logic, Erkenntnis, 7, 1938. P. 288.

- "An imperative sentence tells us to make something the case".

Hare, R. M., Imperative Sentences, Mind, New Series, Vol. 58, No. 229 (Jan., 1949). P. 27.

- "..."imperative"… means a sentence, the object of which is to express an immediate demand for action, but not to describe a fact".

Ross, A. Imperatives and Logic, Philosophy of Science, Vol. 11, No. 1 (Jan., 1944). P. 31.

Approaches to Jorgensen's Dilemma (originated in 40th – 60th of the XX century)

Parallelism approach:

- Marginal branch (Hare, 1949)
- Moderate branch (Dubislav, 1938; Hofstadter, McKinsey, 1939)

Non-isomorphic to truth-functional logical theories approach:

- Unification of the logic of subjective validity and the logic of satisfaction (Ross, 1944)
- Logic of satisfactoriness (Kenny, 1966)

Parallelism approach: Marginal branch

"Imperatives are logical in the same way as indicatives. This is because both imperatives and indicatives contain descriptors, which are the parts of sentences which we normally operate with in our reasoning".

Hare R. M., Imperative Sentences, Mind, New Series, Vol. 58, No. 229 (Jan., 1949). P.33.

Parallelism approach: Marginal branch

"…any formula of formal logic which is capable of an indicative interpretation is capable also of an imperative one". Hare R.M., 1949, P. 35.

$(A \vee B) \rightarrow (\neg A \rightarrow B) \Rightarrow\ !(A \vee B) \rightarrow (!\neg A \rightarrow !B)$

Parallelism approach: Marginal branch

Use of axe or saw by you shortly, please.

No use of axe by you shortly, please.

∴Use of saw by you shortly, please.

"If we command someone to use an axe or a saw, and then not to use an axe, we command him to use a saw". Hare R.M., 1949, P. 31.

Paradoxes of the marginal branch of parallelism approach

$A \to (A \lor B)$ ⇒ $!A \to !(A \lor B)$

$(A \land B) \to A$ ⇒ $!(A \land B) \to !A$

$A \to (B \to (A \land B))$ ⇒ $!A \to (!B \to !(A \land B))$

Parallelism approach: Moderate branch

Dubislav's convention:

$$\begin{array}{ccc} \text{Satisfied imperative sentence}_1 & \rightarrow & \text{True indicative sentence}_1 \\ \downarrow & & \downarrow \\ \text{Satisfied imperative sentence}_2 & \leftarrow & \text{True indicative sentence}_2 \end{array}$$

Dubislav, W., Zur Unbegrundbarkeit der Forderungssatze Theoria, 3, 1938, pp. 330-342.

Parallelism approach: Moderate branch

"...we understand an imperative to be satisfied if what is commanded is the case. Thus the fiat "Let the door be closed!" is satisfied if the door is closed. It will be seen that the satisfaction of an imperative is analogous to the truth of a sentence".

Hofstadter, A. McKinsey, J. C. C. On the Logic of Imperatives, Philosophy of Science, Vol. 6, No. 4 (Oct., 1939). P. 447.

"...we call C_2 derivable from C_1, if S_2 is derivable from S_1, and C_2 a consequence of C_1, if S_2 is a consequence of S_1".

Hofstadter, A. McKinsey, J. C. C., 1939, P. 452.

Parallelism approach: Moderate branch

Classical logic	Logic for imperatives
(1) $A \to A$	$A \to !A$
(2) $A \wedge \neg A$	$!A \wedge \neg !A$
(3) $\{A_1, A_2, \ldots\} \to A_x$	$\{!A_1, !A_2, \ldots\} \to !A_x$
(4) $(\neg A \to A) \to A$	$!(\neg A \to A) \to !A$ or $(\neg A \to !A) \to !A$
Hofstadter, A. McKinsey, J. C. C., 1939, P. 452-453.	

Parallelism approach: Moderate branch

"The results of the previous section are in a sense trivial; for the correlation of the syntax of imperatives and the syntax of (indicative) sentences becomes so close that nothing essentially new is said".

Hofstadter, A. McKinsey, J. C. C., 1939, P. 453.

Unified logic of subjective validity and satisfaction

"…an imperative I is said to be **satisfied**, when the corresponding indicative sentence S, describing the theme of demand, is true, and non-satisfied, when that sentence is false".

Ross, A. Imperatives and Logic, Philosophy of Science, Vol. 11, No. 1 (Jan., 1944). P. 36-37.

"...an imperative I, is said to be **valid** when a certain, further defined psychological state is present in a certain person, and to be non-valid when no such state is present".

Ross A., 1944., P. 38.

Unified logic of subjective validity and satisfaction

Logic based on satisfaction	Logic based on validity
$!A \,/\, !(\neg A)$	$!A \,/\, \neg!(A)$
$\dfrac{!(A \wedge B)}{!A}$	$\dfrac{!A \wedge !B}{!A}$
$\dfrac{!A}{!(A \vee B)}$	$\dfrac{!A}{!A \vee !B}$
$\begin{array}{l} !A \\ \underline{!(A \to B)} \\ !B \end{array}$	$\begin{array}{l} !A \\ \underline{!A \to !B} \\ !B \end{array}$

The combination of satisfaction and validity

$$\frac{!\,(A\wedge B)^{Sat}}{!\,A^{Sat}} + \frac{!\,A\wedge !\,B^{Val}}{!\,A^{Val}} \Rightarrow \frac{!\,(A\wedge B)^{Val}}{!\,A^{Val}}$$

Unified logic of subjective validity and satisfaction

Logic based on satisfaction	Logic based on validity	A combination
$!A \,/\, !(\neg A)$	$!A \,/\, \neg!(A)$	!A / !(¬A), where "!A" is valid and "!(¬A)" is not valid. Ross, 1944, P. 40.
$\frac{!\,(A\wedge B)}{!\,A}$	$\frac{!\,A\wedge !\,B}{!\,A}$	Conjunction elimination "is not possible" . Ross, 1944, P. 43.
$\frac{!\,A}{!\,(A\vee B)}$	$\frac{!\,A}{!\,A\vee !\,B}$	Disjunction introduction "is obviously impossible". Ross, 1944, P. 41. Ross paradox.
$\frac{!\,A \quad !\,(A \to B)}{!\,B}$	$\frac{!\,A \quad !\,A \to !\,B}{!\,B}$	Implication elimination "is impossible". Ross, 1944, P. 42.

Logic of satisfactoriness

"The logic of satisfactoriness consists of the rules which ensure that in practical reasoning we never pass from a fiat which is satisfactory for a particular purpose to a fiat which is unsatisfactory for that purpose. These rules are satisfactoriness-preserving just as rules for assertoric inference are truth-preserving".

Kenny, A. J. Practical Inference, Analysis, Vol. 26, No. 3 (Jan., 1966). P. 72.

Logic of satisfactoriness

Ex.1:

Plan: "If she sees him (A), she will talk to him (B)".

Imperative inference: "Talk to him!" (!B) means "See him!" (!A).

Ex.2:

Plan: "If they find the book (C), they will return it to the library (D)".

Imperative inference: "Return the book to the library!" (!D) means "Find it!" (!C).

Methodological difficulties common to all approaches

- The analogy between classical and imperative logic:
  - The abuse of standard logical connectives: $\neg$, $\wedge$, $\vee$, and $\rightarrow$;
    - The lack of linguistic phenomena connected with formulas: $!A\wedge!B$ and $!(A\wedge B)$, $!A\vee!B$ and $!(A\vee B)$, $!A\rightarrow!B$, $!(A\rightarrow B)$ and $A \rightarrow!B$;
  - Dualistic approach to imperative sentences;
- No clear account of logical status of conclusion in imperative inference.

The standard interpretation of imperatives (dualistic approach)

1. Imperatives are sentences of natural language.
2. Imperatives consist of descriptive part and dictor-part.
3. Dictors and descriptors are implicit, it is not possible to catch their real existence without artificial extracting them from imperative sentences.

Switching from dualistic to monistic approach

"Peter plays the piano" (1)

"Peter, play the piano, please!" (2)

The man who plays the piano is Peter (1a)

The musical instrument that Peter plays is piano (1b)

The man, whose playing piano I want to hear is Peter (2a)

The musical instrument which I want Peter to play is piano (2b)

Why Dubislav's convention should not be used

$$\begin{array}{ccc}
\text{imperative sentence}_1 & \rightarrow & \text{indicative sentence}_1 \\
\downarrow & & \downarrow \\
\text{imperative sentence}_2 & \leftarrow & \text{indicative sentence}_2
\end{array}$$

Why Dubislav's convention should not be used

1. I_1= "Let it be the case that all chairs in the classroom are painted green".
2. S_1= "All chairs in the classroom are painted green".
3. S_2= "Some green objects are chairs in the classroom".
4. I_1= "Let it be the case that some green objects are chairs in the classroom".

The abuse of standard logical connectives

Wittgenstein:

- "A picture is a model of reality" (2.12).
- "The fact that the elements of a picture are related to one another in a determinate way represents that things are related to one another in the same way" (2.15).

The abuse of standard logical connectives

Formulas of imperative logic	Linguistic phenomena
$!(A\wedge B)$ / $!A\wedge!B$	"Let the place 2 be blue and the place 3 be red!" (Hofstadter, A. McKinsey, J. C. C.) / ?
$!(A\vee B)$ / $!A\vee!B$	"Either the letter is to be slipped into the letter-box, or it is to be burnet!" / "Either slip the letter into the letter-box or burn it!" (Ross, A.)
$!(A\rightarrow B)$ / $!A\rightarrow!B$	"…if you are to love yourself, you are to love your neighbour too…" / "...if you love yourself, you are also to love your neighbour..." (Ross, A.)
$A\rightarrow!B$	?

Beyond the bounds of the Standard interpretation

$!(A\wedge B)$:

- Fix the clock and the chair.
- Help me to do my homework in physics and math.
- Watch Champion League and Europa League.

$!A\wedge!B$:

- Do the dishes and prepare yourself for the first day of school.
- Look out the window and tell me what you see.
- Go for a walk and return the library books.

Beyond the bounds of the Standard interpretation

!(A∨B):

- Speak English or Spanish.
- Buy cream or milk.
- Choose between red ball or green ball.

!A∨!B:

- Turn off the music or put on your headphones.
- Eat an apple or drink apple juice.
- Go on a trip or study hard.

Rules for imperatives

- When performing several different imperatives take care that the addressee knows the order you wish him to execute these imperatives.
- Always try to perform all your imperatives explicitly; if you perform implicit imperative !B by means of imperative !A which is explicit, take care that the addressee is able to proceed correctly from !A to !B.
- If you mean !B while performing !A (or vice versa) take care that your addressee is informed as much as you that the communicative function of !A and that !B in that context is the same.