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**RESPONDING TO THE CHALLENGES OF LATE LIFE:
STRATEGIES FOR MAINTAINING AND ENHANCING COMPETENCE**

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Running Head:

MAINTAINING AND ENHANCING COMPETENCE

The People were nomads living in the far north. They survived by moving in search of food. The winter had been a particularly harsh one for the People. Two elderly women in the group, Ch'idzigyaak and Sa', had become burdensome because of their slow pace and complaints. Worried about the survival of the group the People faced a desperate decision, whether or not to abandon the two old women. There was much disagreement among the People. While abandonment was not uncommon in bleak times, Ch'idzigyaak and Sa' seemed too young and capable for such a practice. The usual practice would have been to abandon the women with nothing so that they would die in the night. However, because of the feelings of uncertainty and guilt among the People, Ch'idzigyaak and Sa' were left with a tent, a hatchet, and a bundle of babiche, which are thick strips of moose hide used for many things.

Ch'idzigyaak and Sa' were hurt and angered by the actions of the group. They prepared to die as they settled in their tent for the night. Much to their surprise, they awoke the next morning and were very much alive. Sa' became hopeful and suggested to her companion that if they were to die, they may as well die trying to survive. Together, the two women remembered how to set traps with the babiche and they caught a squirrel with the hatchet that was left behind. They quickly realized that game around the campsite was too scarce, and they knew they had to move on if they were to make it through the winter. Ch'idzigyaak told Sa' an old story of a Place the People had visited in her youth which had an abundance of fish and other game. With nothing to lose, they decided to make their way towards this fruitful spot which was many days journey away. The traveling was long and tiresome. The women walked for many hours each day with little rest. They would awake in the morning feeling great aches and pains in their bodies. Several days into their journey they realized they had left behind the walking sticks that they had needed when they had traveled with the People. Their former complaints now seemed trivial, and they felt remorse about the way they had behaved with the People.

Eventually they made it to the Place and the fish and game were as plentiful as Ch'idzigyaak had remembered. In the Place Ch'idzigyaak and Sa' flourished. They survived the winter, and when summer came they worked hard preserving animals and making warm clothing for the following winter. At the end of the summer, they had more food and clothing than the two of them needed. (Abridged from Wallis, V.,1994)

“The Tale” highlights a major theme for this chapter, that is, the social facilitation of the non-use of competence. As the two women aged, changes in abilities likely occurred, the types of changes which have been well documented in the cognitive and biological aging literature (Finch & Schneider, 1985; Salthouse, 1991). However, a more important factor in shaping their behavior was the reduced expectations from the tribe (i.e., age stereotypes) of what they could contribute, and a progressive loss of role and status. Over time, the tribe, and even the women themselves, became more aware of their limitations and frailties. Unfortunately, the outward behavior of the women (e.g., slow pace, complaining), served only to reinforce the tribe's beliefs and behaviors.

The life span developmental approach provides a useful framework for understanding the process of aging, and identifies mechanisms which contribute to successful aging. From

this perspective changes which occur in late development are not solely considered to be a result of chronological age or age-related declines in biological processes but the result of multiple social, psychological and biological influences (Baltes & Baltes, 1990). The ability to maintain mastery over simple tasks (e.g., self care) and more complex tasks (e.g., managing finances) is viewed as a contributor to an older adult's level of perceived competence, and is also interpreted as an indicator of cognitive ability (Baltes, Mayr, Borchelt, Maas, & Wilms, 1993; Willis, 1996). Performance on formal evaluations, which largely focus on cognitive ability, has also been used as a way to measure older adults' level of competence. However, as we discuss throughout the chapter, formal evaluations may be problematic and, therefore, may not accurately reflect the older adult's level of competence.

In this chapter, we describe a lifespan framework of successful aging which includes three primary adaptive mechanisms, namely selection, optimization, and compensation (Baltes & Baltes, 1990; Marsiske, Lang, Baltes & Baltes, 1996). We also discuss the influence of non-aging factors on development. Interventions that have enabled older adults to overcome competence predicaments will be reviewed. These interventions primarily targeted either the older individual, the task at hand, or the social/physical environment in such ways as to break the negative feedback cycle described so eloquently in "The Tale."

THE COMPETENCE PREDICAMENT: THE SOCIAL FACILITATION OF THE NON-USE OF COMPETENCE

Negative expectations about aging have their basis in negative stereotypes about old age in terms of poor memory, frailty, increasing dependency and inflexibility, (Hummert, 1990; Kite & Johnson, 1988) and in terms of social policies that limit roles for older adults which lead to reduced social status and prestige (Palmore, 1990). Through a process of socialization, young adults internalize the stereotypes prevalent in society and enter old age with negative expectations about aging. As a result, older adults behave in ways that are thought to be typical and characteristic of their age group (Heckhausen & Lang, 1996). Older adults who experience declines that are consistent with age stereotypes may not try to change their behavior because they believe it represents the norm. In a similar vein, stereotyped expectations also lead older adults to accept the diminished role society gives them and they behave "old" (Rodin & Langer, 1980).

Age stereotypes also bias how the performance of older adults is interpreted by observers. An identical memory, achievement, or communication performance will be interpreted differently depending on whether the target is young or old. Erber and her colleagues demonstrated the existence of an age-based double standard in memory appraisals. She found that people were more likely to interpret benign, everyday memory failures as a sign of mental impairment when they occurred in old compared to young adults. Such memory failures were seen to be caused more by lack of ability (a non-controllable source) when they occurred in old targets but caused by lack of effort (a controllable source) when they occurred in young targets (e.g. Erber, 1989; Erber & Rothberg, 1991; Erber, Szuchman, & Rothberg, 1990a, 1990b; also Parr and Siegert, 1993). In addition, Bieman-Copland & Ryan (in press) demonstrated that such age-biased interpretations were robust even when salient situational variables, which could account for the memory outcome, were included in the scenarios. Successes and achievements are also interpreted in a stereotypical manner. For example, Bieman-Copland & Ryan (in press) found that everyday memory

successes were judged to be less typical for old compared to young targets. Likewise, Ryan, Szechtman, and Bodkin (1992) found that young participants rated old targets as less likely than young targets to succeed in completing a computer course despite giving the old target who was taking the course higher competence ratings than the young target. Ryan & Laurie (1990) found that when messages were communicated by old versus young men, the messages were evaluated less positively and perceptions of the men who communicated them were also less positive. Moreover, young listeners failed to differentiate good versus poor communication performances of old but not young speakers.

The Communication Predicament of Aging model was developed to highlight how these stereotyped expectations and interpretations influence intergenerational communication and contribute to age-related losses in functioning (Ryan, Giles, Bartolucci, & Henwood, 1986; Ryan, Hummert & Boich, 1995). According to the framework, conversational partners sometimes base their speech with older adults on erroneous assumptions guided by beliefs about decline and incompetence in old age. Such age-biased modifications can include high-pitch, exaggerated intonation, slow pace, simplification, repetition, reduced politeness, terms of endearment, and talk about the past. While some degree of modification may be necessary for some older individuals, these patronizing styles of speaking are elicited solely on the perception of general old age cues (e.g., white hair, stooped posture) rather than on the needs of the particular individual. These speech modifications reinforce age-stereotyped behaviors such as dependence and inactivity, and subsequently create barriers to positive interaction. In the extreme, continued exposure to such situations may eventually lead to reduced self esteem in the older adult, and withdrawal by young and old communicators from intergenerational exchanges.

Aging stereotypes and expectations can also influence an older adult's level of perceived control. Frail elders are more often in low control environments such as nursing homes or hospitals (Teitelman, & Priddy, 1988), which are typically socially and physically restrictive. Although staff intend to be helpful, their behaviors are often based on stereotypes about older adults. Research in nursing home environments found that staff engaged more frequently in actions which caused further dependency among residents (Baltes & Wahl, 1992). Seligman (1975) and other researchers have developed the theory of learned helplessness and found that individuals who are frequently exposed to low control physical and/or social environments may experience several deficits. There are declines in motivation, cognitive ability, as well as emotional disturbances which are particularly consequential for frail older adults. A common response to being exposed to low control environments is passive behavior which is usually interpreted by others as a sign of incompetence.

The function of stereotypes may be so strong that it can also affect formal evaluations of competence. Too often old age is considered the primary contributor to poor performance in older adults and multiple factors which influence performance are frequently overlooked. A competence enhancing approach to evaluation and intervention involves appropriate consideration of the multiple influences (Ryan, Kwong See, Meneer, & Trovato, 1994; Willis, 1991).

Cohort effects rather than age per se may explain some age differences in performance. Evaluations that are completed by psychologists and others often occur in school-like settings and involve unfamiliar tasks which put older adults at a disadvantage because of their lack of recent experience. For example, the education of older adults differs

both quantitatively (e.g. number of years of formal schooling) and qualitatively (e.g. teaching techniques used) from younger adults. This situation is aggravated if there are arbitrary time limits for completing the task. For older adults, it is critical that tasks which evaluate competence have high levels of face validity (i.e. be similar to tasks they perform in everyday life). An older adult may be poorly motivated to complete tasks that lack relevance for them. Fatigue may also adversely affect performance.

Individual life histories provide important information about the life long skills and abilities which may influence how current performance is evaluated. For example, an older adult may have always experienced difficulty with memory in a particular domain such as remembering names. One older adult we interviewed about perceptions of her memory ability replied, "I take heart in knowing that what I forget now are things I've always had difficulty remembering" (Bieman-Copland & Ryan, 1996). Life time experiences tend to magnify individual differences among older adults in areas such as world knowledge, domain specific expertise, and information processing strengths and weaknesses.

Recent experience with health changes, levels of activity, and environmental stimulation may also markedly affect a person's performance at a given time (Rowe & Kahn, 1987; Lawton, 1982). An older person may have to be more conscientious about the time of day and the physical environment, (e.g., background noise, poor lighting, glare), in which they perform activities if optimal levels of competence are to be demonstrated. Furthermore, one must also be cognizant of the fact that older adults may set different task goals affecting their views of what is meaningful and what is an ideal strategy (Brigham & Pressley, 1988). Likewise, subtle biases within examiners may be inadvertently communicated to older adults further reducing their expectation and motivation to exert effort.

Rowe and Kahn (1987) differentiate usual aging from successful aging based on the degree to which non-aging or extrinsic factors are controlled. They argue that many of the effects that the scientific literature has described as being caused by age, are in fact due to a greater degree by factors other than age. The term successful aging has become the "buzz" word of gerontological researchers in the 1990's. Successful aging is often defined in terms of exceptional performance or achievements by older adults (Baltes & Carstensen, 1996), an end state which may be unachievable by a majority of older adults.

A LIFE SPAN DEVELOPMENTAL FRAMEWORK FOR SUCCESSFUL AGING

In contrast, a life span developmental framework emphasizes that successful aging is a process rather than an end state. Figure 1 displays a modified version of concepts critical for this perspective which were introduced by Baltes and Baltes (1990). Successful aging is a highly individualized and subjective concept and is recognized when an older individual is able to achieve desired goals with dignity and as independently as possible. This means that successful aging is possible for a nursing home resident whose goal is to be able to maintain health and complete basic activities of daily living as well as for a recent retiree whose goal is to be an active member in the community.

Insert Figure 1 about here

Core Assumptions about Aging

Aging like all development involves processes of specialization. In aging, part of this

specialization involves increasing knowledge acquired through life experiences. But as with any specialization, there is a cost in that potential expertise in areas not chosen is sacrificed. Because opportunities for experience are so vast and individual, variation both within and across individuals tends to increase with age. This heterogeneity is the hallmark of late adulthood.

For older adults, the process of specialization occurs in the context of clear age-related changes in physiological capacities. In the past, the focus in adult developmental research has largely been on losses in domains such as sensory perception, information processing, and memory. Because of this focus, late adulthood has been generally accepted as a time of accumulating losses and is equated with declining competence. While losses may outweigh gains, the possibility of maintaining or increasing adaptive capacity is a timely concept which the Baltes approach has brought to the study of human development. The key for adaptive functioning is ensuring that older adults work with rather than against changes in physiological capacity. This notion of development as an active and dynamic process replaces the more simplistic developmental notion of childhood as a period of growth while aging is a period of decline.

We propose an extension of the Baltes model that considers factors unrelated to age which affect the performance of older adults. We believe that the focus on losses within adult developmental research has led to a situation where such factors have been largely ignored. The distinction between age differences and age changes is often blurred and, as a result, losses attributed to aging per se are magnified. What is unfortunate about this situation is that many factors which adversely affect the performance of older adults are modifiable, and appropriate interventions could lead to increased competence.

Basic Premises of Successful Aging

In contrast to normal aging, the process of successful aging is influenced by a combination of factors which are internal to the individual, and external in the social or physical environment. An internal factor considered to be a basic premise of successful aging is maintaining a balance between gains and losses which occur simultaneously at any point across the lifespan. Although, the number of losses experienced in late life may outweigh the number of gains, there is the possibility of positive developmental change during the latter part of the lifespan. This balance can be achieved through the use of various mechanisms which will be described in more detail later in the chapter. These processes allow older adults to adapt and adjust to changing abilities and environments, characteristic of late adulthood.

The external factors, which are unrelated to the aging process, need to be addressed as these may affect an older adult's perceived level of competence and successful aging. The older adults' use of existing skills or their ability to acquire new ones to perform a given task can often be challenged by non-aging factors which are most often found in the environment. As discussed earlier on, factors such as perceptual environmental conditions, low expectation, or lack of meaningful task materials may lead to negative outcomes. As well, non-aging factors are compounded with age-related changes (e.g., poor vision) which serve to accentuate poor performance, but are not direct reflections of true ability. The influence of such factors may unnecessarily affect an older adult's level of perceived competence, and their beliefs about their ability to master events in the environment.

Antecedents

In recent years a major focus in the field of cognitive aging has been to identify the age-related declines in memory, language, and other cognitive domains (for extensive reviews, see Blanchard-Fields & Hess, 1996; Craik & Salthouse, 1992; Kausler, 1994). A strong position within the cognitive aging literature has emerged, suggesting that a wide range of findings can be accounted for on the basis of changes in some of the underlying elementary processes, such as speed of information processing or working memory (Park, et al., 1996; Salthouse, 1991). In other words, at this point in time, there is a general consensus that aging causes significant declines in information processing and reserve capacity. At the same time, there is enormous discrepancy between high levels of everyday functioning in older adults and that which would be predicted based on laboratory studies (Salthouse, 1987). We believe that since the focus on age declines is consistent with stereotyped expectations of late adulthood as a period of loss, researchers have not adequately examined the factors (such as, accumulated background knowledge and 'know-how') which older adults use to maintain functional competence.

The study of older experts tells us a great deal about how experience may or may not offset age-related losses. In a classic study, Charness (1981a, 1981b) selected young and old chess players with similar levels of expertise based on their competitive ratings. He found no significant differences between the two groups on standardized measures developed to assess skill level (i.e. selecting the next move and evaluating game outcomes). In contrast, older chess players were less accurate in a task where they were required to recall the positions of chess pieces placed in meaningful configurations on a board. In a similar vein, Salthouse (1984; see also Bosman, 1993) found that older typists were able to maintain typing speed while still displaying the expected age-related deficits in laboratory reaction time tasks. This means that life time experience did not protect the older adults from the expected age-related changes in basic information processing domains. However, such changes did not necessarily negatively affect their competence in areas of expertise.

Other studies have demonstrated that experience may allow some attenuation of age-related differences. For example, older adults compared to younger adults have more difficulty acquiring basic computer skills (Kelley & Charness, 1995). However Kelley, Charness, Mottram, & Bosman (1994) found no age difference in measures reflecting learning a new computer application among individuals who already had computer skills. Studies of age-related changes in verbal memory ability have shown smaller age differences in individuals with high versus low levels of verbal ability (Cavanaugh, 1990; Hultsch, Hertzog, & Dixon, 1990; Meyer & Rice, 1989) or in individuals with active versus passive lifestyles (Craik, Byrd, & Swanson, 1987). Such individual differences somehow protect older adults from some of the memory declines usually associated with age, however, the mechanism by which such protection occurs has not been articulated.

Salthouse & Somberg (1982) demonstrated that experience derived from practice within a laboratory setting may be sufficient to reduce age-related differences. These authors found large initial age difference in performance on simple detection, discrimination, and speeded classification tasks. However, practice improved the performance of both young and old participants, with improvement being "perhaps even greater in older subjects than in young subjects" (p. 201). In other words, task experience (consisting of 51 practice sessions) enhanced the performance of old adults as much or more than it did for young adults.

Moreover, this improvement was equally evident in both age groups over a period of one month. Other studies have shown similar effects of practice with shorter periods of intervention in a broader range of mental abilities (see Schaie and Willis, 1986). At the same time, one should not expect that practice, even extensive practice, on one type of mental ability task will lead to enhanced performance on another. That is, cognitive retraining tends to have specific rather than generalized effects.

In a similar vein, we have found it interesting that studies which demonstrate the phenomenal degree of plasticity within cognitive structures and processes of older adults are interpreted in the literature strictly in terms of losses in reserve capacity. In a series of studies, researchers in Berlin (Kliegl, Smith & Baltes, 1986, 1989, 1990) taught young and old participants a complex strategy for learning word or number sequences, then provided them with extended opportunities for practice. They found that the old participants, like the young participants were able to use these strategies to make extraordinary gains in digit span. Without practice or strategy instruction, digit span performance for both young and old adults was approximately seven (plus or minus two) digits. With extensive practice, but without the strategy training, the span performance of neither young nor old participants exceeded sixteen digits. However, given both extensive practice and specific strategy training, digit span performance increased to over 100 digits for individuals in both age groups. When this research is cited in the cognitive aging literature it is usually used to demonstrate that age differences become magnified at extreme levels of performance because old adults are only able to demonstrate this type of extraordinary performances when the presentation of digits occurred at a very slow rate (i.e., one digit every twenty seconds), whereas young adults can achieve this level of performance over a much wider range of task conditions. However, we see this as a demonstration of the extraordinary potential that is present within older adults.

Potentially modifiable non-aging factors may unnecessarily impinge upon older adults perceived or measured capacity in a number of domains. Many of the standards selected by researchers to judge performance are often inherently youth biased. This may be the case whenever age differences are examined on measures that are time-based or unpracticed. For example, early research in aging and intelligence concluded that aging led to dramatic declines in fluid intelligence abilities. However, this research likely overestimated these declines because the standardized administration of such tests dictated that they be performed under strict time constraints, used materials that were novel, and may have been unduly influenced by fatigue (Botwinick, 1984). Therefore, there was an inherent confounding of speed of performance, task familiarity, and fatigue with the construct of interest (i.e., fluid intelligence). While more recent research continues to show that fluid abilities decline with age, such changes are less dramatic than once thought (Berg & Klaczynski, 1996).

Mechanisms

In the following section we describe and provide examples of three particular mechanisms that can lead to preserved or enhanced levels of everyday functioning despite losses in some domains. Clear theoretical distinctions are made between these mechanisms of selection, optimization and compensation and we talk about them as separate strategies. However, the reader should be cognizant that in reality all three strategies tend to operate

together and continuously interact.

Selection

Selection is a process by which older adults readjust goals to ensure that they are able to achieve acceptable levels of performance, within a narrower range of activities. This means that older adults may drop certain activities to focus on those areas which they perceive to be most important, where abilities and skills are most preserved and/or where interest is highest. Such selection highlights the process of specialization which characterizes adult development, serving to maintain or enhance the competence of older adults.

An important part of selection is cognitive restructuring, whereby older adults perceive selected activities to be of greater importance and devalue those goals which are not selected. Through such cognitive activity older adults maintain a sense of personal control. We have seen evidence of such control strategies in our research on memory beliefs of older adults (Bieman-Copland & Ryan, 1996). In this study, we asked older subjects to describe how they perceived their memory abilities had changed with age. Some participants acknowledged that their memory ability had declined with age, but interpreted such change as positive rather than negative (e.g., "Forgetting occurs more frequently now because my sense of values have changed. Lots of things that were once important to me I no longer consider worth remembering."). Other participants contended that their memory had improved with age because of associated positive age-related changes (e.g., "I would say my memory is better now because I've learned to use my memory over the years and have more confidence in myself.").

Selection mechanisms may influence strategy preference in memory-demanding situations. Brigham and Pressley (1988) had young and old adults learn unfamiliar words with one of two mnemonic strategies. Although both appeared to be reasonable learning strategies, one led to more effective recall. After one learning trial, a majority of young but not old participants stated a preference for the more effective method. Questioning after the experiment suggested that the preference decisions by young participants were guided almost entirely by recall enhancement, while older participants tended to base their preference decisions on familiarity and meaningfulness. Difference in strategy selection can also be seen in the study of old and young chess players. Charness (1985) found that while older chess players selected a move as soon as they found one that was acceptable, younger players continued to search for better alternatives until a time limit was reached.

In a social domain, Carstensen (1991) examined patterns of interaction and social exchange throughout the life span. As expected, she found that older adults had a more limited social network. However rather than being an inevitable consequence of aging, she found that older adults were active agents in the process and participants generally viewed the quality of their social network quite positively. Highly valued social contacts tend to remain stable across the life span, while less highly valued contacts change slowly from mid life on, and then dramatically in old age.

An implication of selectivity for researchers is that goals which researchers deem optimal (e.g., high accuracy in recall, large social networks), may not be viewed in the same way by older adults. On the negative side, the process of selection may lead older adults to prematurely adjust goals meaning that areas where competence could be achieved are not pursued. Individuals are at risk for setting goals based on their chronological age as opposed

to their ability and skill (Dittman-Kohli, 1990). For example, some older adults may have the potential to achieve high goals such as obtaining a university degree, however they have been shaped to believe that selecting such a goal is inappropriate. In short, premature goal adjustment may be one consequence of the negative feedback loop described earlier, and result in the non-use of well preserved abilities.

Optimization

The mechanism of optimization involves the maintenance and enhancement of existing reserves or resources so that optimal levels of functioning are achieved (Baltes & Carstensen, 1996). Optimization serves to protect the skills and abilities needed to perform highly valued and selected goals in the face of age-related declines. This is partly achieved through the selection of appropriate environments that serve to promote or enhance performance (e.g., choosing appropriate living arrangements or social partners, performing tasks in selected goal areas under optimal physical conditions), as well as through learning new skills or expanding existing knowledge bases. Practice is a key feature of optimization. As an individual becomes more familiar with a particular task and the necessary skills involved, their efficiency at performing the task increases because of increasing automaticity. Studies which have demonstrated optimization have been previously discussed in the context of plasticity.

Compensation

Compensation is a process whereby older adults change the way they perform tasks in order to minimize the mismatch between personal resources and contextual demands (Backman & Dixon, 1992; Dixon & Backman, 1995). This mismatch may arise because of individual deficits, caused by aging or non-aging factors, which means the individual is unable to maintain competence despite no change in environmental demand. Alternatively, the mismatch may arise because of an increase in environmental demands that is not matched by an increase in the individual's abilities or skills (Backman & Dixon, 1992; Dixon & Backman, 1995). The advantage of compensation is that older adults may be able to continue engaging in valued activities that they might have otherwise abandoned. The disadvantage of the process is that they no longer complete the activity in the usual manner or as efficiently as previously. An individual may find such a situation to be unacceptable and prefer to abandon the activity. Cognitive restructuring interventions may be needed to make the modified activity more acceptable to the individual.

Compensation includes a) modifying skills used to perform a target task, b) transferring skills from other domains that are relevant to the present task but not previously used, or c) collaborating with others so that the full range of skills required to complete a task are available to the 'team'. Examples of compensatory behavior in older adults are prevalent in the psychological aging literature. In the driving domain, older adults compared to younger adults drive fewer miles per year, drive less frequently on the highway, at night, or during rush hour (Charness & Bosman, 1995). In the domain of memory, research has shown that compared to young adults, older adults make greater use of external memory aids relative to internal mnemonic strategies (Cavanaugh, Grady & Perlmutter, 1983). In the skill domain, Salthouse (1984; also see Bosman, 1993) found that older typists were able to produce transcription typing speeds equivalent to younger typists, but did so by increasing

the number of characters in their preview span (i.e., the number of characters which their visual scanning exceeded their motor response). This work is important because it articulated a mechanism by which older adults' experience allowed them to compensate for age-related declines in speed of motor responses. Moreover, it provided an example where compensation occurred without awareness. Therefore, contrary to the position of Backman & Dixon (1992), compensation does not necessarily involve a conscious recognition of the mismatch between ability and task requirements.

Defining Successful Aging Outcomes

The processes of selection, optimization and compensation are particularly beneficial in light of the various social, physical and environmental changes experienced by older adults. The ability to perform tasks which are highly valued and maintain mastery over everyday activities may enhance an older adult's level of perceived competence (Heckhausen & Lang, 1996). Associated with increases in perceived competence are feelings of self-esteem, self-worth, control and independence. These self perceptions also contribute to physical health and well being (Ryff, 1989). Whereas "The Tale" described a negative feedback loop, the processes involved in successful aging promote a positive feedback loop, an enhanced quality of life and a greater capacity for future adaptation.

INTERVENTION RESEARCH DIRECTED TOWARDS IMPROVING COMPETENCE IN OLDER ADULTS

In this section, we will review selected research studies which have attempted to preserve and increase the abilities of older adults. The primary goal of many of these interventions was to bring performance levels of older adults up to those displayed by young adults who receive no intervention (i.e., attempts to eliminate age differences). We will argue that such a goal may not be the most appropriate one for intervention research. From a practical point of view, interventions must expand the focus beyond the older individual to include modifications to the task and physical/social environment.

Interventions Directed Toward the Older Adult

One of the most active areas of intervention research in the elderly has been in improving memory. Studies of memory have consistently shown that older adults tend to encode information less actively and make less use of memory strategies to enhance retrieval (see Craik, 1977; Poon, 1985). Therefore, it would seem reasonable that providing instruction in specific mnemonic strategies might be useful in improving the memory competence of older adults. Mnemonic techniques such as the method of loci, the pegword method, face-name, and keyword strategies have been successful with young adults (see Searleman & Herrmann, 1994). Although their application to older adults have met with mixed results, a meta-analytic study by Verhaeghen, Marcoen, and Goossens (1992) reported that pre-post test gains in memory performance were significantly larger in groups receiving training than in control or placebo groups. Unfortunately, there is also evidence suggesting that older adults who learn the memory strategies do not actually use the strategy later on,

even when tested in similar circumstances (e.g., Anschutz, Camp, Markley, & Kramer, 1987; Robertson-Tchabo, Hausman, & Arenberg, 1976). West (1989) cites a number of reasons for such lack of maintenance. For example, the strategies that are taught may have been too resource demanding, and therefore, yield too high a cost for the benefits they accrue in memory performance. Finally, strategies may not be taught in a step-by-step manner that would lead to better procedural consolidation of the strategy.

However, an alternate explanation is that the goals of the researchers (i.e., to improve memory performance) may have been quite different from the goals of the older adults (i.e., to feel better about their memory ability). Scogin, Storandt, and Lott (1985) developed a memory training protocol which resulted in improved memory performance, but did not reduce memory complaints. Lachman, Weaver, Bandura, Elliot & Lewkowicz (1992) developed a multi-faceted memory intervention intended to both improve memory performance and reduce memory complaints. Their approach to memory training was unique in that those in the memory training condition were provided with information about different approaches to enhancing memory but they were required to individually develop their own memory strategies based on this intervention. Those in the memory beliefs conditions received information designed to change how they thought about the role of effort in memory functioning so as to alter beliefs that all memory failures in old age are inevitable and uncontrollable. Interestingly, all treatment groups including the no treatment group improved from pre-test to post-test. However, those who received both individualized memory training and belief restructuring were more likely to believe that they could improve their memory. Unlike other training studies, those in the memory training conditions reported three months after training that they were still using the strategies learned in training to help them remember in everyday situations.

Intervention studies have also focused on helping older adults develop new skills. Much of the skill development research has focused on teaching older adults to use word processing and other types of common computer software. This research has demonstrated that older adults, even those with no previous computer expertise can learn computer skills. However, they learn less efficiently than and differently from comparable novice young adults. For example, they require about twice the amount of time to move through tutorial lessons and they make more requests for assistance from the instructor during learning (Elias, Elias, Robbins & Gage, 1987; Czaja, Hammond, Blascovich, & Swede, 1989; Zandri & Charness, 1989). Both young and old adults make greater gains when learning is collaborative (i.e., with a partner) than when taught individually, even though it decreases the amount of time each person is in direct contact with the computer. (Zandri & Charness, 1989). Such collaborative learning may be more effective because it facilitates active problem solving when errors occur. For older adults, training may need to specifically address interference effects that arise because the similarity in appearance between a computer keyboard and a typewriter may cause them to engage knowledge that actually interferes with acquiring computer skills.

Other interventions geared toward the individual are more familiar and have been promoted for many years. Research on the effects of engaging in regular physical activity suggests a positive relationship between exercise and functional capacity in a variety of domains including cognitive tasks. For the aging body, participation in physical activity improves cardiovascular functioning, flexibility, muscle strength, and reaction time (Fletcher

& Hirdes, 1996). Studies also indicate that active older adults maintain a higher level of psychological functioning and well-being compared to older adults who are inactive (Mihalko & McAuley, 1996). With respect to cognitive ability, DiPietro, Seeman, Merrill, and Berkman (1996) found a modest but significant relationship between the ability to perform cognitive tasks and the amount of physical activity reported by their subjects; however, the component of exercise which affects cognitive functioning remains unclear. There is also a correlation between depressive symptoms and lack of physical activity_ (O'Connor, Aenchbacher & Dishman, 1993). The social aspect of physical exercise may be a mediating variable in the relationship between physical activity and psychological functioning.

Interventions aimed at promoting skills and abilities of older adults have shown good success across many domains. The studies discussed above demonstrate that older adults can be active participants in counterbalancing the negative changes associated with age. However, intervention needs to go beyond changing the older individual. The competence of older adults can also be maintained or enhanced by altering tasks and physical and social environments.

Intervention Directed Toward the Task and the Physical/Social Environment

To increase the accessibility of computers to older adults, modifications in computer design and machine-user interfaces need to be made. For example, the speed at which young adults can read from a computer monitor does not vary with the display color, but older adults read significantly faster with black on white displays (which most closely approximates reading from a printed page) compared to blue on black (Charness & Bosman, 1990). Similarly, using a light pen instead of a mouse interface reduced age differences in movement times on a computer pointing task and allowed older adults to perform difficult tasks such as moving to small targets (Charness, 1995). The 'double click' on the mouse interface is also problematic for older adults. To overcome this difficulty, Kelley and Charness (1995) suggested that the default double-click speed be reset for older adults. There is great potential for computers to enhance the competence of the older adult. More research into elder-friendly computer systems to enable this potential to be realized seems warranted.

The physical environment can be altered to fit the physical and social needs of older adults, thereby offsetting age-related declines. Environmental design interventions described by Hiatt (1987) create an environment which assists instead of hinders those with cognitive difficulty. Examples of such design interventions include minimizing of problem stimuli (e.g., glare), and reducing sensory overload (e.g., background noise), or selecting furnishings that facilitate physical activity and social interaction. It has been found that environmental adaptations especially in institutional settings can lead to an improvement in attention span, decrease agitation and may even alleviate problematic behavior of residents (Hiatt, 1987).

A number of effective intervention studies were conducted in an effort to demonstrate that modifications in social environments result in positive changes in physical health and well-being in institutionalized older adults. Langer and Rodin's (1976) initial study conducted in a nursing home implemented small measures (i.e., residents received a plant to care for) to increase the older individual's sense of personal responsibility and control in the nursing home. The results of this study showed that there were significant differences in self

reports of well-being between the experimental and control groups and differences were still apparent on follow-up 18 months later (Langer & Rodin, 1976; Rodin & Langer, 1977). A similar study by Schulz (1976) suggested that perceived control was the critical element in the intervention. In his study, participants in the experimental group were given control over where and when social interactions with a new social partner would occur. The changes in psychological status and activity level that were found in these studies suggest that manipulation of the social environment of older adults can help reverse a pattern of progressive decline. These studies are some of the most influential in the aging literature because of the remarkable results obtained with relatively minor, inexpensive interventions.

More recently, Baltes and her colleagues have identified dependence-support scripts in interactions between nursing home staff and residents (Baltes & Wahl, 1992) and developed an intervention which targeted changing staff behaviors rather than that of the resident. In particular, staff behavior was altered so that they would react in a more reinforcing manner to independent behaviors displayed by the residents. Over time, the residents engaged more frequently in independent behaviors. The most important aspect of the study is that some of the onus for enhancing competence in older adults needs to be placed on those who interact with them.

SUMMARY AND CONCLUSIONS

This chapter reviewed many of the important conceptual and applied notions of aging. The intervention studies described are only a sample of those which have had a common goal of promoting and enhancing the competence of older adults. Effective interventions share several common characteristics. First, they are multifaceted. They attempt to make changes in the individual by facilitating processes of selection, optimization, and compensation, and in doing so make the older individual an active participant in the intervention. They examine the task and facilitate changes that would ensure a better match between task demands and abilities of the older adult. Finally, they examine the environment within which older adults perform tasks and make alterations which would enhance performance. Environmental modifications must go beyond the physical environment and consider the ways in which social interaction between older adults and others can lead to a non-use of competence. Sometimes interventions have been put in place which have not resulted in enhanced performance of older adults in everyday situations. This may result because the goals of older adults and researchers are often different. As researchers, we must be sensitive to how age stereotypes influence our own perceptions of older adults and remember that heterogeneity is the hallmark of old age. Because individuals grow old in diverse ways, interventions must be flexible. The role of psychologists should be to empower and treat older adults as unique individuals who do not share common needs. Some guidelines for how to communicate effectively so that older adults can enhance competence are offered in the communication enhancement model (Ryan, Meredith, Maclean, & Orange, 1995). The balancing act for psychologists involves adjusting to individual older persons' losses while maintaining appropriately high expectations and taking full advantage of the gains.

While Ch 'izigyaak and Sa' flourished in the Place, The People had not fared so well and when the next winter came they were in the same state that they had been in the year before. With feelings of guilt the People returned to where they had abandoned the two old

women. They were surprised to find no sign of the women at the old campsite and the Chief sent out trackers to find the women. The People were surprised that the women were alive and were astonished at their present living condition. With new found independence and respect, Ch'idzigyaak and Sa' rejoined their People and helped the group survive a second harsh winter.

(Abridged from Wallis, V.,1994)

The irony in “The Tale” is that had the knowledge and competence of the two old women been recognized and promoted by the tribe, a great deal of suffering within the tribe would have been avoided. So beyond enhancing the quality of life, interventions which promote competence have the potential to positively change our views of older adults from being a societal burden to a valuable resource.

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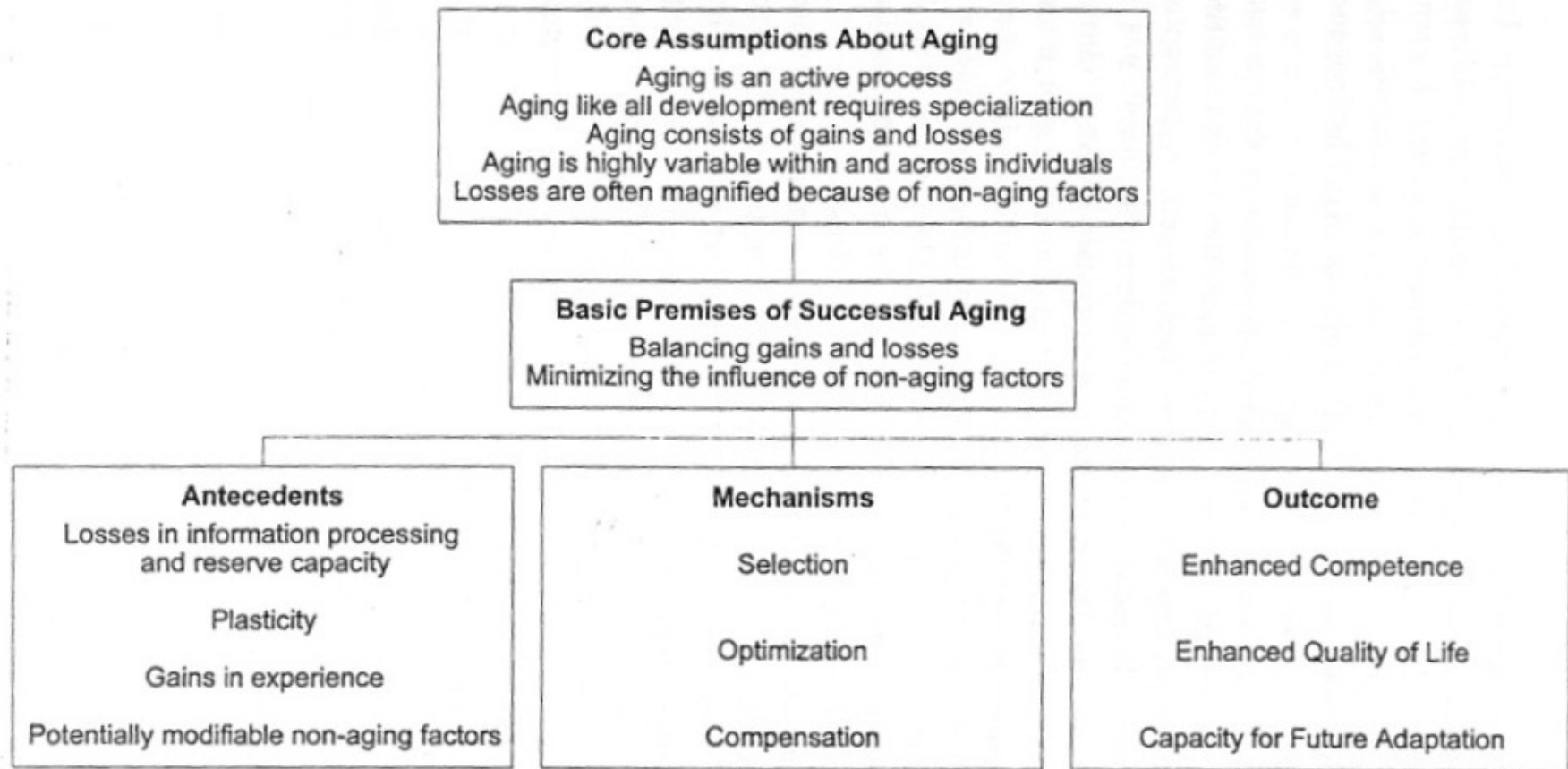


Figure 1. A lifespan developmental framework of successful aging. [Adapted from Baltes & Baltes, 1993.]