

# Making Computers Easier for Older Adults to Use: Area Cursors and Sticky Icons

## ABSTRACT

The normal effects of aging include some decline in cognitive, perceptual, and motor abilities. This can have a negative effect on the performance of a number of tasks, including basic pointing and selection tasks common to today's graphical user interfaces. This paper describes a study of the effectiveness of two interaction techniques: area cursors and sticky icons, in improving the performance of older adults in basic selection tasks. The study described here indicates that when combined, these techniques can decrease target selection times for older adults by as much as 50% when applied to the most difficult cases (smallest selection targets). At the same time these techniques are shown not to impede performance in cases known to be problematical for related techniques (e.g., differentiation between closely spaced targets) and to provide similar but smaller benefits for younger users.

## KEYWORDS

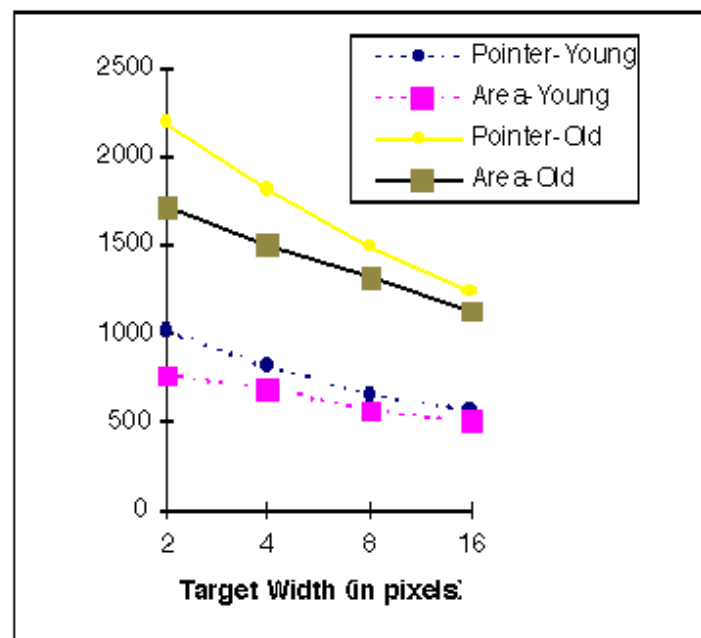
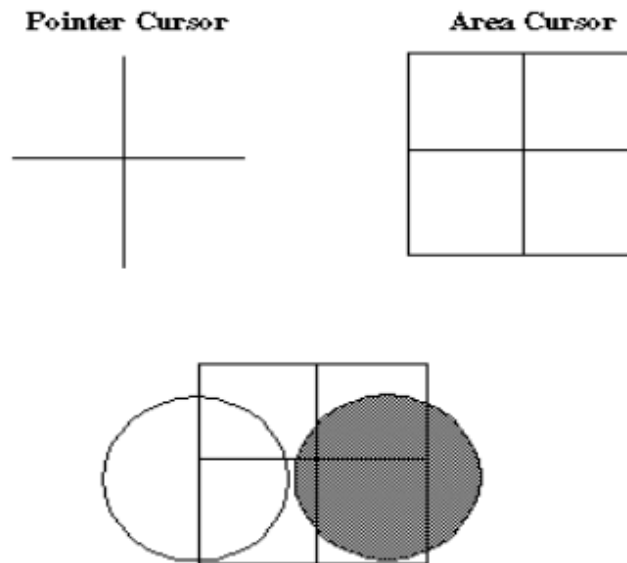
Graphical interfaces, user input, interaction techniques, pointing and selection tasks, Fitts' law, aging.

Researchers have studied a translucent cursor design to remedy the problem of large cursors that obscure potentially important screen information. The results of their experiments suggest that viewing information behind translucent cursors does not hinder performance [11]. We utilized this translucent design in our study and investigated a new feature that should improve performance for discrimination tasks with area cursors.

The participants were 16 younger and 16 older adults. The younger adults (mean age = 23.4 years) were recruited undergraduate and graduate students from the Georgia Institute of Technology. All students were regular users of computers with a mouse as the pointing device. The older adults (mean age = 70.1 years) were recruited from the older adults subject pool of the psychology department at the university. The older adults had all participated previously in a study that provided three hours of training using a computer mouse followed by a three-hour experiment that required them to use the mouse as a pointing device. The older adults were paid US \$50 for their participation in the experiment. Younger subjects were either volunteers or received course credit for their participation. An incentive of \$25 per 8 participants was awarded based on overall performance in the experimental task.

Question: Could the area cursor be used to discriminate between adjacent icons?

To address this issue we looked at the interaction between intervening icon and cursor type. This interaction was significant ( $F(2,56) = 35.51$ ,  $p < .001$ ). Follow-up tests revealed that the area cursor led to faster movements when there was no intervening icon or when the intervening icon was far from the target icon. More importantly, there was no difference between area cursors and pointer cursors when the intervening icon was next to the target. This shows that both younger and older adults were able to use the area cursor with the adaptive function to select small targets in a crowded environment.



## CONCLUSIONS

This study clearly demonstrates that cursor positioning among older computer users can be improved. As we reported previously [8], older computer users position the cursor much more slowly than younger computer users and have great difficulty making correct movements to small targets. However, the time required to move the cursor to a small target was cut by over 50% when using a fully augmented pointing system as compared to the system used on most computer systems.

The study also shows that both older and younger computer users can use the area cursor effectively. When an icon was not in close proximity to another icon, cursor positioning time was much faster with the area cursor. When there were two icons next to one another, both older and younger computer users could select a single icon as quickly and easily with the area cursor as the

pointer cursor. The results show that use of an adaptive hot-spot with the area cursor seems to have eliminated one drawback to its use. The results of the study also show that sticky icons can be beneficial, especially for older adults. The effects are not as dramatic as those for the area cursor, but there was a clear benefit in positioning time with smaller targets. As this is a particular cursor positioning problem with older adults, the use of sticky icons could help alleviate this problem.

In addition to the obvious benefits for positioning time that result from this system, this approach to solving age-related problems in computer usage can be easily implemented on current interfaces. Rather than making changes to all software, these options can be made part of mouse driver software and will then apply to all programs used.