Multitheoretical Perspectives on Cognitive Responses of Older Adults

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MULTITHEORETICAL PERSPECTIVES ON COGNITIVE RESPONSES OF OLDER ADULTS

ABSTRACT When studying age-related differences in consumer behavior of older adults, researchers tend to attribute the observed differences to the person’s declining abilities in mental capacity that accompanies biological aging. However, recent research in cognitive psychology suggests that cognitive functioning in general and declining abilities in particular might not be a matter of cognitive deficits due to biological aging pointing to additional explanations for age-related declines. This paper extends previous research by presenting explanations beyond biological declines. It suggests a multitheoretical framework and presents the results of qualitative research in support of a more comprehensive model of cognitive functioning in later life.

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ABSTRACT

When studying age-related differences in consumer behavior of older adults, researchers tend to attribute the observed differences to the person’s declining abilities in mental capacity that accompanies biological aging. However, recent research in cognitive psychology suggests that cognitive functioning in general and declining abilities in particular might not be a matter of cognitive deficits due to biological aging, pointing to additional explanations for age-related declines. This paper extends previous research by presenting explanations beyond biological declines. It suggests a multitheoretical framework and presents the results of qualitative research that can be interpreted in the context of a more comprehensive model of cognitive functioning in later life.

INTRODUCTION

Models of cognitive aging have been widely used by consumer researchers to explain age-related differences in information processing and decision making (e.g., Cole and Balasubramanian 1993; Cole and Gaeth 1990). The processing resources framework is generally used to explain age-related differences in such cognitive responses. In this framework, age-related deficits in memory, intelligence, problem solving, and reasoning are conceptualised in terms of deficits in processing resources - i.e., resource deficit models (John and Cole 1986; Salthouse 1991). These models assume that mental operations require varying amounts of cognitive resources, which tend to be limited in early and late life and show a wide variation across individuals. While many cognitive deficits in early life have been attributed to stages in cognitive development (e.g., Piaget 1983), declines in processing resources that characterise late stages in life are generally attributed to biological aging that causes the central nervous system to slow down (e.g., Axlrod 1963; Salthouse 1985).

Many scholars in the fields of cognitive psychology and consumer behavior have documented age-related differences in cognitive responses (e.g., Lambert-Pandraud, Laurent, and Lapersonne 2005; Marsiske and Willis 1985; Phillips and Sternthal 1977; Salthouse 1991). However, the causes of these differences are not well-understood in part because there are no formal theories of cognitive aging (Light 1988; Salthouse 1991). What is available is a set of ideas at the framework level that “... has not yet been formulated in sufficient detail to be considered a true theory or model” (Salthouse 1991, p. 349). Based on a review of research on cognitive aging Salthouse (1991) concluded:

As it currently stands, the processing resources perspective attempts to specify the most appropriate level (i.e., specific or general) for characterizing what the age differences are, but it ... leaves unanswered the fundamental questions of why the reduction in resources occurs, and how that reduction results in lower levels of cognitive performance (p. 349).

Recent studies have shown that it is possible for aging persons to continue improvement of existing cognitive skills and acquire compensatory and new cognitive skills throughout life (Fillit et al. 2002; Perlmutter 1988; Willis and Schaie 1986). Evidence to support this phenomenon (also known as “plasticity” of the cognitive system) comes from demonstrations of cultural and historical effects on adult intelligence (cf. Perlmutter 1988). Furthermore, this improvement in cognitive functioning may reflect higher education, changes in societal roles, increase in the level of intellectual stimulation in one’s environment, and other factors (Perlmutter 1988).

Evidence presented by Salthouse (1991) supports the notion that environmental, experiential and cohort-related factors are important in understanding cognitive functioning. Similarly, several studies in the field of consumer behavior show that cognitive performance can be enhanced with training (Cole and Gaeth 1990; Gaeth and Heath 1987), pointing to the importance of the environmental factors. These as well as studies in the field of cognitive psychology (e.g., Perlmutter 1988, Salthouse 1991 and 1999) suggest that biological, psychological, socio-cultural and environmental factors have an impact on cognitive functioning.

There are also issues regarding appropriate measures of cognitive activity. Schaie (1987), for example, criticised commonly used measures of cognitive activity and information-processing paradigms for predicting competence across age groups, arguing for a contextualistic approach where different behavioral situations demand alternative combinations of intellectual abilities for their competent mastery. According to Schaie (1987), such situational demands impinge on an individual’s cognitive performance, and may vary markedly depending on the relevance of the task in a given stage of life; and individual responses may also be determined by the perceived attributes of a given situation, with such perceptions also likely to differ by life stage. He concludes: “It is necessary therefore to specify life-stage-specific situational taxonomies and to provide instruments that allow the appraisal of observed and perceived competence in specific situations” (p. 52).

In a parallel vein, some consumer researchers have observed that the methods that have dominated research on information processing and cognitive psychology in general may be incomplete, and have suggested the existential-phenomenological view for studying human cognitive activity (e.g., Thompson, Locander, and Pollio 1989). According to this view, the world of lived experiences does not always correspond with the world of objective description because objectivity implies one can separate an event from its contextual setting. Thus, although both younger and older adults may be exposed to the same stimuli (e.g., products, experimental treatments) one cannot assume that these are perceived in isolation from one’s lived experiences.

To summarise, resource deficit models may not completely account for all age differences in cognitive functioning. Consumer researchers might benefit from using additional variables deriving from competing or complementary models.

The present research explores a number of factors related to the individual’s cognition. It uses Perlmutter’s (1988) definition of cognition, which refers to “… the psychological ability that accounts for all mental life” (p. 250). This definition includes, memory, problem solving, reasoning and, therefore, mental operations required in decision making. Unlike previous studies that have used quantitative data to examine cognitive responses, the present study uses qualitative data in an effort to explore and understand cognitive processes among older adults. Specifically, it uses a multiple-tier model of cognition as a framework for interpreting data regarding older consumers’ responses to a new technological innovation.
CONCEPTUAL FRAMEWORK
In order to integrate the various cognitive psychological perspectives and summarise evidence about cognitive functioning, Perlmutter (1988) proposed a multidisciplinary framework that takes into account biological factors, environmental factors (both physical and social), and cognitive factors in a three-tier model of cognition. The first tier incorporates basic mechanisms, primary mental functions, and fluid abilities. These are basic processing components of cognition that have been the focus of psychometric and experimental studies (e.g., Salthouse 1991) susceptible to deterioration associated with programmed biological aging and health problems. Resource deficit models assume the presence of this tier, which is also the basis of many consumer information-processing studies (e.g., Phillips and Sternthal 1977; Yoon 1997). The second tier of the cognitive system incorporates what has been known as world knowledge and crystallised abilities it includes the pragmatics of cognition (e.g., vocabulary) that are the focus of ecological studies (cf. Perlmutter 1988) or what Thompson and his associates (1989) refer to as "the individual’s world of lived experiences." This tier derives from environmental experiences and is assumed to be a psychological addition to the biological layer. It is immune to deterioration associated with programmed biological aging, but is capable of adapting to the environment. Gaeth and Heath (1987), for example, found that older consumers’ susceptibility to misleading advertising can decrease with appropriate training, while a study by Cole and Gaeth (1990) showed that older people can improve their ability to use complex decision rules.

The third tier incorporates what has been referred to as strategic or higher mental functions, activities well-mastered (e.g., expertise) due to, for example, one’s occupation or hobbies. This tier is also immune to biological fluctuations and emerges or improves with age as a result of the organism’s cognition about its own activity (internal experiences of the cognitive system), possibly directed by social interaction. The 55 SeniorNet Learning Centers and their members who subscribe to various information services accessed via personal computer (Thompson 1994) attests to the possible presence of this tier. This last view focuses attention on factors that mediate change in cognitive functioning, specifically on variables such as health, personality, attitudes, social roles and lifestyles. Although Perlmutter postulates only three tiers, she does indicate that it is possible to speculate a fourth or possibly fifth cognitive tier, with such tiers deriving from the cognitive system’s emotional or biological experiences.

THE STUDY
The purpose of this study was to identify and validate the presence of the three types of cognitive tiers related to home-information technologies, in line with Perlmutter’s conceptual framework. Specifically, skills identified to decline due to physical deterioration of the bodily systems would be classified under Tier I; those that remain constant or modified by the individual (through experience) to adapt to new circumstances (e.g., products, services) as skills related to Tier II; and those skills that appear and improve in later life would be relevant to Tier III. In addition, the model provides opportunities for exploring the presence of additional tiers.

Research by Wallendorf and Brucks (1993) suggests the usefulness of various methods of introspection, including guided and syncretic introspection, for interpreting informants’ comments. This study used one form of guided introspection (focus group interviews) as well as a combination of introspection methods, including analysis of other researchers’ conclusions (syncretic introspection). While the data used in the present study are neither purely introspective nor phenomenological, they provide interesting insights.

The study was based on comments of focus group participants and researchers from two waves of focus groups conducted within a period of approximately ten months as part of a large-scale qualitative research program on information technologies directed by the senior author. The first wave consisted of ten focus groups (N = 109) conducted in five cities. Criteria used in participant selection included age, sex, income, type of impairment, living arrangement, and employment/retirement status. Participants were presented with a wide variety of new or emerging products and services, many of which are available via the Internet today. Some of the services were being offered through the Internet on a trial basis to participants of three focus groups in one city. Group discussions focused mainly on the needs of older consumers. The participants of the nine focus groups were over 55; and one focus group included participants of different age groups. Comments from older participants are most relevant in identifying the presence of skills related to all three tiers under investigation, since the accumulation of life experiences and biological declines tend to be associated with age (Perlmutter 1988, p. 263).

The second wave consisted of seven focus groups (N = 78) conducted in three cities. Six of the groups comprised a matrix of small business managers and consumers, with and without PCs. The seventh group consisted of persons who were already subscribers to Internet services. All the services presented to these groups had been available through the Internet. There was a minimum income criterion ($30,000) but not age requirement. The participants in these groups tended to be younger and employed, representing diverse groups of households and small businesses. Information from these focus groups was sought as it might relate to different needs, competence, and expertise of householders and business professionals.

Thus, participants of the seventeen groups were very diverse with respect to their present and potential needs, experience with and expertise in using the Internet. Two experienced moderators conducted the focus groups. One had an MBA degree and the other a Ph.D. in Psychology. Both moderators were very familiar with Internet services. The interviews were recorded, transcribed by the two researchers independently, and summarised. Because syncretic introspection includes analysis of other researchers’ conclusions in order to achieve confirmability (Hirschman 1986), the researchers’ reports were also audited (evaluated) by the authors whose experience with the Internet is comparable to that of the two researchers.

RESULTS
Biological Declines
One approach to investigating biological declines in cognitive functioning is to examine deficits in the various components of the information-processing system (Schaie 1987). Thus, for example, with respect to the biological effects on the perceptual system, one can examine the physiological declines in the sensory system (vision, hearing, etc.) as it relates to the person’s ability to make quick perceptual discriminations; the effects on the cognitive system as deficits in memory span or ability to retain numerical symbols and meaningful words in short-term memory; and motor performance system could be influenced by changes in the biomechanical system due to factors such as declining strength, loss of flexibility in joints and the onset of chronic conditions (e.g., arthritis).
Participants in focus groups were asked to describe their experiences with existing products or services that have been or could be incorporated into Internet services (e.g., telephone directories that could be replaced with an electronic telephone directory), and to comment on such new products and services that were described (in writing and orally) to the participants.

Several of the older participants in the focus group discussions made comments that suggest biological influences on information processing and cognitive functioning. Specifically, informants made comments about the Internet service that would alleviate the need to see at night. For example, several informants reacted positively to a security system that would use special equipment to read hand prints and automatically unlock the door. Several of them with severe vision impairments made comments such as “... have trouble with the keys at night” and “... would be convenient at night.” Younger informants, on the other hand, saw little or no value in this technology. Older informants also made comments on other products and services that suggest deficiency in other components of the sensory system. For example, with respect to hearing, several participants reacted favorably to technologies that enhance their ability to hear or reduce background noise. All these comments are consistent with data that show increasing deficiency in the sensory system (i.e., information-processing abilities) in later life (e.g., Salthouse 1991).

Informants also made comments on existing and new products and services that reflect declines in deficit resources and adverse affects on the cognitive and motor performance systems. For example, many older responders reacted positively to the idea of having an electronic calendar or telecommunication service that would remind them to do certain things (e.g., take medications). One older respondent indicated preference for verbal messages rather than a beeper, suggesting that a beeping may not serve as an adequate reminder (the person would still have to remember why the occasion for the beeping). Another older informant responded to the idea of having an electronic directory by saying that verbally-delivered listings could not be remembered. As another older informant put it: “... sometimes I don’t remember a complete name; ‘I’d need a form of reference to help me.’”

One informant’s comments on the idea of getting information about such new products in the mail can be interpreted as preference for internally-paced (as opposed to externally-paced) information (John and Cole 1986; Phillips and Sternthal 1977):

“... if you wanted to go to a place to see the thing itself you, at least, are familiar with what you’ve seen in the catalog and you are reasonably intelligent. I know I went by one of those telephone places not long ago about a touch tone... and I am telling you ... by the time that girl got one of those telephone places not long ago about a touch tone... and I am telling you ... by the time that girl got one of those telephone places not long ago about a touch tone... and I am telling you ... by the time that girl got..." 

Decline in the motor performance system is manifested in longer time span for response or responses different from those intended, perhaps due to slowing down of the central nervous system as well as deficits in manual dexterity. This deficit is reflected in comments on new phone designs made by older informants with arthritis: “desk model is easy to dial; trimline is difficult because the numbers are too close together” and “...because fingers are more inflexible, more than one number may be punched simultaneously.”

Collectively, these comments can be interpreted in the context of physical or biological deficits, which may affect cognitive functioning in general and information processing in particular. Since such comments were made by older informants, they suggest the presence of biological deficits in older adults. Many of the comments were made on products and services concerning everyday activities that are essential for adaptive functioning in given life circumstances (e.g., use of telephone). Biological declines do not only appear to affect cognitive processes but also the outcomes (products) of such processes (Schaie 1987).

Compensatory Skills

The second tier of cognition is subject to physical deterioration but capable of adapting itself to environmental circumstances it encounters. Experience acquired over time (primarily from one’s environment) is believed to be incorporated in thought and decision making, capable of compensating for processing limitations due to biological declines. Studies have shown that in some domains older adults can acquire compensatory skills that enable them to perform complex tasks with the same competence as younger adults (e.g., Perlmutter 1988). For example, a study reported by Salthouse (1991) found that although basic reaction time of older typists generally was slower than that of younger typists, older typists were able to maintain comparable typing speed by reading farther ahead. A similar type of study of bridge players concluded that older players developed some skills that compensate for speed they had lost (cf. Perlmutter 1988).

Evidence for compensatory skill development was also sought in comments made by our older informants. One unsolicited comment in particular stands out as an example of a compensatory skill due to failing vision and declining ability to read small print at places where there is less than adequate lighting.

“... Some years ago, I found out ... you know, I normally do not need glasses ... but if I get in a dim light in some phone booth, it’s difficult to see. This fellow said: “Take a business card, take a sharp pencil like that and punch a hole and hold it up (a bit higher from the printed material), and it acts like a magnifier, and it’s great ... its like a lens ... and ... any way, for what’s worth. You probably can use it because I got stuck like that a couple of times in an airport or something like it (M, 65+).”

This comment can be interpreted in the context of the second tier of the cognitive system. First, the skill was developed to compensate for visual declines (inability to focus and see in dark environments). Second, it is based on external experiences (compared to Tier III which is internal-experimentally based) -- i.e., the informant learned this skill from others.

Improvement of Existing Skills

Perlmutter makes reference to one specific kind of cognitive skill, expertise, which seems to have the potential to develop and improve throughout life, referring to skills underlying an activity that is especially well-mastered due to factors such as one’s occupation or hobbies. In studies of expertise, the knowledge base and performance characteristics of experts and novices typically are compared. Regardless of age, an expert’s knowledge base in his or her area of expertise is quantitatively larger, more organised and operative than that of the novice’s (Perlmutter 1988). The cumulative experience with work and leisure, according to Perlmutter, could make an older person a universal expert, “with advance organisations of knowledge and general strategic operations” (p. 255). She also explains the role of mediating factors in improvement of existing skills over the life span:

“...because the mediating effects of factors such as personality, attitudes, and life-style accumulate across time ... the impact of mediating factors should be most apparent
in that age (very old) group. For example, if a life of cognitive challenge enhances cognitive function, cognitively challenged individuals should appear increasingly different with age. The individual who maintains a life habit of extensive reading may enter old age with an exceptionally intact cognitive system, and the emeritus professor who continues active research and teaching past retirement may stay mentally sharp to his or her last days (Perlmutter 1988, p. 263).

We interpreted researchers’ conclusions and informant comments in the context of presence or absence of background characteristics (lifestyles, profession, hobbies, etc.) rather than age. One researcher’s conclusion based on focus group participants’ cognitive responses to the Internet was as follows:

Households and businesses without computers did not perceive the need for a computer in their everyday lives. Many of the householders (and some of the business managers) simply did not see worthwhile applications for computers in their lives and did not consider (the Internet) to be sufficiently interesting to warrant the purchase of a computer to be able to use (the Internet) ... The computer use by the home and business PC-using participants tended to be simple and unsophisticated, and neither group had elaborated informational needs ... PC-using households and businesses ... were easiest to educate about the system ... they were also more aware of the real costs of accessing databases.

The researcher’s conclusion highlights points that can be interpreted in the context of Perlmutter’s third tier of cognition. Those whose profession or lifestyles included the use of the information technologies were also likely to be the most knowledgeable and interested in learning about, and to respond favorably to the new home-information system.

**Additional Cognitive Tiers**

Although Perlmutter postulates only three tiers, she suggests that additional system might be present, she indicates that:

it almost surely includes and experientially-based control system that ever more adaptively reviews, plans, and manages activity. Such a control system is likely to reflect increasing awareness, mediation, and integration of emotion and thought ... Such a system may have been in the making for the as yet vague quality of wisdom (Perlmutter 1988, p. 256).

Comments made by informants on an existing custom calling-telephone service (call-waiting) suggest the presence of a layer that integrates cognitive and emotional responses, in line with a possible fourth cognitive tier.

We have it ... but as the guy on the other end of the line I resent it because once somebody tells me, “I’ve got another call coming,” and puts me on hold, I hang up ... But it’s, I think, it’s an insult to the people you are talking to when that happens (M, 65+). I object to it ... like my son calls me, and he’s got two teenagers in their home, and we never can carry on a conversation ... its constantly beeping, and we’ve got to stop it ... somebody ... it, it, it annoys me (F, 65+). My husband would call me from the office and I’d be on the phone, and he’d try several times ... and when finally got through to me he was furious because he couldn’t get me ... And now, with call waiting ... you know ... it beeps, ... and I talk to him ... he is happy, and I am happy, and everybody gets along fine ... (F, 55-64).

These comments illustrate emotions beyond cognition, a mixture of emotions (anger, affection) and cognitions, and the meaning of such a service in the person’s life. At least for these older consumers, their responses are filled with emotions because of the way the service has affected their lives, creating life experiences that go beyond their ability to perceive, understand, and use such a service.

To summarise, comments made from focus group participants and conclusions reached by moderators provide some evidence that can be interpreted in line with the multitheoretical model presented by Perlmutter.

**DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH**

The results provide some support for the multitheoretical model of cognition. Collectively, the results of the present and previous studies raise interesting questions to be addressed in future research. First, we need to understand specific consumption-related cognitions that decline in later life and the reason(s) some older people maintain certain cognitive skills longer than others. Are these declines due to biological processes, or are there early-life social and environmental factors that contribute to the observed differences? Second, we need to know more about strategies older people may use to compensate for cognitive declines. Information obtained through comments and findings of other studies (Salthouse 1991) suggest that older adults may develop new strategies to compensate for cognitive declines.

Some evidence from this study also suggests the possibility of additional tiers that integrate cognition with emotions, in line with Perlmutter’s speculations. Emergent themes that describe these additional tiers could also be the focus of future research. For example, we need to answer questions such as: Are there age differences in consumption experiences with products and services? What meaning(s) do different age groups attach to specific commercial stimuli? How do emotional responses to age-stereotypes in advertisements and other age-segmented stimuli affect cognitive orientations toward the firm’s offerings? How do biological experiences due to, for example, declining health affect the perceptions of commercial stimuli? Does education contribute to the older person’s inclination to resist certain commercial stimuli (new products, persuasive messages, etc.), as the findings of the Gaeth and Heath (1987) study suggest? Future quantitative research in this area should also be guided by findings and recommendations in related fields, especially cognitive and developmental psychology. For example, Salthouse (1991) recommends three important kinds of information should be obtained from participants: (a) various experiential factors as moderators of age-related declines in cognitive functioning; (b) multiple measures representing several theoretical constructs; and (c) health-related symptoms or measures of neurological and physiological variables should be used to tap biological processes. The present study attempted to follow the first two suggestions, while the latter could be addressed in future research. The last suggestion also appears to be the most challenging, since there is no agreement on how to conceptualise and measure biological declines (e.g., Dean 1988; Salthouse 1991), and how to incorporate them into multitheoretical frameworks (Moody 1988).

**REFERENCES**


