Correlates of A Sense of Control of Aging

by

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(ABSTRACT)

During the past few decades much research has focused on the salutary effects of personal control over life events generally and specifically in the area of health. Studies indicate that people who feel that they are in control of the events in their lives cope more effectively than do those people who feel that their lives are governed by chance, luck, or fate. Feelings of control or mastery are an important psychological coping resource.

In recent years much has been written about whether the expanding elderly population will place a burden on society because of their greater susceptibility to illness and disability, or whether life-style changes made by progressive cohorts will bring about modifications of the aging process. The question arises as to whether some sense of control over the aging process exists in a similar fashion as does control over one's health. Further, if such a sense of control over aging exists, what social structural conditions contribute to such a perceived control of aging.

The present study, conducted among members of an athletic facility in a southwest Virginia city and among staff, faculty, and graduate students at a major state university, seeks to determine if a sense of control over the aging process exists, and what social structural variables and personal attributes might contribute to such a perception. Results indicate that several social structural variables (for example, gender, age and education) are predictors of perceived control over the aging process. Self-related variables (for example,self-efficacy, beliefs concerning the health benefits of exercise, and exercise behavior itself) are also significant predictors of perceived control over aging.

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Chapter I. Statement of the Problem

The desire to believe that we have control over things that happen and know how we will be affected by them, along with the tendency to interpret events as being under our control is pervasive in our culture (Gatchel and Baum, 1986). When people have some control over events, their environment is more predictable, and predictability has a strong positive effect on stress reduction (Rodin, 1986). This sense of control over all aspects of our lives has been applied with increasing frequency to the area of health during the past few decades (Lau, 1982). Much of today's literature on health is concerned with changing lifestyles (for example, smoking cessation and weight reduction for health purposes, and the current exercise movement) which are undertaken, in part, to gain some control over one's life.

It is well-acknowledged that the American population has been "aging" for some time, and the current projection is that Americans aged 65 and over will comprise 17 percent of the population by the year 2030. It has only been since the 1930s that social scientists have been drawing attention to the problems of aging, and one of the most important variables is health. That most people can expect to become old has important consequences for both individuals and the wider society (Huyck and Hoyer, 1982). One consequence involves a critical question of whether the increasing population of elderly people will encounter a growing burden of illness and disability, or whether lifestyle changes will enhance their health over that of earlier generations. The growing evidence

of the considerable variation in individuals as they age has brought forth reevaluations of what we call aging. This variation in individuals as they age suggests that patterns of aging are open to change as understanding is altered over time. In this broader sense, the problem involves concern for the potential for modifications of the aging process and choices regarding alternatives in constructing the future of aging (Maddox, 1987). It is feasible to view this as conceptually related to the social psychological statement of W.I. Thomas: "If men define situations as real, they are real in their consequences" (Thomas and Thomas, 1928). How we define and perceive aging, and our expectations for aging will affect the future of aging.

Much of the current literature in gerontology suggests that many age-associated declines can be explained in terms of lifestyle, habits, diet, and a combination of psychosocial factors extrinsic to the aging process (Fries and Crapo, 1981; Harris, 1977; Paffenbarger, et al., 1986; Rowe and Kahn, 1987; Maddox, 1987). One lifestyle change which has received a lot of attention is the movement to exercise. A recent newspaper article makes the claim that "...a growing number of middle-aged individuals who never before have been serious athletes...are, late in life, starting to train and compete in the hope of staving off the effects of aging"(Roark, 1989). In a pamphlet entitled "Living with Aging: Don't Take It Easy-- Exercise!" sponsored by the National Institute on Aging, U.S. Department of Health and Human Services, Robert N. Butler states that "If exercise could be packed into a pill, it would be the most widely prescribed, and beneficial, medicine in the Nation." The pamphlet further states that "Regular physical activity can help your body maintain, repair, and improve itself to an amazing degree."

Considering the importance of control over health and in our lives generally, the question arises as to whether a sense of control exists in relation to the aging process, and if so, what factors might influence such a perceived control of aging. Much research has been done on the importance of a sense of control in the area of health and the importance of control as we age and among the elderly. However, little, if any, research exists specifically on *control over the aging process.* It seems reasonable that a perceived control of aging might be predicted by the same mechanisms which explain control in the related field of health.

The purpose of this study was to ask the question of whether a sense of control exists, and to determine correlates of perceived control over the aging process. One logical place to begin such a sociological inquiry is to ask what similar conditions, contexts, or patterns are shared by people who might exhibit a sense of control over aging, or what aspects of social structures and people's locations within them might contribute to perceived control over physical aspects of aging. Within sociology, this perspective is referred to as the paradigm of social structure and personality.

Chapter 2. Review of the Literature

In this chapter the importance of control, followed by the related concepts of locus of control and self-efficacy, will be reviewed first. Next, the literature on the relationships between health and control, and then exercise, will be followed by an examination of the current literature on what we call age and aging, and perceptions of aging and health, including a review of the dominant paradigms in the field of health. Finally, a review of knowledge of facts on aging and beliefs in the health benefits of exercise will be presented. Since the theoretical orientation of this study is that of the paradigm of social structure and personality which is mapped out in Chapter 3, social structural correlates of locus of control and self-efficacy will be presented within each subsection as will social structural correlates of perceived health and exercise behavior.

Control, Locus of Control, and Self-efficacy

Control. The importance of a sense of agency, mastery, and control for general well-being is evident in contemporary social psychology literature and in the literature on health. Psychologists have recognized individuals' perception of mastery and control in many ways. This theme of human agency is expressed in such terms as effectance motivation (White, 1959; Harter, 1978), personal

causation (deCharms, 1968), intrinsic motivation (Deci, 1975), intentionality (Weigert, 1975), internal locus of control (Rotter, 1966) and self-control (Mischel and Mischel, 1977). On a general level, control is defined as the ability to regulate or influence behavior or environment. It is generally agreed that control is one of the most basic processes in our daily interaction with our environment and other people. Kelley (1967) has noted that a person may spend a great deal of time and energy trying to explain how and why things happen as they do. This is done, according to Kelley, to achieve control over one's surroundings--to gain knowledge that will help a person to achieve effective management of one's individual environment. DeCharms (1968) has noted similarly that feelings of competence and increased self-esteem are derived from the perception of having control over an event. People are less perturbed by events when they believe they can prevent, terminate, or lessen the severity of those events (Lazarus and DeLongis, 1983; Bandura, 1982). Gatchel and Baum (1983) point out that the desire to believe that we have control over things that happen and know how we will be affected by them, along with the tendency to interpret events as being under our control, is pervasive in our culture.

Locus of Control. Rotter's (1966) seminal work on locus of control argues for the beneficial consequences of a sense of agency and mastery. His concept of "internal vs. external control" refers to a person's expectancy that his or her own behavior can or cannot have an influence on the outcome of events. He proposed that individuals acquire expectancies about the future based on reflections about the past. Generally, people learn that they are effective in gaining reinforcements for themselves or that they are not effective. Such self-evaluations lead to generalized expectancies regarding whether people control events or whether events exert control over them. Defining an internal-external control orientation, Rotter (1966) refers to "the degree to which the individual believes that what happens to him results from his own behavior versus the degree to which he believes that what happens to him is the result of luck, chance, fate, or forces beyond his control." In other words, persons with an internal control orientation typically attribute their outcomes to the effects of their own behavior, while persons with an external control orientation attribute the causes of their outcomes to something outside themselves. Research has established that

"internals" are more achievement-oriented, develop more realistic aspirations based on past successes and failures, are more likely to use available resources to help them solve problems and prepare for future events, and are better at delaying gratification than are "externals" (Tedeschi, et al., 1985).

Since Rotter's (1966) work, locus of control has been examined in hundreds of empirical studies. For this study it is important to ask how and why social structural conditions predispose individuals to an internal or external locus of control. Some studies done on the construct of locus of control, which indicate that women have a more external locus of control as do those of lower socioeconomic levels (Lefcourt, 1976; Stephan and Stephan, 1985; Palmore and Luikart, 1972; Lopez and Staszkiewicz, 1985). It is suggested that the gender differential may possibly reflect the passive-dependent role women have traditionally played in many cultures whereas men are expected to be independent and more in control of their own destinies. Also, Hale and Cochran (1986) report that externality increases with age. They suggest that this may reflect an over-all physical decline as well as being at much greater risk for chronic illnesses. In addition there is an increased risk of losing important social reinforcers. And Kivett (1977) reported that persons in administrative jobs which required some form of control, manipulation or direction of other people, and operatives such as textile machine operators of large powerful machinery perceived more control over their environment than laborers or service workers.

Self-efficacy. Many dimensions of the self-concept have been considered in social psychology. One dimension is that of self-esteem, and much of the research that is done on the self-concept focuses on this dimension. However, various aspects of self-esteem have been further differentiated. Common to the many subdivisions is the distinction between (1) self-esteem based on a sense of competence, power, or *efficacy*, defined as "the belief that one's personal efforts can influence events" (Gurin, Gurin, and Morrison, 1978), and (2) self-esteem based on a sense of virtue or moral worth. Gecas and Schwalbe (1983) believe the individual's sense of *efficacy* is an overlooked component of self-esteem. They argue that beyond Cooley's looking-glass self, where the self-concept is viewed as being formed through reflections of the responses and evaluations of others in

the environment, is a self that develops out of the autonomous and efficacious actions of the individual. This self is not merely a reflected appraisal, but is constructed actively by the individual.

Bandura (1977) describes self-efficacy as the belief that one can do what is necessary to get desired outcomes, or simply the feeling of being effective in coping with the environment. It has also been conceptualized as a willingness to initiate and persist in behavior (Scherer and Adams, 1983). It is argued that efficacy-related experiences of control and lack of control are at the core of the human condition and life-long development (Baltes and Baltes, 1986). People who have a low sense of self-efficacy do not expect to be effective and may therefore avoid tasks. They may also be less willing to take action which has positive implications for them. This fatalistic or anomic attitude may lead persons with low self-efficacy to give up easily when attempting to solve problems.

The literature on self-efficacy asserts that successful performance leads to increases in self-efficacy expectations and that efficacious experiences in one area may generalize to other areas of behavior (Bandura, 1977). In their discussion of social structure and efficacy-based self-esteem, Gecas and Schwalbe (1982) argue that various social structural conditions both enable and constrain an individual's opportunities for participating in efficacious action; these conditions include access to both material and nonmaterial (e.g., knowledge) resources in society. Therefore, individuals with a history of success experiences in important life areas such as education and employment along with income, should have higher self-efficacy expectations than individuals who lack success experiences. In terms of the social structural variables mentioned above (education and employment), Gecas and Schwalbe (1983) assert that the opportunity to engage in efficacious action is dependent upon the individual's position in the power structure. Power is a function of resources and available alternatives. Presumably, autonomy, control, and resource availability increase as one moves up the hierarchy, thereby increasing opportunities for efficacy-based self-esteem (Gecas and Schwalbe, 1983). How social structural variables afford differential opportunities for individuals will be discussed in more detail in the chapter on theoretical orientation. While some research has been done on the influence of education and occupation, little is known about the influence of age and sex on perceived self-efficacy. One study (Godin and Shephard, 1985) suggests that women

show a weaker sense of physical self-efficacy and lower perceived ability than men, but there is no evidence of a progressive decline in perceived physical self-efficacy with age. In this study the authors note that one factor contributing to this differential is that few women aged between 45 and 74 were physically active when they were younger, so the development of their physical skills was below the expected potential. They suggest that this difference between sexes probably reflects cultural constraints of a particular era rather than actual biological differences.

Health, Control and Exercise

Health and Control. In their study of health behavior and personal autonomy, Seeman and Seeman (1983) document the wide-ranging significance of perceptions of personal control in the areas of health behavior and health status. They argue that it seems entirely feasible that a realistic and active sense of control is a fundamental feature of the well person. They also point out that the concern about autonomy and control represents a major thrust in the literature of the last decade. Seeman (1983) discusses "powerlessness," referring to the person's sense of control over events (or lack of it) as being one of the dominant concerns in the classical literature on alienation. According to Rowe and Kahn (1987), research results in the broad area of control and autonomy show a remarkable convergence: lack of control has adverse effects--on emotional states, performance, subjective well-being, and on physiological indicators. These authors further discuss the importance of the psychosocial factor of support or connectedness. They emphasize that different kinds of support have different effects. For example, studies indicate that persons given direct assistance on tasks do not do as well as those given verbal encouragement. They argue that the effect of direct assistance is infantilizing, and the lesson is learned helplessness and control reducing whereas the effect of encouragement in a situation is control enhancing.

Exercise. A study reported by Gurin and Harris in *American Health* in March, 1987 indicates that exercise still seems to be a motivator for people to change other health habits, and that the decision to take charge of one's health--and one's life--involves mental as well as physical activity. They acknowledge that psychologists have found that a feeling of control over one's fate makes a basic difference in one's health, resistance to stress, and overall well-being. This study suggests that people are healthier when they feel in control both because they are more likely to change their health habits and because there is something about an optimistic feeling in itself that promotes health and well-being. They're also extremely satisfied in all areas of life. In this study, taking charge of one's health relates to a general sense of well-being more strongly than any other variable, including income (Gurin and Harris, 1987). In other words, people with the strongest sense of power over their health are most likely to act on it. This group of people is referred to by Gurin and Harris (1987) as "Health-Confidents." Results from this survey indicate that the move to exercise has occurred among all age groups, people of all income and education levels, and men and women alike. The percentage of men who exercised in 1985 increased from 56 percent to 74 percent in 1987, and for women, the proportion has grown from 51 percent to 63 percent. Another observation is that while the high-exercise crowd (those who work out 5 hours or more a week) tends to be young and male, a full 34 percent of men, and 42 percent of 13-to-29 year olds now get that much exercise. Twenty-one percent of all women are now also high-level exercisers, and the percentage of those 50 and older is 26 percent (two-and-a-half times what it was several years ago).

In a review of the relation between health and a sense of control as one ages, Rodin (1986) points to studies that indicate that there are detrimental effects on the health of older people when control of their activities is restricted; in contrast, interventions that enhance options for control promote health. Kuhl (1986) cites physical exercise as an important mechanism for maintaining a sense of control:

> Perceived or actual control deficits may discourage the aged from engaging in the amount of physical exercise needed to stay healthy. Many elderly persons may cut down on sports that they used to enjoy.... The environmental factors encouraging a passive and reflective attitude may render it very difficult for an elderly person to maintain and enact an intention to engage in physical exercise.

In *Healthy People*, the Surgeon General's Report on Health Promotion and Disease Prevention (1970), it is stated that people who regularly exercise report that they feel better, have more

energy, and often require less sleep. Elsewhere, Powell and Paffenbarger (1985) report on the beneficial effects of physical activity are becoming more apparent. Despite the many difficulties in measurement, a relatively strong association has been found between physical activity and health, suggesting that with improvements in assessment techniques even stronger associations might be seen (Laporte, Montoye and Caspersen, 1985). Already established benefits of exercise (*Healthy People*, 1979; Fries and Crapo, 1981) include reduced risk of coronary heart disease, desirable weight control, retardation of osteoporosis, and the reduction of symptoms of anxiety and depression. Beneficial effects on hypertension, type I and II diabetes, and certain psychiatric and psychologic conditions appear likely. As individuals age, exercise helps reduce fat and contributes to good posture and muscular strength required for efficient movement in daily activities; improves joint mobility for better balance skills needed for safety (reducing the hazards of falls, loss of equilibrium and other accidents); and stimulates cardiorespiratory endurance (*Healthy People*, 1979; Heckler, 1985). Even when the musculoskeletal, respiratory, cardiovascular and central nervous systems have already deteriorated due to lack of physical conditioning and/or disease, properly prescribed and adequately supervised exercise can be expected to partially improve fitness and other functions (Harris, 1977).

Whether exercise actually extends longevity is a longstanding debate. However, a study by Paffenbarger, et al. (1986) indicates that the amount of additional life attributable to adequate exercise, as compared with sedentariness, is one to more than two years. According to Dishman, Sallis and Orenstein (1985), some groups more likely to exercise are well-educated persons, working women and single parents. While both active and inactive people view exercise as a positive health behavior, those who strongly value exercise, who believe they have control over health outcomes, and who expect personal health benefits from exercise are likely to engage in much exercise. In addition, perceived self-efficacy, or confidence in one's ability to exercise is a predictor of activity (Dishman, Sallis and Orenstein, 1985). In looking at relationships between sociodemographics and physical activity using a multivariate analysis and causal modeling strategy, Brooks (1988) concludes that the association between education, income, and physical activity behavior is surprisingly weak. This was a different finding from that found by Stephens, Jacob and White (1985) after an-

alyzing physical activity surveys that provided sociodemographic data. These authors found a decline of physical activity with advancing age, and a consistent modest positive relationship between physical activity behavior and income as well as education. Brooks (1988), however, suggests that the explanation is a combination of psychological factors and exposure to physical education and sports in school. She suggests that education has been having a more important influence on physical activity behavior in recent decades, or that education has its most important influence at the stage of one's life just following the completion of schooling. Income is included and explained by the fact that participation in many sports activities requires an outlay of money which may exclude segments of the population.

In summary, then, correlates of exercise and control of health include the social class components of education, income and occupation, gender, and age. Given the association between exercise and control over one's health, it seems reasonable that exercise might have a control-enhancing effect on individuals as they age.

Defining Age and Aging

It is generally agreed that "age" is viewed not only as a physiological aspect of life, but also as a social and psychological aspect of existence. Theories which address aging come from the disciplines representing these aspects of life. In *Adult Development and Aging* (1982) Huyck and Hoyer discuss five measures of age: (1) chronological age, the time passed since birth; (2) biological age, or "the estimate of the individual's present position with respect to his/her potential life span" (Birren and Renner, 1977, p. 4); (3) psychological age, which refers to the adaptive capacity of individuals relative to others of the same age (Birren and Renner, 1977); (4) functional age, which assesses the level of ability to function in a given society, relative to others of the same chronological age; and (5) social age, which reflects expectations about social participation, social habits and social roles.

Two central premises from the emerging life-course perspective in gerontology are that aging from birth to death is a process of growing up and growing old, and as suggested before, aging consists of interactive biological, psychological and social processes (Riley, 1979). In his article entitled "Aging Differently," Maddox (1987) points to Otto Pollak (1948), an early writer who reported on social adjustment the Social Science Research Council. In this report Pollak referred to age as a dependent variable and argued that the social meaning of age is not determined solely by biological processes indexed by chronological age. Further research by Maddox has convinced him that the heart of the matter of aging is the synergistic interaction of biological and sociological factors.

Sociologists contend that meanings accorded to age are contextual in that they are tied to societies and situations. As individuals daily interact in many social circles, they are responded to in terms of different age categories; different situations involve varying expectations concerning age-approriate behaviors. In addition to being a major dimension of social organization, it is a major touchstone by which individuals organize their experiences throughout their lives (Neugarten and Neugarten, 1986). Within sociology, symbolic interactionists argue that age, as such, has no intrinsic meaning, but rather is assigned meaning through interaction and in concert with others which implies there are *many* aging processes. In addition, a social structural perspective emphasizes that "persons occupying different locations in social space interpret and respond to the social messages they hear about the meanings of age" (Karp, 1982). Age stratification theory attempts to explain how chronological age structures and patterns the social roles we perform. Age stratification also directs attention to considering the importance of particular historical contexts in relation to the experience of aging, and also to the varying attitudes, values, and world views of different cohorts which are constantly undergoing transformation.

Perceptions of Aging and Health

In examining aging and health, a number of related constructs need to be considered: actual aging and perceived aging, and actual health status and perceived health status.

Actual Aging. According to Riley and Riley (1986), it has been demonstrated that

> decline accompanying aging, including biological declines, are neither entirely inevitable nor universal, since growing old is a set of processes in which biological aging continually interacts with social and psychological aging. studies show that many of the deficits of today's older people can be explained, not by aging, but by differences in cohort experiences (as new cohorts may be comparatively better educated, healthier, etc. than earlier ones); and by experimental studies that demonstrate that, by correcting defective aspects of social structure, old-age deficits can often be reduced or prevented. (p. 61)

Rowe and Kahn (1987) make the distinction between what they call usual aging, that is, typical nonpathologic age-linked losses, and successful aging which refers to people who show little or no loss in a constellation of physiological functions. These two groups together constitute the heterogeneous category of the normal. They argue that the concept of successful aging does not replace the necessary concern with explicit diseases and their causes, nor the need to discern the dominant patterns of aging. What it does is add a focus on heterogeneity within age groups and the need to determine the factors that explain success. Likewise, Maddox (1987) objects to early gerontological research which seemed to consider the elderly broadly as an "undifferentiated lump of humanity." He points to the Duke longitudinal studies which emphasize the impressively large variety of successful lifestyles documented within and between successive cohorts of older adults. This panel study demonstrates the existence and persistence of heterogeneity in a wide range of social, behavioral, and biological processes of aging.

Perceptions of Aging. According to Achenbaum (1985) perceptions of aging and the aged have always had a profound impact on the ways people individually and collectively define and cope with the potentials and limitations of the human condition. He points out that gerontologists are very much aware of the importance of understanding the nature and dynamics of our ideas about becoming older. This demonstrates the process of anticipatory socialization in which individuals

prepare themselves for roles they might play in the future. They rehearse actions, values, and feelings before they actually enter into a particular status or adopt a new role. This suggests that how persons anticipate how they will act as elderly individuals affects their actual aging. It has been suggested that yielding to old age has become a socially accepted behavior pattern in the United States (Frankel, 1977).

As noted earlier, a fundamental sociological question is whether the increasingly older population will be better off than that of earlier generations because of life-style changes. It has already been noted that current literature in gerontology indicates that there is considerable variation in what we call aging. From the strong evidence (Butler, 1975; Fries and Crapo, 1981; Ostrow, 1984; Riley, 1979) that individuals age at different rates comes the idea of *plasticity of aging*, where plasticity is defined as the capability of being shaped or molded. The idea here is that the capability of a given attribute is not fixed, predestined, and inevitable, but may be modified. This concept applies both to cohort changes and to individual changes. Each cohort experiences its own set of conditioning influences, thereby affecting its perspective on present events, lifestyle choices, and ultimately health. Similarly, Maddox (1987) and others (Rowe and Kahn, 1987) write about the *modifiability* of aging. Maddox (1987) asserts that the heterogeneity constitutes prime evidence of the modifiability of aging processes and hence the potential for intentional modifications of these processes. He also points to the evolutionary biologists Gould (1977) and Lewontin et al. (1984) who argue that the biological fact of greatest significance about humans is their biological potential for a very broad range of adaptive responses. To answer the question of what produces the heterogeneity of humans, Maddox (1987) points out several possibilities: conditions of birth expressed in terms of the socioeconomic status of parents, personal characteristics such as ability, choices by self and others related to human capital investments, and learned adaptive skills. One choice being made by individuals and society is the questioning of the social meanings of age. Perceptions of the periods of life are being changed, as well as role transitions, social competencies, and the ages that mark their boundaries (Neugarten and Neugarten, 1986). Changes in regard to age-appropriate behavior are appearing in informal age norms as well as in the norms codified for law through a process of "cohort norm formation" (Riley and Riley, 1986). Further, the old dis-

tinctions between life periods are blurring in today's society, and evidence for this is the appearance of the young-old. It has been pointed out that this concept was originally based, not on chronological age, but on health and social characteristics (Neugarten and Neugarten, 1986). Thus a young-old person might be fifty-five or eighty-five.

Health. For many years the dominant paradigm in the field of health has been the "medical model" which defines health in terms of the presence or absence of disease states (pathology). In *Unraveling the Mystery of Health*, Antonovsky (1987) discusses the "medical model":

> The pathogenic orientation is committed to the proposition that diseases are caused by bugs--microbiological, psychosocial, chemical, or what have you--singly, as in the germ theory, or multifactorially, as the more sophisticated have it. The Type A behavior pattern contributes to coronary heart diseases, learned helplessness to depression, or internalization of hostility to cancer, to take some examples now current (p.5)

In this work, he coined the term "salutogenesis," the causes of health. This approach " leads one to think in terms of factors promoting movement toward the healthy end of the continuum" (p. 6).

In recent decades in the field of public health, the direction of public health in this country is toward prevention. This "wellness movement" which started in the United States in the 1950s, is in line with the World Health Organization's definition of health which emphasizes that health is a state of physical, mental and social well-being. This perspective views health as measured in terms of function, with function being determined to a large extent by interaction among physiological, psychological, and social forces. According to Burdman (1986), the activities that an older person thinks he or she can do are useful indicators of individual health status. In order to improve the health of the aged around the world in coming years, the World Health Organization has adopted health promotion and self-care among the elderly as one of its major strategies. It is recognized by health promotion programs that a key role in promoting well-being is individual self-responsibility (Burdman, 1986). With regard specifically to older adults, the Surgeon General's report, *Healthy People*, states the following:

> The long-term goals of a health promotion and disease prevention strategy for older people must not only be to achieve further increases in longevity, but also to allow each individual to seek an independent and rewarding life in old age, unlimited by many health problems that are within his or her capacity to control.

In relation to aging, then, adoption of a salutogenesis approach or the preventative perspective of personal responsibility of the wellness movement would seem reasonable and beneficial in the long run.

Perceived Health. Research has generally found substantial relationships between life satisfaction, or subjective well-being, and health, activity, socioeconomic status, and to some extent with age (Palmore and Luikart, 1972). And Larson (1978) confirms the folklore formula of health, wealth and love as the basis of happiness. One study of health and social factors related to life satisfaction by Palmore and Luikart (1972) indicates that self-rated health is the strongest variable related to life satisfaction in groups aged 46-71. This study further shows that a person's own conception of his/her health is more important than the physician's rating of his/her health. According to Palmore and Luikart (1972), this finding is in line with other studies which indicate the greater importance of self-assessment compared to medical assessment. In addition, Maddox (1962) found that the majority of older adults assess their health realistically. In *Vitality and Aging* (1981) Fries and Crapo state that as people age, it is dependence, diminished capacity and lingering disease that many people fear more than death. Perceived health then is a very critical variable in the consideration of aging.

Several social structural variables have frequently been discussed in association with health. It seems apparent that regardless of how social class is measured, differences in health still prevail with the middle and upper strata continuing to maintain the highest levels of health and participating more in preventive medicine (Cockerham, Lueschen, Kunz, and Spaeth, 1986). Education appears to be an important variable at all ages, and the more education a person has, the more likely health will be perceived in a positive fashion (Cockerham, Sharp, and Willcox, 1983). According to Maddox (1987), both optimism about health and the realistic assessment of good health are positively associated with indicators of higher socioeconomic status such as occupation, income, and years of schooling. These indicators of social status are an index of differential access to societal resources such as money, social integration, a positive self-concept, and strategies of adaptation. They not only predict health, but also predict self-assessment of health and other characteristics

such as cognitive functioning, net worth, pattern of social involvement, and perceived well-being (Maddox, 1979; Maddox and Campbell, 1985; Shanas and Maddox, 1985). And in their study of social stratification and self-management of health, Cockerham et al. (1986) report that those persons with the highest level of education were significantly more likely to demonstrate an internal locus of control with respect to health than the less educated. The more educated appear the most active toward personally controlling and being willing to be responsible for their health. They also report that income was significant in relation to a health locus of control in that respondents with the lowest level of income were likely to manifest an external locus of control. They conclude that when it comes to a sense of mastery over health, members of higher-status groups (as determined by education and income) demonstrate higher levels of active control and responsibility, while the poor are more passive.

Surveys of gender differences in health in the United States have found repeatedly that men have higher mortality rates than women, and women have higher rates of therapeutic care. Studies to date indicate that males' disadvantage has a biological base (Verbrugge, 1989). Overall, women are less likely than men to report their health as excellent and are more likely than men to report it as fair or poor. Males and females appear to differ in acquired risks of disease because of differences in work and leisure activities and behaviors such as smoking and coping with stress. They differ in orientations toward health problems, and women are said to be more sensitive to symptoms, more willing to report them, and more willing to seek treatment (Twaddle and Hessler, 1987).

In a recent extensive study, Verbrugge (1989) summarizes gender differences in the following way:

> Men appear to be broadly advantaged by their participation in productive and personally fulfilling roles, life satisfaction and felt stress, socioeconomic status, and some lifestyle behaviors....Women's psychological makeup is less robust overall. Men are deterred from health care because of objective time constraints and fewer established ties to physicians, but they have less trouble taking time for care and more insurance resources to do so. (p.288)

Verbrugge (1989) makes the following conclusion on gender differences in health:

> Women's excess morbidity in contemporary life is influenced by social factors, especially by risks stemming from lesser employment, greater felt stress and unhappiness, stronger feelings of vulnerability to illness, fewer formal time constraints (related to fewer job hours), and less physically strenuous leisure activities. If these risks are reduced--by promoting engagement in productive roles, blunting stress and fostering happiness, and encouraging aerobic activity--women are likely to feel better physically and to suffer fewer daily symptoms and chronic health problems. (p.295)

Marital status has also been associated with health differentials. Results from one study indicate that for the noninstitutional population, divorced and separated people appear least healthy, followed by widowed, then single people, with married people appearing to be the healthiest (Verbrugge, 1979). The explanation given for this is that risks due to marital roles and life style behaviors, and marital selectivity, are important causes of health problems. But further, determinants of how ill people interpret symptoms and what actions are taken for them include "domestic responsibilities and supports, encouragement to take health actions, time constraints, concern about long-term health, and ability to afford medical care" Verbrugge, 1979).

And finally, the self-assessment of health declines with advancing age. The explanation given for this is that the incidence of acute disease (i.e., short intense conditions of disease that may be incapacitating, but over quickly) is more prevalent among the young, whereas the elderly have long, drawn-out chronic diseases, many of which can be controlled but not cured (Twaddle and Hessler, 1987).

In summary, correlates of perceived health are socioeconomic status, age, gender, marital status and personal characteristics and adaptive skills, an example of the latter being exercise.

Knowledge of Aging and Belief in the Health Benefits of Exercise

In *Successful Aging*, Neuhaus and Neuhaus (1982) suggest that successful adaption to aging requires the application of certain skills, knowledge, and experience. "Recognition of one's aging and the physical and social limits it imposes, acceptance of new perceptions of oneself, and a commitment to meaningful values and goals that can be communicated to and shared in and with others are important focal points in coping with the aging process" (p. 238). It seems intuitive that knowing about something in advance is necessary to have control, and this is conceptualized in the literature as cognitive control.

A study done in 1962 by Seeman and Evans indicates an association between low powerlessness and high health knowledge. However, results from a study on health behavior and

personal autonomy indicate that high knowledge is associated with internality although the data on the whole are unpersuasive about the relation between internality and these knowledge scores (Seeman and Seeman, 1983). In recent years attention has been given to the hypothesis that internals believe in the efficacy of their actions and are therefore more likely to engage in health-promoting behavior. Once again, those people most likely to engage in exercise are those who believe they have control over health outcomes and who expect personal health benefits from exercise. Presumably, these beliefs and expectations would come from knowledge of health and exercise.

The limited literature in this area suggests an association between knowledge and control. It also suggests that belief in the efficacy of one's actions and the expectation of personal benefits from exercise would lead one to exercise.

Summary

In summary, this review of literature argues for the salutary effects of a sense of control in general, specifically in the area of health, and poses the question of a possible sense of control over aging. The literature on control, locus of control, and self-efficacy was presented first. The relationship between health and control is that a sense of control appears to enhance health, and literature on exercise behavior shows it to be efficacious action.

The literature on aging emphasizes the considerable variation in individuals as they age; it argues for a perspective which views the individual as dynamic and capable of a broad range of adaptive responses. Further, the literature on perceptions of aging points to the profound effect that perceptions of aging have on the way people individually and collectively define and cope with the potentials and limitations of the human condition. This was followed by a review of the transition of the field of health from the "medical model," which views health in terms of the presence or absence of disease, to that of a "wellness" approach, which emphasizes health in terms of function and promotes preventive strategies and personal responsibility for one's health.

Finally, it is suggested that knowledge of facts on aging is a cognitive coping mechanism, as is a belief in the health benefit of exercise.

Chapter 3. Theoretical Orientation

One logical place to begin a sociological inquiry on control of aging is to ask what similar conditions, contexts, or patterns are shared by people who might exhibit a sense of control over aging. This perspective is traditionally referred to as social structure and personality. Within this paradigm, other theories more explicitly connect social structural variables and perceptions of individuals. Some of these, for example role theory and stratification, will be included in this discussion.

Social Structure and Personality: A Paradigm

Social structure is defined as "persisting patterns of behavior and interaction between people or social positions" (House, 1981) or as "characteristics of social systems (e.g., roles, norms, organizational features, socialization processes)" (Ryff, 1987). Personality is defined broadly as relatively stable and enduring psychological characteristics of the individual (House, 1981; Ryff, 1987). Numerous studies examine how social roles and norms, as in the context of the family, the school or workplace, influence individual characteristics such as independence, sense of control, or sex role identity. House (1981) argues that social structure and personality continues to constitute an im-

portant coherent domain of social psychology in general and of sociological social psychology in particular. The relationship between any macro-social phenomenon and any individual psychological attribute can be considered an aspect of the study of social structure and personality (House, 1981), and the task of this perspective is to link the individual with the social world.

This "tradition" in sociology has its early origins in the works of Auguste Comte, Karl Marx, Max Weber, and Emile Durkheim. The focal question for Comte was how the individual can be both a cause and a consequence of society. Marx's central concern was with (1) the nature and consequences of the "fit" between social structure and the characteristics of individuals, and (2) with how position in the socioeconomic structure shaped values, motives and beliefs (House, 1981). Two of Marx's most enduring concepts, alienation and class consciousness, came from this concern. Weber was concerned with the relationship between position in the social structure and individual values and beliefs. Inkeles (1959) asserts that personality and social structure assumptions are implicit in Durkheim's studies of suicide. And Lukes (1967) argues that Durkheim's concept of anomie is concerned with the relationship between "social phenomena" and individual "states of mind," or what is now referred to as social structure and personality.

House (1981) has mapped out three basic analytic principles to help guide and hopefully to integrate work on relationships between macro-social phenomena and the individual. They are (1) the components principle, which refers to the nature of the social structure, position, or system in question, that is, its multiple aspects and dimensions; (2) the proximity principle, or how the effects of social structures, positions, or systems are transmitted to individuals, or the everyday social realities; and (3) the psychological principle, which refers to the necessity of understanding individual psychology in order to adequately specify when, how, and to what extent macro-social phenomena (components principle) and the micro-social phenomena (proximity principle) affect individual personality or behavior.

The social structure and personality approach posits that membership in a social group defined by economic status, age, or sex, locates individuals within the society. These different groupings expose individuals to different conditions of life and thereby bring about different conceptions of social reality. A typically structuralist perspective is that one's social position or location in the

social system affects one's perceptions, values, ideologies, and other psychodynamics via the smaller structures of proximate social environments, for example, social networks and role relations (Kiecolt, 1988). These proximate social environments, or "interpersonal environments," structure the realities that one must confront on a day-to-day basis (DiRenzo, 1977).

The term "personality and social systems" is also used so that the distinction can be made between the two principal aspects of "social content" and "social structure." Social content usually refers to such elements as roles, norms, and ideologies that comprise the social system, whereas social structure "pertains to the configurational relationship among these elements which would involve such variables as complexity, size, cohesion, and integration." Both are equally viable for a more complete explanation of the interactions between personality and social systems.

Several theories have been used for an analysis midway between the individual and society. One such theory is role theory, which developed out of symbolic interactionism and and has been adapted by other theoretical orientations (Albrecht, Chadwick, and Jacobson, 1987). According to role theory, an individual develops a "social self" through interaction with others, and thereby becomes aware of the social position that s/he occupies. This "social self," or the roles in one's repertoire, is a link between the individual and society. As a result of these societal roles, identities are developed and are tied to the norms and values of society (Gove, Ortega, and Style, 1989). Role theory points to a variety of social roles and their behavioral expectations, and role theorists study the behaviors that are characteristic of people who fill specific positions. Further, multiple roles in an individual's repertoire presumably facilitate adjustment to society because the ability to enact a role requires both an understanding of situations in which the roles are enacted and an understanding of other individuals through role-taking (Albrecht, et al., 1987).

From a role perspective, aging is associated with role acquisition, transition, and role loss. It suggests that during the productive adult years, persons have a full set of social roles with role loss associated with loss of job, loss of health and loss of spouse as one ages. Gerontologists have applied role theory to the life experience of the elderly in their activity theory. These theorists focus consistently on the lack of formal roles and statuses available to the elderly within the main institutional structure of society (Gove, et al. 1989).

The relationship between power and role taking has also been examined with the conclusion that "role-taking ability varies inversely with the degree of power ascribed to social positions" (Thomas, Franks, and Calanico, 1972), that is, those in lesser positions of power have more accurate perceptions of the behaviors of those they perceive have more power.

Another related theory is that of social networks. Social relationships can be distinguished in terms of (1) quantity and type of social ties; (2) network structure which includes properties of dyadic ties (for example, reciprocity) or of sets of relationships (for example, density); and (3) functional content (what is being exchanged) (House, 1987). Two models which have been used to explain attitudinal and behavioral contagion in networks are cohesion and structural equivalence. The model of cohesion posits that communication within a primary group influences one to adopt an attitude; structural equivalence posits that "persons in the same position in the social structure (i.e., with similar relations to other actors, whether or not they interact with each other) come to see an attitude as appropriate for an occupant of their position, presumably by social comparison processes" (Kiecolt, 1988). Some studies indicate that girls and women are more likely to have available and useful social support (i.e., more intensive), while men and boys seem to have more opportunities for contacts that provide a broader range of network settings (i.e., more extensive) (Feiring and Coats, 1987).

Another approach to aging is that of a maturational perspective which differs from role theory in that aging is viewed as more of a positive process than a problematic one. The maturational perspective is derived from Freud's theory of psychosexual development which borrowed from biological developmental models. Although a maturational perspective does not suggest that the loss of roles is not problematic, it views role loss as less problematic than does role theory (Gove, et al., 1989). Also, changes that occur are in the direction of an improvement.

With regard to control over aging, it would seem feasible that from the perspective of role theory, those individuals associated with a fuller or more meaningful set of roles along with more network involvement might perceive more control over aging. For example, it would seem that adults in the middle years might have a fuller set of roles, as well as those with higher levels of education and more complex occupations.

How each of these social structural variables are linked to a possible perceived control over aging is outlined below. Theories possibly linking these social structural variables and individuals' perceptions are also mentioned.

Social class. Kohn (1969) notes that one aspect of social structure, that of hierarchical position, or social class, is related to almost everything about our lives. In working with Pearlin and Schooler over a period of years in trying to understand the impact of social class on individual behavior and personality, Kohn labeled the two underlying patterns "self-direction...which implies that one is attuned to internal dynamics--one's own and other people's" versus "conformity...which implies obedience to the dictates of authority" (Kohn, 1977). According to Kohn (1977):

> ...the essence of higher class position is the expectation that one's decisions and actions can be consequential; the essence of lower class position is the belief that one is at the mercy of forces and people beyond one's control, often beyond one's understanding. (p. 189)

Kohn suggests that these patterns reflect generalized value orientations which develop out of two specific aspects of social class, that of occupational experience and level of education. In other words, different occupational levels are associated with different values; for example, some occupations place greater value on self-direction and autonomy, which is associated with control. And some occupations place more value on external authority, which is more associated with powerlessness. Gilbert and Kahn (1982) observe that sociologists have been aware since Marx that life experience, especially occupational experience, shapes social values. House (1981) says this:

> Two of Marx's earliest and most enduring concepts, alienation and class consciousness, inherently concerned the relationship (both actual and ideal) of societal structure and institutions (for example, industry, government, and the economy) to individual beliefs, motivations, behaviors, and so forth. (p. 529)

And in *The Hidden Injuries of Class* by Sennett and Cobb (1972) a sensed absence of control is prominent in their portrait of a working class, which remains fundamentally deprived despite advancements and increased income. According to House (1981), Kohn's (1969) important contribution has been to stress that people's occupations define for them a whole set of social conditions and experiences, i.e., lifestyle; occupations also give a position in the organization and economy, e.g., owner vs. manager vs. worker. And Kohn and Schooler's work (1983) demonstrates that independent of education and occupational prestige, the structural conditions of work affect intellec-

tual flexibility, self-directedness of orientation, and sense of well-being. The most important job condition seems to be aspects of occupational self-direction--substantive complexity of work, closeness of supervision, and degree of routinization. These findings extend to women in both housework and paid employment in the United States (Kohn and Schooler, 1983). The central fact of occupational life today seems to be the opportunity to use initiative, thought, and independent judgment in one's work, and to direct one's own occupational activities. Furthermore, it appears that ways of coping with job realities are generalized to non-occupational realities. It seems reasonable, then, to expect persons in occupations characterized by a lot of self-direction to have a sense of control of aging and also to engage in activities with some direction in mind.

Education. As for the education component of social class, more education lends itself to the likelihood of exposure to a variety of information on various subjects. It is associated with favorable social feelings such as self-determination, as well as nontraditional and liberal attitudes toward social issues (Kiecolt, 1988). According to Kohn and Schooler (1983), education may affect values and orientations directly by fostering intellectual flexibility and breadth of perspective. They further argue that education's role in job placement--the more education people have, the more likely they are to be recruited into responsible jobs that provide opportunity to be self-directed in their work--may affect values and orientations indirectly. As previously pointed out, research has demonstrated that those persons with higher levels of education are significantly more likely to demonstrate an internal locus of control with respect to health; they appear to be the most active toward personally controlling and being responsible for their health (Cockerham, 1986). And high levels of education and income tend to be related to a positive self-concept and self-evaluation (Gove et al., 1989). Both role theory, with its emphasis on multiple roles increasing understanding of different situations, and social networks' focus on involvement and contact among members, might be applicable as a link between the social class components, occupation and education, and a perceived control of aging through a broader perspective and increased understanding from more extensive contacts.

Age. The complexity of the dimension of age was discussed earlier. Age is a feature of the role structures through which people pass as they grow older. It affects which roles are open to an individual, and which social networks and cultural norms will offer certain opportunities or impose certain demands (Riley and Riley, 1986). In recent years, it has become apparent that we must be careful what we say about the effect of age, as it may be a *cohort* effect (Clausen, 1984). In addition, Clausen points out that we must also consider period effects, that is, the effects of current developments. According to Clausen,

> In modern industrial society, with its rapid technological and social change, new generations regularly face situations vastly different from those that confronted their parents. ... Hand in hand with the products of technology came changes in values.... Since new generations are constantly replacing older ones, there are no sharp boundaries to generations. Moreover, social changes that make a profound difference for the life course are not spaced evenly.

Strong period effects have been characteristic of the past few decades, and these include an increase in the degree to which a psychological framework is used, changes in gender-role attitudes, increase in tolerance with respect to civil liberties and racial attitudes, and a sharp increase in both the proportion of women in the labor force and female-headed households (Gove, et al., 1989). Since the Depression, one significant cohort effect is an increase in education and income with each cohort. Applied to the specific area of health, an example is that some studies of health care beliefs indicate that older persons are more likely to accept physicians' decisions and less likely to challenge their authority (Haug, 1979), prefer a nonparticipatory patient role, and have lower desire for control over health care. Instead of the aging process explaining these findings, a cohort or environmental effect may be responsible for the findings in that calls for increased control over health care and emphasis on patients rights have been fairly recent (Langer, 1983). The elderly patients of today grew up in an era when the omnipotence of doctors was less likely to be challenged (Woodward and Wallston, 1987). A role theory, with its emphasis on role acquisition, role transition, and role loss, would predict that older persons would have less perceived control of aging not only because of the effect of role loss, but also as a result of being in a cohort that is less likely to have high levels of education.

Gender. Gender is yet another dimension of social structure to be considered in this study. According to Elkin and Handel (1984), the identification of the external genitalia at birth,

> ...attesting to maleness or femaleness, results in the newborn being assigned to one of the most fundamental categories in society, the category of sex. This assignment sets in motion an ongoing series of beliefs, values, expectations, and conduct on the part of others with respect to the newborn, a series that will be highly consequential for the life that newborn baby will live in society.

Sources of differential socialization of males and females are family interaction, the school and the media. Many studies have been conducted on parent/child interaction (treatment by same sex parent versus opposite sex parent), toys and the media, the reinforcement of traditional sex roles through the power structure of the schools, differences in peer games, and so forth. According to Elkin and Handel (1984), the differential socialization of boys and girls reflect the anticipation that boys and girls will occupy different statuses when they reach adulthood. There is some evidence in the literature that parents emphasize achievement more for boys than girls (Block, 1973) and that teachers may respond differently to boys and girls (Serbin, O'Leary and Kent, 1973). It seems then, that from childhood on, males have more opportunities for roles that allow for more experiences leading to increases in self-efficacy.

Marital Status. Finally, marital status is a dimension of social structure which has been linked with health. Married people appear to be the healthiest group, and mortality rates show the same pattern (Verbrugge, 1979). One popular explanation is that married people are happier and less stressed than non-married ones. This reduces the likelihood of engaging in behaviors which have high risks of illness and injury. Other explanations presented earlier in the discussion on perceptions of health include differences in domestic responsibilities and supports, encouragement to take health actions, time constraints, concern about long-term health, and ability to afford medical care. Again, both role theory with its emphasis on multiple roles, and social networks with its emphasis on involvement with and support from members, would predict a link between marital status and a sense of control over aging.

Summary and Hypothesis Formation

In summary then, the model of social structure and personality is that individuals have a constellation of characteristics which arises from conditions which induce certain behaviors, have certain expectations, or impose constraints which limit behavioral options. As a result of these characteristics, adaptations and attitudes allow the individual to deal with the conditions and constraints which occur. In relation to the possibility of the existence of perceived control over aging, this study proposes that those factors which account for the heterogeneity among individuals will also account for the variation in perceived control of aging. Specifically, it is predicted that those who have greater access to both the material and nonmaterial (e.g., knowledge) societal resources will perceive more options and adaptive strategies, and consequently have more of a sense of control over aging. The intent of this study then is to examine those social structural configurations, presented in the model in Figure 1, which might lead to a sense of control of aging.

Based on reviews of the social structure and personality paradigm positing that various dimensions of the social structure influence individual characteristics and role theory which makes explicit the links between social structural variables and individuals' perceptions, the following research hypotheses will be tested.

H1: Social structural variables will have a direct impact on locus of control of aging as well as an indirect effect through the self-related process variables. Specifically, young, male, higher status/ educated individuals are expected to exhibit more of an internal locus of control of aging (a sense of control of aging), but these social structural variables are also expected to be mediated through self-efficacy, exercise behavior, perceived health status, beliefs in the health benefits of exercise, and knowledge of aging.

H2: Knowledge of facts on aging and belief in the health benefits of exercise is expected to have a direct effect on locus of control of aging. More knowledge about facts on aging should lead to a more internal locus of control of aging.

H3: Perceived health is expected to have a direct effect on locus of control of aging as well as an indirect effect through exercise behavior. Better perceived health should lead to a more internal locus of control directly, as well as be associated with a more internal locus of control through greater exercise activity.

H4: It is expected that exercise behavior will have a direct effect on locus of control of aging. Exercise behavior should lead to a more internal locus of control of aging.

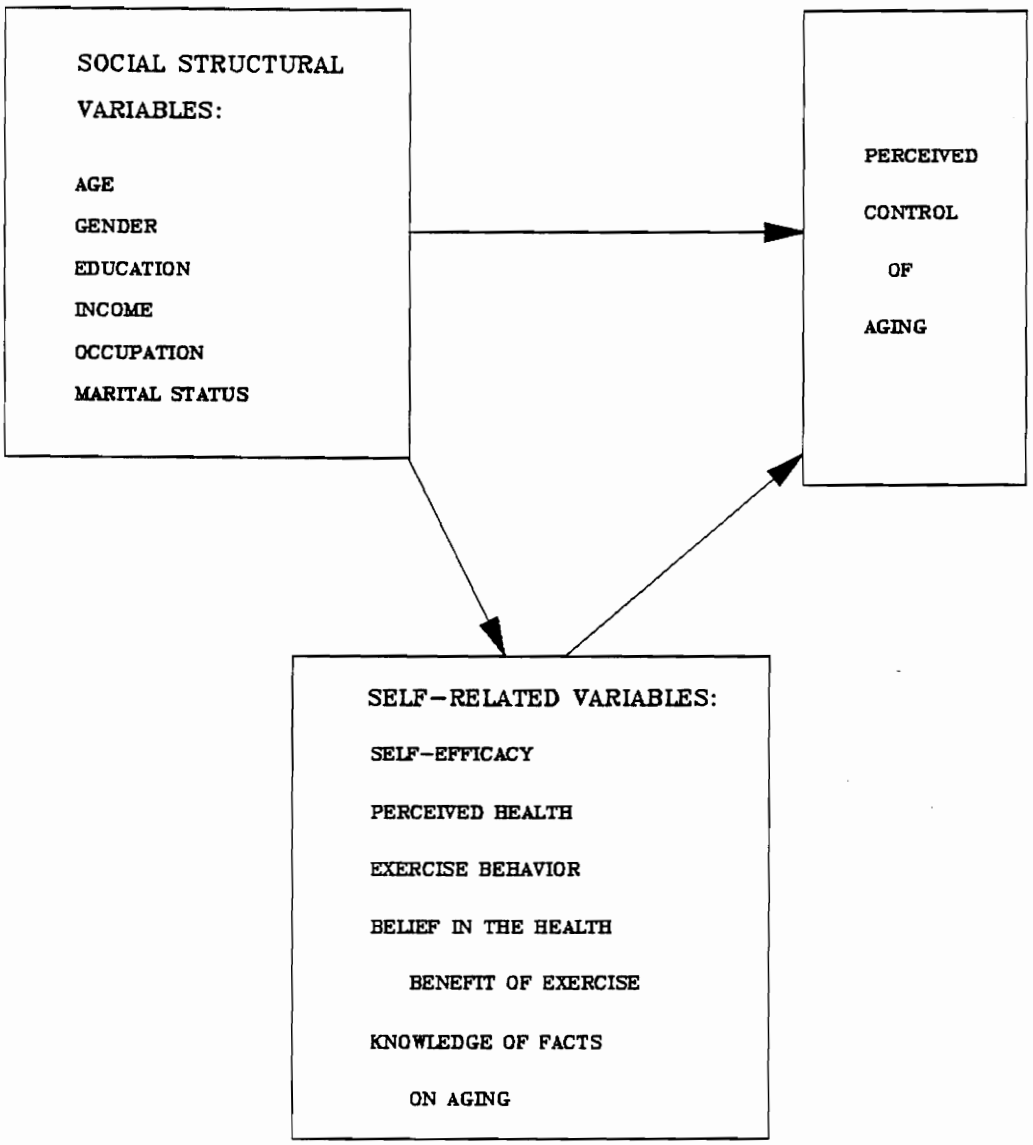

Figure 1. Model of Perceived Control of Aging

Chapter 4. Research Methods

Since it is hypothesized that several social structural variables will have an effect on perceived control of aging, it was decided to use multiple regression analysis. Because of the time and cost restrictions for a master's thesis, it was decided that a self-administered questionnaire would be the most expedient method of research to obtain answers to a preliminary research question on perceived control of aging. In addition, a survey would provide a large number of cases for a descriptive and explanatory analysis.

The Sample

The data are compiled from questionnaires submitted to persons at two different locations: the Roanoke Athletic Club and the staff and faculty at Virginia Polytechnic Institute and State University. On June 30, 1988 a display asking members to voluntarily take a questionnaire was set up at the Athletic Club, which is located in the rapidly growing southwest section of Roanoke. It is owned by Roanoke Memorial Hospital. On July 1, 1988, the total number of memberships was 1842 with 725 family memberships and 1117 single memberships (609 male and 508 female). Four hundred questionnaires were made available for approximately a three-month period. At Virginia

Tech 500 questionnaires were distributed through the Physical Plant office. An additional 500 questionnaires were distributed randomly among faculty, staff and graduate student mailboxes in seven academic buildings as well as among various administrative offices in Burruss. The response rate was 39% for the athletic club sample and 44% for the Virginia Tech sample.

Measures of Variables

Endogenous Variables. The major dependent variable, perceived control over the aging process, was measured in two ways. First, a four-item locus of control of aging scale was adapted from Saltzer's (1982) weight locus of control scale. This was decided after considering the lengthiness of the full locus of control scale and the acceptable results on the validity of locus of control subscales (Lumpkin, 1985; Saltzer, 1982). The scale consisted of two statements worded in the internal direction, "Whether my health decreases as I age is mostly up to me" and "If I take care of myself and get enough exercise, I can slow down the deterioration associated with aging;" and two statements worded in the external direction, "How I grow old is determined by heredity and there is very little that I can do about it"and"Being healthy and active as one ages is largely a matter of good fortune." The four choices of responses were 1 = Strongly agree, 2 = Agree, 3 = Disagree, and 4 = Strongly disagree. The responses were recoded so that a higher number indicates a more internal locus of control. Cronbach's alpha was used to test the reliability of this scale. According to Bohrnstedt and Knoke (1982), alpha is a measure of the internal consistency for multi-item summed indexes and ranges from zero (no internal consistency) to unity (perfect internal consistency); these authors generally strive for indices of .70 or higher. The alpha was .63 (n = 561), which compares favorably with alphas of .58 and .56 obtained by two tests of Saltzer's (1982) weight locus of control. In order to retain as many cases as possible, it was decided to include a case if it had information for at least two scores.

The second way perceived control over aging was measured was by the question, "On a scale from 0 to 5, how much do you think you can personally control the following aspects of aging?

(a) cardiovascular (heart) fitness, (b)physical endurance and muscular strength, (c) susceptibility to disease, (d) keeping alert, (e) maintaining a positive outlook, (f) maintaining feelings of self-reliance and independence, (g) maintaining close relationships with people you care about, (h) recovering from the death of a loved one, and (i) recovering from a loss of income." The alpha for the scale as a whole was .82; alpha for the physical aspects scale (a-c) was .68, for the psychological aspects scale (d-f), .77, and finally for the social aspects scale (g-i), alpha was .71.

Other dependent variables in the analysis are self-efficacy, perceived health, exercise behavior, belief in the health benefits of exercise, and knowledge of aging. Self-efficacy was measured by a six-item scale adapted from a general self-efficacy scale developed by Sherer and Maddux (1982). Response choices on the scale were 1 = Strongly agree, 2 = Agree, 3 = Disagree, and 4 = Strongly disagree. The scale consisted of three statements worded in the direction of high self-efficacy and three in the direction of low self-efficacy. The statements in the direction of high self-efficacy were:

- When I make plans, I am certain I can make them work.
- Failure just makes me try harder.
- I am a self reliant person.

The statements in the direction of low self-efficacy were:

- I avoid trying to learn new things when they look too difficult for me.
- I feel insecure about my ability to do things.
- I do not seem capable of dealing with most problems that come up in life.

The responses were recoded so that a higher number indicates higher self-efficacy. Cronbach's alpha was .71 for this scale of self-efficacy. If at least three items on this scale had non-missing values, the case was included in the analysis.

Perceived health was measured by the question, "How would you rate your overall physical health at the present time? 1 = Poor, 2 = Fair, 3 = Good, and 4 = Excellent." Exercise behavior was measured by two questions: "How many days per month do you engage in (a) moderate exercise

(for example, cycling, tennis/badminton singles, skating, walking at a moderate pace) and (b) strenuous exercise (for example, jogging, swimming, climbing stairs, calisthenics)?" The number of days of strenuous exercise and days of moderate exercise were summed and divided by two resulting in one score.

Belief in the health benefits of exercise was measured by responses to two True/False statements, "A physical exercise program increases how long people live," and "A good exercise program reduces one's risk of heart attacks." The responses were recoded so that 0 = absence of both beliefs, 1 = presence of one belief, and 2 = presence of both beliefs.

Knowledge of aging was measured by responses to ten True/False statements adapted from Palmore's Facts on Aging Quiz (Palmore, 1977, 1981). There is no pass or fail grade, but by comparison a sample of college undergraduates scored sixty-five percent correct, graduate students eighty percent, and faculty ninety percent (Kammermann, Doyle, Valois, and Cox, 1983). The statements are:

- The vast majority of people over 65 are healthy enough to carry out their normal activities.
- As people grow older, reaction time tends to be slower.
- All five senses (smell, touch, eyesight, hearing, taste) tend to decline in old age.
- The majority of elderly people are socially isolated and lonely.
- A person's height tends to decline in old age.
- Older workers have more injuries in the home than persons under 65.
- Lung capacity tends to decline as you grow older.
- Older workers have less absenteeism than younger workers.
- Most elderly people are set in their ways and unwilling to change.
- Older persons who reduce their activity tend to be happier than those who remain active.

These last five endogenous variables, (self-efficacy, perceived health, belief in the health benefit of exercise, exercise behavior, and knowledge of aging) will be referred to as self-related variables.

Exogenous Variables. Several social structural variables were used in the analysis. Age was measured in number of years. Gender was coded so that 0 = female, and 1 = male.: Education was measured on the following ordinal scale: 1 = 8th grade or less, 2 = some high school, 3 = high school graduate, 4 = trade school or associate degree, 5 = some college, 6 = college graduate, and 7 = graduate or professional degree.

Income was measured by the question, "What is the best estimate of the total income last year of your family. Consider annual income from all sources before taxes." Choice of responses were 1 = $4,999 or less, 2 = $5,000-$9,999, 3 = $10,000-$14,999, 4 = $15,000-$19,999, 5 = $20,000-29,999, 6 = $30,000-$39,999, 7 = $40,000-$49,999, 8 = $50,000-$74,999, 8 = $50,000-$74,999 and 9 = $75,000 or more.

The respondent's occupation was coded into one of eleven categories. This variable was recoded into 1 = professional, college faculty and and administrators, and 0 = all others.

Marital status was measured by the question, "Your current marital status: 1 = Never married, 2 = now married, 3 = separated, 4 = divorced, and 5 = widowed." This was then recoded into 1 = now married and 2 = all others.

Chapter 5. Results

Univariate Analysis

The summary statistics for the sample are reported in Table 1. The overall means indicate that this sample has more males than females, and on average are in their mid-thirties, with some education beyond the high school level, and in the income bracket $30,000 to $39,999. Further, more than half are married. Perceived health of this sample is good with a mean of 3.1 on a scale from 0 (Poor) to 4 (Excellent) which indicates a rating of Good or better. The locus of control mean reveals that this sample of people is more toward the internal direction of control than external. The scale measuring perceived control over three different aspects of aging reveals a tendency to perceive more control over psychological aspects of aging than over physical and social aspects of aging. On average, the number of exercise days per month is about ten, and most believe in the health benefit of exercise. The average percentage of correct responses to the facts on aging quiz was seventy which falls in between a comparison group of college undergraduates who scored sixty-five percent correct and graduate students who scored eighty percent.

Bivariate Analysis

As an initial step in the analysis, the bivariate relations between the variables were examined. Table 2 presents the mean ratings on each endogenous variable for levels of the social structural variables. The bivariate correlations are presented in the first column in Tables 3-11. These tables also reveal the results of the regression analysis for each endogenous variable. The numbers in Models 1 and 2 refer to the BETA weights, which are the coefficients of the independent variables when all variables are expressed in standardized form. The impact of the social structural variables is shown in Model 1, and the impact of the addition of the self-related variables is shown in Model 2.

From Table 3 we can see that the significant social structural correlates of locus of control of aging are age ($r = -.179$), gender ($r = -.142$) and education ($r = .134$), suggesting that women, the young, and more educated perceive more control over aging. Perceived control over aging is also significantly correlated with self-efficacy ($r = .339$), belief in the health benefit of exercise ($r = .114$), and exercise behavior ($r = .125$).

Table 4 reveals that education ($r = .214$) and income ($r = .138$) are the strongest structural correlates of perceived control of the physical aspects of aging. Other strong correlations exist with self-efficacy ($r = .255$), belief in the health benefit of exercise ($r = .205$) and perceived health ($r = .198$). From Table 5, we can see that education ($r = .099$), and income ($r = .089$) are also significant social structural correlates of perceived control of psychological aspects of aging; self-efficacy ($r = .347$) and perceived health ($r = .112$) again are significantly correlated with perceived control. Table 6 reveals similar findings in that the stronger correlates of perceived control of social aspects of aging are income ($r = .100$), education ($r = .092$), self-efficacy ($r = .287$) and perceived health ($r = .133$).

Table 7 shows that occupation ($r = .241$), education ($r = .212$) and income ($r = .150$) are significant correlates of perceived health, as are self-efficacy ($r = .201$) and exercise behavior ($r = .177$). Correlates of exercise behavior can be seen in Table 8 with perceived health ($r = .177$) and self-

efficacy (r = .121) being the most highly correlated. None of the social structural variables are significantly related to exercise behavior.

Examining correlates of self-efficacy, Table 9 indicates that education (r = .208) is the most highly correlated among the social structural variables. In addition, perceived health (r = .201) is the strongest correlate among the self-related variables.

Table 10 shows that the significant social structural correlates of a belief in the health benefit of exercise are income (r = .115), occupation (r = .102), and education (r = .100). And finally, Table 11 reveals that the strongest social structural correlates of knowledge of facts on aging are education (r = .255), income (r = .166), and occupation (r = .166).

The mean values for all of the dependent variables by level of each social structural variable are displayed in Table 2. This analysis of means provides the same conclusions as the correlation analysis, but gives some indication of the magnitude of differences on the dependent variable for each group. Each social structural variable is dichotomized in the following manner: age into those under and over 35; education into high school graduate or less and those with more than high school education; income into under and over $40,000; occupation, marital status, and gender are broken down as before.

Mean differences by age groups indicate that those under 35 have better perceived health and have significantly higher levels of perceived control of aging, that is, a more internal locus of control, than those over 35. For the mean analysis of significant sex differences, Table 2 reveals that women have more perceived control over aging generally, but lower self-efficacy than males. On the other measures, there are no significant sex or age differences.

For levels of education, mean differences indicate those people with more than a high school education exhibit significantly more of a sense of control over aging generally, its psychological and social dimensions, and have higher self-efficacy than those with a high school education or less. Persons with higher education also had significantly higher self-ratings of health and scored higher on the knowledge of facts on aging quiz. A similar pattern is observed when groups are compared by levels of income and the different categories of occupational level. Finally, no significant differences by marital status were observed.

Multivariate Analysis

The results of the multiple regression analyses of the effect of various social structural variables (model 1) and then with the self-related variables (model 2) on locus of control of aging are reported in Table 3. Consistent with hypothesis 1, the social structural variables age, gender and education are significant predictors of an internal locus of control of aging; that is, women, the young and those with more education report more of a sense of control over aging than their counterparts. However, it was expected that men, rather than women, would exhibit a more internal locus of control of aging. As a group the social structural variables explain about 8% of the variation in locus of control of aging ($R^2 = .0811$). When the self-related variables are entered into the regression equation (model 2), those three variables remain significant predictors of control over aging, which indicates that the effect of these variables is not being mediated by the self-related variables. This can also be seen in Table 12 which displays the results of a path analysis of the total, direct, and indirect effects of social structural variables on locus of control of aging. With the addition of the self-related variables, the total variation in locus of control of aging accounted for is 22% ($R^2 = .2232$). Of the self-related variables, self-efficacy is the strongest predictor. Only in the case of gender was there a notable indirect effect as expected. Those people exhibiting high self-efficacy have more perceived control over the aging process once other variables are controlled. The other two significant self-related predictors of perceived control of aging are a belief in the health benefit of exercise and exercise behavior itself. This finding is consistent with hypotheses 2 and 4. However, the nonsignificant effect of knowledge of facts on aging is inconsistent with hypothesis 2. On the separate measures of the physical, psychological and social aspects of aging, significant predictors of control over the physical aspects of aging are gender, education, self-efficacy, perceived health and a belief in the benefit of exercise. Age, gender and self-efficacy are also significant predictors of control over the psychological aspects of aging, with older persons, women, and those with high self-efficacy perceiving more control. Self-efficacy is the only significant predictor of control over the social aspects of aging.

It was predicted from hypothesis 3 that perceived health would have a direct effect on locus of control of aging. This was not found to be the case as Table 3 indicates. However, in looking at Table 4, which displays regression coefficients for perceived control of physical aspects of aging, we find that perceived health is a significant predictor of control of physical aspects of aging. In addition, the regression coefficients for exercise behavior found in Table 8 indicate that perceived health is a significant predictor of exercise behavior as implied in hypothesis 3. Tables 3 - 6 all indicate the importance of self-efficacy as a variable affecting locus of control of aging. Further, its importance is also revealed in Table 7 as a significant predictor of perceived health.

Knowledge of facts on aging does not appear to have any effect on a sense of control of aging as was predicted in hypothesis 2. This holds for both the general measure of locus of control of aging and its specific dimensions. Apparently, knowledge of facts on aging per se is not a sufficient condition for high levels of internal locus of control. Tables 9-11 display the effects of social structural variables on the other exogenous variables. These tables also provide the input for computing the direct and indirect effects in Table 12. Generally, we find that age, gender, income, perceived health, exercise behavior, and knowledge of facts on aging, are significant predictors of self-efficacy, with the young, males, those with higher income, those with better perceived health, those who exercise, and those who have more knowledge of facts on aging, have higher self-efficacy. In this analysis, none of the included variables appear to be predictors of belief in the health benefit of exercise (Table 10). Table 11 shows that, as might be expected, both age and education are significant predictors of knowledge of facts on aging, with older and more educated persons having greater knowledge of facts on aging than their respective counterparts. Self-efficacy is also a significant predictor of knowledge of facts on aging.

Finally, Table 12 displays the total, direct and indirect effects of social structural variables on locus of control of aging. The primary nature of age, gender and education are direct rather than indirect. In all cases, the magnitude of the direct effects are larger than the corresponding indirect effects through self-efficacy, perceived health, exercise behavior, beliefs in the health benefit of exercise, and knowledge of facts on aging. These findings suggest that, even after controlling for the

self-related factors, age, gender, and education continue to exert a significant impact on a person's perception of control over aging.

Chapter 6. Discussion and Conclusions

The expanding elderly population has caused concern that this group of people will place a burden on society because of their greater susceptibility to illness and disability. However, others argue that life-style changes made by progressive cohorts will afford more potential for modifications of the aging process. The present study was designed to determine if a sense of control over the aging process exists, and then to assess correlates of such a perceived control from a social structure and personality perspective.

It is acknowledged that any conclusions from this study might be premature considering the preliminary nature of the study and the limitations of the sample. A major limitation is the low response rate of 39% for the athletic club group and 44% for the university sample. However, since respondents were anonymous and voluntary, a followup plea was not possible. Another limitation is that the sample is from a selected group of people who exercise and from a group heavily involved with education. Because of this bias, generalizations should be made with caution.

The data from this study appear to support the primary hypothesis that social structural variables affect perceived control of aging. Consistent with hypothesis 1, age, gender and education appear to have a direct effect on locus of control of aging. The fact that the impact of these variables was not mediated through the self-related variables, however, is contrary to theoretical expectations. With regard to the aspects of aging considered separately, gender and education have

a direct effect on perceived control of physical aspects of aging, (that is, women and those with higher levels of education perceive more control), and age and gender have a direct effect on perceived control over psychological aspects of aging (that is, women and older individuals perceive more control.)

Hypothesis 2 concerning knowledge of facts on aging and belief in the health benefits of exercise having a direct effect on locus of control of aging, was partially supported in that belief in the health benefit of exercise was shown to have a significant effect on locus of control of aging.

Hypothesis 3, that perceived health was expected to have a direct effect on locus of control of aging as well as an indirect effect through exercise behavior, was also partially supported. The data in this study indicate that while perceived health does not have an effect on control of aging, it does have an effect on exercise behavior (Table 8) which has a significant effect on locus of control of aging (Table 3).

Finally, as predicted in hypothesis 4, exercise behavior was found to have a significant effect on locus of control of aging on the basis of the locus of control of aging measure. It appears that people who exercise do have more of a sense of control over physical aging than people who do not.

The surprising finding from this data is that women, rather than men, appear to have more of a sense of control over the aging process. Based on other studies of gender differences in locus of control (Palmore and Luikart, 1972; Lopez and Staskiewicz, 1985), it had been hypothesized that men would be more internal in locus of control of aging than women. The explanation for this finding might possibly be found in role theory which recognizes that social roles played by males and females are dramatically different in that in most societies females are assigned roles that are regarded as less important than the roles assigned males, and women's efforts are not evaluated the same as men (Albrecht, Chadwick, and Jacobson, 1987). These differences in evaluations are evident in a thesis that has been called the double standard of age (Bell, 1970; Sontag, 1972). This double-standard thesis is not that women are seen to age faster or earlier than men, but that women's aging *matters* more than men's because of the importance placed on the appearance of women in this society, that is, appearance has been more important to women's life chances than

to men's in this society (White, 1988). For example, women's wrinkles are seen to make them sexually unattractive, whereas men's attractiveness can survive wrinkles and loose skin. Karp and Yoels (1986) argue that from childhood on females are socialized to place a great deal of emphasis on their physical appearance. Women lose "value" as they age because of the declining "worth" of their physical appearance. Men, however, can gain in status as they age through their success at work (Karp and Yoels, 1982). They conclude that the aging process has indeed affected the lives of men and women in American society in different ways (Karp and Yoels, 1986).

It has been argued that women in Western societies are victims of evaluation in terms of only one standard of beauty--that of a young woman (Sontag, 1972). On the other hand, standards of appearance used for evaluating men change as they age, with the term "distinguished looking" used to describe successful older men. It seems possible then, that the struggle for women to conceal their aging might make aging more salient for women than for men. This explanation draws on the idea of psychological centrality within symbolic interactionism which implies that the impact of a variable depends on its importance as a social identity element (Kiecolt, 1988). The effect of the centrality of aging for women might conceivably lend itself more to a sense of control. Furthermore, the fact that there are more older women than men and therefore more role models, and that women are usually more evident as the caretakers, might also predispose women to more perceived control over aging.

In addition to the emphasis on the gender difference in the importance of physical appearance and how that contributes to a double standard of age, it is also proposed that work and career influences aging (Karp and Yoels, 1986). Work is important in structuring the ways we think about the present and how we anticipate the future, which consequently makes work a primary source of our sense of aging (Sarason, 1977). A career can be a framework for interpreting where we are in the life cycle, for evaluating our performance to a certain point, and for previewing our likely future. The extent to which the different career patterns of men and women contribute to the different aging experiences is an important question (Sarason, 1977). Again, a role theory of aging suggests that persons have a full set of instrumental and social roles during the productive adult years; it views aging primarily as a process of role acquisition, role transition, and role loss (Gove,

Ortega, and Style, 1989). While a role theory might have predicted that men, with their more extensive networks and opportunities for engaging in experiences leading to higher self-efficacy, would have more of a sense of control of aging, it could also explain why women appear to have more perceived control. Riley and Riley (1986) argue that not only are new roles for women envisioned in the future, they have already been manifested.

> Women have provided evidence of the process of cohort-norm formation, as many women in the young-adult cohorts have responded to common social changes by making separate but similar personal "decisions" to move in new directions--to continue their education, to combine marriage and child care with participation in the labor force, to structure families in innovative ways. ...[Women] are performing traditional roles in the home, and at the same time forging new ones in the work place. They are striking delicate balances between the demands of family and the pressures of a job.... No similar course in socialization has been offered to men, many of whom seem to be lagging behind. (p. 67)

This seems to be evidence for role theory's emphasis on multiple roles increasing one's understanding of many situations. In addition, many women in mid-life are beginning graduate work or new careers after rearing a family or balancing with family roles, possibly leading them to perceive new role acquisitions and less role loss, and presumably, more of a sense of control over aging.

Another explanation for the gender difference in perceived control of aging may lie in the differences in social support. Most studies indicate that women's social support networks are more available, more supportive, and more intensive (Feiring and Coates, 1987; House, 1987). One study of social support among older men and women (Antonucci and Akiyama, 1987) concludes that women's networks are better equipped to cope with problems of major current societal changes; further, the support networks of men appear more fragile, and men may have more difficulty coping with the kinds of stresses most likely to be met with the current societal changes.

In addition, studies suggest that persons with higher levels of education and income generally have larger networks, more organizational involvements, and more frequent contact with network members (House, 1987).

In summary, then, the main hypotheses, that social structural variables have an effect on perceived control of physical aging as well as exercise behavior, were supported by these data. Considering the preliminary nature of this study, it is felt that the social structure and personality paradigm was a good choice as a starting point for investigating this topic. The results indicate that the significant social structural predictors of perceived control of aging persist across the self-related

variables. The data from this study seems to be more supportive of a role theory than a maturational one in several ways. First, role theory would emphasize how higher levels of education may lead to more perceived control through its association with feelings of self-determination, through breadth of perspective, and possibly through both larger networks and more frequent contact with network members, and greater organizational involvement. Second, a role theory explanation for the gender difference might be that the importance of appearance to the roles women play plus the positive effect of women's multiple roles and more intense network involvement may lead to more perceived control than for men even though men's networks appear broader and their roles appear to lead to higher self-efficacy. Role theory might also explain the effect of increased age on locus of control of aging and on perceived control over the physical aspects of aging in terms of role loss. However, the maturational perspective might possibly explain the finding that increased age is associated with perceived control of psychological aspects of aging. Overall, role theory seems to be a viable explanation and certainly worthy of consideration in any future study of this topic.

Of the self-related variables, self-efficacy was also a strong predictor of an internal locus of control of aging (Table 3), as well as a predictor of the physical, psychological and social aspects of aging analyzed separately, and perceived health. While the self-related variables increased the explanation of the variation of locus of control of aging from 8% to 22%, there remains a lot left unexplained. In addition to determining explanations for the gender difference, it would also seem worthwhile to investigate other aspects of the self-concept in order to gain a more complete picture of what contributes to a perceived control of the aging process. Hopefully, this might lead to more intervention in the area of aging in order to bring about a restructuring of the aging reality. I agree with George Maddox in his view of the revolution of expectations for aging presented at an aging conference at Virginia Tech in the spring of 1988. At that time he paraphrased a wellknown quote in saying, "What you see may be what you get, but it's not necessarily what you could get if you viewed things differently." This seems to be in agreement, also, with Riley (1979) who concludes that in social policy, focus needs to be on "preventative optimization and not only on alleviation." In the case of aging, the implication is that the focus for intervention is not necessarily on the aged. On the assumption that aging is a life-long process involving anticipatory socialization,

much of social policy concerning aging needs to be directed to younger age groups. With an increase in the availability of preventive and restorative approaches to aging, the possibility that aging need not be a prospect to be dreaded and less rewarding than youth becomes increasingly realistic. The results of this study also suggest that the majority of people believe that various aspects of aging are within their own personal control.

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Appendix A. Survey Questionnaire

VIRGINIA TECH

October 5, 1988

Dear Virginia Tech Colleague:

I would like to invite your participation in a study concerning exercise and health. The number of people exercising and concerned with health is increasing in the United States. Our health habits have become a national concern as our population continues to grow older. The attached questionnaire asks about your attitudes and opinions concerning health habits, aging and life in general. It should take you no more than about 10 minutes to complete. If there is a question which you feel uncomfortable answering, you may omit it.

You may be assured of complete confidentiality. There is no way to identify individuals who have or have not participated. However, in order to represent the faculty and staff adequately, it is important that each questionnaire be completed and returned.

I would be most happy to answer any questions you might have about this study. I may be reached at (703) 989-4403 or at the address given below.

After you have completed the questionnaire, please return it by October 14 through campus mail to the Department of Sociology, 667 McBryde Hall. Thank you for your assistance.

Sincerely,

Judith H. Freeman

Judith H. Freeman
Sociology Department
Virginia Polytechnic Institute
Blacksburg, Virginia 24061

A SURVEY ON HEALTH, EXERCISE AND AGING

I. Physical Health Rating

First, I would like to ask you some questions about your physical health.

Q-1. How would you rate your overall physical health at the present time? (Circle one.)

1. Poor
2. Fair
3. Good
4. Excellent

Q-2. Is your physical health better, about the same or worse than it was three years ago? (Circle one.)

1. Better
2. Same
3. Worse than

Q-3. How often do health problems prevent you from doing things you want to do? (Circle one.)

1. Never
2. Rarely
3. Sometimes
4. Always

Q-4. Would you say that your health is better, about the same, or not as good as most people your age? (Circle one.)

1. Better
2. Same
3. Not as good

Q-5. On a scale from 0 to 10, how satisfied are you with your current health? (Circle one.)

NOT SATISFIED AT ALL										PERFECTLY SATISIFED
0	1	2	3	4	5	6	7	8	9	10

II. Routine Activity and Exercise Habits

Next, I would like to ask you some questions about your routine daily activity and about the ways you typically exercise.

Q-6. Which of the following best describes your routine work activity during a typical work day? (Circle your answer.)

1. Light (Desk work, activity less than the equivalent of climbing 10 flights of stairs or less than one mile of walking per day)

2. Moderate (Housework, light construction work, activity roughly equivalent to climbing 10-20 flights of stairs or 1-2 miles of walking at a moderate pace per day)

3. Strenuous (Heavy construction, activity roughly equivalent to climbing over 20 flights of stairs or 1-2 miles of walking at a fast pace per day)

Q-7. How many days per month do you engage in moderate exercise (for example, cycling, tennis/badminton singles, skating, walking at a moderate pace)? (Write in your answer in the space provided.)

_____days per month.

Q-8. How many days per month do you engage in strenuous exercise (for example, jogging, swimming, climbing stairs, calisthenics)?

_____days per month.

If you do not engage in exercise at least once every 2 weeks, go to question 12.

Q-9. When you engage in exercise, how long do you usually keep at it?

1. less than 30 minutes
2. between 1/2 and 1 hour
3. about 1 hour
4. between 1 and 2 hours
5. more than 2 hours

Q-10. People exercise for different reasons. Please circle YES or NO to indicate the reasons which do or do not apply to you.

		Do you exercise ...	
a.	To maintain cardiovascular (heart) fitness?	Yes	No
b.	To control weight?	Yes	No
c.	To make yourself feel better?	Yes	No
d.	To slow down the aging process?	Yes	No
e.	To make yourself look better?	Yes	No
f.	Because it's a habit?	Yes	No
g.	Because your friends exercise?	Yes	No
h.	To meet new people/make new friends?	Yes	No
i.	For the challenge of competition?	Yes	No

Q-11. What is the MAJOR reason that you exercise?_____

_____

III. Beliefs and Attitudes about Aging and Health

Below are some statements frequently made about various aspects of aging and exercise.

Q-12. For each statement circle the answer that you believe to be correct.

a.	The vast majority of people over 65 are healthy enough to carry out their normal activities.	True	False
b.	As people grow older, reaction time tends to be slower.	True	False
c.	A physical exercise program increases how long people live.	True	False
d.	All five senses (smell, touch, eyesight, hearing, taste) tend to decline in old age.	True	False
e.	The majority of elderly people are socially isolated and lonely.	True	False
f.	A person's height tends to decline in old age.	True	False
g.	A good exercise program reduces one's risk of heart attacks.	True	False
h.	Older workers have more injuries in the home than persons under 65.	True	False
i.	Lung capacity tends to decline as you grow older.	True	False
j.	Older workers have less absenteeism than younger workers.	True	False
k.	Most elderly people are set in their ways and unwilling to change.	True	False
l.	Older persons who reduce their activity tend to be happier than those who remain active.	True	False

IV. General Outlook on Life

Next, I would like to know some things about your general outlook on life.

Q-13. To what extent do you agree or disagree with each of the following statements? (Circle your opinion for each statement)

a)	Whether my health decreases as I age is mostly up to me.	Strongly Agree	Agree	Disagree	Strongly Disagree
b)	I avoid trying to learn new things when they look too difficult for me.	Strongly Agree	Agree	Disagree	Strongly Disagree
c)	How I grow old is determined by heredity and there is very little that I can do about it.	Strongly Agree	Agree	Disagree	Strongly Disagree
d)	When I make plans, I am certain I can make them work.	Strongly Agree	Agree	Disagree	Strongly Disagree
e)	Being healthy and active as one ages is largely a matter of good fortune.	Strongly Agree	Agree	Disagree	Strongly Disagree
f)	Failure just makes me try harder.	Strongly Agree	Agree	Disagree	Strongly Disagree
g)	I feel insecure about my ability to do things.	Strongly Agree	Agree	Disagree	Strongly Disagree
h)	I am a self-reliant person.	Strongly Agree	Agree	Disagree	Strongly Disagree
i)	I do not seem capable of dealing with most problems that come up in life.	Strongly Agree	Agree	Disagree	Strongly Disagree
j)	If I take care of myself and get enough exercise, I can slow down the deterioration associated with aging.	Strongly Agree	Agree	Disagree	Strongly Disagree

Q-14. Taken all together, how satisfied are you with your life? (Circle one.)

1. Not very satisfied
2. Somewhat satisfied
3. Pretty satisfied
4. Very satisfied

Q-15. How often do you feel in low spirits or depressed? (Circle one.)

1. Never
2. Rarely
3. Occasionally
4. Fairly often

Q-16. On a scale from 0 to 5, how much do you think you can personally control the following aspects of aging?

		Not at All					A Great Deal
a)	Cardiovascular (heart) fitness	0	1	2	3	4	5
b)	Physical endurance and muscular strength	0	1	2	3	4	5
c)	Susceptibility to disease	0	1	2	3	4	5
d)	Keeping alert	0	1	2	3	4	5
e)	Maintaining a positive outlook	0	1	2	3	4	5
f)	Maintaining feelings of self-reliance and independence	0	1	2	3	4	5
g)	Maintaining close relationships with people you care about	0	1	2	3	4	5
h)	Recovering from the death of a loved one	0	1	2	3	4	5
i)	Recovering from a loss of income	0	1	2	3	4	5

Finally, I would like to ask some questions about yourself to help interpret the results of this survey.

Q-17. Your age: _____ years

Q-18. Your sex: (Circle the number of your answer.)

1. Male
2. Female

Q-19. Your current marital status:

1. Never married
2. Now married
3. Separated
4. Divorced
5. Widowed

Q-20. Do you have children?

1. No
2. Yes → How many? _____

Q-21. How often do you attend religious services?

1. Never
2. Several times a year
3. About once a month
4. Every week
5. Several times a week

Q-22. What is the last grade or year of school you have completed?

1. 8th grade or less
2. Some high school
3. High school graduate
4. Trade school or associate degree
5. Some college
6. College graduate
7. Graduate or professional degree

Q-23. Are you a faculty or staff member, or are you a laborer here at Virginia Tech?

1. Faculty
2. Staff → What type of work do you do?_____
3. Laborer → What type of work do you do?_____

Q-24. What is the best estimate of the total income last year of your family? Consider annual income from all sources before taxes. (Circle your answer.)

1. $4,999 or less
2. $5,000 - $9,999
3. $10,000 - $14,999
4. $15,000 - $19,999
5. $20,000 - $29,999
6. $30,000 - $39,999
7. $40,000 - $49,999
8. $50,000 - $74,999
9. $75,000 or more

When you have finished, please return the questionnaire through campus mail to the Department of Sociology, 667 McBryde Hall. Thank you for your help on this project!

Appendix B. Tables

Table 1

Variables, Coding and Summary Measures

Variable	Codes	Total (n = 517)
Exogenous Variables:		
Age	1 12-20	2.0%
	2 21-29	20.5%
	3 30-39	31.6%
	4 40-49	25.5%
	5 50-59	11.8%
	6 60-69	2.3%
		$\bar{X}$ = 3.418
Gender	0 Female	40.1%
	1 Male	59.3%
		$\bar{X}$ = .59
Family Income	1 $ 4,999 or less	.7%
	2 $ 5,000 - $ 9,999	3.6%
	3 $10,000 - $14,999	9.6%
	4 $15,000 - $19,999	10.3%
	5 $20,000 - $29,999	12.4%
	6 $30,000 - $39,999	13.6%
	7 $40,000 - $49,999	14.1%
	8 $50,000 - $74,999	17.7%
	9 $75,000 or more	14.9%
		$\bar{X}$ = 6.116
Education	1 8th grade or less	3.8%
	2 Some high school	5.3%
	3 High school graduate	15.2%
	4 Trade school or associate degree	6.3%
	5 Some college	10.6%
	6 College graduate	18.0%
	7 Graduate or professional degree	39.6%
		$\bar{X}$ = 5.366
Occupation	1 Professional, faculty, and managers and administrators	39%
	0 All others	61%
		$\bar{X}$ = .422
Marital Status	1 Now married	66.4%
	0 All others	33.6%
		$\bar{X}$ = .658

Table 1 (Continued)

Variables, Coding and Summary Measures

Variable	Codes	Total (n = 517)
Endogenous Variables:		
Perceived Health Status	1 = Poor	.3%
	2 = Fair	14.1%
	3 = Good	57.5%
	4 = Excellent	28.0%
		$\overline{X}$ = 3.1%
Knowledge of Aging	10-item quiz (% correct)	$\overline{X}$ = 70%
Self-efficacy	6-item scale	
	Lo 1.5	33.2%
	Hi 4.0	66.8%
		$\overline{X}$ = 3.07
Belief in Health Benefits of Exercise	2 items (0 - 2)	$\overline{X}$ = 1.83
Locus of Control of Aging	4-item scale (1 - 4)	
	External	26.3%
	Internal	73.7%
		$\overline{X}$ = 3.092
Control of Physical Aspects	0 = Not At All	.5%
	1	.4%
	2	10.1%
	3	39.4%
	4	41.6%
	5 = A Great Deal	6.0%
		$\overline{X}$ = 3.771
Control of Psychological Aspects	0 = Not At All	0.4%
	1	0.7%
	2	3.5%
	3	23.0%
	4	55.8%
	5	14.6%
		$\overline{X}$ = 4.15
Control of Social Aspects	0 = Not At All	0.4%
	1	1.3%
	2	10.1%
	3	38.2%
	4	34.2%
	5	13.7%
		$\overline{X}$ = 3.82
Exercise Behavior	(Days of Strenuous Exercise + Days of Moderate Exercise)/2	$\overline{X}$ = 10.53

Table 2

Mean Values for All Dependent Variables by Level of Each Social Structural Variable

	A	B	C	D	E	F	G	H	I
Age									
< 35	3.15*	3.77	4.08	3.74	3.10	3.05*	10.66	1.82	.68
> 35	3.04	3.72	4.11	3.79	3.06	3.19	10.43	1.83	.70
Gender									
Female	3.14*	3.75	4.15	3.79	3.01*	3.10	10.23	1.81	.69
Male	3.04	3.74	4.07	3.76	3.12	3.16	10.71	1.84	.69
Education									
≤ High School Graduate	2.92*	3.40*	3.95*	3.62*	2.92*	2.94*	9.97	1.75*	.63*
> High School	3.14	3.85	4.15	3.82	3.13	3.20	10.69	1.85	.71
Income									
≤ $40,000	3.05*	3.65*	4.04*	3.71	3.03*	3.02*	10.39	1.79*	.67*
> $40,000	3.12	3.83	4.16	3.82	3.12	3.25	10.52	1.87	.72
Occupation									
Nonprofessional	3.09	3.68*	4.10	3.75	3.02*	3.01*	10.73	1.79*	.67*
Professional	3.09	3.84	4.11	3.82	3.15	3.33	10.27	1.88	.72
Marital Status									
Not Married	3.13	3.78	4.09	3.78	3.08	3.07	10.47	1.83	.68
Now Married	3.06	3.72	4.10	3.77	3.07	3.16	10.57	1.82	.70

A = Locus of control of Aging,
B = Control of Physical Aspects,
C = Control of Psychological Aspects,
D = Control of Social Aspects,
E = Self-efficacy,
F = Perceived Health,
G = Exercise Behavior,
H = Belief in the Benefit of Exercise,
I = Knowledge of Aging.

*$p < .05$

Table 3

Standardized Partial Regression Coefficients for Locus of Control of Aging With Exogenous Variables

Variables	r	Model 1	Model 2
Age	-.179 *	-.1640 *	-.1127 *
Gender	-.142 *	-.1766 *	-.2084 *
Education	.134 *	.1685 *	.1311 *
Income	.048	.0736	.0184
Occupation	.001	-.0571	-.0778
Marital Status	-.044	-.0142	-.0026
Self-Efficacy	.339 *		.3191 *
Perceived Health	.114 *		.0251
Exercise Behavior	.125 *		.0808 *
Belief in Benefit of Exercise	.183 *		.1867 *
Knowledge of Aging	.051		-.0060
N = 517		R^2 = .0811	R^2 = .2232

*p < .05

Table 4

Standardized Partial Regression Coefficients for Control of Physical Aspects of Aging with Exogenous Variables

Variables	r	Model 1	Model 2
Age	-.076	-.0704	-.0349
Gender	-.042	-.1040 *	-.1235 *
Education	.214 *	.1984 *	.1716 *
Income	.138 *	.0971	.0562
Occupation	.112 *	-.0092	-.0414
Marital Status	-.016	-.0326	-.0253
Exercise Behavior	.105 *		.0575
Self-efficacy	.255 *		.2059 *
Perceived Health	.198 *		.1091 *
Belief in Benefit of Exercise	.205 *		.1886 *
Knowledge of Aging	.034		-.0441
N = 517		R^2 = .0651	R^2 = .1654

*p < .05

Table 5

Standardized Partial Regression Coefficients for Control of Psychological Aspects of Aging with Exogenous Variables

Variables	r	Model 1	Model 2
Age	.031	.0448	.1039 *
Gender	-.067	-.0959 *	-.1253 *
Education	.099 *	.1553 *	.1127
Income	.089 *	.0522	.0097
Occupation	.017	-.0815	-.1078
Marital Status	.033	.0090	.0092
Exercise Behavior	.064		.0123
Self-efficacy	.347 *		.3600 *
Perceived Health	.112 *		.0347
Belief in Benefit of Exercise	.057		.0540
Knowledge of Aging	.083		.0179
N = 517		R^2 = .0267	R^2 = .1562

*p < .05

Table 6

Standardized Partial Regression Coefficients for Control of Social Aspects of Aging with Exogenous Variables

Variables	r	Model 1	Model 2
Age	.000	-.0001	.0445
Gender	-.040	-.0620	-.0800
Education	.092 *	.0977	.0571
Income	.100 *	.1037	.0767
Occupation	.033	-.0592	-.0925
Marital Status	.009	-.0265	-.0329
Exercise Behavior	.019		-.0318
Self-efficacy	.287 *		.2810 *
Perceived Health	.133 *		.0841
Belief in Benefit of Exercise	.024		.0129
Knowledge of Aging	.067		.0213
N = 517		R^2 = .0199	R^2 = .1061

*p < .05

Table 7

Standardized Partial Regression Coefficients for Perceived Health with Exogenous Variables

Variables	r	Model 1	Model 2
Age	.039	.0110	.0446
Gender	.042	-.0492	-.0725
Education	.212 *	.1342 *	.1320 *
Income	.150 *	-.0344	-.0611
Occupation	.241 *	.1817 *	.1843 *
Marital Status	.087	.0799	.0846
Self-efficacy	.201 *		.1559 *
Belief in Benefit of Exercise	.066		.0489
Exercise Behavior	.177 *		.1623 *
Knowledge of Aging	.020		-.0610
N = 517		R^2 = .0723	R^2 = .1312

*p < .05

Table 8

Standardized Partial Regression Coefficients for Exercise Behavior with Exogenous Variables

Variables	r	Model 1	Model 2
Age	-.001	.0037	.0232
Gender	.023	.0332	.0313
Education	.008	.0372	.0135
Income	.009	.0219	.0157
Occupation	-.036	-.0814	-.1199 *
Marital Status	.017	.0142	.0023
Self-efficacy	.121 *		.1011 *
Perceived Health	.177 *		.1775 *
Belief in Benefit of Exercise	.011		.0095
Knowledge of Aging	-.025		-.0296
N = 517		R^2 = .0045	R^2 = .0498

*p < .05

Table 9

Standardized Partial Regression Coefficients for Self-Efficacy with Exogenous Variables

Variables	r	Model 1	Model 2
Age	-.141 *	-.1759 *	-.1897 *
Gender	.133 *	.0866	.0978 *
Education	.208 *	.0841	.0313
Income	.130 *	.1054	.1154 *
Occupation	.155 *	.0548	.0361
Marital Status	.002	.0001	-.0221
Belief in Benefit of Exercise	-.003		-.0409
Perceived Health	.201 *		.1579 *
Exercise Behavior	.121 *		.0936 *
Knowledge of Aging	.107 *		.0969 *
N = 517		R^2 = .0760	R^2 = .1204

*p < .05

Table 10

Standardized Partial Regression Coefficients for
Belief in Benefit of Exercise with Exogenous Variables

Variables	r	Model 1	Model 2
Age	.038	.0270	.0075
Gender	.040	.0122	.0237
Education	.100 *	.0324	.0035
Income	.115 *	.1099	.1181
Occupation	.102 *	.0276	.0220
Marital Status	-.019	-.0772	-.0861
Self-Efficacy	-.003		-.0451
Perceived Health	.066		.0545
Exercise Behavior	.011		.0097
Knowledge of Aging	.097 *		.0821
N = 517		R^2 = .0216	R^2 = .0309

Table 11

Standardized Partial Regression Coeffieients for
Knowledge of Aging with Exogenous Variables

Variables	r	Model 1	Model 2
Age	.107 *	.1323 *	.1484 *
Gender	.026	-.0626	-.0742
Education	.255 *	.3038 *	.3025 *
Income	.166 *	-.0217	-.0420
Occupation	.166 *	-.0126	-.0110
Marital Status	.081	.0534	.0646
Self-Efficacy	.107 *		.0986 *
Perceived Health	.020		-.0628
Exercise Behavior	-.024		-.0279
Belief in Benefit of Exercise	.097 *		.0759
N = 517		R^2 = .0888	R^2 = .1050

*p < .05

Table 12

The Total, Direct and Indirect Effects of Social Structural Variables on Locus of Control of Aging

Exogenous Variable	Total	Direct	Indirect	Spurious & Unanalyzed causal Effect*
Age	-.179	-.164	-.051	.036
Gender	-.143	-.177	.032	.002
Education	.134	.169	.037	-.072
Income	.048	.074	.055	-.081
Occupation	.001	-.057	.021	.037
Marital Status	-.044	-.014	-.011	-.019

*Unanalyzed causal effects refer to the effects that are transmitted through two or more endogenous variables. The absolute value of these unanalyzed effects should be small given the multiplications of the paths. For example, the indirect effect of age on control of aging through self-efficacy, and in turn, self-efficacy's effect on control of aging through perceived health is one of these unanalyzed causal paths.

Vita

of

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December 18, 1989

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