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Implementation strategies of cooperative robots via acceptance manipulation

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BACKGROUND

- cooperative robots are working together with human workers in the same workspace
- technological readiness for safety issues is given
- unlike fully automated systems cooperative robots are not yet integrated in the industrial process
- acceptance among the employees is a crucial factor for success
- especially the early state of dealing with a new robot is important for the acceptance

The „unified theory of acceptance and use of technology“ (Venkatesh, Morris, Davis, & Davis, 2003) was applied to examine the acceptance of the cooperative robot (fig. 1) by manipulating the manner of informing about it to support the entering of this new form of technology for a successful rollout.

FIG. 1. THE INVESTIGATED ROBOT.

DESIGN

- experimental study with two groups, intervention was randomized
- intervention 1: the introduction of the new robot was manipulated (task-oriented vs. user centered perspective)
  2: participants either received the introduction (INT) or the introduction and an additional video (VID) showing the robot in action (INT vs. VID)
- sample (N = 89): 44 male and 44 female students; age 19 – 40 years (*Mdn* = 24)
- variables: affective factors like trust and reactance (Heerink, Kröse, Evers, & Wielinga, 2010), parts of the UTAUT (Venkatesh et al., 2003) and sociocultural questions have been collected

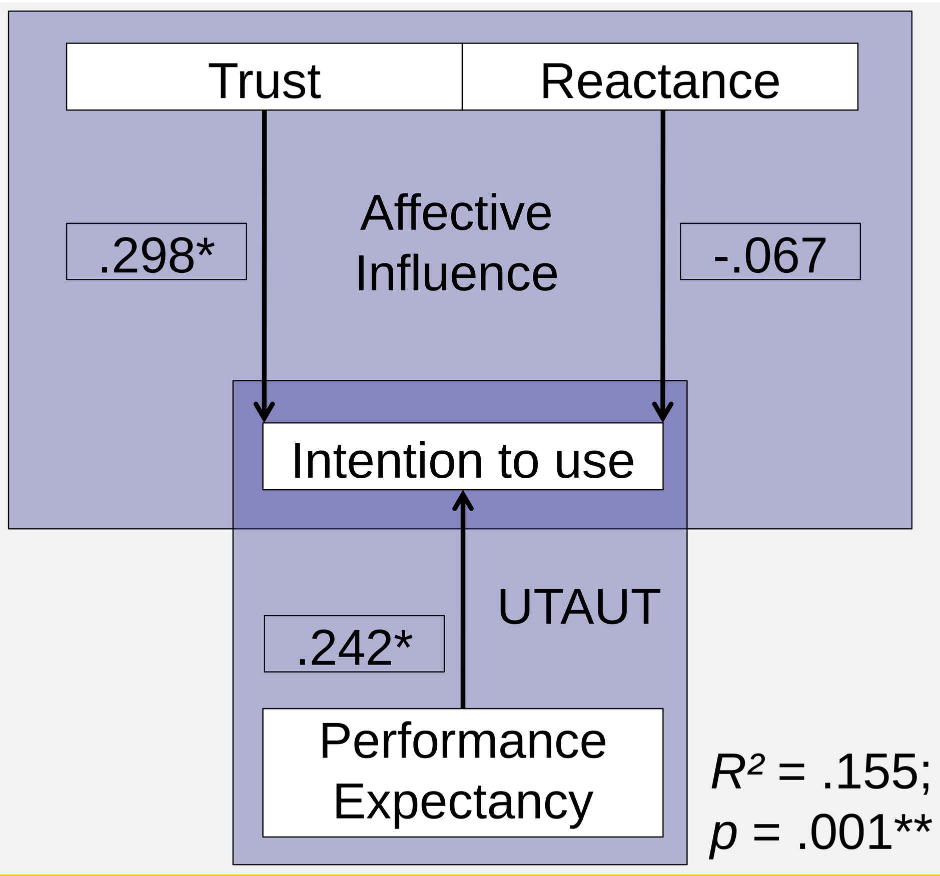

FIG. 2. EXAMINED VARIABLES.

RESULTS

- no differences occured in sociocultural factors between the groups
- groups with different introductions did not differ in their intention to use the robot (I), trust (T), reactance (R) or performance expectancy (PE)

- affective factors were found to influence I (fig. 2)
- T (β = .298) as affective factor as well as PE (β = .242) as part of the UTAUT significantly increased I

- VID (*Mdn* = 3.5) produced significantly higher ratings for social influence than INT (*Mdn* = 3) (fig. 3)
  U = 589.0; z = -2.23; p = .025; r = -.25

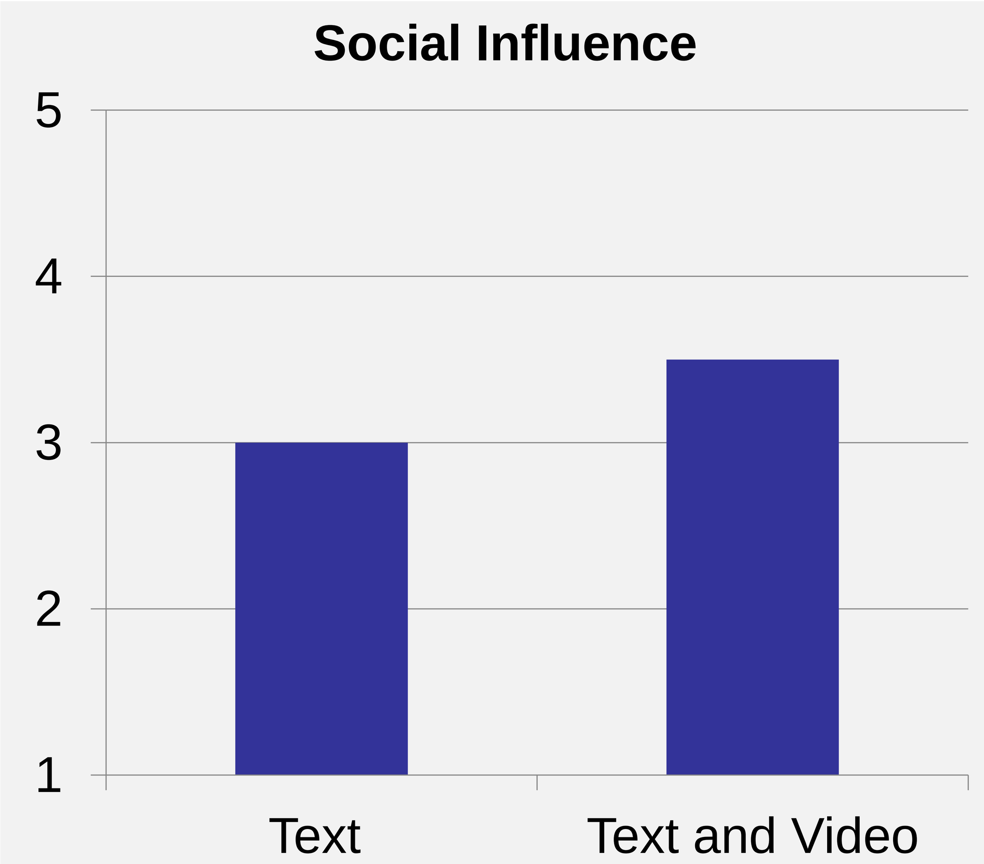

FIG. 3. SOCIAL INFLUENCE DIFFERS.

DISCUSSION AND FUTURE RESEARCH

- affective factors like trust can be a useful extension to the UTAUT
- the way information is provided is a key to reach acceptance in the early state of working with a robot
- it is necessary to further investigate the effect of providing additional information on acceptance in real life settings (in progress)
- due to the small sample size the results need further replication

LITERATURE

- Heerink, M., Kröse, B., Evers, V., & Wielinga, B. (2010). Assessing acceptance of assistive social agent technology by older adults: The almere model. *Int. S. Soc. Robot, 2,* 361-375.
- http://www.zacobria.com (image fig. 2)
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS, 27(3),* 425-478.

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