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Collaborative learning in healthy ageing: Does interlocutor identity matter?

Catherine J. Crompton a, Maria K. Wolters b & Sarah E. MacPherson a

a Human Cognitive Neuroscience, Department of Psychology, University of Edinburgh, b School of Informatics, University of Edinburgh.

Introduction
As we get older, our learning and memory abilities decline. Learning collaboratively with a familiar person may help improve older adults’ learning and memory performance. We tested younger and older adults learning with familiar and unfamiliar partners, and older adults learning with perceived Human and Computer partners. We explored whether interlocutor identity influences performance in collaborative learning, or whether collaboration alone is sufficient for accurate learning.

Method

Study 1
Participants: n = 48; 24 younger (mean 21.25, SD = 2.69) and 24 older (mean = 68.88, SD = 7.19).
Participants completed the task with a familiar partner and with a stranger, once as a Director and once as a Matcher.
The Director’s cards were set in a specific order, which they communicated to the Matcher. Pairs worked together to create and learn referential labels over nine trials.

Study 2
Participants: 24 older (mean 70.46 years, SD = 7.34) adults.
Participants completed a similar matching task with a Wizard of Oz computer program assuming the role of Director.
“Human” condition: participants told communicating with a Research Assistant in the next room, and the program ran using natural speech recordings. Deception was successful.
“Computer” condition: participants heard the same instructions in a synthetic speech voice.
Nine trials were completed in each condition collapsed into 3 trial bins.

Results

Study 1
Time taken to complete the task: Age group and trial showed a significant interaction, with older adults showing a greater decrease in the time to complete compared with younger adults ($\beta = 44.72$, SE = 6.3; $t = 7.09$). Participants completed the task in similar time with both familiar and unfamiliar partners ($\beta = 9.40$, SE = 6.84; $t = 1.34$).
Number of words: A significant interaction between age group and trial indicates that older adults showed greater decreases in word use than younger adults ($D: \beta = 55.38$, SE = 15.9, $t = 3.58$; $M: \beta = 27.52$, SE = 7.37, $t = 3.73$). Participants used a similar number of words with both familiar and unfamiliar partners ($\beta$ = 15.76, SE = 15.57, $t = 1.01$; M $\beta$ = 0.85, SE = 5.85, $t = -0.14$).

Study 2
When interacting with the “Computer”, older adults were initially quicker, but by final trials were significantly quicker when they believed they were interacting with a human (Figure 5).
There was also a trail by interlocutor identity interaction with trial having a greater effect on completion speed with a human partner than a computer partner ($\beta = -17.96$, SE = 4.59, $t = 3.78$).

Conclusions
Within this collaborative learning paradigm, older adults complete the task with similar efficiency to younger adults over multiple trials. Collaborating with a familiar partner does not improve performance compared with an unfamiliar partner. When older adults believe they are interacting with a human, they complete the task more efficiently and accurately than when they believe they are interacting with a computer.

References
[1] Crompton CJ, Wolters MK, Boyle J, Tranel D, Garrod S, Sotillo E, MacPherson SE. Collaborative learning in healthy ageing: Does interlocutor identity matter? A fluctuation score refers to how many times participants matched a different tangram to the same description over the 9 trials. When participants believed they were interacting with a computer, they changed their answers significantly more frequently than when they believed they were interacting with a human ($Z = 26.5, p < 0.01$).

Further information
We are now conducting the same studies using a route learning task based on the Map Task paradigm to explore whether these effects are task specific or generalise to other learning and memory paradigms.
email – catherine.crompton@ed.ac.uk