TABLE 5

Nonuser Responses

	Young (<35)	Middle-Aged (35–54)	Young-Old (55–64)	Old (65+)
Please rate the importance of each item as a reason you choose not to use an ATM. (Scale: 1 = *unimportant*, 6 = *very important*; means and standard deviations)				
I do not feel safe when using an ATM.	4.2 (2.0)	4.3 (1.9)	4.5 (2.1)	4.1 (2.2)
I am concerned about keeping track of transactions (e.g., balancing account).	4.0 (2.0)	3.9 (2.0)	3.3 (2.2)	3.6 (2.2)
I prefer to deal with people instead of machines.	3.6 (2.1)	4.5 (1.8)	4.7 (1.9)	4.7 (2.0)
I am concerned about the cost of using the system.	3.5 (2.1)	3.2 (2.2)	3.4 (2.1)	2.5 (1.9)
I do not see a need for the service.	3.2 (1.5)	3.5 (1.8)	3.7 (2.0)	3.0 (2.2)
I do not think the system is private enough.	3.0 (2.1)	3.3 (2.0)	3.4 (2.1)	3.3 (2.2)
I do not trust the accuracy of the system.	2.6 (1.5)	3.1 (1.9)	3.0 (2.0)	2.7 (1.9)
I do not know how the system works.	2.0 (1.6)	2.3 (1.6)	2.4 (1.9)	2.4 (1.9)
I do not know how to use the system.	2.0 (1.6)	2.2 (1.6)	2.4 (1.9)	2.4 (2.0)
Would you like to use an ATM? (percentages)				
Yes	22.4	14.3	16.7	6.3
If training were offered in the use of ATMs, would you be interested in learning to use them? (percentages)				
Yes	18.4	12.4	21.0	9.6

different from the old group. Thus the young-old adults rated not needing the service higher than did the old adults. (2) "Prefer people to machines," $F(3, 481) = 4.63$, $p < .01$; a multiple-range test revealed that the young group was significantly different from all the other groups. Young adults were less likely to consider this an important reason for not using ATMs. (3) "Concerned about the cost," $F(3, 416) = 5.67$, $p < .01$; a multiple-range test revealed that the old group was significantly different from all the other groups. The older group was less concerned with cost than were the younger groups.

In response to the question "Would you like to use an ATM?" the percentage of respondents answering yes ranged from 6.3% to 22.4%. The question "If training were offered, would you be interested to learn?" yielded yes answers ranging from 9.6% to 18.4%. Thus a reasonable number of nonusers would like to use ATMs and would be willing to attend a training program to learn how. Interestingly, for young and middle-aged adults, more people would like to use an ATM than were willing to attend a training program. Presumably these individuals do not feel the need for training on this system. However, for the two older groups, more people would be willing to use an ATM if they were first trained.

CONCLUSIONS

As was observed by Zeithaml and Gilly (1987), younger adults are significantly more likely to use ATMs relative to older adults. However, only 15% of their older sample used ATMs, whereas 33% of our respondents over age 65 reported using ATMs. In the years since the Zeithaml and Gilly (1987) study, ATMs have become more available. In addition, ATMs may have become more acceptable to older adults as a means of banking (or they may have become more accepting of technology). In either case, there remains a majority of older individuals who choose not to use ATMs.

Concerns about using ATMs do not appear to be insurmountable. When asked if they would be interested in using an ATM, 6.3% to 22.4% of the nonusers indicated that they would. Moreover,

the range of individuals willing to learn to use ATMs (through training) was 9.6% to 21% (see Table 5). More individuals in the two older groups were potentially willing to use ATMs if training were provided. One of the goals of our research is to provide those individuals who wish to use ATMs the opportunity to do so. The facilitation of ATM use by adults of all ages can be accomplished through a combination of design improvements and the development of training procedures. The implications of the present data for these efforts are discussed in the next section.

Training Implications

One of the clear implications of the present study is the need to train individuals to use ATMs (see also Adams & Thieben, 1991; Hatta & Iiyama, 1991). At best, most banks provide only a brief pamphlet about how to use their ATM. Our results suggest that this training (or lack thereof) is insufficient for successful use of ATMs. For example, 9% of the old adult ATM users claimed that they have never felt comfortable using an ATM. These are individuals who have been using an ATM card and yet continue to be apprehensive about using the machine. In addition, nonusers (of all ages) stated that they would be willing to attend a training program to learn how to use an ATM. Thus even individuals who do not currently use ATMs would be willing to learn. Of particular interest were the young-old and old adults, more of whom would be more willing to use an ATM if training were provided than if they had to learn to use one on their own.

The optimum training method remains an empirical question. However, such a training method should be brief, easy to use, and yet comprehensive. Ideally the training could be administered by a bank officer in a nonstressful environment in about 15 min. In a related study, older adults expressed concern about learning to use ATMs while others are waiting (Rogers, Gilbert, & Cabrera, in press).

Training should be focused on the reportedly more difficult transactions, such as transfers between accounts and payments. In the not-too-distant future, ATMs will probably be used for functions such as paying bills and purchasing tickets. Consequently, it will be important for users to learn how to take advantage of all the available functions.

Training issues to be resolved in future research include (a) the optimal type of training material (e.g., on-line tutorial, augmented textual instructions, or perhaps a pictorial guide) and whether the utility of training materials differs across individuals of varying ages or abilities; (b) the amount of training required; (c) retention of information across time (e.g., if trained at the bank, will the person remember what to do at the ATM several weeks later?); and (d) transfer of training across different types of ATMs.

Design Implications

Design improvements for ATMs can occur at two levels: surface-level (hardware) improvements and conceptual-level (software) improvements. In terms of surface-level improvements, older users stated that they often had difficulty seeing the ATM screen. Antiglare screens, bigger text, better alignment of options to buttons, and better location with respect to the sun could improve the usability of the system. Users of all ages complained about having to wait in line to use the ATM, and the younger respondents also complained about the machine working too slowly. ATM designers should focus some of their energies on maximizing turnaround time at ATMs and, within the ATM system, improving efficiency so as to minimize wait time.

Conceptual-level design improvements should also be considered. The younger age groups expressed concern about remembering to record their transactions, which represents a challenge to designers in the development of future systems. The fact that use of technology was the best predictor of ATM use suggests that designers should attempt to reduce the technological nature of ATMs (i.e., focus on user-friendliness). To illustrate, many of the older nonusers expressed a preference for dealing with people.

Hence improvement in the personal and interactive nature of ATMs might result in use by nonusers as well as increased use by current users. As is often the case, design improvements made with special populations in mind will improve the overall functionality of the system for all users.

The present survey has provided a valuable set of data. First, we obtained detailed information about the demographics and individual characteristics of ATM users and nonusers; importantly, these data are stratified across the adult life span. In addition, we now know the usage patterns of ATM users and the types of problems they typically have using ATMs. Moreover, we have a detailed analysis of why adults of all ages choose not to use ATMs. All of this information can provide insight to the developers of training programs as well as to system designers.

ACKNOWLEDGMENTS

This research was supported in part by a grant from National Institutes of Health (National Institute on Aging) Grant P50 AG11715 under the auspices of the Center for Applied Cognitive Research on Aging (one of the Edward R. Roybal Centers for Research on Applied Gerontology).

REFERENCES

Adams, A. S., & Thieben, K. A. (1991). Automatic teller machines and the older population. *Applied Ergonomics, 22,* 85–90.

Fowler, F. J. (1988). *Survey research methods.* Newbury Park, CA: Sage.

Gilly, M. C., & Zeithaml, V. A. (1985). The elderly consumer and adoption of technologies. *Journal of Consumer Research, 12,* 353–357.

Hatta, K., & Iiyama, Y. (1991). Ergonomic study of automatic teller machine operability. *International Journal of Human-Computer Interaction, 3,* 295–309.

Judd, C. M., Smith, E. R., & Kidder, L. H. (1991). *Research methods in social relations.* Chicago: Holt, Rinehart & Winston.

McNally, K. A., & Abernathy, W. B. (1989). Effects of monetary incentives on customer behavior: Use of automatic teller machines (ATMs) by low frequency users. *Journal of Organizational Behavior Management, 10,* 79–91.

Maultsby, C. R., Sutherland, J. C., & Hofmeister, J. F. (1978). Operant attitude segmentation and marketing decisions. *Operant Subjectivity, 1,* 38–50.

Rogers, W. A., Gilbert, D. K., & Cabrera, E. F. (in press). An analysis of automatic teller machine usage by older adults: A structured interview approach. *Applied Ergonomics.*

Zeithaml, V. A., & Gilly, M. C. (1987). Characteristics affecting the acceptance of retail technologies: A comparison of elderly and nonelderly consumers. *Journal of Retailing, 63,* 49–68.

Wendy A. Rogers is an assistant professor of psychology at the University of Georgia. She received her M.S. (1989) and Ph.D. (1991) degrees in experimental psychology from the Georgia Institute of Technology.

Elizabeth F. Cabrera is a visiting professor in the Business Department at Universidad Carlos III in Madrid. She received M.S. (1993) and Ph.D. (1995) degrees in industrial/organizational psychology from Georgia Institute of Technology.

Neff Walker is an assistant professor at the Georgia Institute of Technology. He received his Ph.D. in psychology from Columbia University in 1983.

D. Kristen Gilbert is an assistant professor of psychology in the Social Science Division at Pepperdine University. She received her M.S. (1992) and Ph.D. (1995) degrees in experimental psychology from the University of Memphis.

Arthur D. Fisk is a professor in both the general-experimental and engineering psychology programs at the Georgia Institute of Technology in the School of Psychology and is coordinator of the engineering psychology program. He received a Ph.D. from the University of Illinois in 1982.

Date received: June 21, 1994
Date accepted: February 13, 1995