Young Computer Scientists' Perceptions of Older Users of Smartphones and Related Technologies

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Abstract. A study was undertaken with 61 computer science students to assess their perceptions of older people as users of desktop and laptop computers and smartphones. They were shown a picture of either a young or old woman or man and asked to assess the likelihood that this person would use these technologies and their level of expertise in them. The results showed that the students did have negative perceptions of the older people in comparison to young people, but that they did not have negative perceptions of women, and there was no evidence of a "double standard" of older women being perceived particularly negatively.

Keywords: Perceptions of older people · Ageism · Perceptions of technology use · Perceptions of technology expertise

1   Introduction

It is well-known that young people tend to have negative attitudes and beliefs about older people, and there has been a considerable amount of research exploring different parameters of these attitudes [e.g. 5] and attitudes by different types of young people [8, 9, 13, 14], particularly those who will interact with older people in their professional lives such as doctors, nurses, and social workers [e.g. 4, 7]. Also of interest is the fact that there appears to be a "double standard" in attitudes and beliefs about older people, with older women being more negatively viewed than older men [10, 12]. In response to these issues, there has been interesting research on how to overcome such negative attitudes and beliefs [e.g. 1, 3, 6].

However, no studies could be identified which investigated the attitudes and beliefs about older people of young computer science students, and in particular their perceptions of older people as users of technologies such as desktop computers, laptop computers and smartphones. Yet in an aging society, it is important that the coming generations of computer scientists understand that older people are increasingly users of such technologies, indeed that these technologies are becoming increasingly important in supporting older people in their everyday lives, particularly in living independently for as long as possible.

2   Method

This study conducted an initial investigation of the perceptions of young university students studying computer science of younger and older men and women as users and experts of smartphones and related technologies.

A class of first year computer science students at the University of York in the United Kingdom completed a very short survey for the study as part of one of their courses. Students who completed the survey were entered into a prize draw for five Amazon gift vouchers worth £5 (approximately USD 7.50) each.

The survey comprised a photograph of either an old or young man or woman (see Figs. 1 and 2). Eight different versions of the survey were created, each with a different photograph. Four of the photographs were of older people, four were of younger people. Photographs were chosen carefully so that the person looked to be in their 70s for the older people, and in their late 20s/early 30s for the younger people (so a little older than the target respondents for the survey, but people they would still consider young). Within each group two images were of women and two were of men. All the photographs were chosen to be close up shots of a person reading a book. All the photographs were copyright free images from the Internet.

Fig. 1. Images of older people used in the survey

Fig. 2. Images of younger people used in the survey

The survey asked the following nine questions about the person in the photograph. Firstly, three questions about the age of the person and old age in genera:

- How old do you think the person is?
- Would you call this person old?
- What is the minimum age you would think of someone as old?

Three questions about the person's use of technology:

- How likely do you think it is that this person uses a desktop computer regularly (rated on a scale from 1 = not at all likely to 7 = very likely)?
- How likely do you think it is that this person uses a laptop computer regularly (same rating as above)?
- How likely do you think it is that this person uses a smartphone regularly (same rating as above)?

Three questions about the person's expertise with technology:

- How expert do you think this person would be with a desktop computer/(rated on a scale from 1 = not at all expert to 7 = very expert)?
- How expert do you think this person would be with a laptop computer (same rating as above)?
- How expert do you think this person would be with a smartphone (same rating as above)?

Finally respondents were asked their age and gender.

61 students completed the survey, 54 (88.5%) were men, 5 (8.2%) were women and 2 (3.3%) preferred not to identify their gender. The imbalance between women and men respondents unfortunately reflects the strong male bias in our undergraduate computer science community. Because of the small number of women, no analyses could be attempted on differences due to the gender of the respondents, which would have been interesting to investigate. Respondents ages ranged from 18 to 6 years, with a median age of 18 years.

3   Results

In response to the question about the age of the person in the photograph, the mean estimated age for the photographs of young people was 27.5 years (Standard Deviation = 4.31) and 71.8 years (SD = 8.60) for the photographs of older people. This matched very well with the choice of photographs, which were chosen to have young people in their late 20s/early 30s and to have older people in their 70s. A two way analysis of variance (Age × Gender of person in the photograph) on respondents' estimate of the person's age showed a main effect for age (F (1, 57) = 10002.84, p < .000), so the older people in the photographs were estimated to be significantly older than the younger people. There was also a main effect for gender, with the men being estimated to be a little older overall than the women (F (1, 57) = 6.88, p = 0.011) (mean estimated age of men = 46.64, SD = 19.46; mean estimated age of women = 46.18, SD = 25.88). However, there was a strong interaction between age and gender (F (1, 57) = 26.33, p < .000), with the older women being estimated to be older than the older men (mean estimated age for the older women = 77.15 years, SD = 7.11; mean estimated age for the older men = 66.4 years, SD = 6.30), whereas the young women being estimated to be younger than the young men (mean estimated age for the young women = 26.0 years, SD = 3.61; mean estimated age for the young men: 29.5 years, SD = 4.49). This interaction is illustrated in Fig. 3. It may be a hint of the "double standard" with respect to ageism, with older women being seen as substantially older (and hence potentially less competent) than older men.

In response to the question on when old age begins, on average respondents estimated that old age begins at 55 years, with a very wide range of answers, from 30 to 75 years. However, just over half the respondents (53%) felt that old age begins between 60 and 65 years, which are the typical ages for retirement and also those used in demographics and aging research [2, 15].

Only one respondent failed to classify the person in the photograph into a different group from that which was intended. That respondent had one of the photographs of an older men, whom he estimated to be 60 years old. But he stated that old age began at 65 years, so he would not call the person old. The data from this respondent was therefore omitted from the subsequent analyses.

In response to the likelihood that the people in the photos would use a desktop computer/laptop computer/smartphone regularly, a three way multivariate analysis of variance was conducted: Device (desktop/laptop/smartphone) × Age of person in the photograph (Young or Old) × Gender of person in the photograph (woman or man)
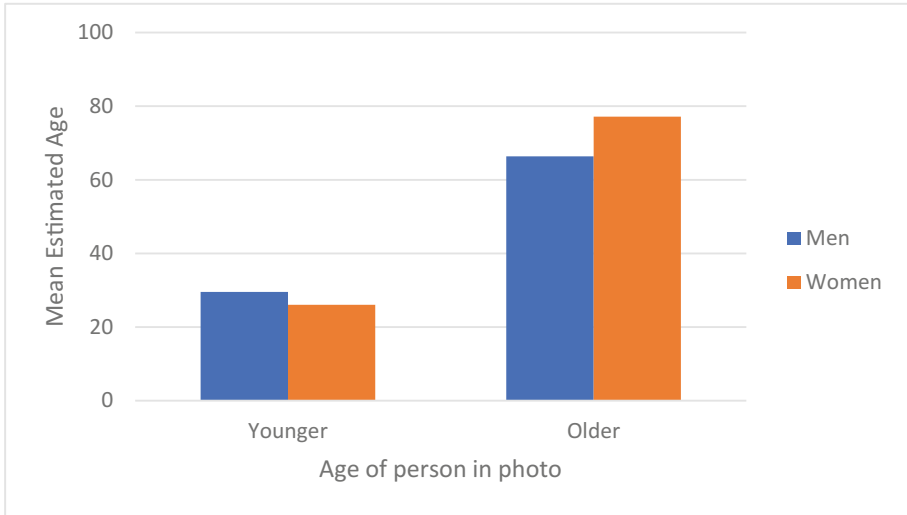
Fig. 3. Mean estimated age of people in the photographs for young and older people and men and women

This showed a main effect for device (F (2, 57) = 3.10, p < .000) with smartphone being rated as the most likely to be used, followed by laptop, with desktop the least likely to be used. There was also a main effect for Age (F (1, 57) = 114.54, p < .000) with young people rated more likely to use all the devices than older people (mean young people: 5.30; mean older people: 2.86). There was no main effect for Gender (F (1, 57) = 1.31, n.s.). There was also a significant interaction between Device and Age (F (1, 57) = 46.33, p < .000), illustrated in Fig. 4. This shows that there was a clear increase in perception of likelihood of use from desktop to laptop to smartphone for young people, but a slight decrease across these devices in perception of likelihood of use for older people. There was no significant interaction between Age and Gender (which might suggest the double standard in ageism).

The results for the expertise questions were very similar to those for the likelihood of use question. The three way multivariate analysis of variance showed a main effect for device (F (2, 57) = 3.62, p < .05) with smartphone being rated as the device with which people with have the most expertise, followed by laptop, and desktop the device with which people would have the least expertise. There was also a main effect for Age (F (1, 57) = 44.92, p < .000) with young people rated more likely to use all the devices than older people (mean young people: 5.30; mean older people: 2.86). There was no main effect for Gender (F (1, 57) = 1.34, n.s.). There was also a significant interaction between Device and Age (F (1, 57) = 12.29, p < .000), illustrated in Fig. 5. This shows that there was a clear increase in perception of expertise from desktop to laptop to smartphone for young people, but a slight decrease across these devices in perception of expertise for older people. There was no significant interaction between Age and Gender (which might suggest the double standard in ageism) (F (1, 57) = 0.21, n.s.).
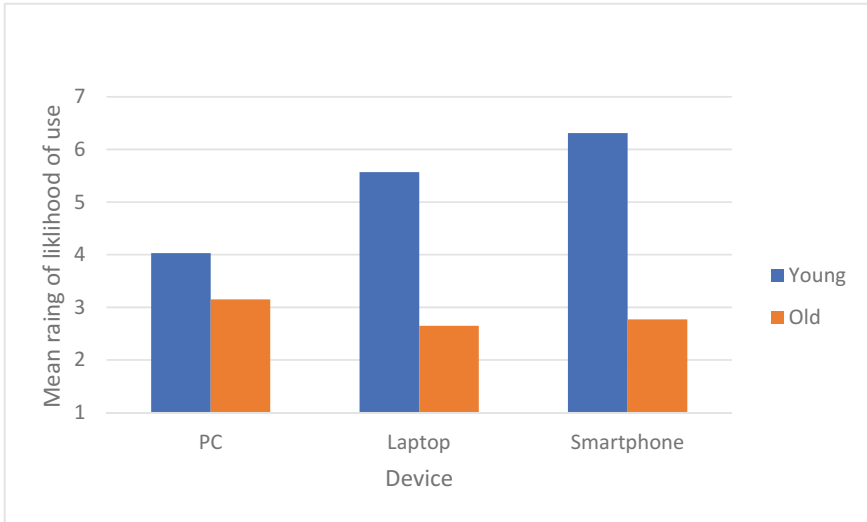
Fig. 4. Mean ratings of likelihood of use for young and older people for three devices
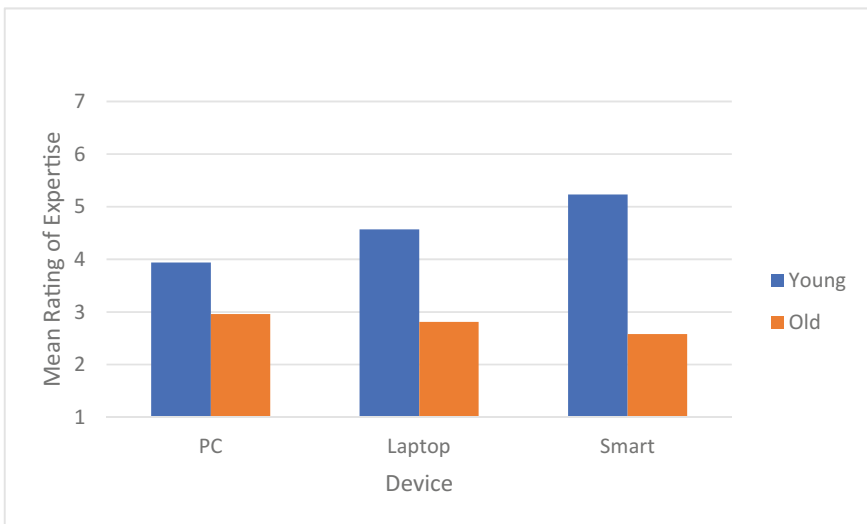

Fig. 5. Mean ratings of perception of expertise of for young and older people for three devices

4   Discussion and Conclusions

This paper reported on the results of an initial investigation into the perceptions of older people as users of technology, particularly desktop computers, laptop computers and smartphones by young, predominantly male, British computer science students. The results showed that the students perceived older people as both less likely to use these

technologies and less expert in using them. However, there was no evidence of sexism, with no significant differences in the way women and men were perceived, or of a double standard in ageism, in which older women are perceived less positively than older men. It was interesting that for younger people, they were seen as most likely to use and be more expert in smartphones in comparison to laptop computers and least likely to use and be expert in desktop computers. This reflects the move away from desktop machines to mobile devices and computing.

These results agree with numerous previous studies which have shown that young people hold negative attitudes and beliefs about older people (see Introduction). While the uptake of computing technologies by older people is still a lower that of younger people, older people in the UK are currently the fastest group adopting mobile technologies, especially smartphones and tablet computers [4]. Indeed the usage of portable devices such as laptop or tablet computers amongst older people has grown, in 2016 43% of 65 to 74 year olds now use a laptop or netbook (20% of those 75 and older), 31% use a tablet computer (15% of those 75 and older) and 83% use a mobile or smartphone (50% of those 75 and older) [4]. Undoubtedly these figures will continue to grow as the "baby boomer" generation of those born after the World War II ages. And with the decreasing number of younger people to care for them in old age, they will rely much more on technology than previous generations of older people. Thus, it is particularly important that the younger generations of computer scientists appreciate that older people are users of computing technologies. Clearly awareness of the issues around older computer users is needed.

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