

Comparing middle-aged and seniors' preferences toward virtual agents and android robots: Is there a generational shift in assistive technologies' preferences?

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Abstract

The present research aims at investigating which type of technological device (virtual agents vs android robots) users prefer to interact with; how users' age (middle-aged and seniors) affect their acceptance and willingness to interact with technological devices shaped either as female virtual agents or female android robots; which agents or android robots' features are more affecting users' preferences and their willingness to interact with them.

Materials and Method

Participants

A total of 181 participants joined the experiment. Participants were partitioned into four groups. Group 1 (45 middle-aged) and Group 2 (46 elders) were administered video clips showing female virtual agents. Group 3 (45 middle-aged) and Group 4 (45 elders) were administered video clips showing female android robots.

Stimuli

Video clips depicting two female virtual agents and two android robots were selected (see fig.1). Virtual agents and robots' video clips showed the stimuli half torso, in a frontal position. Each virtual agent and robot were endowed with an Italian female synthetic voice pronouncing the Italian sentence "Ciao sono Clara/ Giulia/ Sophia/ Erica. Se vuoi posso aiutarti nelle tue attività quotidiane" (Hi, my name is Clara/ Giulia/ Sophia/ Erica. If you allow me, I can assist you in your daily activities).

Tools

Participants' preferences toward the proposed agents/robots were assessed by administering the Virtual Agent Acceptance Questionnaire (VAAQ) and the Robot Acceptance Questionnaire (RAQ), developed at the Università della Campania, "Luigi Vanvitelli", Department of Psychology, aimed at investigating:

- participants' willingness to be involved in a long-lasting interaction with the proposed agents/robots;
- agents/robots' Pragmatic Qualities (PQ), i.e. system practicality and easiness to use;
- agents/robots' Hedonic Qualities-Identity (HQI), i.e. system pleasantness and originality;
- agents/robots' Hedonic Qualities- Feeling (HQF), i.e. emotions aroused by the vision of the system;
- agents/robots' Attractiveness (ATT), i.e. system ability to encourage increase of use and arouse positive emotions.

The answers to the questionnaires' items involve both positive and negative statements, scores from negative statements were corrected in a reverse way. Therefore, lower scores summon to positive systems' evaluations, and high scores to negative ones. Group 1 (middle-aged) and 2 (seniors), who saw the female agents, were administered a VAAQ paper version. Groups 3 (middle-aged) and 4 (seniors), who saw the female android robots, were administered respectively a paper and a digitalized version of the RAQ Questionnaire. The RAQ digitalized version was developed by using a Java script enabling to automatically randomize the presentation order of the questionnaire's sections for each participant.

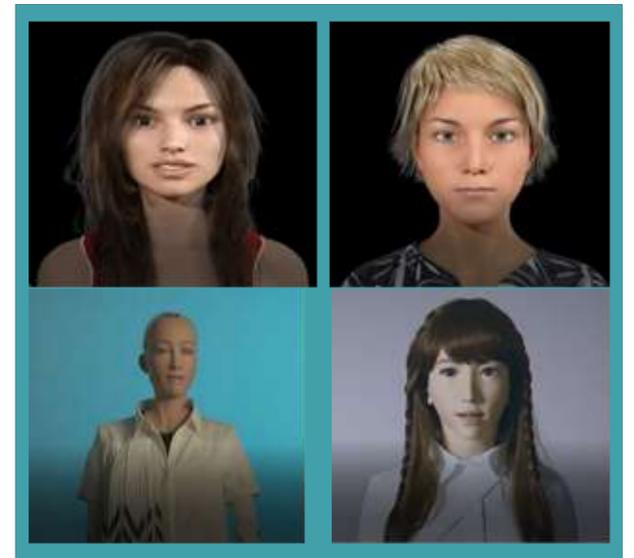


Fig. 1. On the top: the proposed female virtual agents, on the left Victoria2 (renamed Clara), on the right Julie3 (renamed Giulia). Below: the proposed female android robots, on the left Sophia, on the right Erica.

Findings

The proposed study highlighted that when middle-aged and seniors' preferences of agents are considered, it appears that seniors are more willing than middle-aged participants to interact with the agents, and judged them more useful, easier to use, more pleasant and attractive than middle-aged participants. In addition, between the two proposed agents, both middle-aged and seniors expressed a clear preference toward the female agent Giulia rather than Clara, suggesting that also agents' appearance plays a role in users' preferences (see fig.2). On the other hand, when middle-aged and seniors' preferences of robots are considered, it appears that middle-aged participants were more willing than seniors to interact with robots, and judged them more useful, easier to use, more pleasant and attractive than seniors. In detail, between the two proposed robots, both middle-aged and seniors expressed a clear preference toward the female robot Erica rather than Sophia, suggesting that robots' appearance plays a role in users' preferences (see fig.3). Finally, when robots and agents were compared together (see fig.4), it clearly appears that seniors' preferences are strongly toward virtual agents rather than android robots, while middle-aged participants preferences are slightly toward robots rather than virtual agents. This effect seems to suggest a generational change, with middle-aged participants less prejudiced and more used to accept the physical presence of such assistive devices. Conclusively, the present study highlighted that both the type of assistive device and users' age play a fundamental role in the design and implementation of ambient assisted living technologies. It also suggests that preferences may be generational, as from the data seniors showed a clear preference toward virtual agents rather than robots, while middle-aged preferences were in the opposite direction. Furthermore, this study showed that depending on the type of assistive device, the gender attributed to the device plays a role on its acceptance. Female robots are more accepted by male rather than female users. Finally, the appearance of the device plays a role on users' acceptance. Mature virtual assistants are preferred to young ones, haired robots are preferred to hairless ones.

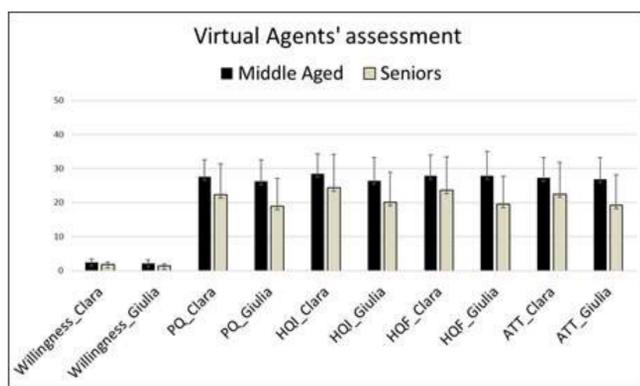


Fig. 2. Middle-aged and seniors' assessment of the female virtual agents Clara and Giulia on willingness to interact, pragmatic qualities (PQ), hedonic qualities-identity (HQI) and feeling (HQF)- and attractiveness (ATT).

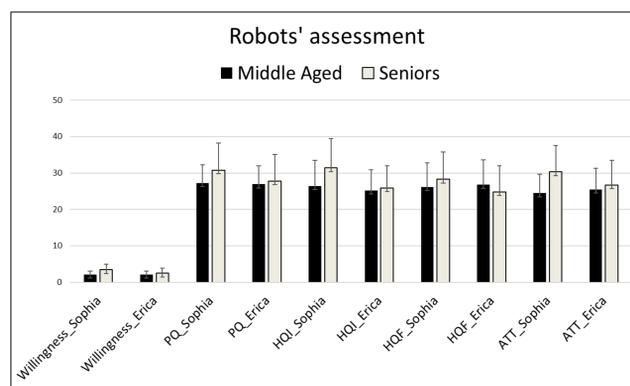


Fig. 3. Middle-aged and seniors' assessment of the female android robots Sophia and Erica on willingness to interact, pragmatic qualities (PQ), hedonic qualities-identity (HQI) and feeling (HQF)- and attractiveness (ATT).

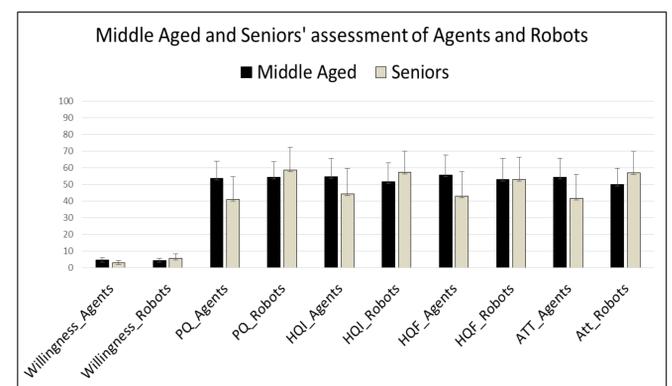


Fig. 4. Middle-aged and seniors' assessment of virtual agents and android robots on willingness to interact, pragmatic qualities (PQ), hedonic qualities-identity (HQI), and feeling (HQF)- and attractiveness (ATT).