A New Analysis of the Structure of Social Reality

Yasuo NAKAYAMA
Graduate School of Human Sciences,
Osaka University

Presented in SOCREAL 2007,
at Hokkaido University,
on March 9, 2007

Aim of this talk

- I examine several theses in Searle (1995) and point out some difficulties in his description.
- I clarify some notions and show how to overcome these shortcomings.
  - Searle, J. R. (1995) *The Construction of Social Reality*, New York: The Free Press.

Institutional Facts

Searle's notion of institutional facts

- According to Searle (1995), ***institutional facts*** can be explained by means of three notions, i.e.

  collective intentionality,

  assignment of function, and

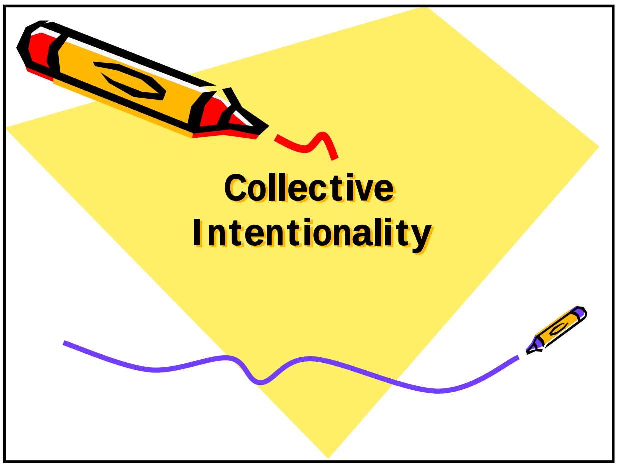
  constitutive rule.

Problems with Searle's notion of collective intentionality

- Searle claims **collective intentionality** is primitive and biologically founded.
  - His insistence on the primitiveness of collective intentionality makes it difficult to analyze interactions of intentional states among agents.

Problems with Searle's notions

- Searle's schema of ***assignments of function*** and schema of ***constitutive rules*** are too inflexible, so that the application of these schemata becomes unnecessarily restricted.



Primitiveness of collective intentionality (Searle (1995) p. 25f)

- It is indeed the case that all my mental life is inside my brain, and all your mental life is inside your brain, and so on for everybody else. But it does not follow from that all my mental life must be expressed in the form of a singular noun phrase referring to me.

- The form that my collective intentionality can take is simply “we intend,” “we are doing so-and-so,” and the like. In such cases I intend only as part of our intending. The intentionality that exists in each individual head has the form “we intend.”

Problem with this description

- A problem with this description is that it is unclear what is stated by “I intend only as part of our intending”.
- A possible interpretation:
  - We, i.e. group G, intend that p *iff*
    every member of G believes that we intend that p.

  $I_G p \equiv \forall x \in G\ (B_x I_G p)$

Problems with Searle’s notions

- Nakayama (2004) criticizes the primitiveness of collective intentionality in Searle (1995).
  - Nakayama, Y. (2004) *Contemporary Philosophy of Collectivity – From Mind to Society*, Keiso-shobo (in Japanese).

Collective Intentionlity
multi-agent BDI logic

- In this presentation, I use *multi-agent BDI logic* explained in Meyer and Veltman (2007).
  - Meyer, J-J. and Veltman, F. (2007) “Intelligent Agents and Common Sense Reasoning,” P. Blackburn et al. (eds.) *Handbook of Modal Logic*, Elsevier B. V.
- I slightly modify notations of some modal operators.
  - I write ${}^{B}C_G p$ instead of $C p$.
  - ${}^{B}C_G p$ means: **Group *G* collectively believes that *p***.

Multi-agent BDI formulas

- $B_i p$: i believes that p.
- ${}^{B}E_G p$: everybody in G believes that p.
- ${}^{B}C_G p$: Group G collectively believes that p.
- $I_i p$: i intends that p.
- ${}^{I}E_G p$: everybody in G intends that p.
- ${}^{I}M_G p$: all members in G mutually intend that p.
- ${}^{I}C_G p$: Group G collectively intends that p.

Models for *n*-agent BDI logic

- Models for *n*-agent BDI logic are Kripke structures of the form

  $M = \langle W, V, R_1,\ldots,R_n, R_{F,G}, R_{D,G}, S_1,\ldots,S_n, S_{F,G}, S_{D,G}\rangle$

  where
  - W is a non-empty set of states (or worlds);
  - V is a truth assignment function per state;
  - **G is a subset of {1,…,*n*}.**
  - The R_i are accessibility relations on W for interpreting the modal operations B_i, assumed to be serial, transitive and euclidean relations, while the S_i are accessibility relations on W for interpreting the modal operations I_i, assumed to be serial relations.
  - $R_{F,G} = \cup_{i \in G} R_i$ and $S_{F,G} = \cup_{i \in G} S_i$;
  - $R_{D,G} = R_{F,G}{}^{+}$ and $S_{D,G} = S_{F,G}{}^{+}$, the transitive closure of $R_{F,G}$ and $S_{F,G}$ respectively.

Models for *n*-agent BDI logic

$M = \langle W, V, R_1,\ldots,R_n, R_{F,G}, R_{D,G}, S_1,\ldots,S_n, S_{F,G}, S_{D,G}\rangle$

- W is a non-empty set of states (or worlds);
- V is a truth assignment function per state;
- **G is a subset of {1,…,*n*}.**
- The R_i are accessibility relations on W for interpreting the modal operations B_i, assumed to be serial, transitive and euclidean relations, while the S_i are accessibility relations on W for interpreting the modal operations I_i, assumed to be serial relations.
- $R_{F,G} = \cup_{i \in G} R_i$ and $S_{F,G} = \cup_{i \in G} S_i$;
- $R_{D,G} = R_{F,G}{}^{+}$ and $S_{D,G} = S_{F,G}{}^{+}$, the transitive closure of $R_{F,G}$ and $S_{F,G}$ respectively.

Interpretation of multi-agent BDI formulas

- $M,w \vDash p$ iff $V(w)(p) = true$, for $p \in P$;
- The logical connectives are interpreted as usual;
- $M,w \vDash B_i p$ iff $M,w' \vDash p$ for all w' with $R_i(w,w')$;
- $M,w \vDash {}^{B}E_G p$ iff $M,w' \vDash p$ for all w' with $R_{F,G}(w,w')$;
- $M,w \vDash {}^{B}C_G p$ iff $M,w' \vDash p$ for all w' with $R_{D,G}(w,w')$;
- $M,w \vDash I_i p$ iff $M,w' \vDash p$ for all w' with $S_i(w,w')$;
- $M,w \vDash {}^{I}E_G p$ iff $M,w' \vDash p$ for all w' with $S_{F,G}(w,w')$;
- $M,w \vDash {}^{I}M_G p$ iff $M,w' \vDash p$ for all w' with $S_{D,G}(w,w')$;

Valid formulas of multi-agent BDI logic (1)

- $\vDash {}^{B}E_G p \equiv \forall x \in G\ (B_x p)$
- $\vDash {}^{B}C_G(p \rightarrow q) \rightarrow ({}^{B}C_G p \rightarrow {}^{B}C_G q)$
- $\vDash {}^{B}C_G p \rightarrow {}^{B}E_G p$
- $\vDash {}^{B}C_G p \rightarrow {}^{B}C_G\, {}^{B}C_G\, p$
- $\vDash \neg {}^{B}C_G p \rightarrow {}^{B}C_G \neg {}^{B}C_G\, p$
- $\vDash {}^{B}C_G p \rightarrow {}^{B}E_G\, {}^{B}C_G\, p$
- $\vDash {}^{B}C_G(p \rightarrow {}^{B}E_G p) \rightarrow ({}^{B}E_G p \rightarrow {}^{B}C_G p)$

Valid formulas of multi-agent BDI logic (2)

- $\vDash {}^{I}E_G p \equiv \forall x \in G\ (I_x p)$
- $\vDash {}^{I}M_G(p \rightarrow q) \rightarrow ({}^{B}M_G p \rightarrow {}^{B}M_G q)$
- $\vDash {}^{I}M_G p \rightarrow {}^{I}E_G p$
- $\vDash {}^{I}M_G p \rightarrow {}^{I}E_G\, {}^{I}M_G p$
- $\vDash {}^{I}M_G(p \rightarrow {}^{I}E_G p) \rightarrow ({}^{I}E_G p \rightarrow {}^{I}M_G\, p)$
- Definition of collective intention

  ${}^{I}C_G p = {}^{I}M_G p \wedge {}^{B}C_G\, {}^{I}M_G p$

Clarification

- Multi-agent BDI logic clarify interactions among agents in a group.
- I introduce index G to clarify problems for a person who belongs to different groups.
- If a person A belongs to both $\boldsymbol{G_1}$ and $\boldsymbol{G_2}$, then the union of the collective belief set of $\boldsymbol{G_1}$ and that of $\boldsymbol{G_2}$ must be consistent because of the validity of

  ${}^{B}C_{G1} p \rightarrow {}^{B}E_{G1} p$ and ${}^{B}C_{G2} p \rightarrow {}^{B}E_{G2} p$.
  - Otherwise, A's belief becomes inconsistent.

Description of a Problem

- If a person *A* belongs to both G_1 and G_2, then the collective belief set of G_1 and that of G_2 must be consistent because of the validity of

  ${}^{B}C_{G1}p \rightarrow {}^{B}E_{G1}p$ and ${}^{B}C_{G2}p \rightarrow {}^{B}E_{G2}p$.

- In reality, this is sometimes not the case. There can be a person who cannot decide which group he wants to join, where the union of the collective beliefs of the two groups are inconsistent.
- This is a real problem and it should be also describable within Searle's framework. I doubt if this is possible.

Conditional intention and self-restriction

- A *conditional intention* "*i* intends to do A, if *i* realizes that *p*" can be expressed by

  $B_i(p \rightarrow I_i do(i, A))$.

- A *conditional self-restriction* "*i* does not intend to do *A*, if *i* realizes that *p*" can be expressed by

  $B_i(p \rightarrow \neg I_i do(i, A))$.

- I presuppose here: $B_i(I_i do(i, A)) \rightarrow I_i do(i, A))$.

Conditional obligation and prohibition

- A *conditional obligation* "Do *A*, if *p*" is *accepted* by *x*, if *x* has a conditional intention expressed by $B_x(p \rightarrow I_x do(X, A))$.
  - A *categorical obligation* can be expressed by "Do *A*, if T", where T expresses a tautology.
- A *conditional prohibition* "Do not *A*, if *p*" is *accepted* by *x*, *x* has a conditional intention expressed by $B_x(p \rightarrow \neg I_x do(X, A))$.
  - A *categorical prohibition* can be expressed by "Do not *A*, if T", where T expresses a tautology.

Constitutive Rules and Rule Systems

Searle's constitutive rules

- A constitutive rule has the form

  "*X* counts as *Y* in context *C*".

- The structure of collective rules can be iterated.
- Institutional facts exist only in systems of constitutive rules. (1995, p. 28)

Why can rules create facts?

- Rules work properly only in a rule **system**.
- An action changes a former state.
- A rule describes what kind of actions are allowed and what kind of actions are prohibited.
- A rule system contains descriptive sentences and rules.
- A rule system introduces a new language based on the given language.
- A rule system provides a new interpretation strategy for actions.

Example: Rules of chess

- **Chess** is a two-player game that is played on an 8-by-8 **chessboard**, with thirty-two pieces (sixteen for each player) of six types; each type of piece moves in a distinct way.
- The **goal** of the game is to protect the most valuable piece, the **king**, and trap (**checkmate**) the opposing **king**.

From Wikipedia

Rules of chess: Game play

- Chess pieces, from left to right: **king**, **rook**, **queen**, **pawn**, **knight**, **bishop**.

- The player controlling the white pieces moves first.
- After the initial move by white, players alternate moves.
- Play continues until a draw is called, a player resigns or a **king** is trapped by means of a **checkmate**.

Rules of chess: Movement

- Each piece moves in a different way. Generally, a piece cannot pass through squares occupied by other pieces, but it can move to a square occupied by an opposing piece, which is then "**captured**" (removed from the board). Only one piece can occupy a given square.
  - The **rook** moves orthogonally to the players (forward, backward, left or right) any number of squares.
    - The **bishop** moves diagonally any number of squares and always stays on one of the two chequered colours.
    - The **queen** moves orthogonally or diagonally, any number of squares.
    - The **king** moves orthogonally or diagonally only one square at a time.
    - The knight moves in an "L"-shape (two spaces in one direction and one space orthogonally to it). It is the only piece that can jump over other pieces.
    - The pawn moves one space straight forward (away from the player). On its first move it can optionally move two spaces forward. If there is an enemy piece diagonally (either left or right) one space in front of the pawn, the pawn may move diagonally to capture that piece. A pawn cannot capture or jump over a piece directly in front of it.

Rules of chess constitute a rule system

- The rule system of chess enables interpretations of actions in chess.
- These interpretations are shared by the players.
- Example for interpretation of actions in chess
  - Description of an action (in the standard English):
    - **Peter took one of white figures on a board and placed it on a different square of the board**.
  - Interpretation of this action (described in the **chess-language**):
    - **Peter moved a rook two spaces forward**.

Interpretation of Searle's form for constitutive rules

- Searle's form for constitutive rules has the form

  "***X* counts as *Y* in context *C***".
- I interpret this form as follows:
  - ***C*** is a rule system.
  - ***X*** is described by a language that does not presuppose the rule system.
  - ***Y*** describes ***X*** from the viewpoint of the rule system.

My interpretation of "*X* counts as *Y* in context *C*":

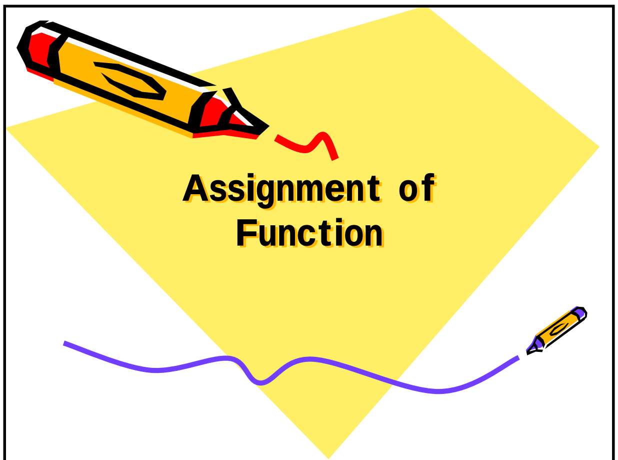
- My interpretation.
  - ***C*** is a rule system.
  - ***X*** is described by a language that does not presuppose the rule system.
  - ***Y*** describes ***X*** from the viewpoint of the rule system.
- Example for interpretation of actions in **chess**
  - Description of an action (in the standard English):
    - **Peter took one of white figures on a board and placed it on a different square of the board.**
  - Interpretation of this action (described in the **chess-language**):
    - **Peter moved a rook two spaces forward**.

A rule system provides an interpretation system for real actions

- Question:
  - **Why can a rule system create facts?**

Answer to:
Why can a rule system create facts?

- A rule system provides a new interpretation system for real actions.
- This interpretation system is collectively believed by the players and they interpret actions (in the game) in the same way.
- A descriptive part in a rule system introduces new notions and describes constraints for these notions.
- In this way, we can explain why a rule system can create facts.
  - This explanation is deeper than Searle's one.



Form of the assignment of function in Searle (1995)

- The function of ***A*** is to ***X***.
- Example (p. 14)

  That river is good to swim in.
- Objects with a function (p. 14)
  - **chairs, tables, houses, cars, lecture halls, pictures, streets, gardens**

Central Conditions for Function in Searle (1995, p. 19)

- Whenever the function of X is to Y, X and Y are parts of a *system* where the system is in part defined by *purposes, goals, and values generally*.
- Whenever the function of X is to Y, then X is *supposed* to cause or otherwise result in Y.

Goal-directed Actions (My view)

- We can use things in order to achieve a certain goal.
- In some rule systems, there are things whose use in it is restricted by its rules.
  - Example in chess:
    - Chess pieces such as **king**, **rook**, **queen**, **pawn**, **knight**, and **bishop**.
- The assignment of function can be explained, when we explain what a rule system is.

Acceptance of a rule system

Acceptance of a rule system

- A *rule system* is *collectively accepted* by *G iff* all sentences in it are collectively believed or accepted by *G*.
- A *normative proposition p* is *collectively accepted* by *G iff* it is collectively believed by *G* that proposition *p* is accepted by all members of *G.*

G-institutional-facts

G-institutional-facts

- The *truth conditions* of a *G-institutional-statement* depend on *G*-collective-beliefs.
- A *G-institutional-fact* is expressed by a corresponding true *G*-institutional-statement.
- *G*-institutional-facts are ***socially constructed***, whereas physical facts are not.

Relations among Institutional Facts

- There are three cases for two groups G_1 and G_2 :
  1. $G_1 \subseteq G_2$ (or $G_2 \subseteq G_1$);
  2. $G_1 \cap G_2 \neq \emptyset$;
  3. $G_1 \cap G_2 = \emptyset$.

Questions

- $G_1 \subseteq G_2$: Are all G_2-institutional facts also G_1-institutional facts?
- $G_1 \cap G_2 \neq \emptyset$: Are all G_1-institutional facts consistent with G_2-institutional facts?

G-declaration

G-declaration according to Nakayama (2004)

- A *G-declaration* is addressed to *G*-members and it expresses a speaker's desire for a *G*-collective-belief.
- A *G*-declaration can be successful only if it is stated by a person whose authority concerning the declared content is accepted by *G*.
- A *G*-declaration can *create* a *G*-institutional fact, because it can *create* *G*-collective-beliefs.

Importance of *G*-declaration

- A *G*-declaration can *create* *G*-institutional facts.
  – Introduction of legal systems
  – Nomination of ministers, a chairman, …
  – Control of meetings

Social Organizations

A thesis about the *ontological status* of *social organizations*

- Social organizations, such as states, companies, and universities, are *four-dimensional fusions* of individual objects.

Conditions for Social Organizations proposed in Nakayama (2004)

1. A social organization *G* has a structure.
2. This structure is so formed that it enables the continuation of the existence of the social organization.
3. Any member of *G* knows that he belongs to *G*.
4. *G* collectively believes that *G* exists.

Acceptance based on a (expert) group

The requirement of collective belief is sometimes too strong

- Conditions for *G*-collective-belief are sometimes too strong, so that they are normally not satisfied by real situations.
- We need a more flexible notion for collectivity.
  - *G-acceptance based on* a (expert) *group E*

A recursive characterization of *G-acceptance based on* a (expert) *group E*

a) A proposition *p* is *accepted* by *G based on* group *E*, if proposition *p* is collectively believed by *E* and it is collectively believed by *G* that *E* is the expert group for the subject expressed by *p*.

b) A proposition *p* is *accepted* by *G based on* group *E*, if there is a group *F* such that proposition *p* is accepted by *E* based on group *F*.

Putnam's division of linguistic labor

- Putnam's *division of linguistic labor* corresponds to an acceptance based on an expert group.
  - Putnam, H. (1975) "The Meaning of 'Meaning'" in: H. Putnam (1975) *Mind, Language and Reality: Philosophical Papers*, vol. 2, Cambridge UP, pp. 215-271.

Putnam's hypothesis of the division of linguistic labor (Putnam (1975) p. 228)

- Every linguistic community exemplifies the sort of **division of linguistic labor** just described:
  - that is, possesses at least some terms whose associated 'criteria' are known only to a **subset of the speakers who acquire the terms**, and whose use by the other speakers depends upon a structured cooperation between them and the speakers in the relevant subsets.
- The subset of the speaker corresponds to an expert group in my description.

Consistency of *G*-acceptance

- Let *S*(*G*) be the set of *G*-accepted sentences. Then, ***S(G)* should be consistent**.
  - Otherwise, any sentence can be inferred from *S*(*G*).
  - Suppose G_1 and G_2 are expert groups in G ($G_1 \subseteq G$ and $G_2 \subseteq G$). If G_1 and G_2 have different views, then there is no *G*-accepted sentence with respect to the controversial issues.

Consistency of *G*-law-systems

- Law systems that are applicable to the organization *G* should be consistent each other or it must be written in them how to resolve contradictions.
- In a modern society *G*, the correctness of the official procedure is often crucial for *G*-acceptance.

Meta-rules for *G*-acceptance

- In our modern society *G*, we have meta-rules that define when a proposal of rules is *G*-accepted.
  - Example for meta-rules for *Japan*-acceptance
    - Some meta-rules for *Japan*-acceptance is written in the Japanese constitution.
    - A Japanese law is *Japan*-accepted, if it is *Diet*-accepted.

Political Decision Group

- In a democratic system, it is often decided by a *G*-election, who belongs to a political decision group for *G*.
  - For example, members of the Diet.

Conclusion

Conclusion 1

- I pointed out some problems of Searle (1995) with respect to description of the social reality.
- I proposed the reason why a rule system can create new facts.
- I proposed a new interpretation of (*G*-)declaration and explained why a successful *G*-declaration can create institutional facts.
- I pointed out that we need an appropriate notion of *G*-acceptance-based-on-a-group, in order to explain the structure of social reality.

Conclusion 2

- I pointed out that it is crucial for an explanation of social reality to make it explicit *who* is involved in particular institutional facts and in a particular collective intentionality.
- The structure of social reality is far more complex than described in Searle (1995).