

Study of Nao's Impact on a Memory Game

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Context

The Simon's game is a memory game which is usually played alone. Our experiment aimed to measure the added value of a robot as a game partner. We compared three conditions: both tablet and robot (C1), robot alone (C2), tablet alone (C3).



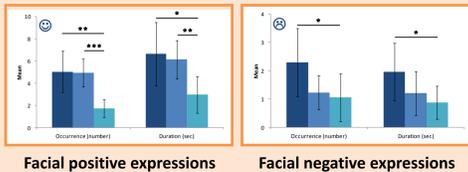
GAME CONCEPT

Game is composed of 3 rounds
3 colors, 7 colors, and 11 colors



In each round, tablet or robot shows a sequence of colors which must be reproduced by the participant. The player adds a new color after each round.

OBSERVATION



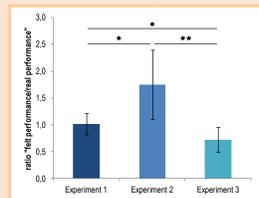
Facial positive expressions

Facial negative expressions

Recording of following behaviors

Back posture & sitting position, spatial distance "participant-device", facial positive and negative expressions, gaze, vocal & verbal utterances, self-centered gestures

Participant's subjective performance compared to real performance



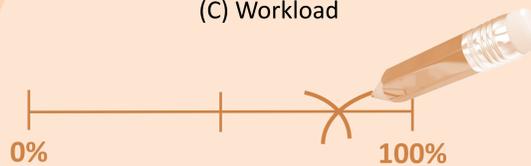
Ratio

<1 ← Perfect concordance → >1
Feels less successful than in reality Feels more successful than in reality

PERFORMANCE

12 QUESTIONS ABOUT

- (A) User's enjoyment
- (B) Game acceptability
- (C) Workload



No difference between the 3 conditions.

(A) & (B) tends to be higher with the robot alone.

QUESTIONNAIRE

PARTICIPANTS

47 ♀ 20 ♂
Mean age: 34.7 yo (8-62)

N= 23 (20 ♀/3 ♂) 39.0 yo (19-60)
N= 23 (15 ♀/8 ♂) 27.9 yo (19-62)
N= 22 (13 ♀/9 ♂) 37.2 yo (8-59)



Condition 01
HUMAN ROBOT + TABLET

Robot guides the game + presses tablet buttons



Condition 02
HUMAN ROBOT

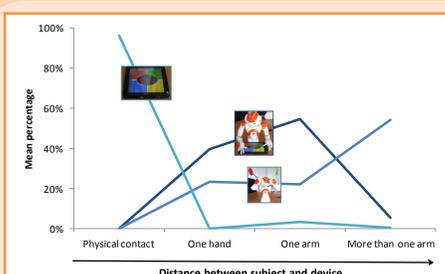
Robot shows colored signs. Interaction with voice



Condition 03
HUMAN TABLET

Robot voice used to interact

3 CONDITIONS



- The robot is not perceived as stressful or annoying and is not an additional difficulty.
- Personal space increased in the presence of the robot. It could be a form of respect.
- When the robot is used alone, more participants want to have the game at home and subjective performance is better than reality.
- Participants have more positive facial expressions in the presence of the robot.
- Interacting with both tablet and robot simultaneously seems to be a problem for people.

Discussion & Conclusion

