Callhan et al.[1] compare pie menus to linear menus. Pie menus should be more efficient because all options are at the same distance from the initial cursor position, and each option has a larger selection area. 33 subjects participated in an experiment in which the number of errors and speed in menu selection were tested. Pie and linear menus were constructed with three types of options: those that favored a pie organization, those that favored a linear organization, and those that favored neither. All menus consisted of eight options. A within-subjects design was used; subjects completed 60 trials, locating an explicit target in one of the menus. Subjects had little or no experience with the mouse. The results showed that subjects were approximately 15% faster overall with the pie menu, though the linear menu was worse only in the half of the options furthest away from the initial cursor position. Nearly twice as many total errors were made with the linear menu, but this result did not achieve significance. The authors note that the pie menu technique suffers a polynomial increase in consumption of screen area as more options are added.

References

1. Jack Callahan, Don Hopkins, Mark Weiser, and Ben Shneiderman, “An Empirical Comparison of Pie Vs. Linear Menus,” *Proceedings of the CHI ’88 Conference on Human Factors in Computing Systems,* pp. 95-100, Washington, D.C. (May 15-19, 1988).