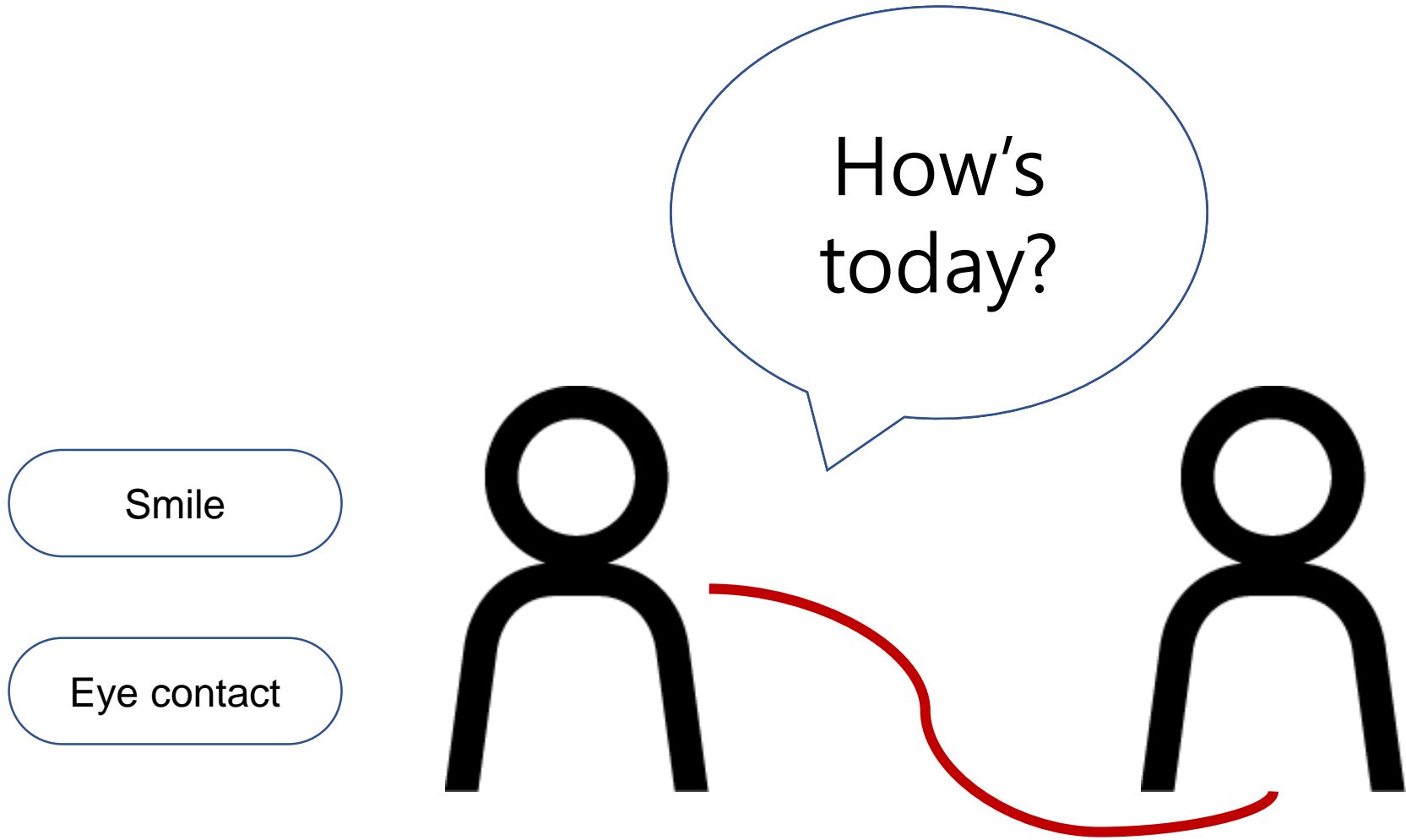
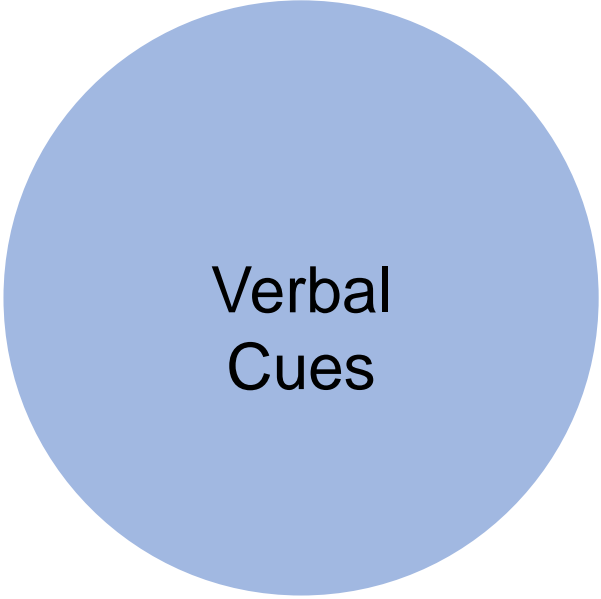


Verbal and Nonverbal Greetings
as a Unit of Social Interaction between Human and Robot

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Ewha Womans University, South Korea

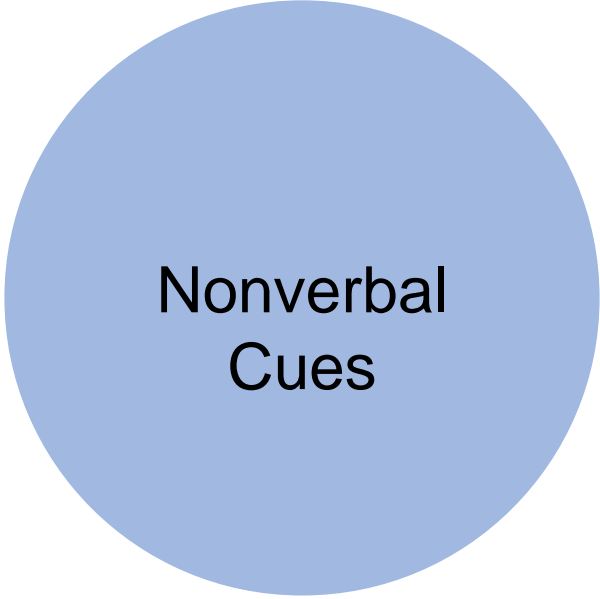


Social Cues



Verbal Cues

- Spoken languages
- Written languages

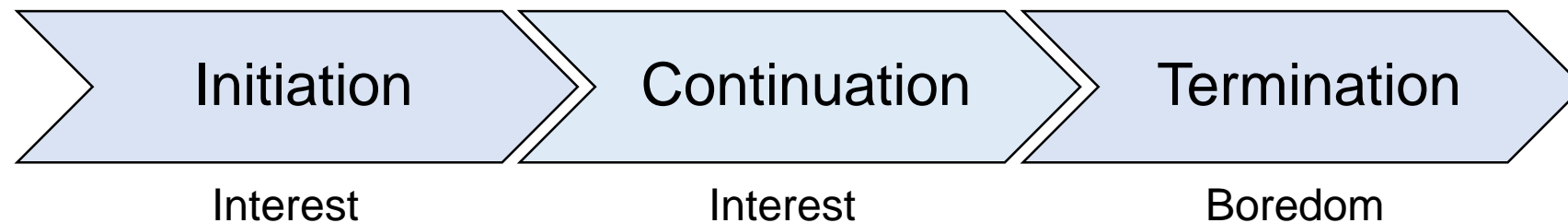


Nonverbal Cues

- Facial expressions
- Gestures
- Postures

Social Interaction

- The way mutually influencing one another
- Involving personalities or social systems
- 2 types of social interaction
 - ① Focused interaction: (becoming) familiar, common goal
 - ② Unfocused interaction: unfamiliar, uncommon goal
- 3 steps of social interaction



Bardis, P. D. (1978) Social interaction and social processes. *International Behavioral Scientist*, 54, pp.147–167.

Fichten, C. S., Tagalakis, V., Judd, D., Wright, J., Amsel, R. (1992) Verbal and nonverbal communication cues in daily conversations and dating. *The Journal of Social Psychology*, 132, pp.751-769.

Social Cues in Each Interaction Unit

		Social Cues	
		Verbal	Nonverbal
Interaction Unit	Initiation (Interest)	Add to conversation Ask questions Call somebody's name Say hello	Establish eye contact Smile Move closer Clear one's throat
	Continuation (Interest)	Make long utterances Ask personal questions Agree with other Suggest an alternatives	Nod head Laugh Touch other Look Intensely
	Termination (Boredom)	Make short utterances Give closed-ended responses Make superficial talk End conversation	Look away Turn away Move away Yawn

Greetings

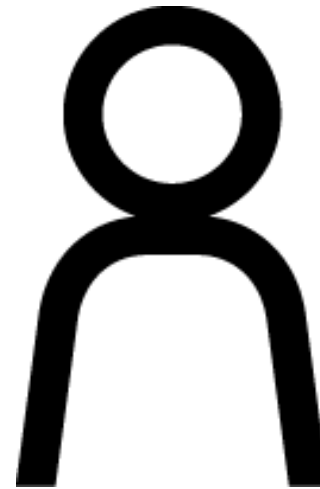
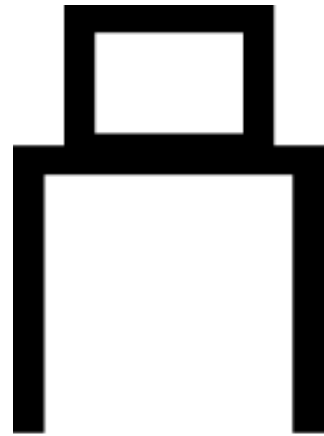
- Unit of social interaction
 - important function in the management of relations between people
 - affected by personalities or social systems
 - 2 types: focused(prolonged) greetings, unfocused(fleeting) greetings
 - a kind of signal by exchanging of utterances or gestures
- Conditions
 1. when a person runs across others
 2. at least two people express interest

Verbal vs. Nonverbal Greetings

Nonverbal > Verbal Greetings

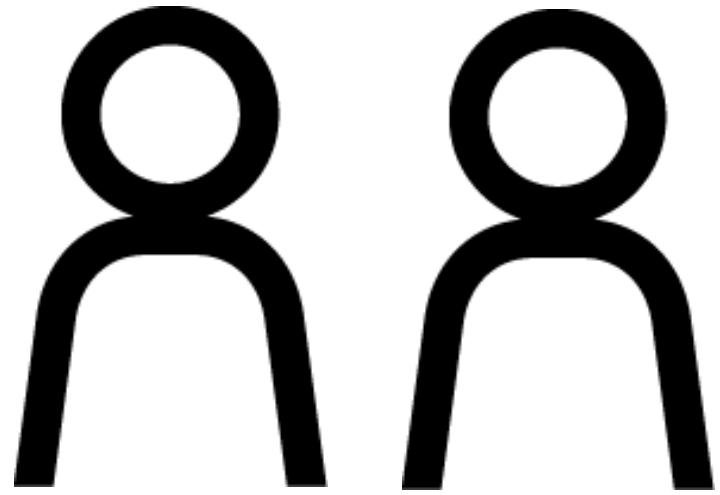
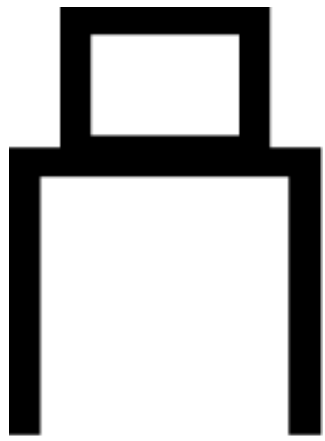
Wave

Body
Orientation



Heenan, B., Greenberg, S., Manesh, S. A., & Sharlin, E. (2004). Designing social greetings in human robot interaction. In *Proceedings of the ACM SIGCHI International Conference on Designing Interactive Systems, DIS'14* (pp. 855-864).

Satake, S., Kanda, T., Glas, D. F., Imai, M., Ishiguro, H., & Hagita, N. (2008). How to approach humans?-Strategies for social robots to initiate interaction. In *Proceedings of the 4th ACM/IEEE International Conference on Human-Robot Interaction, HRI'09* (pp. 109-116).

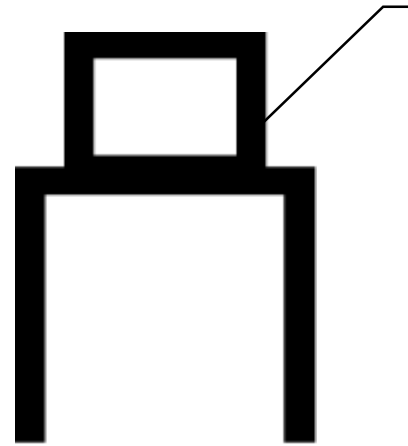


Verbal vs. Nonverbal Greetings

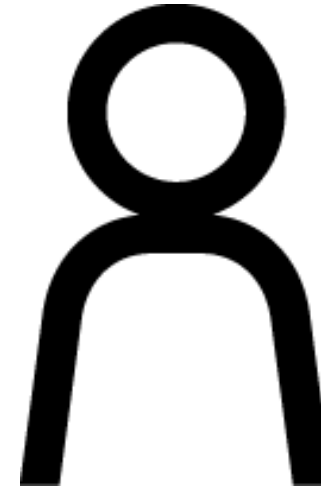
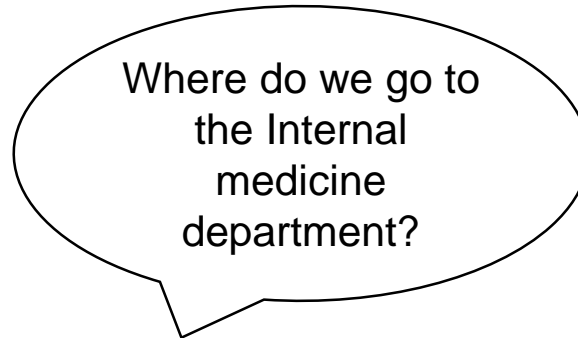
[Scenario]

Hospital

Reception




Social Robot



Verbal vs. Nonverbal Greetings

Verbal { ① Ask a question "May I help you?"
② Add to conversation "Go to the second floor."

Nonverbal { ③ Eye contact 
④ Clear one's throat (ahem)

Dependent Variable (Scale)

Items

Sociability
(Cronbach's $\alpha=.96$)

gloomy / cheerful
unfriendly / friendly
negative / positive
cold / warm
bad / good

Intelligence
(Cronbach's $\alpha =.97$)

incompetent / competent
ignorant / knowledgeable
irresponsible / responsible
unintelligent / intelligent
foolish / sensible

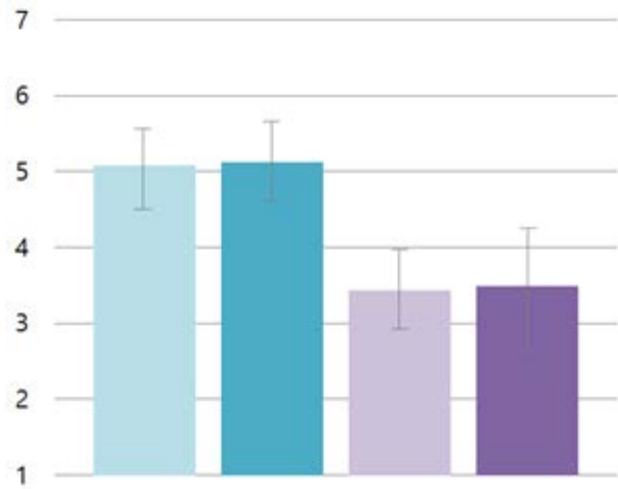
Politeness
(Cronbach's $\alpha =.98$)

irresponsible / responsible
Unprofessional / professional
unhelpful / helpful
insincere / sincere
inconsiderate / considerate
impolite / polite
unfriendly / friendly

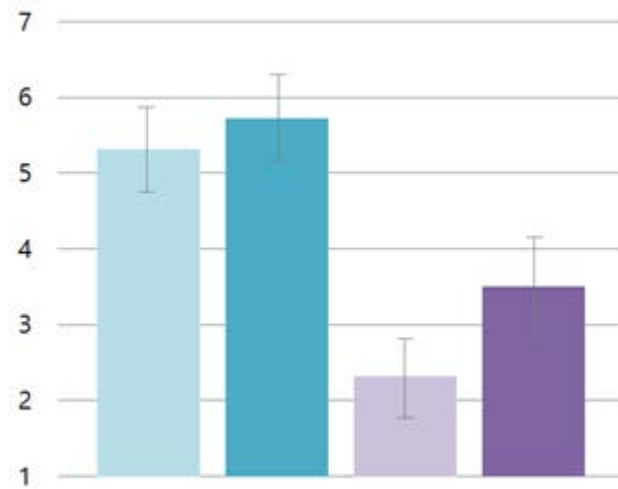
Likability
(Cronbach's $\alpha =.97$)

dislike / like
unfriendly / friendly
unkind / kind
unpleasant / pleasant
awful / nice

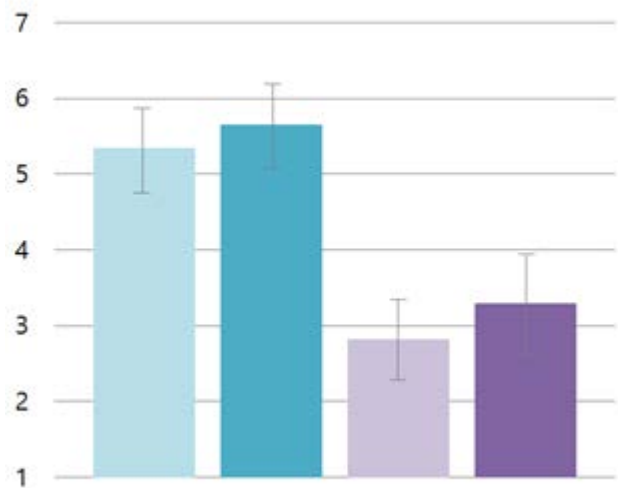
Sociability



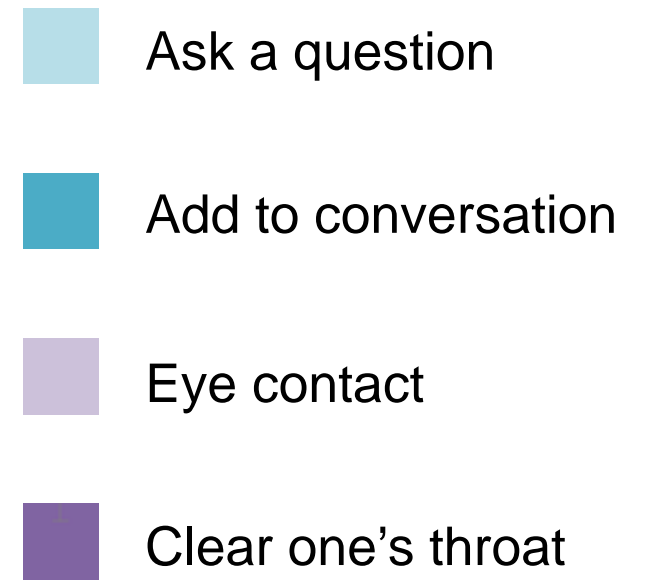
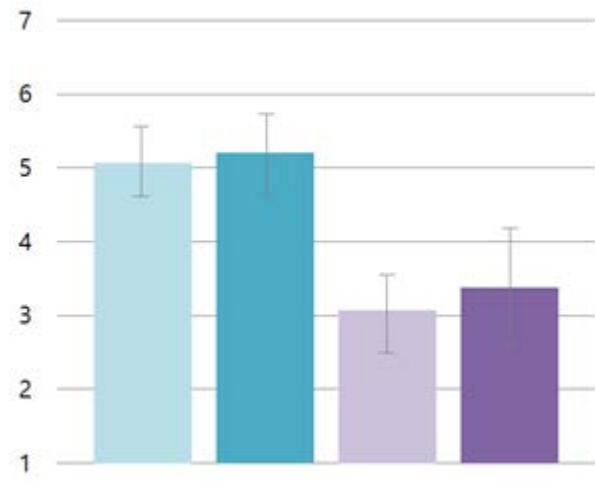
Intelligence



Politeness

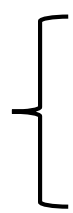


Likeability



HRI Design Guideline

Verbal



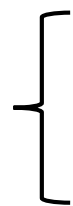
① Ask a question

“May I help you?”

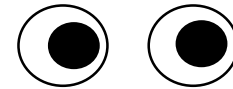
② Add to conversation

“Go to the second floor.”

Nonverbal



③ Eye contact

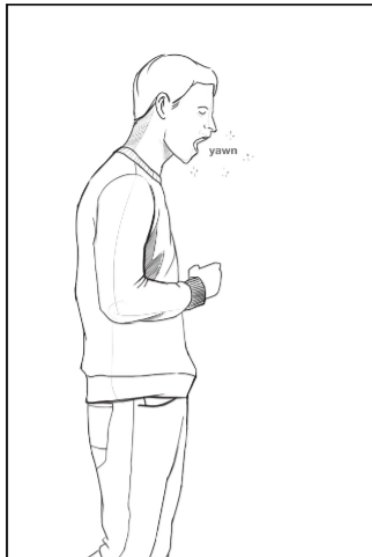
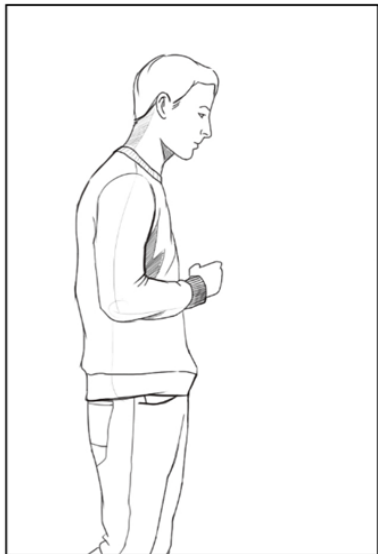


④ Clear one's throat

(ahem)

HRI Scenario Cards

		Social Cues	
		Verbal	Nonverbal
Interaction Unit	Initiation (Interest)	Add to conversation Ask questions Call somebody's name Say hello	Establish eye contact Smile Move closer Clear one's throat
	Continuation (Interest)	Make long utterances Ask personal questions Agree with other Suggest an alternatives	Nod head Laugh Touch other Look Intensely
	Termination (Boredom)	Make short utterances Give closed-ended responses Make superficial talk End conversation	Look away Turn away Move away Yawn



THANK YOU