Functional Limitations to Daily Living Tasks in the Aged: A Focus Group Analysis

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We assessed constraints on daily living of 59 healthy, active adults 65–88 years of age in focus group interviews. Individual comments about specific problems were coded along the dimensions of (a) the locus of the problem (motor, visual, auditory, cognitive, external, or health limitations); (b) the activity involved (e.g., transportation, leisure, housekeeping); (c) whether the problem was attributable to task difficulty or the perception of risk; and (d) response to limitations (perseverance, cessation, compensation, or self-improvement). The data provide information about the types of difficulties encountered in everyday activities as well as the way in which individuals respond to such difficulties. Each comment was also coded in terms of whether it was remediable via training, design changes, or some combination of the two. More than half of the problems that were reported had the potential to be improved in some way, thus providing direction for future research in human factors and aging. Actual or potential applications of this research include identifying problems and difficulties that older adults encounter in daily activities such as transportation and leisure; more specifically, determining the degree to which such problems are potentially remediable by human factors solutions. Applications of this research also include understanding the types of systems, products, and technologies that older adults interact with currently, or are interested in learning to use.

INTRODUCTION

A driving force behind research in the area of applied gerontology is the desire to enhance the daily lives of older individuals. A primary goal of many older individuals is to maintain an independent lifestyle (Willis, 1996); thus, many older adults live in private homes, typically either alone or with family (Smith, 1990). These community-dwelling individuals must be capable of performing basic activities of daily living (ADLs) such as bathing, toileting, and eating. In addition, successful independent living requires the capability to carry out instrumental activities of daily living (IADLs) such as managing a medication regimen, maintaining the household, and preparing meals of adequate nutrition (Lawton, 1990).

Measures of ADLs and IADLs determine how well older adults can maintain performance of everyday events given declining functionality (e.g., changes in vision or strength). However, existence as an independently living, active older adult might require much more; specifically, it requires the ability to adapt to a changing environment. The willingness to accept these new challenges and to learn may be key to staying fully functional in a changing environment. We have labeled these additional behaviors of active elders enhanced activities of daily living (EADLs).

The general purpose of the present project was to increase the understanding of the types of frustrations and difficulties that active older individuals encounter in the context of ADLs, IADLs, and EADLs. That is, in what ways

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do older adults encounter difficulties or constraints on their everyday activities? What is the source or context of the constraints? How do they respond to such constraints? How can human factors research help to minimize such constraints? We conducted a series of focus groups of active older adults to answer these questions.

The specific goals of the research may be summarized as follows: (a) to allow samples of independent-living older individuals to express their concerns, frustrations, and difficulties; (b) to determine the impact of changes in environment on older adults’ ability to function well; (c) to assess the degree to which the reported problems could be aided by design changes, training, or some combination of the two; (d) to provide data for future intervention and research studies aimed at benefiting the daily lives of older individuals; and (e) to develop a useful methodology and coding scheme for the acquisition of this type of information.

Why Use Focus Groups?

A focus group typically consists of 6 to 10 individuals who are brought together to illuminate a particular topic (for reviews, see Morgan, 1988; Stewart & Shamdasani, 1990). Such groups are often used in marketing to determine the feasibility and utility of a particular product or service. They are also used in science to generate hypotheses, to gather information, or to complement the results of more quantitative analyses. In fact, focus groups are typically used as a part of large research programs, as they provide one set of data to be integrated with data from experiments, surveys, and individual interviews. However, Krueger (1994) argued that “focus groups can be used alone, independent of other procedures. They are helpful when insights, perceptions, and explanations are more important than actual numbers” (p. 30).

There are many benefits of the focus group technique. First, the group-interview format enables the participants to interact and build off of the ideas of one another (Morgan, 1988). Hence it is a dynamic process that yields data that could not be acquired in a survey or even in an individual interview. It is important that the focus group is relatively unstructured, because participants will discuss topics that are most relevant to them, thereby providing insights into the issues they deem important (Stewart & Shamdasani, 1990). The participants also have the opportunity to provide a context for their comments, which is not possible in typical survey research. Moreover, the moderator has the opportunity to ask follow-up questions to gather more information on topics that are discussed; this technique may be particularly important for gathering detailed information from older individuals (Jobe, Keller, & Smith, 1996).

METHOD

Participants

There were eight groups consisting of 6–8 participants each (59 total). Participants received compensation of $20.00. Groups were recruited from the following organizations: a continuing education program for older adults, three different senior centers, a small neighborhood club for older adults, and a high-rise retirement community.

Seven of the groups included participants in the 65- to 80-year age range. One group consisted entirely of participants older than 80 years. The mean age of the entire set of participants was 74.1 years (SD = 6.5). Five of the groups were predominantly Caucasian and three were predominantly African-American. Table 1 provides the demographic information for the participants. Each group was structured to be relatively homogeneous with respect to the demographic variables of age, sex, and race in order to encourage free discussion within the groups. Heterogeneity of the sample was achieved across groups. Our goal was to recruit groups that represented a broad range of perspectives from active older adults. For example, the groups from the retirement community and the senior centers had access to structured activities for a large percentage of their time, whereas the other groups had fewer structured activities available. Furthermore, in addition to the ethnic differences, groups differed in terms of income, living arrangements, and type of area (from urban to nearly rural).
Table 1: Participant Characteristicsa.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Categories</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>60–69</td>
<td>18</td>
<td>32.1</td>
</tr>
<tr>
<td></td>
<td>70–79</td>
<td>26</td>
<td>46.4</td>
</tr>
<tr>
<td></td>
<td>80–89</td>
<td>12</td>
<td>21.4</td>
</tr>
<tr>
<td>Sex</td>
<td>Female</td>
<td>52</td>
<td>88.1</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>7</td>
<td>11.9</td>
</tr>
<tr>
<td>Race</td>
<td>Caucasian</td>
<td>35</td>
<td>61.4</td>
</tr>
<tr>
<td></td>
<td>African-American</td>
<td>21</td>
<td>36.8</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Education</td>
<td>No high school</td>
<td>3</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>Some high school</td>
<td>10</td>
<td>17.2</td>
</tr>
<tr>
<td></td>
<td>High school graduate</td>
<td>17</td>
<td>29.3</td>
</tr>
<tr>
<td></td>
<td>Some college</td>
<td>19</td>
<td>32.8</td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>3</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>Some graduate school</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>Master’s degree</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>Doctoral degree</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>16</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>6</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>Widowed</td>
<td>34</td>
<td>57.6</td>
</tr>
<tr>
<td>Income</td>
<td>under $10,000</td>
<td>17</td>
<td>37.0</td>
</tr>
<tr>
<td></td>
<td>$10,000–$19,999</td>
<td>15</td>
<td>32.6</td>
</tr>
<tr>
<td></td>
<td>$20,000–$29,999</td>
<td>6</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>$30,000–$39,999</td>
<td>6</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>$40,000–$49,999</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>$50,000–$59,999</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>$60,000–$69,999</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Housing</td>
<td>House</td>
<td>30</td>
<td>52.6</td>
</tr>
<tr>
<td></td>
<td>Apartment</td>
<td>14</td>
<td>24.6</td>
</tr>
<tr>
<td></td>
<td>Condominium</td>
<td>7</td>
<td>12.3</td>
</tr>
<tr>
<td></td>
<td>Retirement communityb</td>
<td>6</td>
<td>10.5</td>
</tr>
<tr>
<td>Self-health rating</td>
<td>1 (poor)</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15</td>
<td>26.3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>15</td>
<td>26.3</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>14</td>
<td>24.6</td>
</tr>
<tr>
<td></td>
<td>6 (excellent)</td>
<td>6</td>
<td>10.5</td>
</tr>
</tbody>
</table>

aSome cells are missing data because participants did not answer some questions.
bSome participants from the retirement communities described their dwellings as an apartment or condominium.

Procedure

All focus group interviews were conducted at the locations through which the participants were recruited (e.g., at the senior center). The same individual served as moderator for all focus groups, accompanied by either one or two assistant moderators. The interviews were audiotaped.

Each participant was given a booklet containing an overview of the study, a consent form, a background questionnaire, and a list of areas of everyday activities (e.g., transportation) to be used for reference during the discussion. The interview questions were based on a script that dealt with normal activities and frustrations of everyday life. (The complete focus group script and instructions for the coding scheme are available from the first author.) The questions emphasized constraints related to performing tasks and interacting
with devices, but the discussion was not limited to these issues. The first question, “Please tell us about the last time you got really frustrated trying to use something,” served as an icebreaker. For this question, the moderator asked all of the participants to answer in turn. For subsequent questions, participants were allowed to speak freely. By design, each participant had to provide at least one comment, and nearly all of the participants provided many more comments.

After the general discussion, the moderator instructed participants to turn to the final page of the booklet, which listed areas of everyday activities. The moderator then asked the group about problems related to each area listed, in order of area listed. This list of areas consisted of transportation, new technologies, using the library, staying healthy, consumer issues, entertainment and hobbies, communication, cooking and eating, money management, home maintenance, and housekeeping.

The moderator continued asking about these areas until roughly 20 min before the scheduled end of the session. At this time, the moderator discontinued the discussion of the individual areas and began to ask the final summary questions. This ensured that there would be enough time to conclude the discussion. Each session lasted approximately 2 h.

Data Analysis

Coding scheme. The audiotapes of the sessions were transcribed. Categories for coding the transcripts were developed through several iterations of analyzing transcripts, generating categories, reviewing the proposed categories, and attempting to use the revised categories to code transcripts. Table 2 shows the final coding scheme. Each comment was coded along four dimensions (i.e., locus of the problem, activity classification, difficulty vs. risk classification, and response to limitations). For example, consider the following comment: “I have trouble with my vacuum cleaner; it’s too heavy . . . but I got an automatic driven vacuum cleaner which is powered like a power mower and that helps a lot.” The locus of this problem would be a gross motor limitation, it would be coded as a housekeeping problem that is caused by the difficulty of the task, and the response would be compensation via appliance redesign.

Classification of the locus of the problem was based in part on a taxonomy developed by Hunt, Lesgold, and Fisk (1992) that segmented the primary motor, perceptual, and cognitive functions. We added the categories of external (i.e., not directly related to physical or cognitive deficits) and general health limitations.

The activity classification sorted comments into different broad domains with their own sets of related goals, such as housekeeping, money management, and gardening (see Table 2). An initial set of categories was based on ADLs and IADLs (e.g., Lawton & Brody, 1969) as well as on the categories used by Williams et al. (1991) for their assessment of living skills and resources in community-dwelling older adults. We added the categories of personal grooming, exercise, locomotion, and gardening based on the number of comments about these activities.

The classification of difficulty versus risk was designed to determine why an individual was experiencing a particular problem. That is, was the task too difficult (or did it perhaps become difficult as age progressed), or were there particular risks associated with performance of the task (e.g., bodily harm to themselves or others, fear of danger)?

Responses to limitations were subdivided as follows: perseveration, cessation, compensation, and self-improvement. Perseverance referred to settling for lower performance on the task, whereas cessation involved not performing the task at all. Compensation involved changing the approach to the task in some way, and self-improvement involved trying to acquire or restore an ability. The types of redesign identified under the heading of compensation were based on design interventions described by Chapanis (1974).

Transcripts were coded by one primary coder (who coded all eight transcripts) and eight other coders (each of whom coded one transcript). The eight coders were given brief written guidelines but little other instruction or practice. For the hierarchical dimensions, a problem might be identified at a general level but not at the most detailed level. For those situations, the coders gave the comment the
Table 2: Coding Scheme and Percentage Frequency of Occurrence within Each Category.

<table>
<thead>
<tr>
<th>Locus of the Problem</th>
<th>Activity Classification</th>
<th>Difficulty/Risk</th>
<th>Response to Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor limitations</td>
<td>Leisure activity 17%</td>
<td>Problem attributable to:</td>
<td>Cessation 51%</td>
</tr>
<tr>
<td>Gross movement</td>
<td>Transportation 16%</td>
<td>Task difficulty 80%</td>
<td>Delegate</td>
</tr>
<tr>
<td>Fine movement</td>
<td>Housekeeping 10%</td>
<td>Perceived risk 20%</td>
<td>Task not done</td>
</tr>
<tr>
<td>Balance</td>
<td>Locomotion 9%</td>
<td></td>
<td>Perseverance 22%</td>
</tr>
<tr>
<td>Cognitive limitations</td>
<td>Meal preparation 7%</td>
<td></td>
<td>Compensation 19%</td>
</tr>
<tr>
<td>Representations</td>
<td>Personal grooming 6%</td>
<td></td>
<td>Visual and auditory displays</td>
</tr>
<tr>
<td>Visual</td>
<td>Money management 5%</td>
<td></td>
<td>Controls, tools, and appliances</td>
</tr>
<tr>
<td>Linguistic</td>
<td>Gardening/yard work 5%</td>
<td></td>
<td>Layout of environment</td>
</tr>
<tr>
<td>Quantitative</td>
<td>Shopping 4%</td>
<td></td>
<td>Path design</td>
</tr>
<tr>
<td>Declarative knowledge</td>
<td>Telephoning 4%</td>
<td></td>
<td>Ambient design</td>
</tr>
<tr>
<td>Classifications</td>
<td>Exercise 4%</td>
<td></td>
<td>Self-Improvement 8%</td>
</tr>
<tr>
<td>Schemas</td>
<td>Home maintenance 3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental models</td>
<td>Medication management 3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task unfamiliarity</td>
<td>Laundering 2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedural knowledge</td>
<td>Reading 1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working memory</td>
<td>Other 5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed demands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-tasking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term memory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External limitations</td>
<td>26%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual limitations</td>
<td>3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid recognition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Static displays</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic displays</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General health limitations</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auditory limitations</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech recognition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-speech signals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
most specific code possible and then indicated that the problem was undifferentiated at more
detailed levels. If a coder could not assign any
code to a comment because of insufficient
information, a question mark was recorded for
that dimension. Comments that did not relate
to a problem or constraint were not coded.

Supplemental coding. One of the goals of
the study was to determine the degree to
which difficulties reported by participants
could potentially be remedied through design
changes, the provision of training, some com-
bination of training and design, or neither.
However, because this is a somewhat subjec-
tive rating, we considered this aspect of the
analysis separately.

RESULTS

Stability of Coding

To determine the stability of our coding
scheme, we calculated the percentage of
agreement between the coders (Stewart &
Shamdasani, 1990). For each pair of tran-
scripts (one from the primary coder and one
from another coder), we calculated the num-
ber of possible codes assigned. Percentage
agreement was calculated by counting the dis-
crepancies in the codes, and applying the fol-
lowing formula:

\[
\text{Percentage of Agreement} = \frac{\text{total codes} - \text{discrepancies}}{\text{total codes}} \times 100\% 
\]

This figure was computed for each tran-
script. The mean percentage agreement score
for the eight transcripts was 81% (SD = 3.1%). For those dimensions that featured
hierarchical codes, the greater detail of the cod-
ing scheme could introduce additional oppor-
tunities for disagreement. Therefore, we also
calculated percentage agreement for which
only disagreements at the highest level of the
hierarchy were included. The mean percentage
agreement score using this method was 86.7%
(SD = 4.0%). The percentage agreement
scores demonstrate that the coding scheme
was sufficiently well-defined for nine people
(across the eight transcripts) to reliably code
the transcripts.

Patterns of Comments

This section reports a qualitative analysis of
comments. Because these data were collected
in group interviews with free discussion, it is
not appropriate to perform a detailed quan-
titative analysis of coded texts (such as
"Comments reflecting Issue A appeared 43
times whereas those reflecting Issue B appeared
5 times, which is a statistically significant dif-
ference."). The percentages of various classifi-
cations are provided for descriptive purposes.
Our analysis is most consistent with what
Morgan (1988) called an ethnographic analy-
sis, in which we rely on examples and quota-
tions from the group discussions to illustrate
points of interest and to describe general pat-
terns and consistent themes.

Locus of the Problem

The difficulties that participants reported
were classified according to whether they were
attributable to motor, visual, auditory, cogni-
tive, external, or general health limitations. A
total of 506 items were coded. Table 2 presents
the percentage of classifications in each catego-
ry. Common categories of difficulty were motor,
cognitive, and external limitations. Visual, audi-
tory, and general health limitations were rela-
tively rarely reported, but this may have been
because of the nature of our script. Each of
these categories will be discussed in turn.

Motor limitations. This category was subdi-
vided into limitations that involved gross
motor movement, fine motor movement, or
balance. The majority of the motor comments
were related to gross movement problems
such as knee and back problems and lack of
strength. Common themes were problems
walking, bending, climbing steps or hills, and
carrying heavy items.

Issues related to fine movement deficits were
less common. Most of the fine motor move-
ment problems were attributed to arthritis in
the hands. The most common theme was open-
ing small containers, particularly medicine
bottles. Other areas that were affected were
using a can opener, buttoning a shirt, writing,
sewing, and opening a food bag or carton.

Problems were coded as balance issues
when they related to loss of equilibrium, prob-
lems in coordination, or the ability to make the corrective movements needed to prevent a fall. Common themes were getting in and out of vehicles, rising from furniture, walking in the open, going down steps or escalators, using ladders, and stooping.

The motor limitations that could not be more specifically coded involved general comments such as "I am slowing down" or "Everything I do is just about a struggle and it takes longer." Other comments could not be attributed to a specific motor difficulty but involved specific activities such as playing tennis and many aspects of housekeeping.

Visual and auditory limitations. Participants made relatively few comments about visual and auditory limitations. Auditory deficits were mentioned very infrequently. This omission may be in part an artifact of the data collection method; for example, individuals with serious hearing losses may have declined to participate because of the emphasis on group discussion. The major activities affected by visual deficits were reading and driving.

Cognitive limitations. Comments assigned to the category of cognitive limitations were also classified according to the subcategories of representations, declarative knowledge, procedural knowledge, working memory, planning, task control, and long-term memory. Not every class of cognitive deficits occurred frequently in the interview transcripts; representations, procedural knowledge, planning, and task control limitations were very rarely mentioned. Certain cognitive processes, such as the use of representations or retrieving a schema, may have been difficult to positively identify based on general comments.

The most commonly reported cognitive limitation involved declarative knowledge. Initial attempts to perform a task (i.e., learning something new) were considered to be guided by declarative knowledge (Anderson, 1983). Lack of declarative knowledge (i.e., task unfamiliarity, or not knowing how to perform a task) affected a broad range of activity domains. Such tasks included programming home security systems, filling out Medicare forms, starting lawn equipment, using computers at home or in the library, operating kitchen appliances, and using office equipment. A major issue concerned knowing how to operate VCRs and similar home electronics. This may not have been a crucial problem to every participant who mentioned it (according to one participant, "It's not life or death"), but it was common throughout the groups.

The procedural knowledge code was used for difficulties with well-learned skills or the knowledge of how to do something (Anderson, 1983). Very few comments could even be potentially interpreted as this type of event. This is consistent with findings in the literature that well-learned skills appear to remain intact into old age (e.g., Bosman, 1993; Charness & Bosman, 1990; Rogers & Fisk, 1991; Salthouse, 1984).

Working memory limitations yielded a number of difficulties such as forgetting where things were placed moments ago, using hierarchically organized telephone menus, and burning pots while cooking. Long-term memory difficulties included remembering people's names, grocery lists, and where things are stored.

Issues with task-control speed demands (in terms of rapid decision making as opposed to physical speed) were infrequently discussed. The few statements that could potentially be interpreted as referring to speed demands were typically related to driving. The scarcity of these comments does not counteract the robust laboratory findings of slower response times for older adults (e.g., Fisk & Rogers, 1997; Salthouse, 1991). However, it may indicate that these participants encountered relatively few situations, other than while driving, in which rapid reactions were commonly required. Alternatively, the dearth of speed-related problems may be a limitation of the self-report data.

External limitations. These were limits that were not directly related to physical or cognitive deficits of participants. Major themes in this category were fear of crime, financial limits, and frustration with things that break or do not work properly (e.g., lawnmowers, automatic teller machines, washing machines, and cars). Less-widespread themes were burdens of caregiving, annoyances from friends and neighbors, loneliness, and dependence on others.
General health limitations. These were constraints caused by health problems that were not specific to motor, visual, or auditory limitations. The few comments that fell into this category were quite varied in terms of activities. The only common theme for these comments was that these health problems effectively shut people out of activities such as housekeeping, cooking, and traveling (e.g., “Declining health demands a lot of my time,” and “I love to travel but my body does not love to travel”).

Activity Classification

The categories of activities mentioned by participants and the percentage of time that each was mentioned are presented in Table 2. The most commonly discussed activities were in the categories of leisure activities, transportation, housekeeping, and locomotion. A theme that emerged across many different activities, but especially within the category of leisure activities, was the impact of new technology on the everyday lives of older adults. Videocassette recorders (VCRs) and telephone menus were frequently mentioned challenges; however, participants also described a broad range of devices that affected their daily lives, such as home security systems, multiline telephones, credit card scanners, answering machines, entertainment centers, copy machines, cameras, microwave ovens, and fax machines. Thus these participants faced a wide variety of challenges because new technologies were a part of their normal activities.

Many participants, particularly those who could no longer drive, described transportation as one of the most important constraints on their activities. Many issues with transportation had external sources such as lack of a car, inadequate bus schedules, or problems with getting rides with other people. There were also problems with visual deficits and motor deficits, which caused problems getting in and out of cars and buses. The cognitive issues with transportation largely referred to finding one’s way and to reaction time in driving. A telling statement about the importance of transportation was made by one woman who said, “Next to losing my husband, losing that car was the most important thing.”

Difficulty/Risk Classification

The difficulty/risk classification distinguished between problems related to the inherent difficulty of tasks and problems related to potential negative outcomes of activities. The majority of issues were related to task difficulty, broadly interpreted as not knowing how to do something or not having sufficient strength or motor coordination. Examples include “I have a hard time opening medicine bottles” and “I am slower at mopping the floor now.”

Within the smaller set of risk-related comments, examples are “I will not change a light bulb because I might fall off the ladder” and “I always walk with a group because I might be mugged if I am alone.” Several clear themes emerged. Participants were concerned about the risks of falling, having an accident while driving, breaking something or causing a problem because of not knowing how to operate something, or becoming a victim of crime or fraud.

Response to Limitations

Of particular interest were comments about how participants responded to a certain problem or issue (see Table 2). Roughly half of the comments were coded as cessation; that is, participants stopped performing the task in response to their limitations. Perseverance and compensation were mentioned with similar frequency, followed by self-improvement. The following sections provide examples of each of these response types.

Perseverance. One way that participants responded to age-related limits was to persevere and accept lower performance. This response might take the form of allowing more time to perform certain tasks or performing tasks less thoroughly or accurately. For motor limitations, perseverance involved performing tasks more slowly. Participants mentioned having to accept the fact that formerly easy tasks (e.g., getting dressed, cooking) now required more time and that they needed to remember to rest and not overdo and tire themselves out. Walking, climbing stairs, and getting on and off the bus were all mentioned as areas in which performance had declined and yet participants persevered.
Participants also reported having to accept that they required more time to learn new things than they used to (e.g., learning to use computers or telephone systems). With respect to memory failures, they had learned to accept that they would have difficulties, and thus they would not become frustrated. Another perseverance response involved realizing that they simply did not have enough money to do everything that they wanted to do.

Cessation. If an individual stopped performing certain tasks as a result of some personal limitation, their response was classified as cessation. Subcategories were (a) delegating to someone else, or (b) leaving the task undone (which was the more common response).

Tasks that were not performed at all were often tasks that could be avoided with minimal consequence. For example, participants reported using bank tellers instead of automatic teller machines, taking showers rather than baths, waiting for an operator rather than using telephone menus, and eating frozen dinners rather than cooking. Omitting other tasks, however, probably did involve some sacrifice. Physical limitations caused participants to give up exercise activities such as walking, swimming, playing tennis, playing basketball, bicycling, dancing, and yoga. Individuals with arthritis and spinal or knee problems stated that they were no longer able to take the subway or the bus, thereby limiting their mobility.

Many individuals had also given up enjoyable leisure activities such as needlepoint, reading, shopping, dining out, volunteering, using the library, traveling, and visiting friends or relatives. Participants mentioned a number of technologies such as computers, VCRs, fax machines, copiers, and several types of kitchen appliances in this category. Participants reported not using these technologies because they did not know how to use them.

Activities that were not avoided tended to be critical ADL activities such as bathing, going to the toilet, and eating. The IADLs that were necessary for community dwelling were delegated to someone else if the participants could not perform the activity themselves. For example, some participants had others perform such tasks as removing the caps from medicine bottles, filing taxes, filling out insurance and Medicare forms, preparing meals, and shopping. Other activities important to the individual (although perhaps less crucial) were also delegated to others. For example, individuals would have someone clean the house, do yardwork, drive, find library books on the computer system, or program the VCR.

Compensation. Responses in this category involved changing the approach to the task. Changes could take the form of using a tool or appliance, changing the arrangement of things in the place where the task was performed, changing ambient environmental variables such as lighting, redesigning or taking advantage of special passageways, or changing the sequence of steps in the task. When successful, these adaptations allowed the person to continue to perform efficiently in spite of limitations.

Visual and auditory display changes were not reported, though such changes might be beneficial (e.g., enlarging clock dials; Chapanis, 1974). Control, tool, and appliance changes were reported almost half of the time. Compensatory activities related to housework and yard work included the use of a “grabber” to pick up things from the floor, purchasing lightweight or electric garden appliances, using a mop or a broom with a rag to clean the bathtub, and purchasing an automatic drive vacuum cleaner. Mobility compensation involved using a cane or walker and purchasing luggage with wheels to ease traveling. Other movement control difficulties were compensated for by having the pharmacist use nonchildproof caps, using scissors to open food bags and cartons, and buying a card instead of having to deal with subway tokens. Compensation for memory difficulties most often involved having memo pads everywhere – in the kitchen, by the phone, by the bed, and even in the bathroom.

A couple of particularly innovative solutions were the following: “When I put on my stockings I use my walking cane”; “I get a clothespin and pin the tongue of my shoe back, and then take a long wooden spoon to slip my shoe on”; and, to get into a car “I use a plastic bag. I just put it on the seat, turn around, and slide right over.”

Although less common, some of the compensatory changes reported by the participants
involved changing the layout of their environment. By far the most frequently reported change involved the shower and bath, including having a walk-in bathtub or shower stall, using a chair, or using a handheld shower. Other changes to the environment included discontinuing use of lower shelves, sitting down while loading the dryer or doing ironing, and putting things in visible locations as a reminder to take them along (e.g., near the stairs, by the door).

Path design changes were specific to changes in passageways, such as the use of ramps to avoid stairs, choosing buses with shallower steps (e.g., a church bus), and installing wall-to-wall carpeting to avoid tripping over smaller rugs. These were the only examples of actual changes, though difficulties with paths (such as paths with steps) were frequently mentioned.

A large proportion of the compensatory responses could not be specifically categorized into these types of design changes. Many of these were instances of simply changing the steps of a task or developing a new strategy. Examples included choosing doctors with offices within walking distance, cooking enough on the weekend to last through the week, using two hands for the gas pump when one hand is not strong enough, putting laundry in a sack and tossing it down the stairs, and buying clothes that do not need ironing.

Some of the responses demonstrated the persistence of individuals in completing their tasks. For example, one woman said “You ought to see me bringing the fan downstairs the other day, a big fan. I rolled it down. I’d roll it two steps and then I’d sit. And then slide it down another two steps and then sit…. I finally got it down there!” Another comment related to housework was “I have learned that if I cannot pull something, I get behind it and push!”

Self-improvement. This type of adaptation involved attempting to acquire or restore an ability. Examples include physical therapy after a stroke, exercise (a common response for arthritis and back problems), hot baths, operations for cataracts, concentrating more on remembering names, and getting out more to ward off depression and loneliness.

The most common theme of self-improvement was that of learning a previously unknown skill. Instances of learning new skills later in life were mentioned in every group. Participants mentioned learning how to sew, how to read instructions for putting things together, how to use various appliances, computers, and VCRs, and how to fill out Medicare and insurance forms. Individual learning techniques included learning by reading instructions, learning by doing, and asking someone for guidance. Participants also expressed the desire to learn additional things but complained about the lack of instruction available. Individuals across the groups expressed the desire to learn to use computers even if they did not have an immediate practical use for them. Despite their desire to acquire new skills, participants expressed difficulties in learning them as an older adult. For example, people who had been required to start using computers at the end of their careers often reported that they had problems learning the new procedures.

Summary of Coded Comments

Our participants were all active individuals, judging by their reported activities. In addition, none were residents in assisted-living communities or nursing homes. However, it is clear from the results that they encounter a number of constraints on daily living tasks. The dominant themes are that limitations are frequently caused by motor and cognitive limitations, occur during activities of leisure, housekeeping, and transportation, and are primarily caused by task difficulty. The participants’ responses to their limitations ranged from changing themselves (self-improvement), changing the environment (compensation), no longer performing the task (cessation), or accepting lower performance levels (perseverance). It was also apparent that these older adults faced many problems that were related to changes in their environment. Having to learn to use new technologies such as telephone menus was a common problem. In addition, there were other new technologies, such as computers and VCRs, that older adults would have liked to use but did not because they lacked requisite skills. In the fol-
lowing section we discuss how human factors professionals might utilize these data.

**Potential Interventions**

We classified each of the issues mentioned in the focus groups according to ways in which human factors professionals could address them. We used the following categories to describe the appropriate human factors interventions: (a) training, (b) redesign of tools or environment, (c) a combination of training and redesign, and (d) neither training nor redesign will help (e.g., medical problems, financial problems).

Nearly half (47%) of the coded items were considered uncorrectable with training, redesign, or even a combination of the two. Common themes in this category were general transportation problems caused by lack of a car, general fatigue in housework and yard work (though many specific problems with these activities were amenable to redesign), serious physical problems such as arthritis or stroke, financial constraints, and crime.

However, more than half (53%) of the comments were considered to be remediable. These comments were coded into the categories of training, redesign, or training-plus-redesign. Recommendations for training alone were relatively rare and applied primarily to cognitive issues such as task unfamiliarity. The types of items that could be remedied via training were driving, wayfinding (e.g., reading a map), cooking, using a multiple-line phone, sewing, exercising safely (e.g., swimming), medical procedures (e.g., giving a shot), improving memory and time management, and using public transportation.

Solutions that focused solely on redesign, such as buses with lower steps, long-handed tools for grasping or scrubbing, easy-open containers, lightweight garden appliances, ergonomic chairs that ease egress, and so on, would be most successful to minimize primarily motor or sensory problems.

Recommendations for many issues would be a combination of redesign and the provision of some training in the task as well. For example, sophisticated or difficult devices could be made far simpler to use through a user-centered redesign, but even a well-designed version might require some minimal instruction given the inherent complexity of the task. Some troublesome tasks that seemed to require this combined approach involve the use of credit card scanners at grocery stores and fuel stations; complex exercise machines such as treadmills and stair climbers; telephone menu systems; computers; copiers; fax machines; calculators; home electronics such as VCRs, entertainment centers, remote controls, and clock radios; and kitchen appliances such as mixers, microwave ovens, juicers, and food processors.

**DISCUSSION**

**Focus Group Methodology**

There are benefits of the focus group technique: (a) an interactive dynamic effect such that the group data are more than the sum of independent interviews, (b) the fact that participants can provide context and qualification to their statements, and (c) the fact that the moderator has the opportunity to ask relevant follow-up questions. Our collection of eight focus groups demonstrates these benefits. Our participants provided information about the activities with which they had difficulties. The patterns of difficulties with ADLs and IADLs were consistent with data from surveys and observations (e.g., Clark, Czaja, & Weber, 1990). However, the reports of EADLs are unique in that these higher-level activities, such as adaptation, flexibility, and the new learning required because of changes in the environment, are typically not assessed. The qualitative data that we collected were most informative about the contexts in which people have difficulties (i.e., activity classification and locus of the problem). However, the data provided even greater depth in the information about the individuals’ perceptions of the problem (i.e., difficult vs. risky) and about their responses to their limitations.

Our coding scheme had its roots in cognitive psychology, gerontology, and human factors. The delineation of the four aspects of each issue provides a broad context within which to interpret particular difficulties as well as to plan appropriate interventions. The coding scheme pinpoints the locus of the
problem, the activity affected, and the source of the problem (i.e., difficulty or risk). In addition, the scheme provides a classification of the type of response made by the individual. Such data are also relevant to self-improvement plans.

Although the discussion portion of our focus groups was relatively unstructured, many of the groups discussed similar issues that were important to them. The fact that similar topics arose across different groups supports the generalizability of our findings. An additional, intangible benefit of the focus group approach was for the participants themselves. They were able to realize that the types of difficulties and frustrations they experienced in their daily lives were comparable with those experienced by their peers.

The supplemental coding that we conducted for the potential intervention benefits (i.e., training, redesign, or both) was designed to help direct our future research. Our primary goals were to determine the types of constraints that individuals experience, where the constraints occur, and how the individuals respond. However, the ultimate goals are to minimize the constraints on the daily lives of older adults through the development of relevant and age-appropriate training programs and to influence the design of products and systems. As has been suggested by others (Nayak, 1995), improvements that benefit older adult populations will also benefit other populations.

Transportation

A general theme throughout the focus group discussions was transportation difficulty. Critical difficulties included going to the doctor, going to get medicine, and going to buy groceries; other, less-critical difficulties included going shopping (for fun) and going out to dinner. People reported frustration caused by the inability to control transportation needs, discomfort imposing on friends and relatives, and sometimes a sense of isolation. Persons who did have cars were faced with the unhappy task of having to shuttle their peers around or receiving displeasure if they refused to do so.

The problems of transportation were striking, even though all the participants lived in the Atlanta area, which has a well-established public transportation system of subways and buses. Although crime was mentioned as a limiting factor (especially for nighttime travel), concerns that were mentioned more often were getting on and off the buses, using the stairs and escalators in and out of the subway stations, and knowing how to get around (e.g., which bus or subway to take, when it would depart and arrive). These issues of mobility and wayfinding in the context of public transportation are in need of much more attention from the aging and human factors profession. For example, the problems with wayfinding could be addressed with improved signs and maps or perhaps a well-publicized telephone information line (without menus) from which travelers could get directions from guides.

Individuals who continue to drive experienced difficulties driving at night because of glare and other visual factors, problems reading signs, and discomfort with the high rates of travel on local Atlanta freeways. The most typical response was to avoid freeways and to avoid driving at night, especially in unfamiliar areas. Most older drivers do have the advantage of being experts at the task of driving, and there is evidence to suggest that their decision making in the context of driving is equal to that of young adults (Walker, Fain, Fisk, & McGuire, 1997). Our task is to provide the information in the most appropriate and accessible manner. Design changes in the areas of signage and visual aids could improve the situation for older drivers. For example, Kline, Ghali, Kline, and Brown (1990) have demonstrated that icon signs improve visibility distance relative to text signs for all age groups under both daytime and dusk viewing conditions. More research of this type should be conducted and the results implemented.

Responses to Limitations

The responses of the older adults in our sample are consistent with the process of “selective optimization with compensation” (e.g., Baltes, Dittman-Kohli, & Dixon, 1984). Within the context of ADLs and IADLs, Lawton (1990) described such adaptation as follows: “Compensations are made, prostheses are utilized, sometimes human assistance is
sought, and most important, an economy of acceptable gains and losses is maintained whereby some goals and their tasks are relinquished gracefully in favor of others that are both highly valued and still within the realm of the person’s expertise” (p. 532). We observed this pattern in the responses of perseverance, cessation, compensation, and self-improvement reported by our participants. However, we also observed frustrations that remained, perhaps best captured by a woman who said that “everything you do is just about a struggle.” Consequently, though selective optimization with compensation may enable older adults to maintain overall psychological well-being (as suggested by Lawton, 1990), older adults, when probed, reported areas in their daily lives that continue to lead to frustration and that need to be remedied.

Active Learners in a Changing Environment

People are retiring earlier and living longer; thus, older individuals are continuing to be involved in a variety of activities, such as “part-time and at-home employment, volunteerism, professional consultation, travel, and giving care to other retirees” (Smith, 1990, p. 516). Within these contexts, older adults encounter a wide range of technologies that require new learning. The need to learn to use a new technology is sometimes driven by demand (one must learn to deal with telephone menus if that is what stores and offices implement). Other new technologies are sought by older adults because of new opportunities and functionality afforded by their use. Common examples of these were computers, VCRs, and microwave ovens. One positive aspect of many of these technologies is that they can enrich the lives of older adults or make them more functional. Computer access could be a boon to older adults who are home-bound or have transportation problems. Likewise, using a microwave instead of a conventional oven could make food preparation easier and safer for older adults. The problem lies in acquiring the knowledge and skills necessary to use these new technologies.

An encouraging finding was the participants’ willingness and eagerness to learn (see also Morrell & Echt, 1996). Although they frequently acknowledged that they might have difficulty learning and that they require more time to learn, older individuals were eager to learn how to use fax machines, photocopiers, computers, and a variety of kitchen and garden tools. These data demonstrate inaccuracies in traditional stereotypes of older adults as people unwilling to explore new activities or to take advantage of the latest technologies. The participants in our study continue to be active learners throughout life. Indeed, Sinnott (1994) suggested that such active learning is a necessity in today’s environment: “How can one learn to survive and thrive in an environment that, as a child, one couldn’t even imagine? We need to keep learning as adults.” (p. xi).

Human Factors Research

In 1974, Chapanis suggested that human factors researchers should begin to design for the older adult—that is, to consider declines in physical strength, mobility, sensory functioning, and cognitive capabilities that accompany aging. Great strides have been made since then, as illustrated by special issues on aging in the journal Human Factors in 1981 (Fozard, 1981) and 1990 (Czaja, 1990a), as well two special issues devoted to the safety and mobility of elderly drivers (Barr & Eberhard, 1991; Eberhard & Barr, 1992; see also Bouma & Graaflans, 1992; Charness & Bosman, 1992; Czaja, 1990b; Fisk & Rogers, 1997). However, one theme from our focus group discussions is the need to do more to ease the daily lives of older individuals. The types of problems and concerns reported by these individuals can be remedied, at least to some degree, by our continued research and application of our knowledge. It is also clear that there is a need to focus on developing appropriate training for older adults. Given the number of new technologies that older adults must or want to use, accessibility to training that allows them to acquire the necessary knowledge and skills is critical. This lack of training for new technologies can be the critical factor in older adults adopting a new technology (Rogers, Cabrera, Walker, Gilbert, & Fisk, 1996). Of course, many devices could be redesigned with the
older adult in mind, but the need for age-appropriate training will remain.

We surmise that through training, redesign, or some combination of the two, approximately half of the issues raised in the focus group discussions could be improved. That does not mean that these difficulties would be completely eliminated, nor do we mean to suggest that the appropriate training and redesign strategies are known or easily determined. The point is that there is a great deal of potential for both the science and practice of human factors to favorably affect the daily lives of the older segment of the population.

A clear conclusion drawn from this research is that the changing environment has large effects on older adults. Faletti (1984) stated “the physical environment is a major factor affecting the extent to which an older person can continue to live independently” (p. 192). We believe that the technological environment of today’s world may impose limitations on older adults’ ability to live independent and enriched lives. The participants in our focus groups stressed that many problems they face in daily life are caused by the need or desire to use new technologies. Failure to acquire the knowledge and skills to use new technologies can prevent older adults from performing some tasks, eliminate sources of enrichment, and limit access to technologies that can offset limitations caused by the reduced motor, perceptual, and cognitive functioning associated with later life.

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