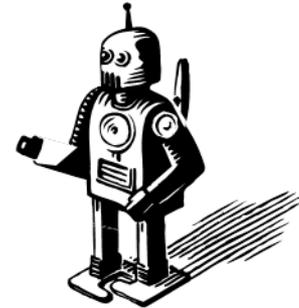


Friday, July 6th, 2018 at Tohoku Univ., Sendai

3rd Dutch-Japanese Workshop on Philosophy of Technology



CULTURAL
INHERITANCE
MEDIATED BY
SOCIAL ROBOTS ?



KOJIRO HONDA

KANAZAWA MEDICAL
UNIVERSITY

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- 2. Our imitative community**
- 3. The “I” and the “me” as phases of the self**
- 4. Robots’ Educational Effect on People**
- 5. Concluding Remarks**

§ 1

Introduction

ANDROID BOOM IN JAPAN

■Honda's Asimo



■Asada's "Constructive Approach"



■Ishiguro's Geminoid

■Takahashi's KIROBO



WHY HUMANOIDS?

Humanoid Boom in Japan

Why do they try to make humanoid robots?

This question has not been discussed in a serious manner.



Dr. Ishiguro and his copy geminoid



WHY HUMANOIDS?: PRO - ASADA (2010)

Minoru Asada (Osaka University)

“Knowing Humanity through Robotics”



The cognitive developmental robotics approach

To understand

- the development of increasingly complex cognitive processes in natural and artificial systems
- how such processes emerge through physical/ social interaction

WHY HUMANOIDS?: PRO - ASADA (2010)

“I have got a inspiration such that, to understand humanity, it is useful to make human being in fact.”

Experiment on a human body is strictly banned

The cognitive developmental robotics approach

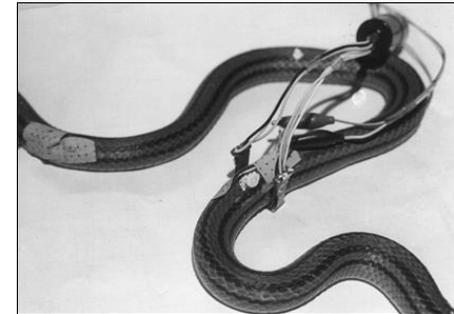
- making hypothesis about human development of intelligence or body
- making robot according to the hypothesis
- observing the robot's development of intelligence
- validating the hypothesis

WHY HUMANOIDS?: CON - HIROSE (2011)

Shigeo Hirose (Tokyo Institute of Technology)

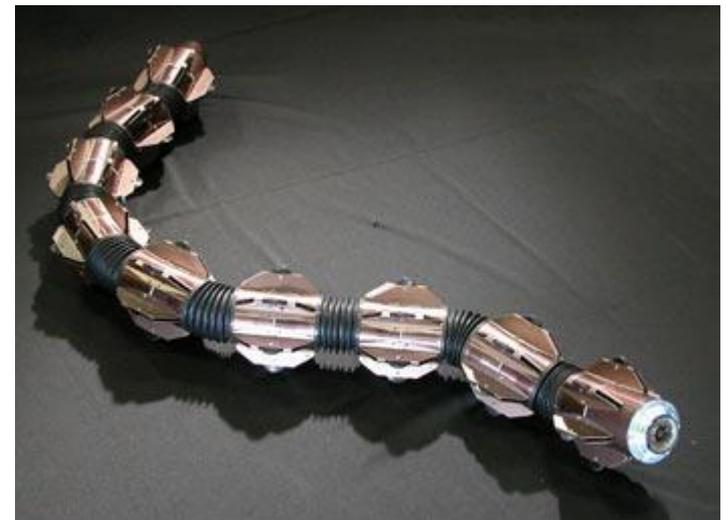


Recipient 2014 IEEE Robotics and Automation Award



Development of Humanoid is

- ① Not fitted together with natural evolution of technology
- ② Not fitted together with the stream of evolution of whole technological system
- ③ Not fitted together with the future generation's life



WHY HUMANOIDS?: CON - HIROSE (2011)

Ubiquitous robot

It is better for us to make every artifact intelligent

So in the future, robots will be out-of-sight in the nature of things

-Not be human-like or human-shaped

Design of robots

Robots should be designed according to their own purpose

We should throw away “humanoid fundamentalism”

WHY HUMANOIDS?: MAIN OPINIONS

- 1. Because we want to know ourselves (Scientific Interest)**
- 2. Because the human shape is congenial
(Aesthetic Interest)**
- 3. Because the human shape is adjustive to domestic
environment (Functional Interest)**
- 4. Because humanoid technology could be applied to
prostheses (Medical or Morphological Interest)**

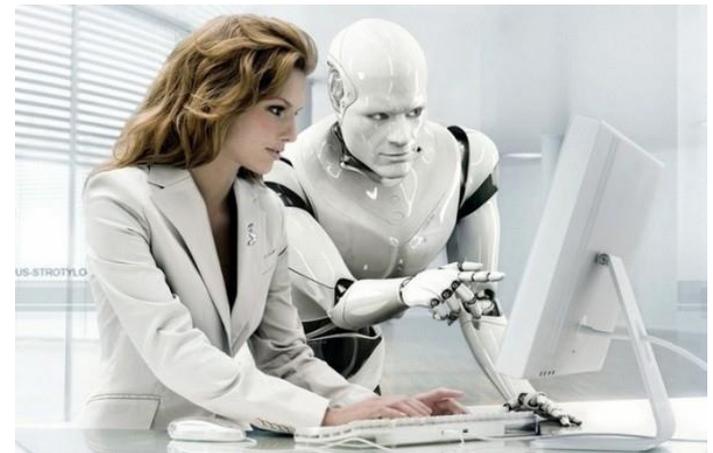
HUMANOIDS WILL BE

1. Resources for Human Enhancement



2. Social Agents in Our Society

What kind of
consequence ?



SOCIAL IMPACT OF ROBOTICS

Social-ethical problems will be happen

- A) Ascription of Responsibility
- B) New type of Private Information
- C) Educational Effect on People**
- D) Estate of Robots in our society
- E) Human Enhancement

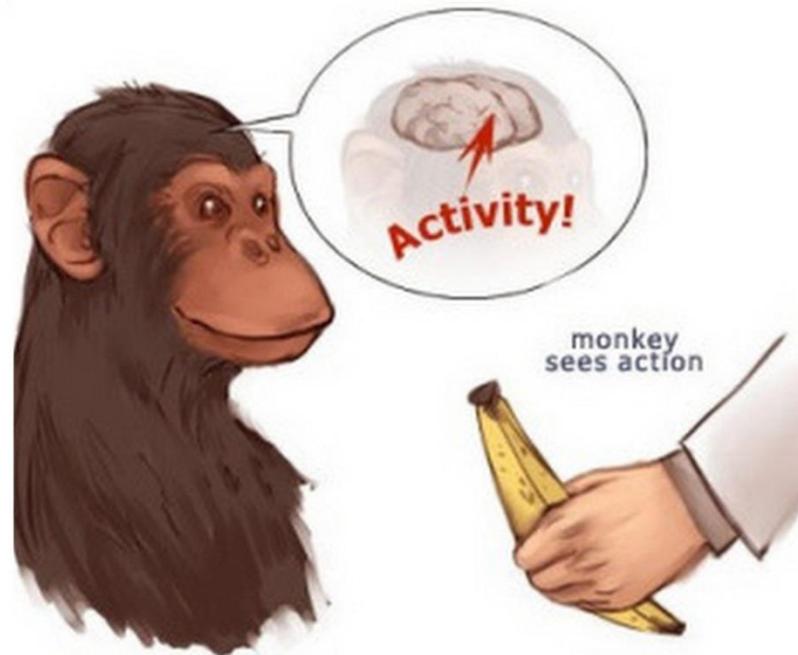




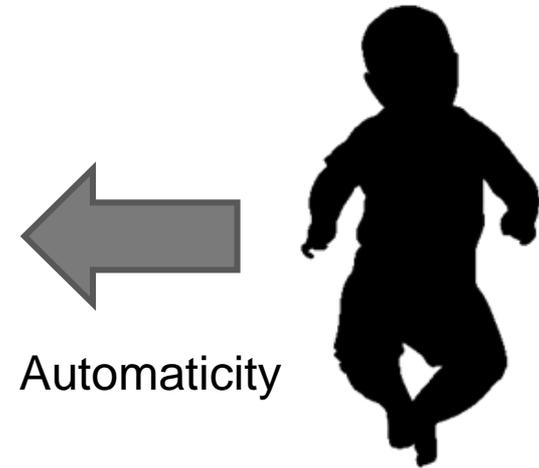
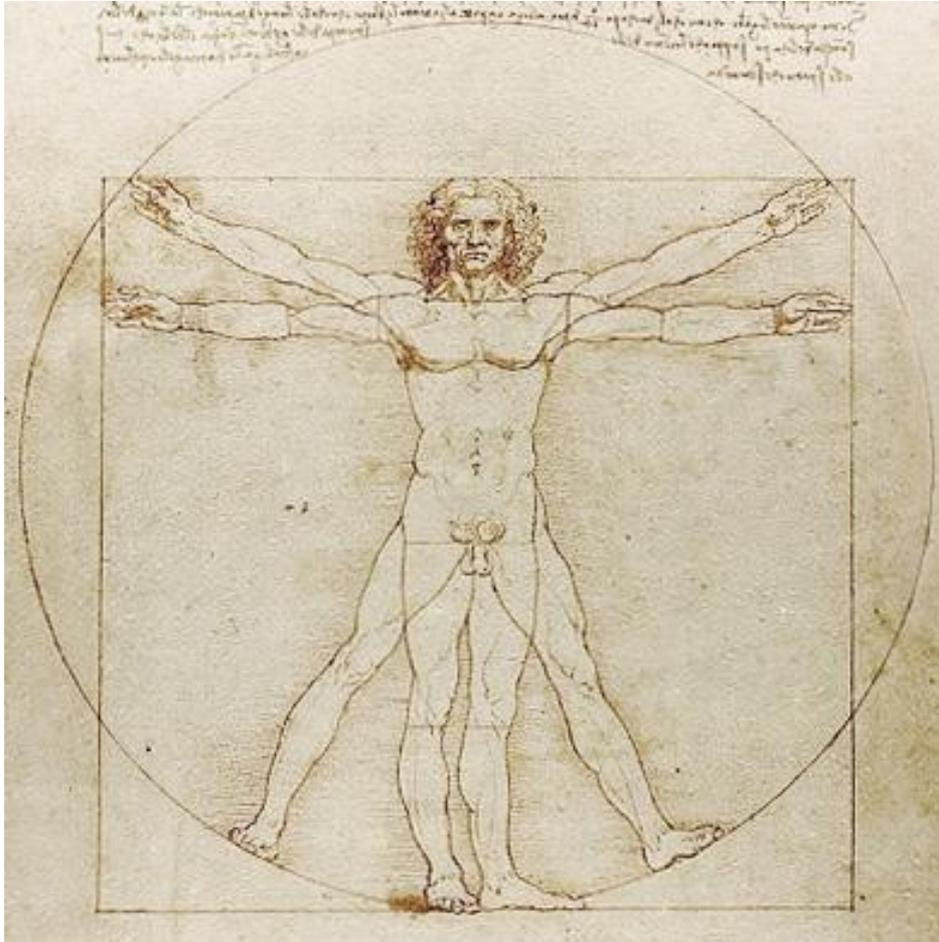
§ 2

Our Imitative Community

MIRROR NEURON



HUMAN SHAPE



GESTURE

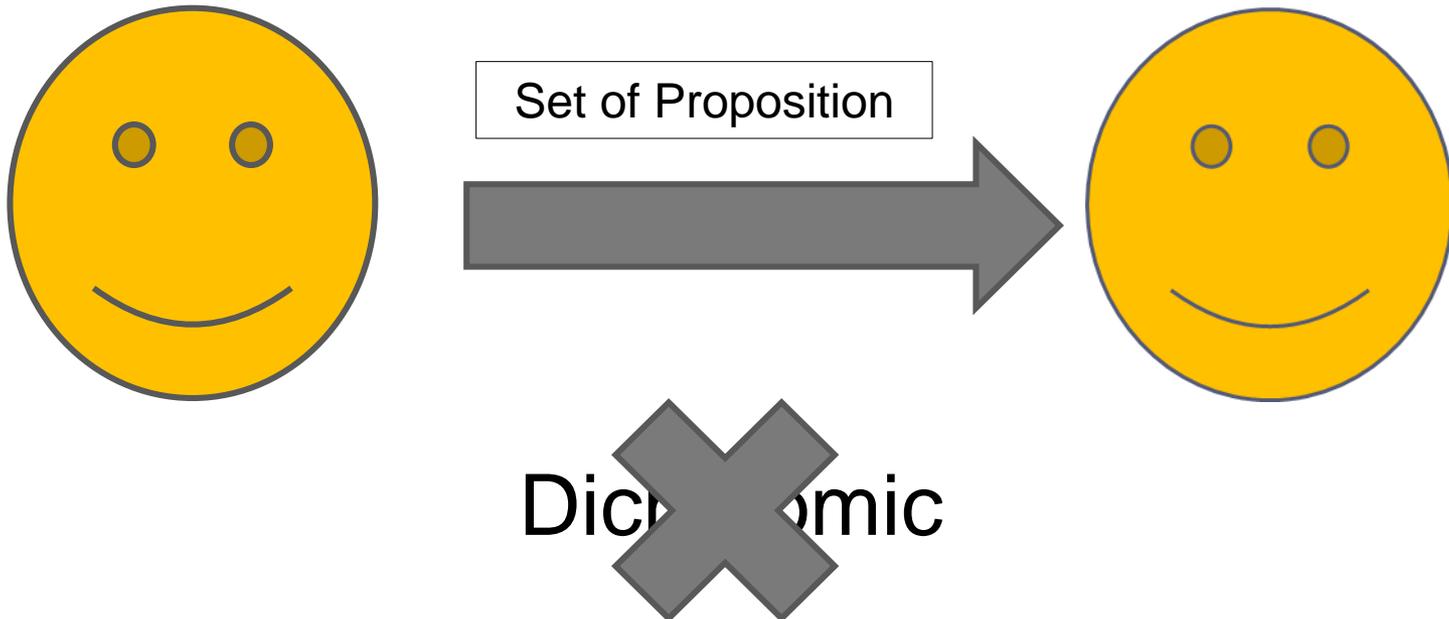


The sense of the gestures is not given, but understood, that is, recaptured by an act on the spectator's part. The whole difficulty is to conceive this act clearly without confusing it with a cognitive operation.

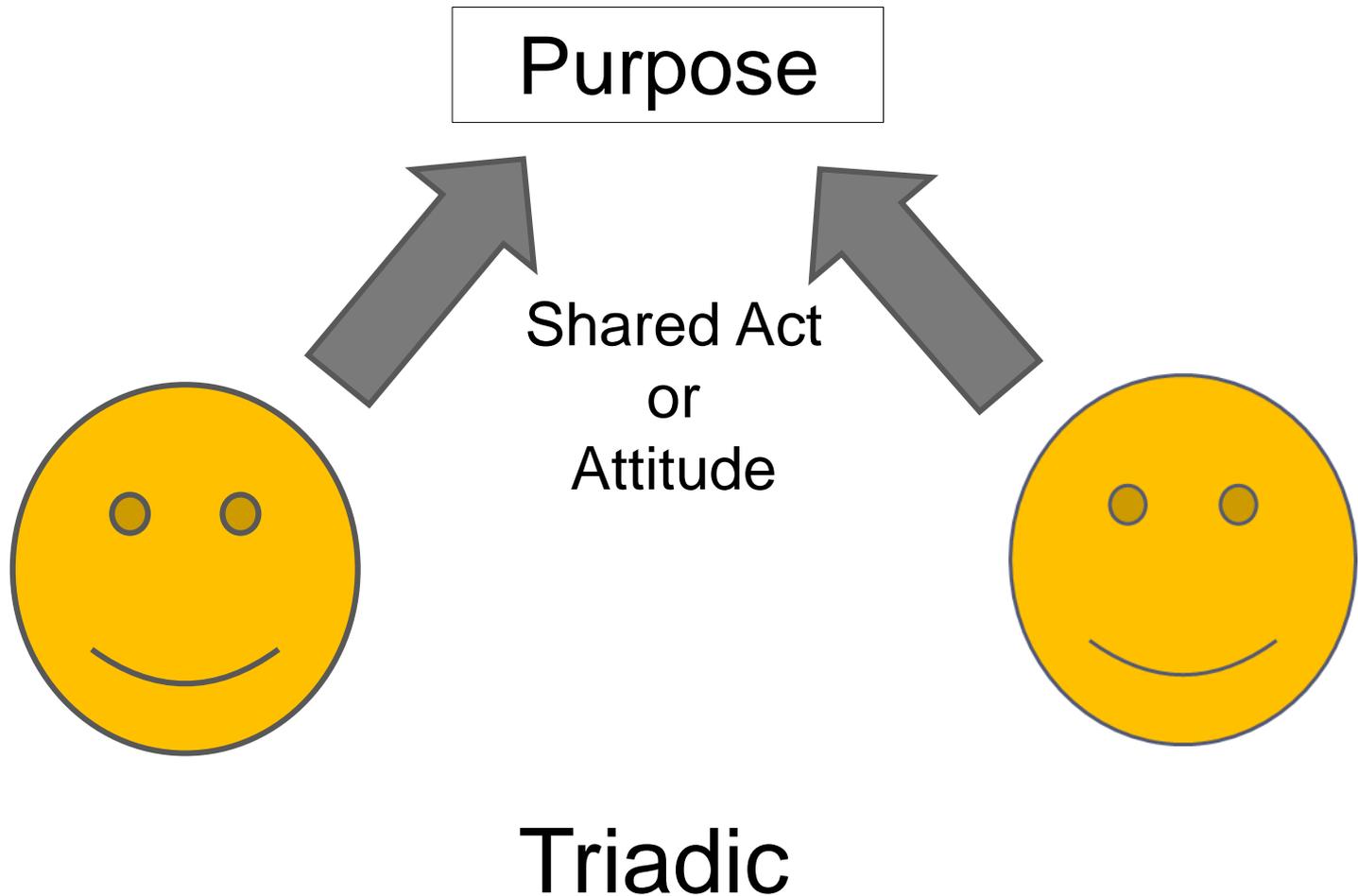
The communication or comprehension of gestures comes about through the reciprocity of my intentions discernible in the conduct of other people. It is as if the other person's intention inhabited my body and mine his.

Maurice Merleau-Ponty, 1945

KNOWLEDGE COMMUNICATION



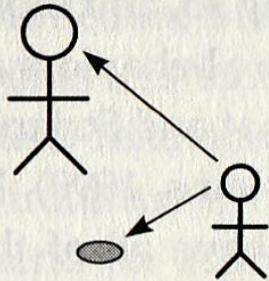
IMITATION: GUILLAUME MODEL



JOINT ATTENTION

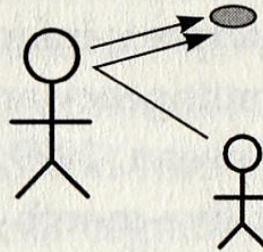


Check attention
(9–12 months)



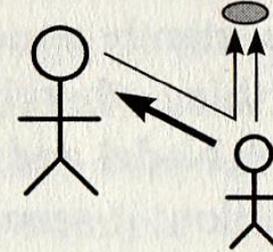
Joint engagement
Social obstacle
Show object

Follow attention
(11–14 months)



Gaze/point follow
Imitative learning
[Social referencing]

Direct attention
(13–15 months)



Imperative pointing
Declarative pointing
[Referential language]

Figure 3.1 Three main types of joint attentional interaction and their ages of emergence in the study by Carpenter, Nagell, and Tomasello (1998). (Approximately 80 percent of subjects in designated age ranges.)

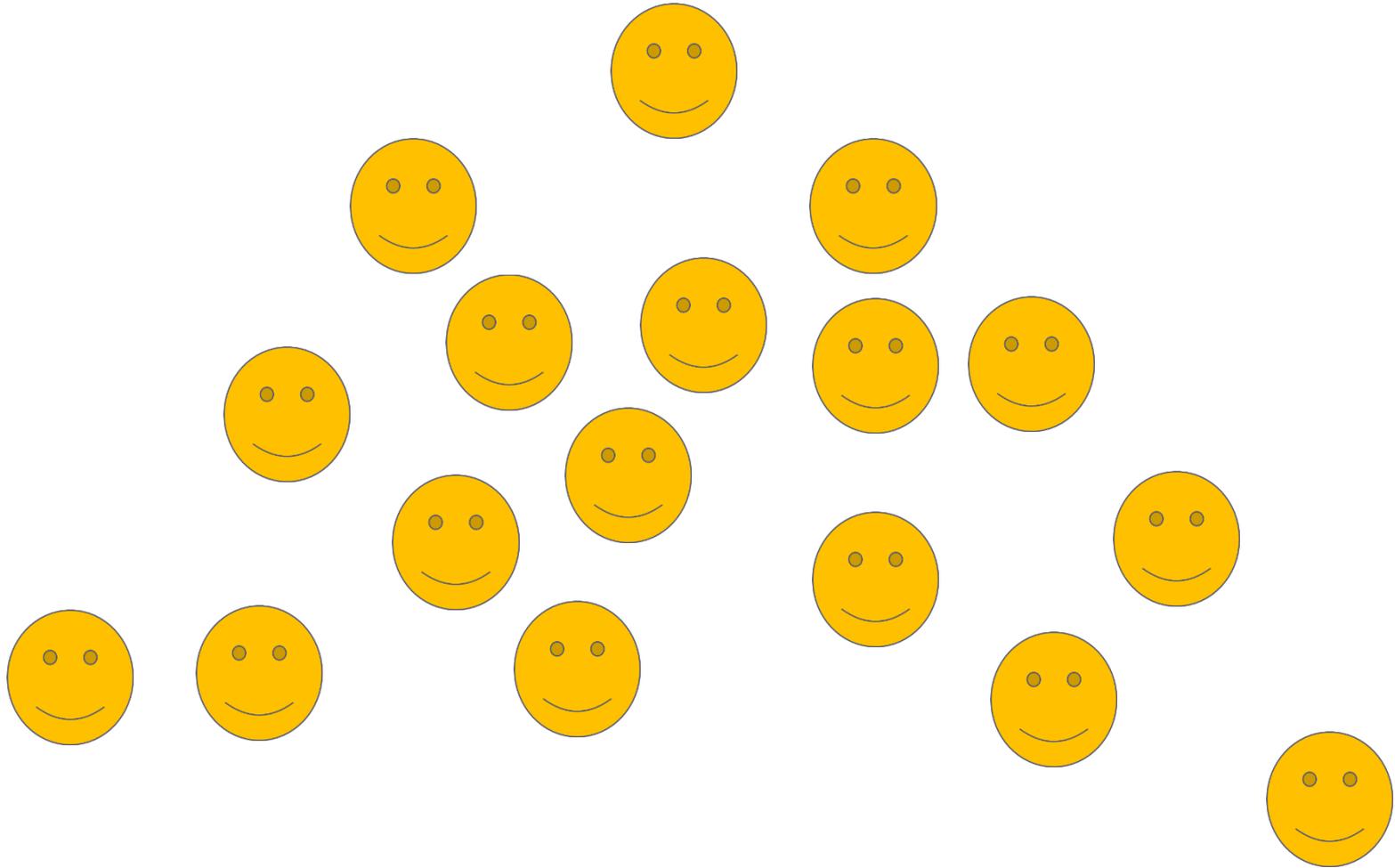
Michael Tomasello, 1999

WE LIVE IN AN IMITATIVE COMMUNITY

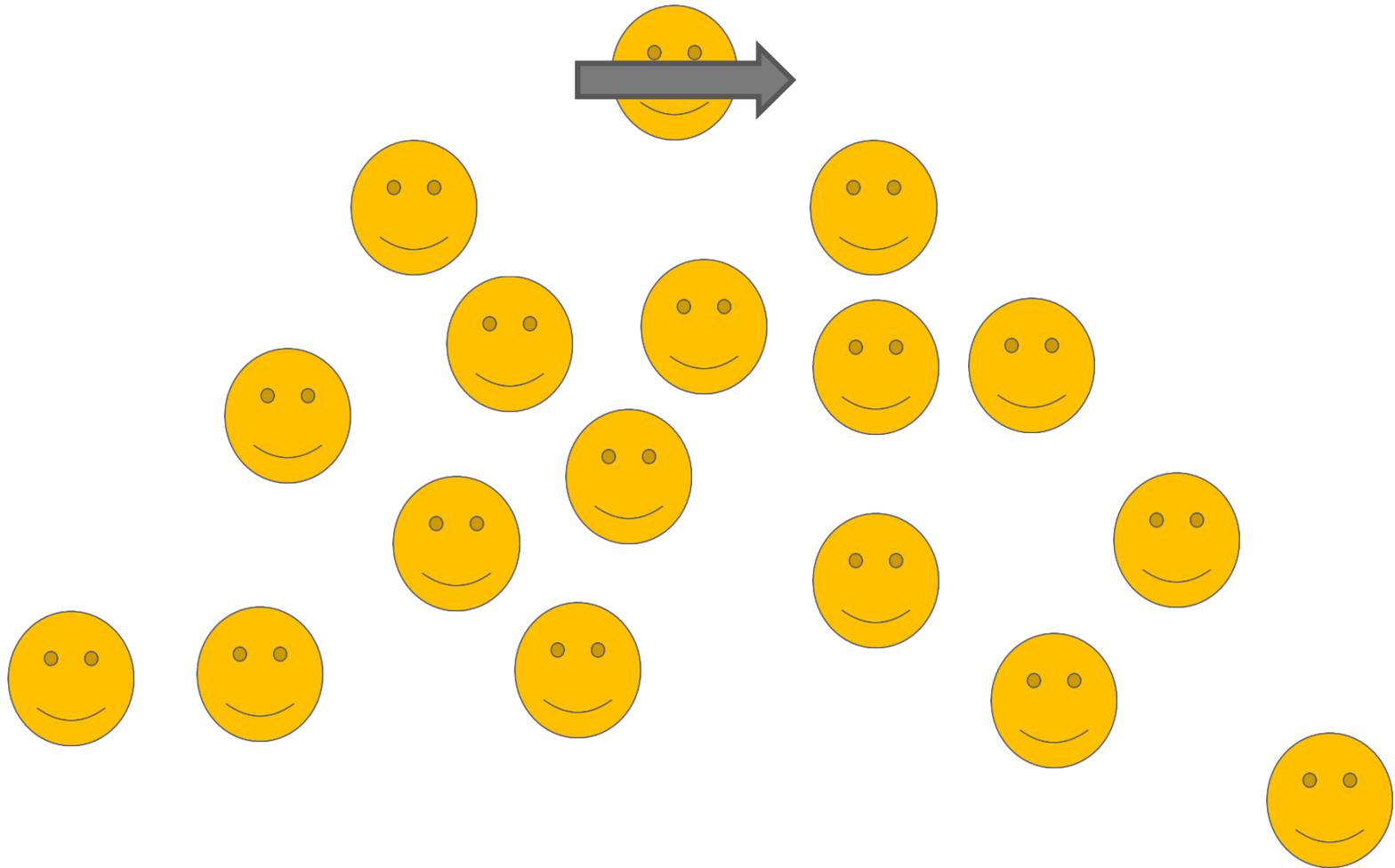


**Basic
Ability =
Empathy**

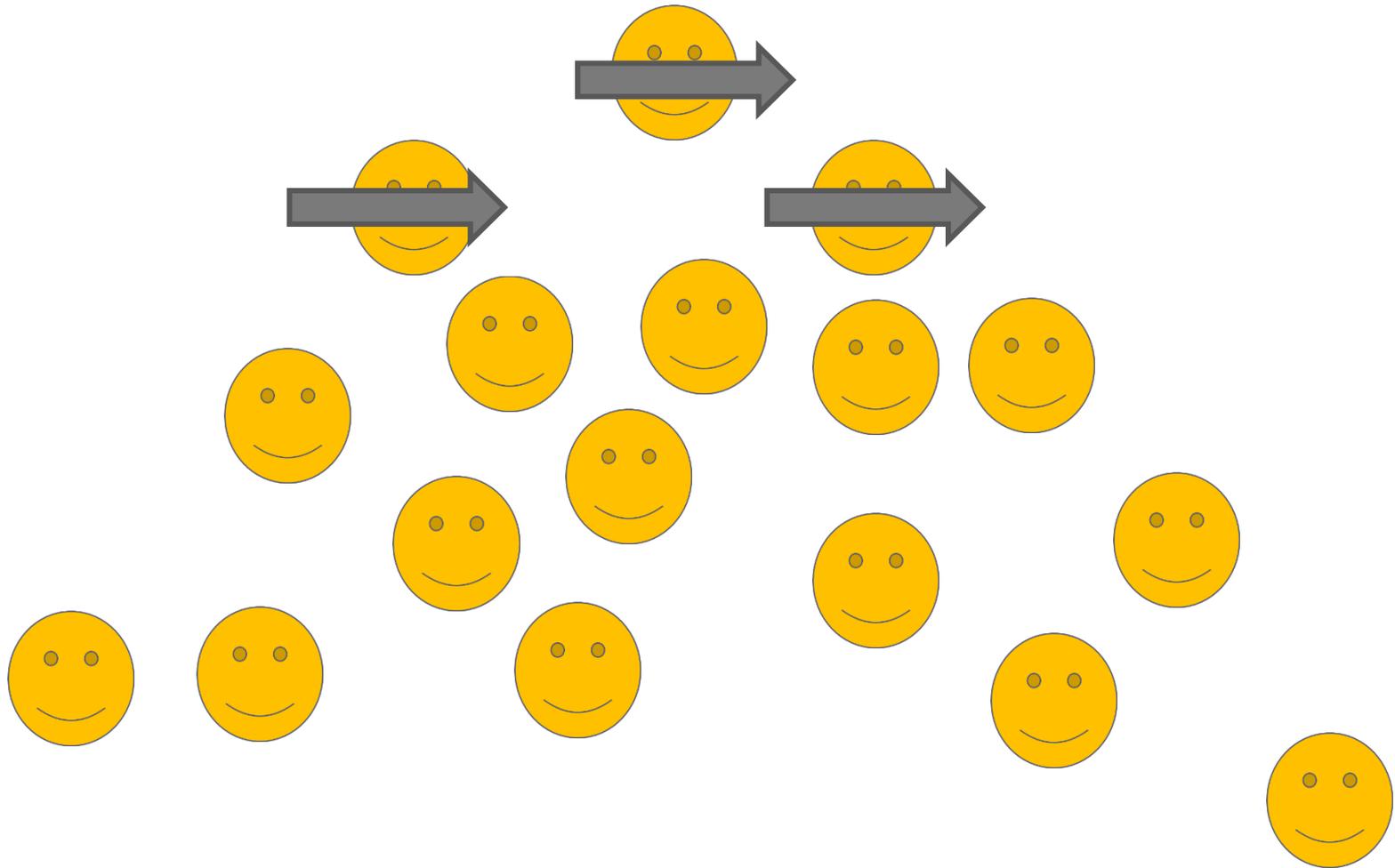
CULTURAL INHERITANCE



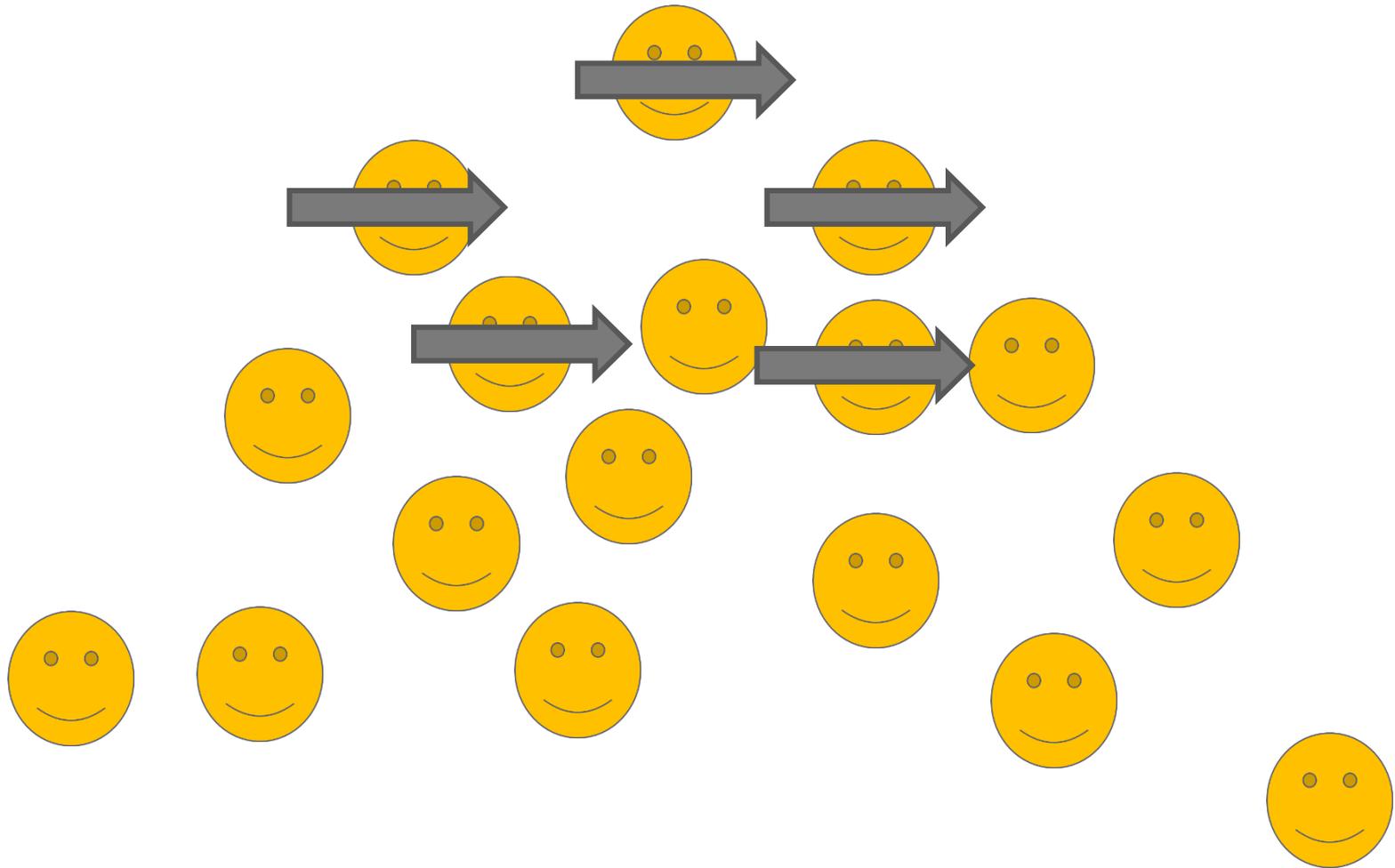
CULTURAL INHERITANCE



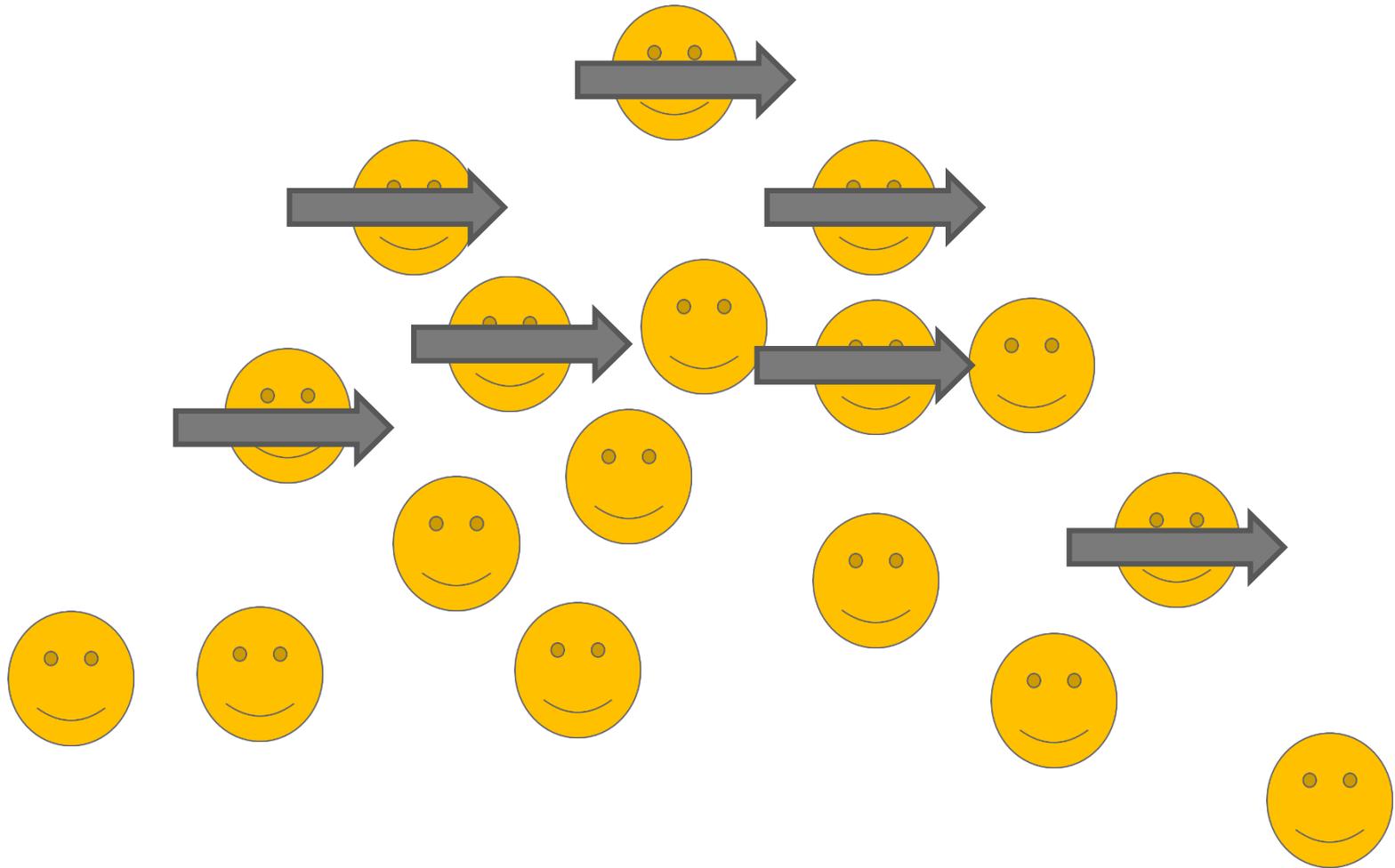
CI = INTENTIONALITY SHARING PROCESS



CI = INTENTIONALITY SHARING PROCESS



CI = INTENTIONALITY SHARING PROCESS



IMITATION AND SOCIETY



Invention and imitation are, as we know, the elementary social acts. But what is the social substance or force through this act is accomplished and of which it is merely the form ?

In other words, what is invented or imitated ?

The thing which is invented, the thing which is imitated, is always an idea or a volition, judgement or a purpose, which embodies a certain amount of **belief and desire**.

Jean Gabriel Tarde, 1890

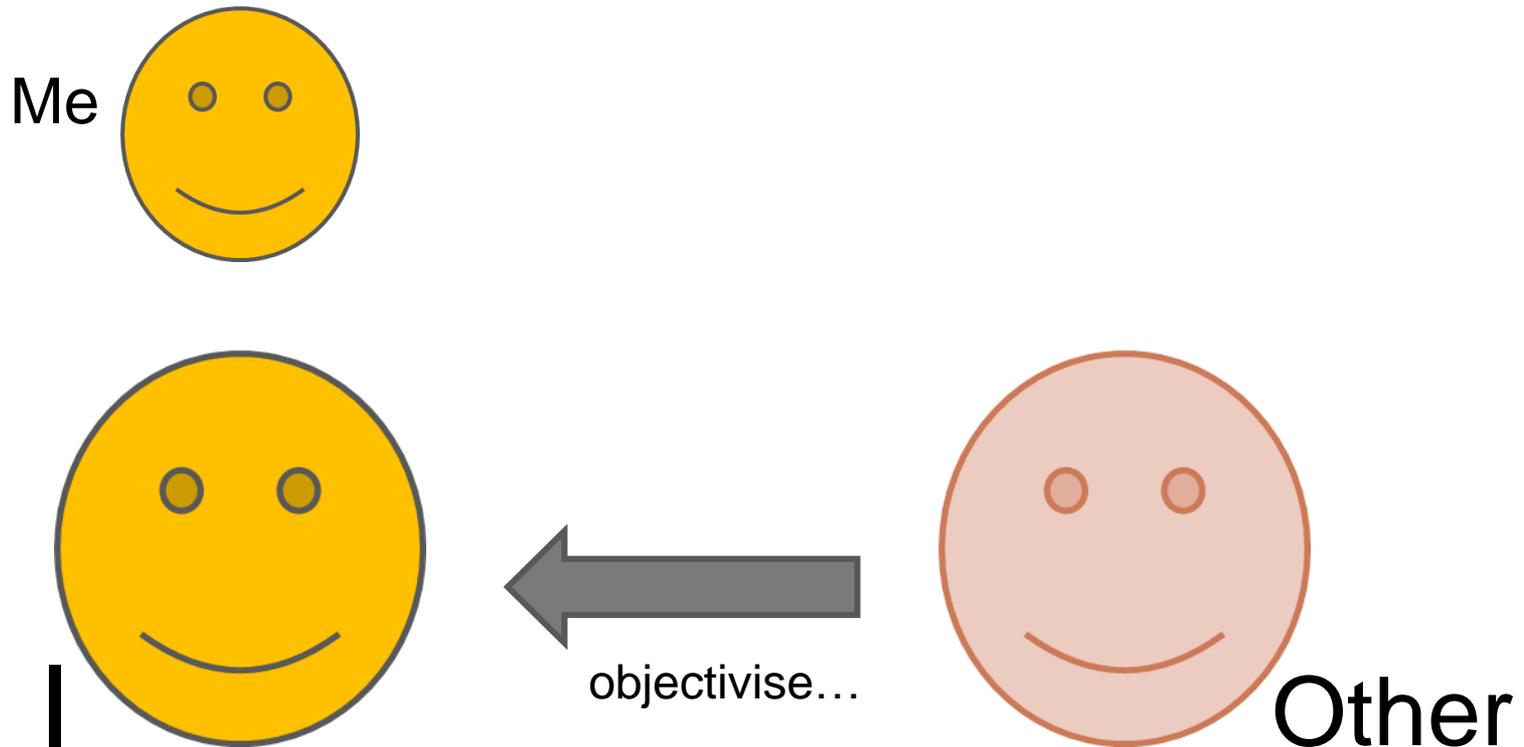
§ 3

The “I” and the “me” as
phases of the self

RESPONSE TO OTHERS / OURSELVES



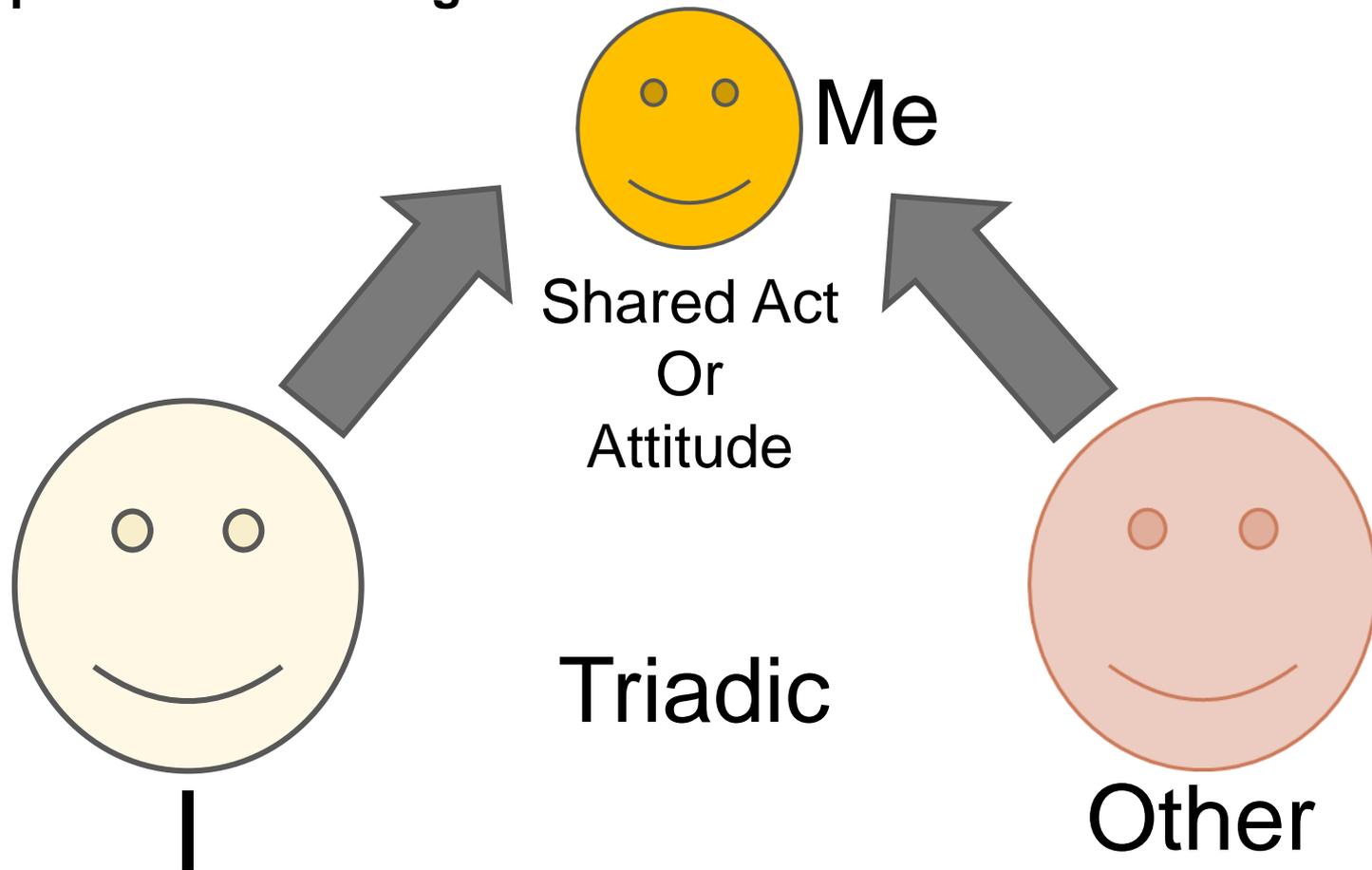
Infants imitate not only other bodies but also the response-attitudes toward themselves.



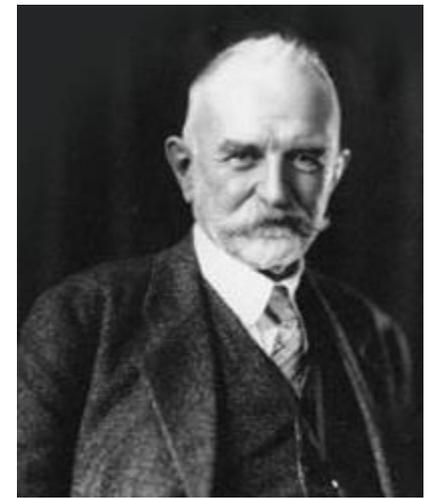
RESPONSE TO OTHERS / OURSELVES



Infants imitate not only other bodies but also the response-attitudes against themselves.



I - ME



“I” = Experiencing-Self

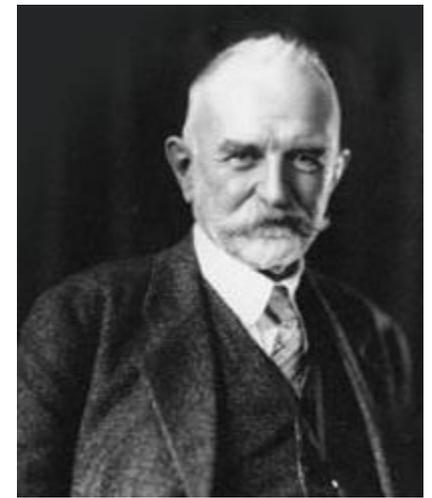
“Me” = Experienced-Self

The very sounds, gestures, especially vocal gestures, which man makes in addressing others, call out or tend to call out responses from himself.

The mechanism of thought, in so far as thought uses symbols which are used in social intercourse, is but an inner conversation.

G.H. Mead (1913)

I - ME



“I” = Experiencing-Self

“Me” = Experienced-Self

The child can think about his conduct as good or bad only as he reacts to his own acts in the remembered words of his parents.

G.H. Mead (1913)

The “I” is the transcendental self of Kant.

G.H.Mead (1912)

§ 4

Robots' Educational Effect on People

EMPATHY WITH ROBOTS ?

Some psychological experiment proved that:

Child can follow robots' sight-line

Meltzoff et al. , 2007

**At least potentially, child, robot, and an object can make the
triadic relation of imitation:**

Humanoid robot could be our role model ?

EMPATHY WITH ROBOTS ?

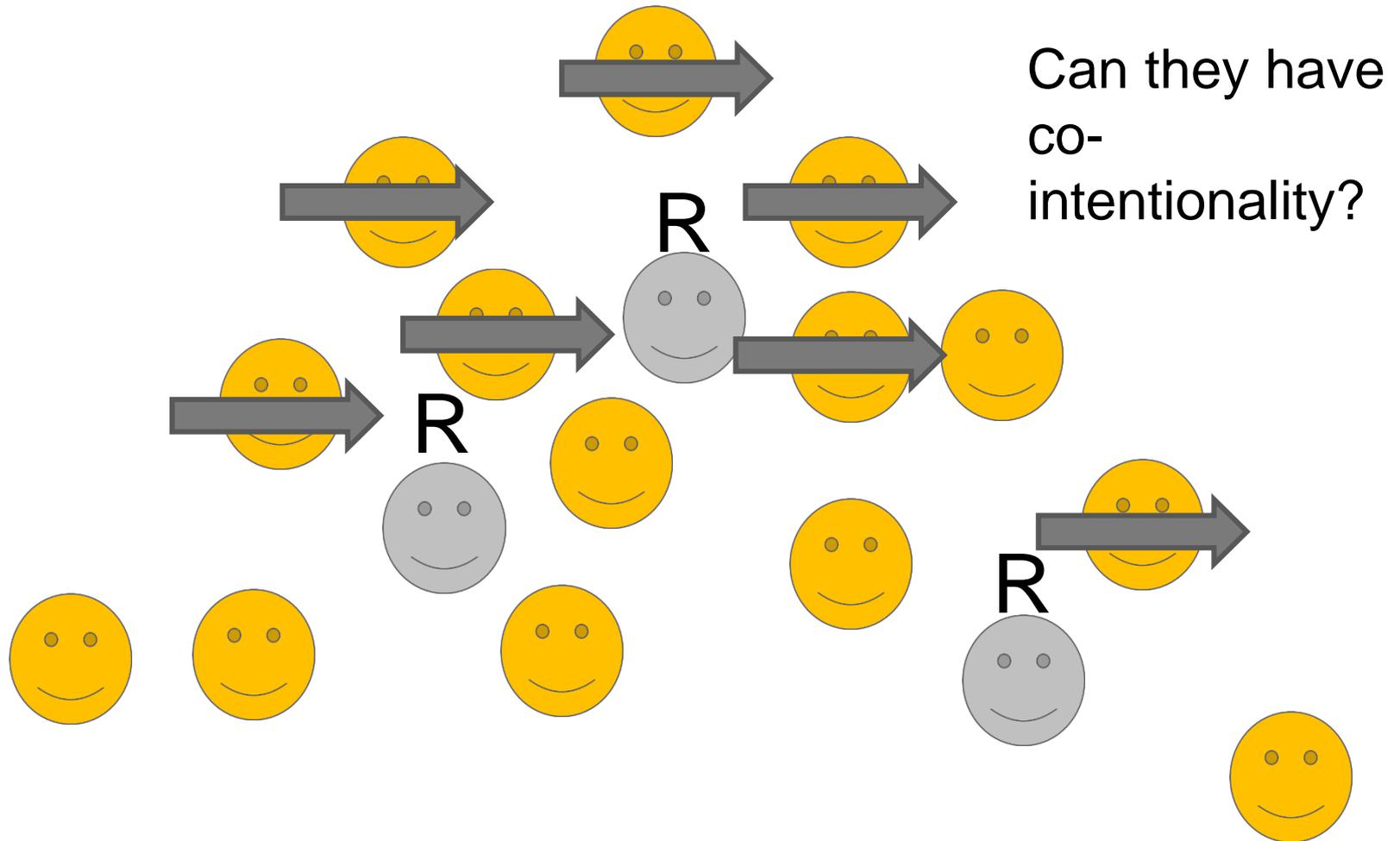
The condition for living together with robots:

**Human and robots should share
“co-intentionality.”**

Naoyuki Osaka, 2015

What kind of co-intentionality should we design for robots ?

CI = INTENTIONALITY SHARING PROCESS



EMPATHY WITH ROBOTS ?

We should accentuate that:

1. Infants' imitation is an automatic process.
2. Engineers have to design humanoid as their role model.
3. Trainers for humanoids are necessary.

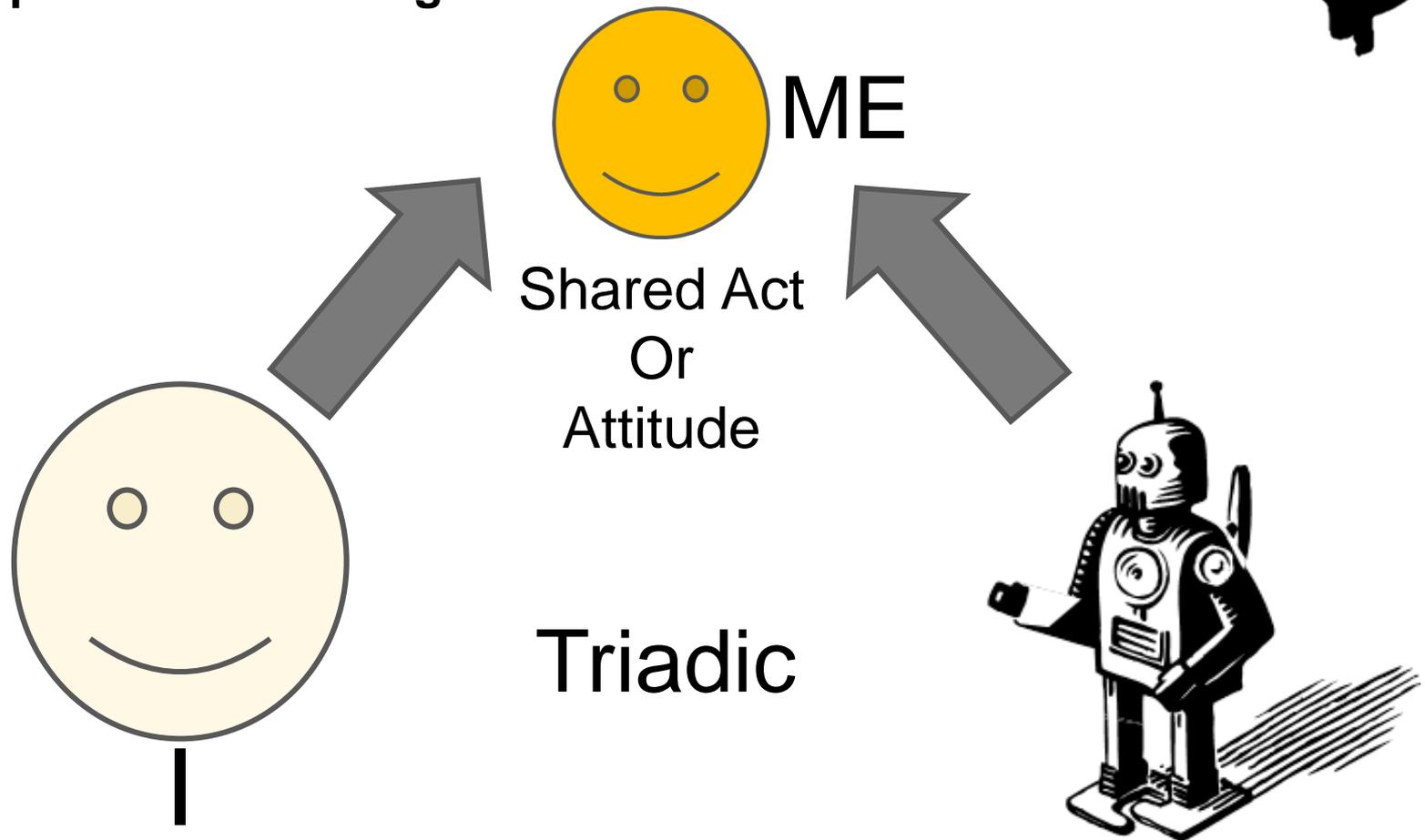
ROBOTS' ATTITUDE TOWARD HUMAN



RESPONSE TO OTHERS / OURSELVES



Infants imitate not only other bodies but also the response-attitudes against themselves.



SELF-CONSCIOUSNESS MAKER?

Robots' attitude toward infants will have a profound effect on the process of making their self-consciousness.

They would assimilate into robots' attitude easily.

Engineers should design robots as “good reactor.”

(Can they?)

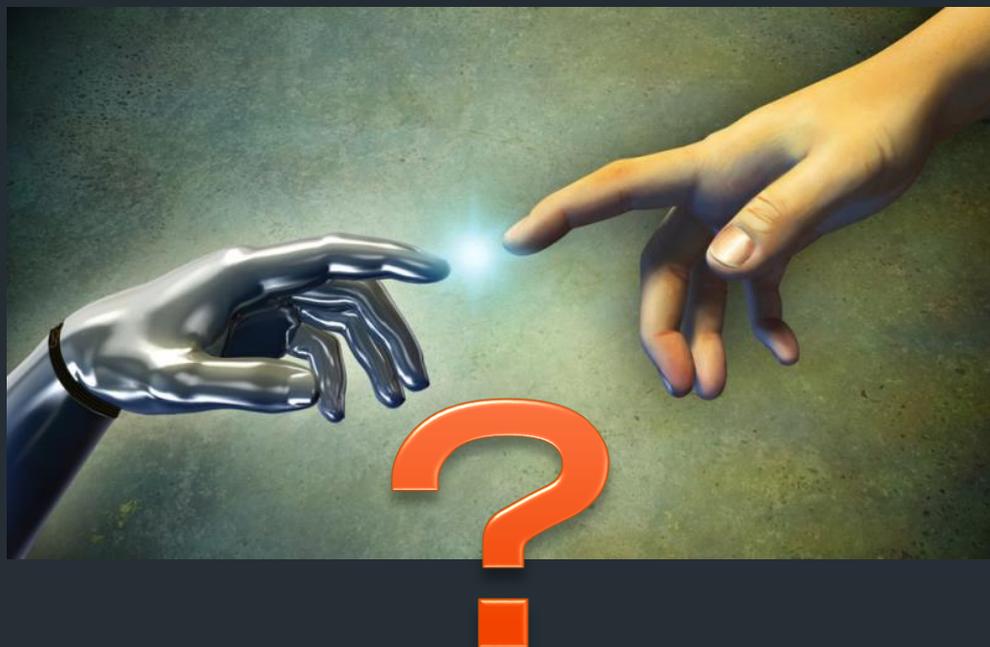
HUMANOID: NECESSARY ENOUGH?

“Dad, do you know the reason why I don’t want to become a dog ? ”

“Because I don’t know how to swing the tail.”

In Rizzolatti 2006





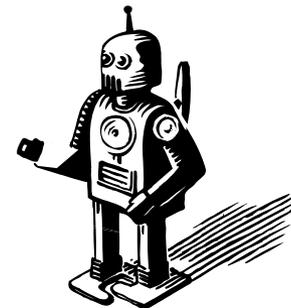
§ 5

Concluding Remarks

CONCLUDING REMARKS

- **Human-shaped robots could have a big cultural impact on our society.**
- **Early exposure to the humanoids could be dangerous.**
- **Our generation has a big responsibility to introduce humanoid robots to the society or our domestic settings, because of babies who automatically start to imitate them and cannot refuse to do that.**

THANK YOU FOR YOUR ATTENTION!



kh-honda@kanazawa-med.ac.jp



AMED

希少難治性脳・脊髄疾患の歩行障害
に対する生体電位駆動型肢装着型補
助ロボット(HAL-HN01)を用いた新た
な治療実用化のための多施設共同医
師主導治験
【研究代表: 中島孝(国立新潟病院)】

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