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AGE, SOCIOECONOMIC STATUS AND THE STRESS PROCESS

by

John Cairney

Graduate Program
in
Sociology

Submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

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ABSTRACT

Although a substantial body of research has examined the relationship between socioeconomic status and morbidity and mortality, less work has examined whether or not the relationship varies with age. A small body of work has demonstrated the importance of examining socioeconomic status differences in physical health across the life span. It remains unclear, however, whether the same is true for psychological well-being.

This dissertation consists of four papers that examine the influence of age on the relationship between socioeconomic status and some of the major components of the stress process model. The first paper examines whether age moderates the relationship between socioeconomic status and psychological distress. A similar question is addressed in the second paper but considers mastery as the dependent variable. The third paper assesses whether age influences the relationship between socioeconomic status and three separate measures of stress (life events, chronic strains, and childhood adversities). The fourth paper responds to researchers who call for more attention to the influence of age on the entire stress process. Interactions between age and each of the major components of the stress process model are tested to assess whether or not age moderates the relationship between each of these components and psychological distress.

It appears that age is indeed an important moderator of each of the relationships between socioeconomic status and both mastery and social stress. The socioeconomic gap in both mastery and social stress declines across age groups. Conversely, the socioeconomic gap in psychological distress remains constant with age. Age, however,

does not moderate the relationship between each of the major domains of the stress process model and psychological distress.

This dissertation has made an important contribution to the field by attending to two central stratification processes - age and socioeconomic status. The findings of this dissertation support the theoretical argument that position in the social structure is best conceptualized in terms of interlocking hierarchies of stratification rather than separate measures of social status. Although age and socioeconomic status are not the only systems of stratification, it is clear that they have important influences on mastery and stress. However, I find no evidence that interlocking systems of stratification better predict psychological distress. In terms of age and socioeconomic status, income and education gaps in distress remain constant across the life course.

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CHAPTER ONE

INTRODUCTION

The relationship between socioeconomic status and illness has been recognized for hundreds of years (Kaplan and Keil 1993; Lynch, Cohen, Tuomilehto and Salonen 1996). Whether socioeconomic status is measured using income, occupation or education, and whether illness is measured in terms of mortality or morbidity, the relationship between socioeconomic status and ill health has been documented across different time periods and countries (Townsend and Davidson 1982; Kaplan and Keil 1993; Kunst and Mackenbach 1994; Lynch et al. 1996; Mackenbach et al. 1997). The findings of this work suggest not only that individuals from lower socioeconomic status groups suffer higher levels of illness, disability and premature mortality, but that the association between socioeconomic status and illness is gradational (Wilkinson 1996). In fact, there is a "fine grade" of socioeconomic status and illness, as demonstrated in studies such as the Whitehall Study where differences within groups in disease and illness have been documented. In this study of middle class, white collar civil servants in Britain, occupational hierarchies within the civil service produced a social gradient in health similar to the social gradients observed across entire populations (van Rossum, Shipley, van de Mheen, Grobbee and Marmot 2000). It seems that hierarchical systems of social organization, no matter how slight, exert a negative impact on health and well-being.

While some proponents of the social causation perspective argue that the material conditions of poverty best account for health disparities across social and economic groups, the work of Wilkinson and others has re-invigorated an interest in the

psychosocial determinants of health, especially those factors associated with power and social integration. In fact, while this perspective is touted as relatively new, or at least fashionable again in the British and European literature (e.g. Stronks, van de Mheen, Looman and Mackenbach 1998), North American sociologists, particularly those working in the area of mental health, have been examining the role that psychosocial factors play in accounting for social structural differences in well-being for the past couple of decades. Similar to the physical health literature, sociologists and others have documented social class and socioeconomic status differences in psychological distress and a wide variety of diagnosable disorders (Dohrenwend and Dohrenwend 1969; Faris and Dunham 1939; Hollingshead and Redlich 1958; Kessler et al. 1994; Turner and Lloyd 1999).

Although the demonstration of social and economic disparities in mental well-being has been an important and fruitful entry point for sociologists into the study of mental health (a field dominated by individually oriented disciplines like psychology and psychiatry), it has certainly not been an endpoint. Sociologists of mental health have sought to elucidate the linkages between position in the social structure of our society and individual psychology. Traditionally, this has involved examining the mental health consequences of occupying specific social statuses (based upon educational attainment for example) and roles (e.g. factory worker). One of the most influential theories to emerge from this effort is the stress process model. Although the credit for development of the model resides with several individuals who published important first works within the same time period (e.g. Billings and Moos 1982; Lazarus, Kanner and Folkman 1980), Leonard Pearlin and his colleagues are generally regarded among sociologists as the

progenitors of this model (Pearlin, Lieberman, Menaghan and Mullan 1981; Pearlin 1989; 1999). In fact, since the early 1980s, literally hundreds of articles have been published (cf. Thoits 1995).

Pearlin's unique contribution is his emphasis on the social origins of stressors and stressful events. In a seminal article (Pearlin 1989), he argues that a key role that sociologists can play in understanding the mental health effects of exposure to stress is to delineate how the structure of everyday life and the social positions that people occupy influence mental well-being. The sociologist can apply a perspective that considers stress as embedded in the very fabric of our social structure. This also leads to a focus on those in society most vulnerable to the potential stressors of social organization - those in poverty, women and the aged. It is here, of course, that sociologists working with the stress process model meet their colleagues in the field of social epidemiology. Their shared focus is on the health consequences of socioeconomic disadvantage. It is also here that sociologists can aid in the development of theory in social epidemiology. Specifically, the importation of sociological theories that link social organization to health and well-being can ensure that what social epidemiologists have traditionally thought of as "risk factors" (e.g. poverty status, educational attainment) can be placed within the broader context of social structure.

1.1 Risk Factor Analysis and the Contextualization of Health Risks

Most epidemiologic research has been narrowly focused on individuals as the most appropriate level of analysis to understand the etiology of disease processes (see Rose 2001; Schwartz and Carpenter 1999; Diez-Roux 1998 for discussions). Indeed, the

very designs most commonly used in epidemiologic research -- case-control and cohort designs -- can only detect individual level differences between those diagnosed with a particular condition (cases) and those who do not (controls) (Rose 2001). Because epidemiology has focused on individual level-risk factors, aspects associated with the social environment have tended to be either neglected at best or dismissed completely at worst. Link and Phelan (1995) argue that the over-attention paid to what they call the proximate risk factors of disease as opposed to the more fundamental causes of illness and disease has hindered not only research, but also public health interventions. Their argument is straightforward; if we focus only on those risk factors most proximate to health outcomes in a causal model (e.g. behavioral factors like smoking), we fail to consider the enduring social structures that condition exposure to these risk factors. Stated somewhat differently, Link and Phelan (1995) challenge us to consider what puts individuals at risk of those very factors epidemiologists currently treat as risks for disease. From a sociological perspective, their paper is simply a call for attention to the social context in which individual behaviours occur. Because epidemiologists tend to focus on individual-level differences, the social structures that condition behaviour are frequently ignored.

Link and Phelan (1995) define social conditions as resources that allow individuals to protect themselves from potentially damaging elements in the social environment, particularly those associated with social and economic deprivation. Although it is clear that Link and Phelan recognize social inequality as the basis for the differential distribution of disease and illness in society, and that they conceive of

inequalities in a much broader sense than simply income, it is not explicit in their work how different systems of inequality are linked together. Stated differently, while these authors regard gender and socioeconomic status as measures of hierarchical social structures, they do not explicitly explain how these statuses interact to produce differential health outcomes. Nevertheless, the attention they direct toward contextualization of individual risk factors at least sensitizes researchers to the nature of social structure. The fact that there are several social status positions that signify "systems" of inequalities (e.g. age and socioeconomic status) requires considering how occupying multiple social categories influences life circumstances.

1.2 Additive versus Interactive Risk Factor Models

Individuals do not occupy single demographic categories, yet most social epidemiologic research focuses on the additive relationships between individual risk factors and health outcomes. An impressive mass of research has documented relationships between socio-demographic risk factors such as socioeconomic status, gender, martial status and health. Indeed, documenting the effect of these variables on health has become the mainstay of population health research. Virtually all of this work, however, uses a similar, analytic and conceptual approach to the study of social differences in health. First, the population is categorized into social groups usually based on income, education, occupation or by gender, age or marital status. Next, differences in the prevalence of disease are documented across one or more of these categories; this, in fact, is considered evidence of social differentials in illness and disease. Sometimes, multivariate statistical models are used to document, for example, income differences in

disease while controlling for other factors simultaneously (e.g. age and/or gender). The implicit assumption in this last approach is that the variable of interest (income) is a master status. In other words, income differences in a particular outcome, net of other factors, suggest that economic factors rather than gender or age are the most important social determinants of illness. To be poor, regardless of age and sex, increases the likelihood of ill health.

Although it is important to better understand how specific aspects of social structure influence health and well-being, we must also recognize that this approach tends to obscure the fact that master statuses are problematic in societies organized hierarchically by a number of different factors. In other words, inequality is not linked to single or master statuses, but multiple, interacting positions. Societies are not only stratified by income, education and occupation, but by gender, age and race also. People do not occupy single social positions, but multiple ones. Social structure, then, is not defined by socioeconomic status, it is also made up of these other bases of inequality.

In fact, this is not a new idea in sociology; however, relatively little work explicitly makes reference to the fact that social status is multiplex. Work that is contrary to this general trend can be found in the sub-fields of medical sociology and social gerontology. One example concerns the double or multiple-jeopardy hypothesis. In this work, sociologists have been interested in examining the mental and physical health consequences of occupying two or more disadvantaged social positions (e.g. Clark and Maddox 1992; Dowd and Bengtson 1978; Ferraro and Farmer 1996; Markides, Timbers and Osberg 1984). Most of this work has focused on age and race and the interactive

effect these two measures of social position have on mortality and morbidity. From a conceptual point of view, the importance of this work lies in the explicit recognition that the experience of old age is not uniform across other social categories. Rather, there is an important intersection between variables like age and race/ethnicity that leads to unique structural disadvantages. Quite simply, to be old is to be generally disadvantaged in Western society. In a country such as the United States, where most of this work has been conducted, to be old and black is to occupy a more precarious position than that of an old, non-Hispanic Caucasian person. Multiple jeopardy is used in this context to recognize the fact that the systems of inequality (e.g. gender, socioeconomic status, race) operate simultaneously to sift and sort individuals into hierarchies. These hierarchies, in turn, lead to the differential distribution of health and well-being characteristic of modern societies.

In the sociology of aging literature, McMullin (1995, 2000) has also discussed the theoretical importance of considering intersecting systems of social inequality. She uses the relationship between gender and social class as the starting point for her argument. Many feminist scholars argue that sociology's traditional concern with the study of the impact of social class on personal circumstances disregards the fact that modern, western societies are patriarchal. Therefore, the influence of social class on determining access to resources like wealth is different for men than women. Lower class women, unlike men, suffer the double disadvantage of living in both a patriarchal and a capitalist system where social advantages are distributed on the basis of gender and socioeconomic status. Building upon this perspective, McMullin argues that sociologists need to reformulate current social gerontological theory to include age as another important component of

social structure. Using the concept of wage (in terms of the participation in the paid labour market) as a focal point, she asks, while it is commonly known that women earn less than men, does this not also vary by age? The argument is that gender, labour market status and age interact to determine the size of the wage that a person will receive. McMullin argues (1995) that we must theorize about how all of these social structures influence personal circumstances simultaneously, rather than simply focusing on one aspect of social stratification such as social class.

Together, the multiple jeopardy hypothesis and McMullin's (1995) theoretical work suggest a new direction for sociologists interested in understanding the social determinants of health and well-being. Since our concern is with the social structural determinants of illness and disease, we must attend to how individuals are organized within the structure of modern society. We must recognize that this structure is multiplex and therefore we must consider the health consequences of occupying multiple statuses.

The papers in this dissertation contribute to a better understanding of the ways in which measures of social position interact to influence well-being. Unfortunately, the questions that interest researchers are not always accompanied by sufficient data sources from which to evaluate the adequacy of theoretical propositions. Analyses of interactive models require sufficiently large databases with representative samples of the population under consideration to allow for multiple social groupings based upon the aforementioned attributes (ascribed and achieved). In Canada, such databases are frequently collected and administered by our central statistical gathering organization - Statistics Canada. As a government organization, they are subject to restrictions that other

non-governmental research institutions are not. Most notably, in the interest of ensuring confidentiality, Statistics Canada does not release complete information on race and ethnicity for public use. Therefore, the focus in this dissertation will be on the interactive effect of age and socioeconomic status (measured by income and education) in predicting some key components that sociologists have found essential in the study of health and well-being.

While race and ethnicity are not available in these data and therefore excluded from the analyses, the question of focusing on age and socioeconomic status rather than some other basis of inequality such as gender requires some explanation. Gender, of course, is available in the Statistics Canada databases and although it is not one of the core systems of stratification examined in this dissertation, the issue of gender has been addressed empirically if not theoretically in several ways. First, all multivariate analyses include gender as a control variable. Second, and more directly, all analyses test for the possibility that age by socioeconomic interactions in outcomes may be different for women than for men. This involves testing for a second-order three-way interaction among gender, age , socioeconomic status and a particular outcome (e.g. mastery). There were no significant three-way interactions in these data. This, of course, in no way minimizes the importance of gender as a predictor of psychological well-being. Rather, the focus on age variations in socioeconomic status reflects the challenges associated with analyzing interactive relationships between measures of social position. As demonstrated in these papers, any attempt to examine the joint consequences of occupying just two status positions substantially increases the degree of complexity in analyses and

interpretation. Thus, while our theory may point us in the direction of multiple, intersecting bases of social inequality, the sheer complexity of analyses force us to be more limited in the relationships we seek to better understand.

In addition to the challenges and complexities of analysis, the importance of age variations in the relationship between socioeconomic status and health has been brought into prominence by the publication of several recent papers that demonstrate important changes in the socioeconomic gap across age groups (see House et al. 1992; 1994; Ross and Wu 1996) (see below). Understanding age stratification processes, therefore, is a recognized and significant task in its own right for sociologists. Given the long standing interest in the relationship between income, education and health, the next logical progression in the field is to understand how this relationship may be conditioned by other factors. As the age structure of our society continues to change (Moore and Rosenberg 1997), it is important to consider how age will influence some of our most fundamental social predictors of health and well-being. It is on this challenge that I have chosen to focus my work.

1.3 Age and Socioeconomic Status: Toward an interactive model of the social determinants of health

Although a substantial amount of research has examined the relationship between socioeconomic status and morbidity and mortality, less work has examined whether or not the relationship varies with age. In the literature in medical sociology, an important body of work has demonstrated the importance of examining socioeconomic status differences in health across the life span (House et al. 1990; 1992; 1994; Ross and Wu

1996). This work has focused exclusively on physical health, leaving the question of whether these findings are applicable to mental health outcomes open to further inquiry (Krause 1999). In fact, during the course of the writing of this dissertation, only one article that examined the question of age by socioeconomic status interactions with psychological distress was published (Miech and Shanahan 2000). Prior to this article, only Krause's (1999) call for more work in this area was to be found in the extant literature.

The influence of age on the relationship between socioeconomic status and psychological outcomes like distress provides yet another way of connecting the sociology of mental health and sociology of aging. In a recent paper, I argued, following the work of Robert and House (1996), that a greater understanding of the relationship among age, socioeconomic status and health (broadly defined) has been hindered by a failure to merge work in social gerontology with findings from medical sociology (Cairney 2000). This is especially true regarding work in the sociology of mental health (but see Pearlin and Skaff 1996). As noted above, for decades, sociologists of mental health have examined the mental health consequences of social stratification However, this work has, for the most part, neglected age as a significant factor in predicting psychological distress and depression (but see Mirowsky and Ross 1992; Wade and Cairney 2000; Schieman 2001). In most of the research literature in the sociology of mental health, age appears as a control variable only. The implicit assumption underlying this work is that age has no impact on the relationship between socioeconomic status and

mental well-being[1]. Conversely, gerontologists, while interested in age differences in mental health outcomes like depression, tend not to be as concerned with the impact of social structure on personal well-being. Rather, socioeconomic status variables like education and income are effects that need to be partialled out (controlled). The implicit assumption in this work is that the relationship between age and psychological distress/disorder is unaffected by position in the social structure. While sociologists have long argued that age is a fundamental organizing principal of social relations, how more common sociological measures of social structure (e.g. income, education and occupation) are theoretically linked to age is still relatively underdeveloped in the sociology of aging and health literature.

1.4 The organization of the dissertation

The following work is a collection of four papers that reflects my research over the past three years on the influence of age on the relationship between socioeconomic status and some of the major components of the stress process model. In the papers that follow, I consider the interactive effect of age and socioeconomic status in predicting three important components of the stress process as conceived by Pearlin and his colleagues (Pearlin 1989; Turner and Lloyd 1999). The final paper examines the overall

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[1] This may be due in part to a lack of data available to study differences in mental health outcomes across the entire life-span. Many recent, large-scale community surveys that examine psychiatric disorders simply do not sample individuals over the age of 65 (for example, the Toronto Co-morbidity Study (Turner, Wheaton and Lloyd 1995), the National Co-morbidity Study (Kessler et al. 1994), the Ontario Mental Health Supplement (Boyle, Offord, Campbell, Catlin, Goering, Lin and Racine 1996), to name only a few, do not sample older adults).

contribution of age to a more complete model of the stress process. A detailed description of each work is offered below.

The first paper examines whether age moderates the relationship between socioeconomic status and psychological distress. A small body of work has focused on the relationship between age and depressive symptomotology (i.e. psychological distress) (Kessler et al. 1992; Mirowsky and Ross 1992; Schieman 2001; Wade and Cairney 1997) and a large body of work has established the importance of socioeconomic factors (see Link and Phelan 1995; Turner, Wheaton and Lloyd 1995). Very few studies, however, have examined whether the relationship between socioeconomic status and psychological distress varies with age (Miech and Shanahan 2000). Toward this objective, I determine whether there is a significant interaction between age and two important measures of social status (education and income).

The data for the first paper come from two representative samples of Canadians (1994 National Population Health Survey and the 1991 General Social Survey). Because both surveys are large, representative samples, there is a sufficient number of persons across the adult lifespan (ages 20 and over) to assess both age and class variations in psychological distress.

Whether or not age influences the relationship between socioeconomic status and mastery is the focus of the second paper. During the writing of the dissertation, Schieman (2000) published an article examining the relationship between age, education and sense of personal control. However, this is the only other article I am aware of that has examined this question directly. Again, the rationale for addressing this question is

similar to the rationale for the first paper - while research has examined age differences in sense of personal control (see Mirowsky 1995; Wolinsky and Stump 1996) and sociologists have demonstrated socioeconomic status differences in this construct (Wheaton 1980), virtually no work has examined how age may moderate the relationship between socioeconomic status and mastery.

The data set for this paper is again the 1994-95 National Population Health Survey. The dependent variable is a seven-item measure of mastery derived from Pearlin and Schooler (1978). Unlike the more domain-specific measures of personal control or self-efficacy, the construct of mastery is a globalized measure of personal control reflecting an individual's general belief in the extent to which his/her actions make a difference in directing the course of his/her life. Research applying the stress process paradigm has shown mastery to be an important mediating and moderating variable in the stress-distress relationship (see Turner and Roszell 1994 for a review).

The third paper is an extension of the very influential paper by Turner, Wheaton and Lloyd (1995) on the epidemiology of social stress. In their paper, Turner and his colleagues demonstrate that the social distribution of stress mirrors the social distribution of psychological distress and depression. Unlike previous work that relies on single measures of stress such as life events, Turner et al. (1995) create a measure of a cumulative burden of stress. This measure is a composite of many different sources of stress across several distinct domains (e.g. chronic stress, early childhood traumas). With their much broader and more comprehensive measure of stress, they demonstrate that a substantial proportion of the relationship between socio-demographic factors such as age,

gender, marital status, occupation and depression could be accounted for by exposure to stress. Notwithstanding the important contribution this paper makes to the sociology of mental health, its central limitation is the conception of social position (i.e. age, socioeconomic status) in terms of an additive rather than interactive framework. After demonstrating that exposure to stress tends to decline with age, I ask if this decline is the same for everyone regardless of social and economic position? Once again, using the National Population Health Survey, I test for interactions between age, socioeconomic status and three different measures of stress (life events, chronic strains and early child and adulthood adversities) based on the hypothesis that age will moderate the effect of socioeconomic status on each of these measures of social stress. The stress measures are derived principally from the work of Blair Wheaton and Jay Turner in their study of psychiatric co-morbidity in Toronto, Canada.

In the final paper, I follow the lead of Linda George and her colleagues who call for more attention to the influence of age on the entire stress process. Using the National Population Health Survey, I first establish the overall contribution that the stress process model (stress, psychosocial resources and social support) makes to accounting for the variation in psychological distress by age, gender, marital status and socioeconomic status. Next, I introduce interaction terms for age by each of the major components of the model (e.g. age by life events) to assess whether or not age moderates the relationship between each of these components and psychological distress.

Finally, drawing upon on the results of each of these papers, I present a summary and concluding discussion in Chapter Six.

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CHAPTER TWO

SOCIOECONOMIC STATUS, AGE AND PSYCHOLOGICAL DISTRESS

2.1 INTRODUCTION

An important program of research in the sociology of mental health has been to examine the links between markers of social position and psychological distress and disorder. This interest is based on the assumption that there are important etiologic messages to be found in the social patterning of psychological well-being (cf. Turner and Avison1989; Turner and Roszell 1994; Turner, Wheaton and Lloyd 1995). In other words, the social distributions of mental disorder and psychological distress are not random, but reflect the important influence of environmental factors on mental health. This emphasis on the role of social structure on well-being is a uniquely sociological approach to the study of health and illness (Pearlin 1989). In this approach, the social environment is viewed as the essential determinant or "fundamental cause" of disease (Link and Phelan 1995).

This assumption or guiding principle is not without an empirical foundation. Indeed, it has been well-established in the sociological literature that a social gradient of mental disorders exists in the community. One of the most robust findings is the correlation between measures of socioeconomic status or position and psychological distress and disorder (Dohrenwend and Dohrenwend 1969; Glenn and Weaver 1981; Hollingshead and Redlich 1958; Kessler 1982; Lennon and Rosenfield 1992; Link, Lennon and Dohrenwend 1993; Mirowsky and Ross 1989; 1995; Pearlin et al. 1981; Ross and Huber 1985; Ross and Mirowsky 1989). These studies show consistently that

individuals from disadvantaged socioeconomic positions have higher rates of distress and disorder compared to individuals from more socially and economically advantaged circumstances. Moreover, the relationship between social position and mental health does not appear to be spurious. While some evidence exists supporting the proposition that the relationship between socioeconomic status and psychiatric disorders is due to social selection processes (individuals with mental disorders drift down the social hierarchy) (Ortega and Corzine 1990; Mirowsky and Ross 1995), in the case of depression and substance alcohol abuse, social causation is the favoured explanation for observed relationships between social class and mental disorder (Dohrenwend et al. 1992).

Although there is little doubt of the importance of social position to mental health in contemporary sociology, significant gaps remain in our understanding of the relationship between socioeconomic status and psychological disorders. As in other areas of science, knowledge grows when we attempt to unravel complex, dynamic relationships in the social world. Our understanding of the relationship between social class and health has grown more complex as we have reconsidered the adequacy of our indicators of social position. Sociologists have generally conceived of stratification in terms of a relatively small set of socioeconomic indicators - education, occupation and household income. Indeed, until fairly recently, these indicators were the "gold standard" in measuring social class or socioeconomic position. Sociologists have now begun to consider other markers of social position that move beyond these three variables. One such marker is age. Chronological age, like social class, is a social stratification system

that is tied to individuals in a socio-historical context. As Riley, Johnson and Foner (1972) note, age is not only a process that occurs in the individual, but is an indicator of his/her location in a social system. Thus, education, income and occupation are not the only ways in which individuals may be socially stratified; age also operates as a system of stratification.

The inclusion of age as a marker of social position along with the standard socioeconomic variables raises important considerations for the sociology of mental health. As Abeles notes (1992), age is both a person-level variable (signifying complex social, biological and psychological processes operating within the individual) and a societal-level variable (indicating location in a system of social stratification). Studies of social position, age and health, then, are in fact investigating two social stratification systems (age and socioeconomic status), and two biopsychosocial processes (aging and health). Conceived in this way, any serious consideration of socioeconomic status and mental health must address how the relationship between these two variables itself varies by chronological age, because age is both a determinant of social position and a process that influences health status. Yet, as Miech and Shanahan (2000) argue, despite major advancements in the stress process literature over the past couple of decades, the potential moderating impact of age on the socioeconomic status-distress relationship remains largely unexplored by sociologists. The current state of much of the stress-depression literature "rests on the implicit assumption of the "ageless" adult who experiences the same stressors and reacts to them in the same way from age 18 until the end of life" (Miech and Shanahan 2000, p. 163). In light of this criticism and Pearlin and Skaff's

(1996) recent call for links between stress process and life course research, it seems timely for mental health researchers to re-consider the role of age in their research.

2.1.1 The Compression of Morbidity Hypothesis and the Socioeconomic Gap in Health: Attending to the Social Stratification of Health and Aging

The importance of considering the influence of age on the relationship between socioeconomic status and health has been stated quite eloquently by House et al. (1990) in relation to more general arguments about the consequences of an aging society for health. Life expectancy, they argue, has increased dramatically in the past century in many Western societies. As Fries (1980) notes, however, the maximum length of time has remained relatively fixed. In other words, more people are living longer but the span of time one can hope to live has increased only slightly if at all. Given that the maximum amount of time one can expect to live may be relatively fixed, House and his colleagues argue that attention has turned from how to increase the life span to how we may ensure quality of life throughout its duration. The question of interest, then, is what can individuals expect in terms of their health now that most of us are living longer? Will growing old automatically lead to ill health and disease or will improvements to health care and population health postpone illness until much later in life making the experience of old age relatively free of disease or disability? The later proposition, which has been referred to as the "utopian" scenario (House et al. 1990), was originally articulated by Fries (1980). The "compression of morbidity" hypothesis states that advances in medicine will increasingly postpone illness and disability well into old age. This compression of the onset of morbidity into later and hence shorter durations of time prior to death will

result in less need for medical care and improve the overall quality of life in old age. A much less optimistic view, however, suggests that increases in life expectancy will simply translate into more suffering as people will live with disability and disease for longer periods prior to death (see Verbrugge 1984).

Although both of these scenarios raise important considerations for "aging" societies, including the future role of medicine in such societies, the debate over the compression of morbidity has disregarded a fundamental concern of medical sociology; the consequence of position in the social structure for health and well-being. The assumption, implicit in both of the optimistic and pessimistic scenarios, is that the experience of health and aging will be the same for all individuals regardless of their position in society. For sociologists, this is a problematic assumption.

In a series of important articles, James House and his colleagues (House et al. 1990; 1992; 1994) have drawn attention to the social stratification of aging and health. They argue that the compression of morbidity hypothesis is contingent upon socioeconomic status and the social distribution of morbidity. Drawing upon both theory and data from medical sociology, House and his colleagues propose that in order to understand the relationship between health and aging, we must consider how this relationship varies by position in the social structure. Decades of research have confirmed that socioeconomic status is an important determinant of morbidity and mortality (see Feinstein 1993; Link and Phelan 1995; Williams 1990 for reviews). Across most Western societies, the findings consistently show that the most advantaged groups in terms of socioeconomic position have lower rates of morbidity and mortality than do

disadvantaged socioeconomic status groups. Moreover, these socioeconomic differentials have persisted across time and may even be increasing despite advances in medicine and improvements to public sanitation and other public health interventions (Link and Phelan 1995). It stands to reason, then, that the same social determinants that produce differentials in health may affect and be affected by the process of aging. Specifically, as House et al. (1990) note, the compression of morbidity hypothesis may be a reality for those individuals from higher socioeconomic groups where illness and disability are less frequent than among those from disadvantaged social groups. For individuals from low socioeconomic status groups, the grim projections of Verbrugge (1984) may be more of a reality - longer life simply meaning more time spent in ill health.

Despite the findings of medical sociology and the implications these findings may have for aging, surprisingly little research has addressed how socioeconomic differences in health may vary by age. Toward this goal, I will examine the socioeconomic gap in psychological distress across the lifespan.

2.1.2 Age and Psychological Distress: A Review of the Findings

While a concern with the relationship between age and symptoms of psychopathology can be traced back to the early pioneering work of the first studies of the community prevalence of distress and disorder (e.g., Harding et al. 1963), there has been a renewed interest in the relationship between age and depressive symptomotology (see Bebbington et al. 1998; Kessler et al. 1992; Mirowsky and Ross 1992; Schieman, Van Gundy and Taylor 2001; Wade and Cairney 1997; 2000). In no small part, this interest can be traced to inconsistent findings in the literature. Community studies on the

relationship between distress and depressive symptomotology and age have produced equivocal results - some studies showing decreases in depressive symptoms with age, other showing an increase (Feinson 1989; Himmelfarb 1984; Jorm 1987; Newman 1989). Although several reasons for this have been posed in the literature (see Kessler et al. 1992; Mirowsky and Ross 1992; Newman 1989), a crucial hindrance to examining the relationship between age and distress has been age truncated samples. Many studies simply do not have large enough samples to adequately assess the prevalence of depression and psychological distress across each age cohort. Thus, in most instances, it was impossible to measure age related changes in distress and depression across the entire adult lifespan. Within the last few years, however, several studies have been conducted that address the question of age related changes in psychological distress and employ large, representative samples of adults across the lifespan. It is this small body of work that we must now examine.

The impetus for this work can be traced to one of the most comprehensive qualitative reviews of the age-depressive symptomotology relationship (Newman 1989). By combining many different findings across a wide range of community studies, Newman suggested that the relationship was curvilinear, or U-shaped, with the highest reported levels of symptomotology reported among the young (less than 35) and the very old (75 and old). Since this review, at least three studies have employed large samples of adults across the entire lifespan, to replicate this pattern. Using a combined total of four representative national samples of the US population, Kessler et al. (1992) and Mirowsky and Ross (1992) confirm Newmann's (1989) findings that the highest levels of

psychological distress were to be found among young adults and the very old. Both these works found that the lowest reported levels of depression are among those 45 to 55 years of age. Kessler et al. (1992) also find that when depressive symptom scales are divided into two separate scales based upon somatic and non-somatic complaints, the non-linear relationship is evident for both measures. In other words, the increase in depressive symptomotology cannot be attributed to increasing levels of somatic complaints among the elderly. Kessler et al. (1992) also report that there are no significant differences in the age curves between the sexes.

However, evidence also exists that disconfirms the curvilinear relationship observed by Kessler et al. (1992), Mirowsky and Ross (1992), Newmann (1989). Wade and Cairney (1997), using a large representative sample of Canadians, find the age-distress relationship to be negative and linear, with only a modest increase in depressive symptomotology among the elderly (at ages 65-69 in men and after age 75 in women). The slight upward turn in the curve observed among the elderly does not come close to the high levels of distress and disorder observed among the young (15 to 24). Thus, instead of a curvilinear or U-shaped age curve, Wade and Cairney (1997) find an inverted j-shaped curve for distress, and a negative linear relationship between age and depressive disorder (diagnostic measure). They also find no significant differences between males and females, and, because the distress measure they employed contains only non-somatic depressive symptomotology, they conclude that bias due to somatic complaints is not a concern in their data. Thus, even when the issue of age truncation is addressed, inconsistency is still evident in the literature.

Despite these continued discrepancies in the literature, the recent attention directed toward age differences in psychological distress has stimulated discussion on the importance of a life course perspective on mental health. Moreover, while this work highlights inconsistencies concerning psychological distress among the old, all of the data suggest that the prevalence of distress and disorder decreases from early adulthood to about middle age.

What appears to be absent from all of this work is any consideration of how the relationship between age and psychological distress may vary by position in the social structure. In other words, there is an assumption underlying all of this work that the relationship between age and distress is invariant across socioeconomic status groups. As we have already seen, the work of House and his colleagues has challenged this assumption with data on physical health. Therefore, there is good reason to hypothesize that the pattern or association of age and distress may be different contingent upon socioeconomic status or position.

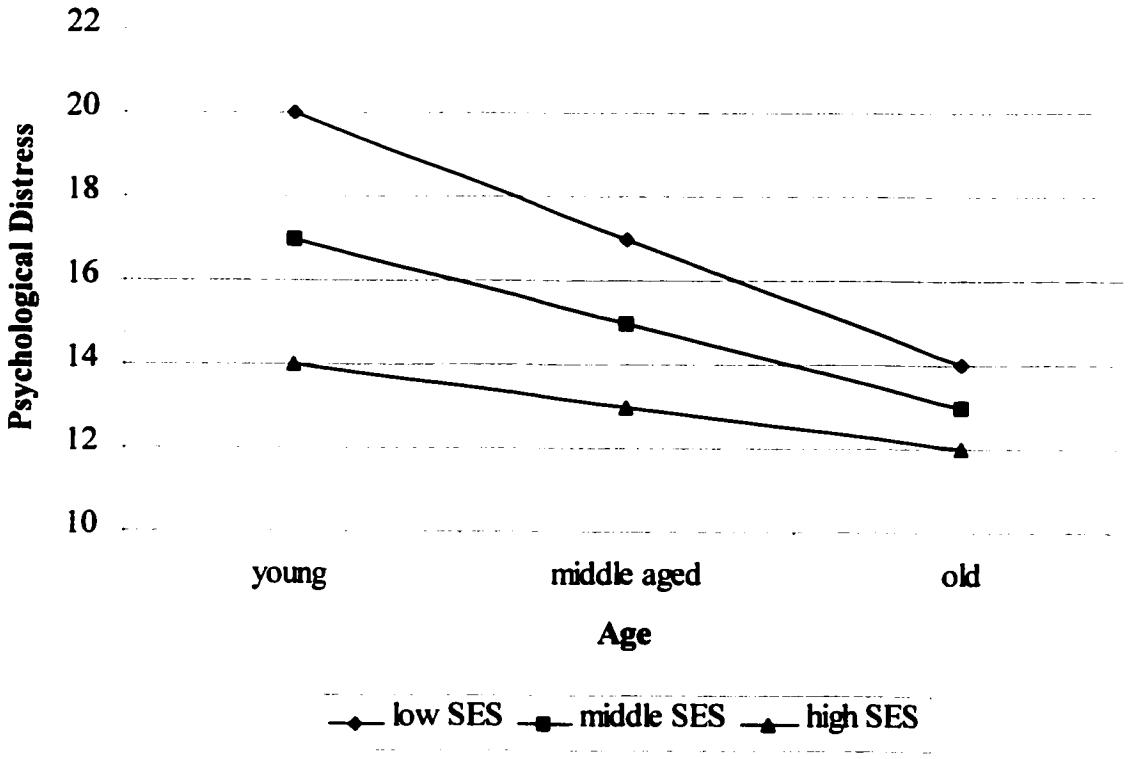
While there has only been one direct test for whether or not the socioeconomic gap in psychological distress varies by age (see Miech and Shanahan 2000), the literature on physical health conditions provides several possible hypotheses to guide such an analysis (Krause 1999). Because the relationship between age and distress in Canada is essentially negative and linear after controlling for demographics and socioeconomic status (Wade and Cairney, 1997), the following hypotheses are based upon a model of declining psychological distress across older cohorts.

2.1.3 Convergence with Age Hypothesis

The first hypothesis is based, in part, upon the work of House et al. (1990; 1992; 1994). They find that differences in physical health by socioeconomic status are small among younger cohorts where the overall prevalence of physical health conditions is low. Among middle aged and early old age cohorts (ages 45 to 64), a significant gap emerges for health between socioeconomic groups. This is due primarily to the increasing prevalence of physical health conditions among lower socioeconomic groups. While the prevalence of physical health problems increases with age for all socioeconomic status groups, among the oldest cohort, House et al. (1990;1994) find socioeconomic differences in health to be slight or non-existent. Thus, similar to younger cohorts, there are no differences in physical health by socioeconomic status among older cohorts - the gap diverges among the old relative to middle and early old age cohorts.

There is good reason to suspect that the first part of the convergence-divergence model will not predict population models of age, socioeconomic status and psychological distress due to the natural pathogenesis of psychological disorder. Specifically, the House et al. (1994) model predicts that among young adults, the socioeconomic gap in health will be small (i.e. will show convergence). Unlike many physical health conditions, psychological distress and disorder tend to emerge in adolescence or early adulthood (Fleming and Offord 1990; Goodyear 1990; Kandel and Davies 1986). Since these conditions are also associated with socioeconomic status, we would expect that the socioeconomic gap in distress would be wide among younger cohorts and narrow across successively older age cohorts. The convergence model hypothesized in this work is

Figure 1a. Convergence with Age Hypothesis



based upon the latter part of the model presented by House et al. (1994) showing the socioeconomic gap in health to converge among old age cohorts. Unlike House et al.'s (1994) model, I hypothesize the widest point in the gap in distress by socioeconomic groups is among the youngest age cohorts (see figure 1a).

Some support for the argument that socioeconomic differences in health are minimized among the old is offered in the broader medical sociological literature (see Mustard, Derksen and Berthelot et al. 1997; Thorslund and Lundberg 1994). The explanation for this narrowing of class differences with age is termed the "healthy survivor effect." Since class differences tend to emerge early in life, and socioeconomic status is related to pre-mature mortality (Wilkinson 1986), only the healthiest survive to old age thus minimizing differences in health between socioeconomic status groups. Newacheck et al. (1980) found the gap in health between the poor and non-poor diverged until about age 64 and then converged among those over the age of 65. Consistent with House et al. (1994), Newacheck et al. (1980) found the widest gap in bed disability and restricted activity days between the non-poor and the poor to occur between the ages of 45 to 64. Since physical health problems are highly correlated with psychological distress among older adults (Mirowsky and Ross 1992), it is plausible to assume that socioeconomic differences in psychological distress may follow a similar pattern.

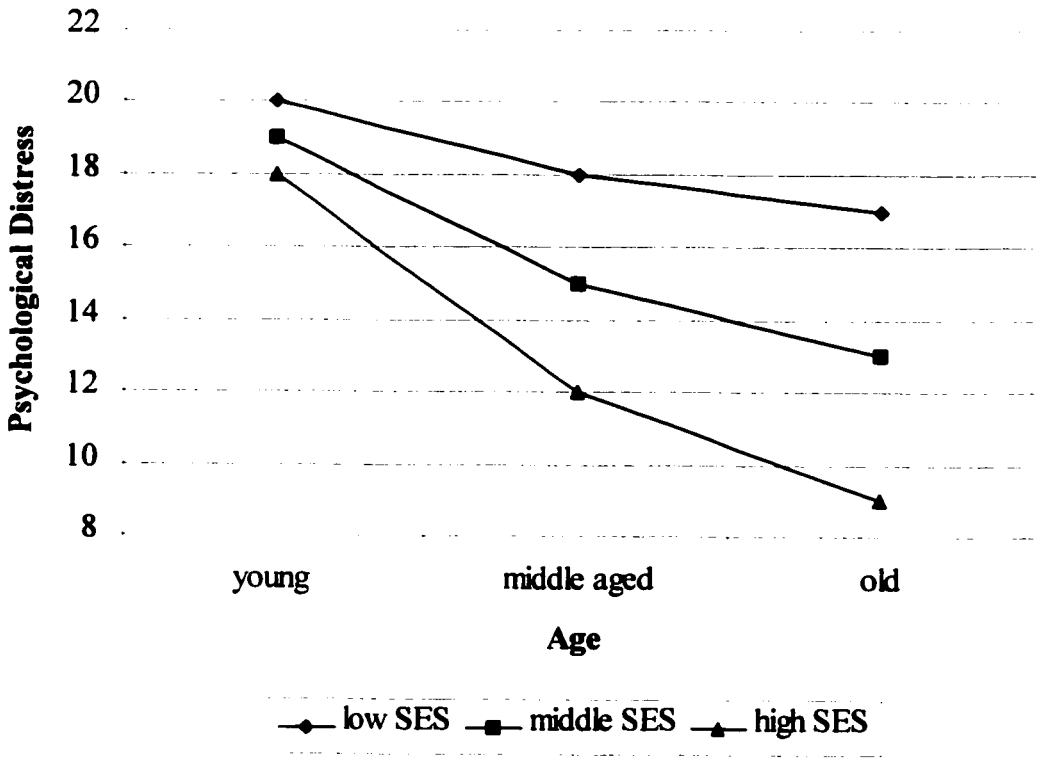
2.1.4 The Cumulative Advantage Hypothesis

It is also reasonable to hypothesize that the socioeconomic gap in psychological distress may diverge across successively older cohorts reaching the widest point of divergence among the oldest-old. Again, such a pattern has been observed in the literature

on physical health. Ross and Wu (1996) found that the socioeconomic gap in health widened or diverged across successively older cohorts. This pattern by age can be explained by a theory of cumulative advantage which posits that differential educational attainment early in life affects health subsequently in old age through the accumulation of resources or "advantages." For example, the better educated tend to secure better jobs, are more likely to marry and remain married, are able to accumulate wealth and so forth. These advantages, which are associated with better health, accumulate over the life course and result in an overall health advantage relative to lower socioeconomic or less educated groups. The less educated are often not able to secure such advantages and are thus more likely to experience illness and disability as they age. The maintenance of health among the most advantaged, coupled with the decline in health status among the less advantaged, accounts for the overall widening of the gap in health between the rich and the poor across successively older cohorts.

We can hypothesize a pattern similar to that identified by Ross and Wu (1996) for psychological distress. Indeed, while these authors focussed primarily on physical health problems, their work revealed a similar pattern for self-rated health - a measure of subjective well-being. While the rates of psychological distress are highest among younger cohorts, we can hypothesize a relatively small difference between socioeconomic groups. The divergence pattern may be explained by declining levels of distress across older age groups. Among the least advantaged, socially and economically, rates of distress remain comparatively high (see figure 1b).

Figure 1b. Cumulative Advantage Hypothesis



While there is a paucity of literature in both medical and psychiatric sociology concerning the socioeconomic gap in health in old age, there are several studies which provide at least preliminary support for the convergence hypothesis. Most notably, the divergence hypothesis is contingent upon a narrowing of class differences due to the selection of the least healthy individuals from each class out of the population. A necessary but not sufficient condition for the convergence hypothesis is the existence of class differences in health among the elderly. Indeed, several studies do show differences in health status, variously measured, by socioeconomic status among those aged 65 and older (Arber and Ginn 1993; Cairney and Arnold 1996; Cairney 2000; Hirdes et al. 1986; Thorslund and Lundberg 1994; Victor 1989). Also, as Krause (1999) notes, recent research by Mirowsky (1995) suggests that mastery may decline with age. Since mastery is highly correlated with both socioeconomic status and psychological distress, Krause (1999) predicts that socioeconomic status differences in psychological distress will mirror the accelerated rate of decline in mastery observed by Mirowsky (1995) thereby supporting the hypothesis proposed by Ross and Wu (1996) for distress. Because mastery is lowest among the least economically advantaged, the escalating rate of decline in mastery will result in a widening gap in psychological distress with age across socioeconomic status groups. This is predicated on the assumption that the rate of decline in mastery is more pronounced for individuals from low SES groups. Thus, divergence is based upon a steeper rate of decline for low SES groups as compared to high SES groups.

There is only one study that directly examines the question of whether or not age moderates the relationship between socioeconomic status and psychological distress.

Using a large, nationally representative sample of US citizens, Miech and Shanahan (2000) find support for the cumulative advantage hypothesis- the widest socioeconomic gap in psychological distress occurs among the oldest age cohorts in their data.

2.1.5 Rate of Constant Decline Hypothesis

In contrast to both the convergence with age and the cumulative advantage hypotheses, the rate of constant decline hypothesis predicts that the socioeconomic gap in psychological distress will remain constant across all age groups. In other words, the rate of decline by age will be the same for all socioeconomic status groups. The most socially advantaged will have consistently lower levels of psychological distress compared with those from less advantaged groups across the entire adult life-span (see figure 1c). While not explicitly stated in the literature on the relationship between socioeconomic status and psychological distress, this relationship of constant decline is often presumed since no attempt is made to model an interaction between measures of social position and mental well-being[2]. Some evidence supporting this hypothesis also exists in the literature on physical health and aging. Taubman and Rosen (1982) and Maddox and Clark (1992) all report a constant socioeconomic gap in health with age; however, these findings are limited. Maddox and Clark use a sample of men and women who range in age from 58 to 63. It is therefore impossible to assess differences over a broader range of ages. Taubman and Rosen use a sample composed of older men only. Obviously, in order to adequately

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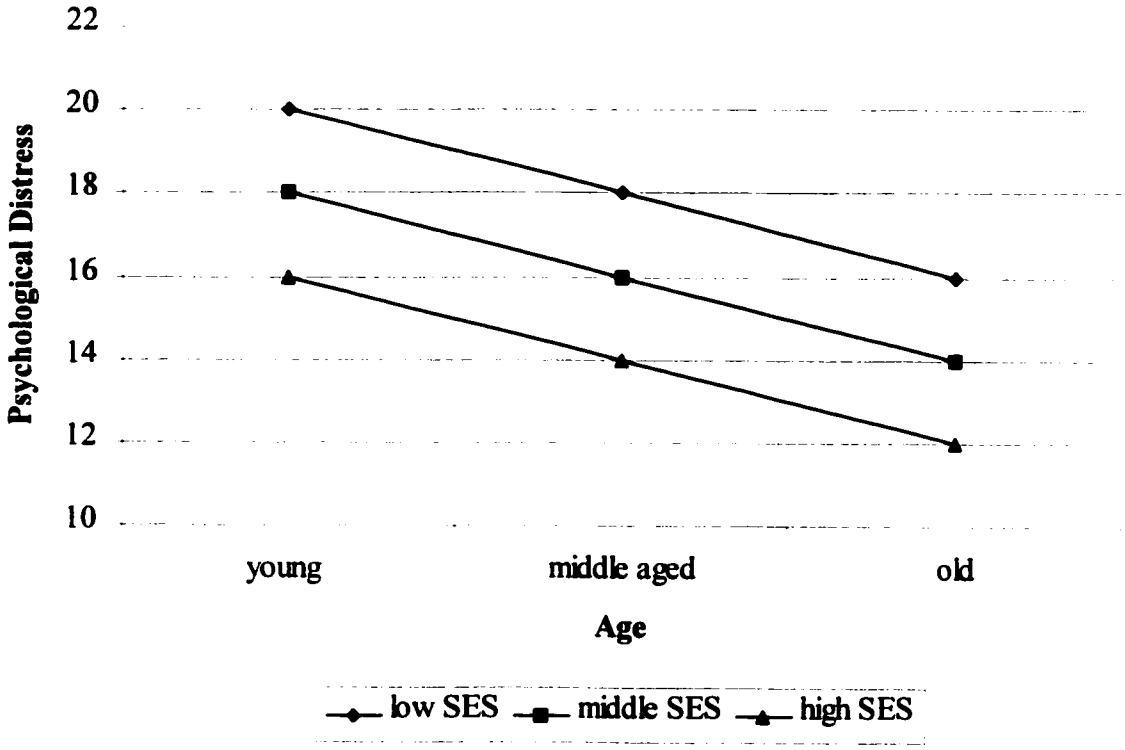
[2] It may also be the case that researchers test for interactions between age and socioeconomic status but do not find any and therefore do not report the test.

Figure 1c. The Rate of Constant Decline Hypothesis



assess this hypothesis, a large sample of both men and women representative of the whole adult life-span is required.

2.2 METHOD

Two nationally representative samples are used in the present analysis. As Ross and Van Willigen (1997) point out, using two separate samples increases our confidence in the findings by distinguishing robust findings from sample-specific results. The other benefit of analyses with these two data sets is that they employ different, yet comparable, measures of psychological distress. This also increases confidence in the findings if different measures of the same construct yield comparable results.

2.2.1 Samples

The first sample is the National Population Health Survey (hereafter NPHS) conducted by Statistics Canada. It is a 1994 telephone survey of a national probability sample of Canadian residents across all 10 provinces. Using a multi-stage, stratified random sampling procedure, Statistics Canada interviewers surveyed 19,600 households in which one person in each household was selected to provide detailed personal information for the longitudinal component of the survey. Persons living on Native reserves, military bases, institutions, and some remote areas in Ontario and Quebec were excluded. Of the 18,342 possible respondents aged 12 and older, 17,626 participated resulting in a response rate of 96.1%. Because I am primarily interested in adults, and to be consistent with other studies, only those aged 20 and over were selected for this study, reducing the total sample to 15,789. After a list-wise deletion of cases with missing values, the total sample was further reduced to 14,425 (n=13,575 weighted). This reduced

sample was virtually identical to the original sub-sample in terms of age, gender and marital status. Since a significant number of cases were lost because of missing values on income, a logistic regression analysis with missing values for income as the dependent variable was performed. The missing value variable was regressed on gender, age and marital status. While there was a slight trend toward older adults being less likely to report their incomes, the size of the effect was relatively weak (Odds Ratio close to 1.0). Moreover, the coefficient was significant at the $p<.05$ level. Thus, while there is some concern about an age trend in not reporting income, overall the findings do not suggest that the loss of these cases biases the sample.

The second representative sample is the General Social Survey (Cycle 6) on Health (hereafter GSS-H), a 1991 telephone survey of a national probability sample of Canadians aged 15 years of age and older. The survey, also conducted by Statistics Canada, uses random digit dialling to reach prospective households. Each province is divided into strata based upon Census Metropolitan Areas (CMAs) and non-CMAs. One of each is selected from each province excluding Prince Edward Island which has no CMA. Montreal and Toronto are each separate strata. The final sample consists of 11,924 households (80% response rate). Again, in order to be consistent with the other sample employed in this survey, only individuals aged 20 and over are selected (N=11,248). After a list-wise deletion of cases with missing values, the sub-sample is reduced to 8117. Consistent with the analysis on missing data for the previous sample, the age, gender and marital status composition of the reduced sample remained unchanged from the original. Also, a similar procedure for missing cases for the income variable does not raise concern

about a biased sample. The results are virtually the same.

2.2.2 MEASUREMENT

2.2.3 Psychological Distress

In the present study, two measures of psychological distress are included. The first measure is a six item index of generalized distress used in the NPHS. Statistics Canada selected these six items from a generalized distress scale composed of 45 items developed at the University of Michigan. The original scale is derived from over 500 items selected from 22 previously published distress measures. The six item distress measure is assessed by asking respondents: "During the past month, how often did you feel: (1) ... so sad that nothing could cheer you up (2) ... nervous (3) restless or fidgety (4) ... hopeless (5) ... worthless (6) ... that everything was an effort ?" Respondents answered each query by selecting one of the following responses: "all of the time", "most of the time", "some of the time", "a little of the time" or "none of the time". The measure is scored such that higher scores reflect increasing levels of psychological distress (mean=3.37, s.d.=3.43). The internal reliability for this scale is alpha=0.79.

The measure of distress available in the 1991 GSS-H is a five item index selected from the Bradburn Positive-Negative Affect Balance Scale. The items are derived from the negative affect portion of the scale. Distress is assessed by asking respondents: "Here is a list that describes some of the ways in which people feel at different times. During the past few weeks, how often have you felt: (1) ... very lonely or remote from other people (2) ... depressed or very unhappy (3) ... bored (4) ... so restless that you couldn't sit long in a chair (5) ... upset because someone criticized you?" Respondents answered each

query by selecting one of the following responses: "Never", "Sometimes" or "Often". The measure is scored such that higher scores reflect increasing levels of psychological distress (mean= 2.08, s.d.=1.90). The internal reliability for this scale is alpha=0.61.

2.2.4 Socioeconomic measures

Socioeconomic status is measured by two different variables in these analyses; education and household income. Education is based on an item involving a combination of qualitative and ordinal categories. The original item is a 12 category variable reflecting different levels of education attainment. While some categories appeared to be ordered others do not. Thus, the original variable is re-coded into 8 categories: (1) no formal schooling, (2) elementary level education, (3) some secondary level education, (4) high school diploma, (5) some education beyond high school, (6) college diploma or trade certificate, (7) undergraduate university degree, and (8) graduate degree (M.A. or Ph.D.) or a degree in Medicine. For multivariate analysis, this measure is treated as a continuous variable. The same measure is available in both data sets (NPHS education measure: mean= 4.79, s.d.=1.56; GSS education measure: mean=4.62, s.d.=1.67).

Household income is coded into the following 11 intervals in the 1994 NPHS: (0) no income, (1) less than $5000, (2) $5,000 to $9,999, (3) $10,000 to $14,999, (4) $15,000 to $19,999 (5) $20,000 to $29,999 (6) $30,000 to $39,999 (7) $40,000 to $49,999 (8) $50,000 to $59,999 (9) $60,000 to $79,999 (10) $80,000 and more. An 11 item scale is created by setting each scale value to the midpoint of the interval (e.g. 3=$12,499) (mean=44,900, s.d.=27,700). A similar variable was available in the 1991 GSS-H

although there only were 10 categories instead of 11: (0) no income, (1) less than $5000, (2) $5,000 to $9,999, (3) $10,000 to $14,999, (4) $15,000 to $19,999 (5) $20,000 to $29,000 (6) $30,000 to $39,000 (7) $40,000 to $59,000 (8) $60,000 to $79,000 (9) $80,000 and more. As above, a scale of midpoint values is created (mean=43,600, s.d.=25,000). For multivariate analysis, both of these variables are treated as quasi-continuous.

The decision to use education and income as measures of social status is based upon several considerations. First, many individuals in this sample are not in the paid labour force (i.e. those who are retired and those who work at home). Therefore, a significant number of individuals in the sample would be categorized as "not employed". The obvious heterogeneity of this group makes using a measure for occupation less than desirable. Second, the use of education and income as indicators of social position are frequently used in the literature (Glenn and Weaver 1981; House et al., 1990;1992;1994; Kessler 1982; Lennon and Rosenfield 1992; Link, Lennon and Dohrenwend 1993; Mirowsky and Ross 1989; 1995; Pearlin et al. 1981; Ross and Huber 1985; Ross and Mirowsky 1989; Ross and Wu 1996). Using these measures, then, allows for comparability of results with previous work in the area. Finally, the inclusion of both education and income provides the opportunity to capture the different pathways that lead from social structure to psychological distress. Education, for example, reflects the accumulated knowledge and skills acquired through the formal education system. It is also a determinant of occupation. Education is the "key to one's position in the social structure" (Ross and Van Willigen 1997, p. 276). Income, on the other hand, reflects

economic resources. It is more an indicator of material standing whereas education can often reflects cognitive and behavioural resources like coping skills. Combining these indicators together may obscure the unique contribution of different processes (Ross and Van Willigen 1997).

2.2.5 Age and Sociodemographic Controls

Age is an ordinal variable coded in five years intervals (20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79) except for the last interval which includes those aged 80 and over. A quasi-continuous measure is created by setting each interval to the midpoint of the range. In the last interval (80 and over), all respondents are set to 90 years of age (NPHS: mean=44.96, s.d.=16.68 ; GSS: mean=46.78, s.d.=18.39). In addition to age, I have included three different control measures: gender, marital status and main activity. These measures are available in both data sets; therefore, the coding for each of these variables is identical in both data sets. Gender is coded 1 for females, 0 for males (NPHS: males=6424, females=7151; GSS: males=5220, females=6704). Marital status is measured using three dummy variables for married (including common-law) (NPHS: n=9222; GSS: n=4920), previously married[3] (including widowed, divorced and separated)(NPHS: n=1941; GSS: n=1770) and single

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[3] It is important to note that it was not possible to separate divorced/separated from widowed individuals in the 1994-95 National Population Health Survey public use file. It was, however, possible to separate these groups in the 1991 General Social Survey. The results of analyses using the four category measure of marital status is the same as the results using the three category measure. In the interest of consistency across surveys, I elected to include only the three category measure in the final analysis and report.

(reference category) (NPHS: n=2412; GSS: n=1427). Finally, a set of dummy variables measuring the main activity at the time of each survey is included: working at home[4] (NPHS: n=2064; GSS: n=1603), working (NPHS: n=7728; GSS: n=4414), unemployed (NPHS: n=1590; GSS: n=646) and retired (NPHS: n=2193; GSS: n=1454).

2.2.6 Analysis

First, I examine the additive effects of income and education on psychological distress in both samples, controlling for age, gender, marital status and main activity:

$$\text{Distress} = b_0 + b_1 (A) + b_2 (I) + b_3 (G) + b_4 (MS) + b_5 (MA)$$

$$\text{Distress} = b_0 + b_1 (A) + b_2 (E) + b_3 (G) + b_4 (MS) + b_5 (MA)$$

$$\text{Distress} = b_0 + b_1 (A) + b_2 (E) + b_3 (I) + b_3 (G) + b_4 (MS) + b_5 (MA)$$

where A=age, I=income, E=education, G=gender, MS=marital status and MA=main activity.

In the next set of equations, the interaction terms for both age by education and age by income are introduced. These are tests for the convergence, cumulative advantage (divergence) and rate of constant decline hypotheses.

Convergence Model:

For the convergence test, the interaction terms for education and income must be negative and significant, showing that the positive effect of education decreases with age.

$$\text{Distress} = b_0 - b_1 (A) - b_2 (I) - b_3 (E) + b_4 (G) - b_5 (MS) + b_5 (MA) - b_6 (A*I) - b_7 (A*E)$$

[4] "Working at home" is used in place of "homemaker" or "housework."

where A*E= represents an interaction between age and education and

A*I=represents an interaction between age and income.

Cumulative Advantage Model:

If the interaction terms are positive and significant, then positive effect of education on distress increases with age, supporting the cumulative advantage or divergence hypothesis.

$$\text{Distress} = b_0 - b_1(A) - b_2(I) + b_3(G) - b_4(MS) + b_5(MA) + b_6(A*E) + b_7(A*I)$$

Constant Decline Model:

If the interaction term is insignificant, support for the constant rate of decline hypothesis is achieved.

$$\text{Distress} = b_0 - b_1(A) - b_2(I) + b_3(G) - b_4(MS) + b_5(MA)$$

Finally, I also test whether the functional form of the age effect of distress accelerates across older cohorts. In other words, does the socioeconomic gap in distress widen or converge at a constant (linear) rate or does it accelerate across age groups (age squared)?

Accelerated Divergence:

$$\text{Distress} = b_0 - b_1(A) + b_2(A^2) - b_3(I) + b_4(E) + b_5(G) - b_6(MS) + b_7(MA) + b_8(A*I) + b_9(A*E) + b_{10}(A^2*I) + b_{11}(A^2*E)$$

Accelerated Convergence:

$$\text{Distress} = b_0 - b_1(A) + b_3(A^2) - b_3(I) + b_4(E) + b_5(G) - b_6(MS) + b_7(MA) - b_8(A*I) - b_9(A*E) - b_{10}(A^2*I) - b_{11}(A^2*E)$$

2.2.7 Test for Interactions

All tests for the presence of interactions follow the procedures described by Jaccard, Turrisi and Wan (1990). Equations with interactions are entered into a base model containing all lower order terms. To test for the presence of a statistical interaction, R-squared values for base models and models containing interaction terms are compared using an incremental, or hierarchal F test procedure. The null hypothesis for this test is that the regression coefficient for the interaction term is zero in the population.

The regression approach to modelling interactions between continuous variables assumes that the variables are measured at the interval-ratio level. While some have suggested that bias is introduced when the data are not interval-ratio (Busemeyer and Jones 1983), others argue that the assumption of intervality or linearity of responses is appropriate with non interval-level data (Borgatta and Bohrnstedt 1980). Although, strictly speaking, the data in these analyses are ordinal, the variables approximate interval-level characteristics and therefore, it is reasonable to proceed with a standard regression approach (Jaccard, Turrisi and Wan 1990).

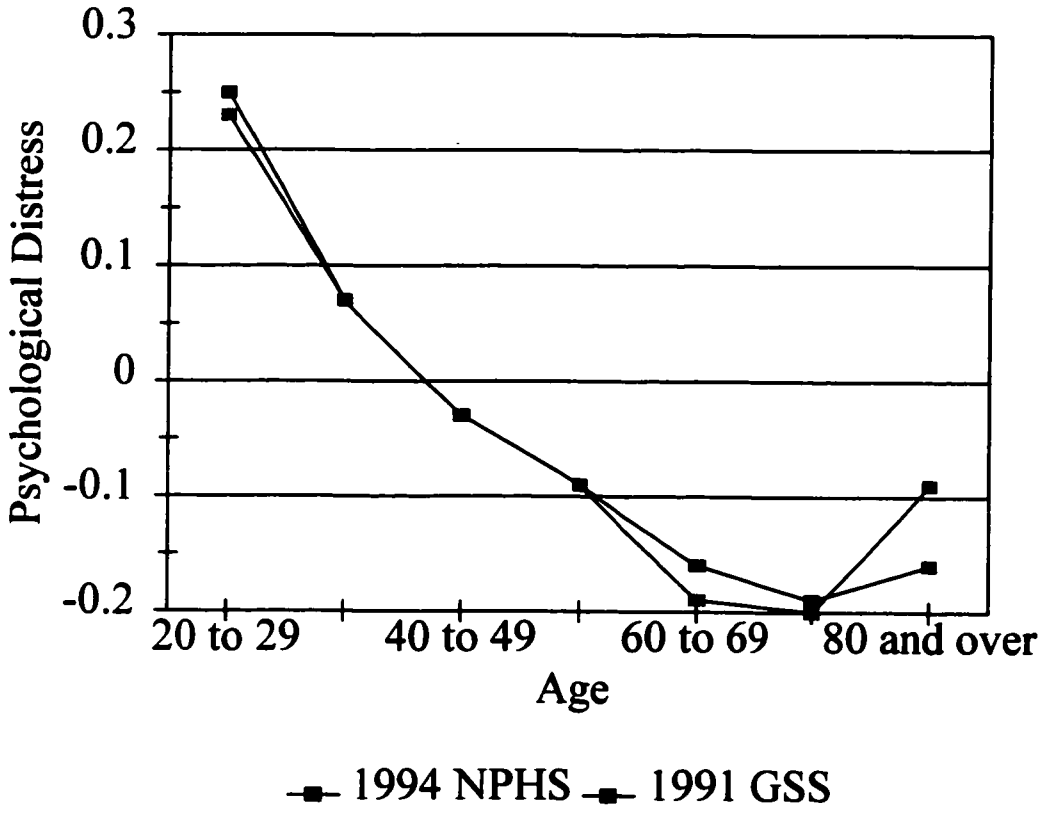
While mispecification of an interaction effect is of concern, an equally important issue is the failure to detect interaction effects. Since the sample size in these analyses are large enough to achieve adequate statistical power, steps have been taken in these analyses to address the potential problem of multicolinearity. Thus, following the advice of Cronbach (1987), and Jaccard, Turrisi and Wan (1990), all independent variables are "centred" prior to forming interaction terms.

2.3 RESULTS

In the first part of the analysis, I examine the distribution of distress by age to assess comparability between samples. Figure 2 is a plot of the standardized mean values of distress in each age cohort for both samples. The light shaded line represents the mean scores on distress for each age cohort in the 1994 National Population Health Survey; the dark shaded line represents the mean distress score for each cohort in the 1991 General Social Survey. For the most part, the shape of the distribution of mean distress scores by age is similar for both samples; there is a downward trend across age groups to about ages 70 to 79 followed by a slight rise in mean distress among the oldest cohort. The most notable discrepancy between samples concerns the slight curvilinear trend in distress by age; it is more pronounced in the 1994 National Population Survey. That notwithstanding, the most remarkable observation is the overall similarity between these two measures. It is clear that in both of these samples, the age-distress relationship is substantially different than the U-shaped pattern described elsewhere in the literature (Kessler et al. 1992; Mirowsky and Ross 1992; Newmann 1989). Overall, consistent with the assumption used to formulate the hypotheses, but for a small up-ward turn among the oldest cohorts, the general trend between age and distress is negative and linear.

Having established that the age-distress distribution is relatively similar in both samples, I then compare the means and proportions for each of the independent variables. The results, again, show significant congruity between samples. The mean age, education, and household income levels are the same across both samples (comparison of mean tests $p>.10$). The composition of the sample in terms of marital status and

Figure 2. Standardized Distress Scores by Age: 1991 General Social Survey, 1994 National Population Health Survey



gender is also identical (X^2 tests p>.10). Thus, there are no substantial differences in terms of social or demographic variables between these two samples.

2.3.1 OLS Regressions

Prior to examining potential interactions between age and measures of socioeconomic position, we must first establish significant associations between each of these variables and psychological distress. Tables 2 and 3 report the results of two hierarchal regression analyses on the socioeconomic and demographic determinants of psychological distress. The table in Appendix A shows the correlation matrix for all variables in both data sets. The first set of analyses are conducted using the 1994 NPHS (see Table 1). In model 2, the effects of age and age squared on psychological distress are presented. Consistent with the pattern observed in figure 2, the relationship between age and distress is curvilinear[5]. While both these coefficients are significant, the total amount of explained variance in distress due to age is small accounting for only 2 percent of the total variation. This, however, is consistent with previous work which shows that the effect between age and psychological distress is significant but small (Kessler et al. 1992; Schieman, Van Gundy and Taylor 2001). Models 2 and 3 show the effects of introducing education and income separately into the base model containing age and age squared. The coefficients for both measures are significant and negative, indicating that higher

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As noted above, the coefficient for age-squared is small reflecting the relatively slight up-turn in the age-distress pattern. Given the large sample size, it is easier to detect minor fluctuations in the data. For the most part, the relationship between age and distress is negative and linear.

TABLE 1. OLS Regression of Psychological Distress on Age, Education, Household Income, Gender and Marital Status: 1994 National Population Survey [a]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Age	-3.37E-2 *** (-.16)	-3.80E-2 *** (-.18)	-3.57E-2 *** (-.17)	-3.79E-2 *** (-.18)	-3.04E-2 *** (-.15)
Age-squared	6.13E-4 *** (.07)	5.33E-4 *** (.06)	3.23E-4 *** (.04)	3.17E-4 ** (.03)	1.29E-4 (.01)
Education		-.20 *** (-.09)		-.12 *** (-.05)	-.11 *** (-.05)
Income			-1.73E-5 *** (-.14)	-1.54E-5 *** (-.12)	-9.37E-6 *** (-.08)
Female					.59 *** (.09)
Single					.20 * (.02)
Previously Married					.65 *** (.07)
Working at Home					.28 ** (.03)
Unemployed					1.53 *** (.14)
Retired					-9.95E-2 (-.01)
Constant	3.2	3.22	3.28	3.28	2.69
R-squared	0.02	0.03	0.04	0.04	0.07

[a] unstandardized coefficients with standardized coefficients reported in parenthesis; *** p<.001 ** p<.01 *p<.05

position within the social structure is associated with lower levels of psychological distress. Both education and income are significant, suggesting that each of these measures is independently related to distress. The final model in Table 2 shows the relationship between age, income and distress adjusting for gender, marital status and main activity at the time of the survey. The age squared term is not significant after all socioeconomic and demographic factors are included; the relationship between age and distress net of these other factors is negative and linear. The coefficient for education remains unchanged from model 4 while the unstandardized coefficient for income is reduced by about 37 percent. At least part of the relationship between distress and income can be attributed to differences in gender, marital status and main activity. Finally, each of the coefficients for the indicator variables for gender and marital status are significant in the final model. Women report higher levels of distress than men. Single respondents and those who are previously married have higher levels of distress compared to married individuals. Two of the three dummy variables for main activity are also significant in the final model. Individuals who worked in the home and the unemployed report higher levels of distress than those employed for pay outside of the home. The coefficient representing retired individuals is not statistically significant. Together, all of these predictors account for only seven percent of the total variance in psychological distress. Again, however, this is consistent with previous work which use these variables to predict distress (e.g. Schieman, Van Gundy and Taylor 2001).

A parallel analysis is conducted using the 1991 General Social Survey on Health. For the most part, the results are comparable to the previous findings (see Table 2).

TABLE 2. OLS Regression of Psychological Distress on Age, Education, Household Income, Gender and Marital Status: 1991 General Social Survey [a]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Age	-1.80E-2 *** (-.17)	-2.15E-2 *** (-.21)	-2.16E-2 *** (-.21)	-2.31E-2 *** (-.22)	-2.26E-2 *** (-.22)
Age-squared	3.41E-4 *** (.07)	3.01E-4 *** (.06)	1.07E-4 (.02)	1.10E-4 (.02)	-1.75E-5 (.00)
Education		-.14 *** (-.12)		-1.38E-2 *** (-.06)	-8.47E-2 *** (-.07)
Income			-1.54E-5 *** (-.20)	-1.38E-5 *** (-.18)	-8.18E-6 *** (-.11)
Female					-3.60E-2 (-.00)
Single					.37 *** (.08)
Previously Married					.70 *** (.15)
Working at Home					.24 ** (.05)
Unemployed					.64 *** (.09)
Retired					-2.79E-2 (-.01)
Constant	1.96	1.97	2.04	2.04	1.79
R-squared	0.02	0.04	0.06	0.06	0.09

[a] unstandardized coefficients with standardized coefficients reported in parenthesis; *** p<.001 ** p<.01 *p<.05

Model 1 shows that the bivariate relationship between age and psychological distress is curvilinear. Also, education and income are both independently related to distress. Unlike the previous analyses, the introduction of income into the model containing age and age squared (model 3) reduces the age squared coefficient to insignificance. Thus, the curvilinear relationship between age and psychological distress can be accounted for by income. The full equation (model 5) controls for all the covariates in the analyses. Again the findings using the 1994 NPHS are replicated, with one important difference. The variable for gender in these analyses is not significant, suggesting no differences in distress between men and women after controlling for age, socioeconomic status, marital status and main activity. Since this finding is inconsistent with previous work in the literature, further analyses are conducted. The results show that women report higher levels of distress than men but that this effect can be explained by differences in income; women have significantly lower average incomes than men ($t=13.77$, $p<.01$).

2.3.2 Tests for Interactions

Having established a statistically significant relationship between age, education, income and distress net of the potential confounding effects of gender, marital status and main activity, it was then possible to test whether or not the relationship between age and distress varies by socioeconomic status. Interaction terms between age and socioeconomic status are created and entered into the full equation (model 5 in both tables) in the manner outlined in the analysis section. First, interactions between age and education, and age and income are entered into the base model separately and then together. In all cases, the contribution of the interaction terms to the overall model is

non-significant (p>.05). Next, interaction terms are created between age squared and education, and age squared and income. These interactions are entered into a base model containing all lower order terms including the interactions for age and education, and age and income. Neither the sets of interaction terms, nor the individual coefficients make a statistically significant contribution to the overall fit of the model (p>.05).

2.4 DISCUSSION

2.4.1 Methodological Issues

There are several limitations with this work that need to be addressed in subsequent research. The first is an interpretative issue concerning the causal ordering of variables like socioeconomic status and psychological distress. Consistent with previous studies, I measure socioeconomic status in terms of education and income. Each of these measures has a different implication concerning the issue of causality. Income, for example, is often criticized as a measure of socioeconomic status because it is more sensitive to changes in health status than other measures of social position (Feinstein 1993; Hay 1988). In other words, the income-illness relationship may be due to selection processes where illness leads to reduced income levels. Education, by contrast, is preferable to income because educational attainment usually occurs early in life and therefore should occur prior to the onset of illness (Kitagawa & Hauser 1973; Ross & Wu 1995; Ross & Van Willigen 1997). On this basis, it would seem logical to use education in place of income to avoid the problem of reverse causality. However, it is also been argued that while education reflects the cumulative experience of social deprivation on health, income captures the more proximate effect of social position on well-being. As a

result, it seems important to include both measures. Consistent with previous work (House et al. 1990, 1994; Robert & House 1996), I find similar results for both indicators. Although I am more confident of the causal ordering between education and distress since the former is more likely to be temporally prior to the latter, and previous research has suggested that social position is causally prior to mental health status, these findings must still be tempered with caution.

The findings presented here may be related to the composition of the samples. Most notably, changes in the socioeconomic gap in distress with age may be due to a healthy survivor effect. This explanation, for example, has been used to explain the convergence pattern in the socioeconomic gap by age (see House et al. 1994). It also is possible, given that the data are based upon a non-institutionalized sample, that morbidity, in addition to mortality, is causing a selection effect - only in a different manner. Since disability and sickness can lead to institutionalized care in old age, the failure to detect a widening gap (divergence) between socioeconomic groups may be due to the fact that the sickest individuals are no longer residing in the community (Ross and Wu 1996). Because these individuals are selected "out" of the sample, the gap appears constant. Since there is no strong evidence of convergence in these data, it may be that the selection effect is not as prevalent as originally suggested (see House et al. 1994). The failure to find evidence of divergence, on the other hand, could be due to the "healthiness" of the sample. Including institutionalized patients, in addition to those residing in the community, many of whom are from low socioeconomic positions, may actually increase the socioeconomic gap among older cohorts. By excluding this part of

the population, the socioeconomic gap in psychological distress may indeed have been underestimated. However, it is important to note that the samples which Ross and Wu (1996) used also excluded institutionalized persons; yet, they still found significant divergence across older cohorts.

Another limitation in these data that needs to be addressed in future work concerns the exclusion of two important variables from the analysis. This public use data set does not contain an adequate measure of either race or ethnicity. Only one question, "country of origin", taps into this potentially important variable. This is an inadequate measure of ethnicity since place of birth is not necessarily connected to ethnic origin. Moreover, this categorical variable combines different countries together (for example, South America and Australia), making it difficult to use this measure with any confidence. On the basis of these limitations, I decided not to include this measure in the present analysis. Race and ethnicity, however, are important variables that must be included in future studies which attempt to address this question. Nevertheless, it is equally important to consider that House et al. (1994), Ross and Wu (1996) and Schieman, Van Gundy and Taylor (2001) included a control for ethnicity in their multivariate analyses. In no case did the inclusion of this variable affect the socioeconomic gap identified by these researchers.

In this paper, I use cross-sectional data to examine the relationship between age, socioeconomic status and psychological distress. While this is certainly not an uncommon approach, the use of cross-sectional data raises important issues for the interpretation of results. For example, until fairly recently, it was assumed that any

observed age differences in cross sectional analyses could be attributed to an aging effect. However, much attention has been directed toward the fact that age differences observed in cross-sectional data may also be due to experiences unique to particular birth cohorts (Gove, Ortega and Style 1989). Such experiences or "cohort effects" have largely been interpreted as "historical" events or conditions which are uniquely experienced by specific birth cohorts. These "unique historical events" impact on the life course trajectories of cohort members producing differences in social and psychological outcomes relative to other birth cohorts for whom the event is not remarkable. Frequently, the timing of an event, in terms of the average age of cohort members at the time of the historical marker, is crucial to the future impact of the event in terms of attitude formation and other social psychological attributes.

There is compelling evidence in the literature to suspect that age differences in psychological distress may be due to cohort effects. The work of Elder (1974; Elder and Liker 1982) suggests that those who were children and young adults during the great depression have lower self-evaluations and concepts, and poorer health, which in turn should affect their psychological well-being. Thus, we would anticipate that among older cohorts, psychological distress may be high relative to younger age groups. Moreover, these differences may be exacerbated by social position such that those who were children during the depression and who were poor at that time, may have higher levels of distress relative to more advantaged persons within the same cohort - an interactive effect between age and socioeconomic status. These data do not support either of these predictions; relative to younger cohorts, those who lived through the depression as

children and young adults (ages 65 and older) had lower levels of psychological distress. Also, the relationship between socioeconomic status and distress does not vary by age.

Further evidence against a cohort effect concerns the finding that distress declines with age in two different data sets at two separate points in time. If changes in distress by age are due to a unique cohort experience, there would not be stability in the age-depression relationship over time (Gove, Ortega and Style, 1989). Future research may be able to assess the cohort versus aging interpretation question by examining the relationship between age, socioeconomic status and psychological distress across studies conducted in different decades. The comparability of results between the 1994 National Population Health Survey sample and the 1991 General Social Survey sample suggests the possibility of an "aging" effect. However, it must also be noted that the time span between these surveys is relatively small. Caution, therefore, is warranted in using these findings to reject the cohort explanation outright. Obviously, further work on this issue is required.

One advantage in using cross-sectional data concerns a limitation associated with longitudinal data. Specifically, longitudinal data cannot control for the influence of effects due to contemporaneous circumstances. Period effects emphasize the impact of current social forces on attitude formation, and how they may interact or supercede cohort related events in shaping personality dispositions and health, both mental and physical. Several researchers in the field of aging have identified period effects as potential confounders in the interpretation of panel data. Changes in gender role attitudes (Thornton, Alwin and Canburn 1983), and/or the increase in female-headed households

(Avison 1995), to a name only a few, are examples of significant social changes that may impact responses on surveys net of any cohort or aging effects. Thus, there is good reason to believe that age changes in longitudinal data may be as much a result of period effects, as of either aging or cohort effects. In light of this limitation with longitudinal data, the advantage of using cross-sectional data is that we can largely rule out the possibility of a direct period effect on age related differences (Gove, Ortega and Style 1989). Note however, that the possibility of an interaction between period and cohort effects cannot entirely be ruled out. While cross-sectional data do not allow the researcher to disentangle aging from period and cohort effects, the predictions based upon these effects are not well-supported in these data. Thus, it is safe to conclude that we have at least provisional support for an "aging" effect in relation to age and psychological distress.

2.4.2 Theoretical and Policy Issues

Consistent with previous research, I find both socioeconomic status and age to be negatively associated with psychological distress. Those who are older report lower average levels of distress than those who are younger. Also, those from lower socioeconomic status groups report higher levels of distress than those who occupy more advantaged positions within the social hierarchy of Canadian society. Unlike the literature on physical health, there is no evidence in these data of either convergence (House et al. 1990; 1992; 1994) or divergence (Ross and Wu 1996) of the socioeconomic gap in distress by age. The results of the analysis support the third hypothesis - the rate of constant decline model. In other words, while average levels of distress decrease across

age cohorts, the rate of decline does not vary between socioeconomic groups. Psychological distress in all groups, defined either by education or income levels, decreases across older cohorts. The data show that a socioeconomic gap in distress exists across all age groups, even among those aged 80 years and older.

While these findings fail to provide support for the age by class interactions observed in the physical health literature, they support much of the literature in the sociology of mental health that reports an additive relationship between socioeconomic status, age and psychological distress (Dohrenwend and Dohrenwend 1969; Glenn and Weaver 1981; Hollingshead and Redlich 1958; Kessler 1982; Lennon and Rosenfield 1992; Link, Lennon and Dohrenwend 1993; Mirowsky and Ross 1989; 1995; Pearlin et al. 1981; Ross and Huber 1985; Ross and Mirowsky 1989 but see Schieman, Van Gundy and Taylor 2001). The results of this study suggest that age differences are invariant in the socioeconomic status-psychological distress relationship. In other words, regardless of age, the socioeconomic gap in psychological distress remains intact. This has important implications for our understanding of the relationship between age, class and distress. Socioeconomic disadvantage results in higher levels of distress across the lifespan. Even among the oldest in this sample, social position still produces a gradient in psychological distress. For the sociologist of mental health, the important point is the primacy of socioeconomic status. Regardless of age, aging effects or cohort effects, the socioeconomic gap in psychological distress is maintained.

However, since my findings contradict those of Miech and Shanahan (2000) who found that the gap in socioeconomic status diverged across old age cohorts, further

research is required to examine the age patterning of the socioeconomic status and depression relationship. Since these researchers findings are different from the findings reported in this paper, and given that they use data from a US sample, it is tempting to speculate on whether the differences between these studies is attributable to social structural differences between the US and Canada. Most notably, could cross national differences in the structure of the social welfare systems of these two countries explain the differences observed here? Further research on this question is certainly warranted.

From a policy perspective, the present work, and the work of Ross and Wu (1996) and House et al. (1994), have important implications for intervention. In particular, all of these works confirm the hypothesis about the social stratification of health and aging. The experience of "good" health across age groups is dependent upon one's position within the social structure. Thus, as stated at the outset, the possibility of a compression of morbidity may be a reality, but not for everyone. Whether the gap widens, diminishes or remains the same, individuals from low socioeconomic positions are disadvantaged in terms of psychological distress. In order to achieve the compression of morbidity for everyone, the underlying social inequities that produce disease and illness must be addressed. As Link and Phelan (1995) note, public health interventions which focus solely on the proximate causes of disease cannot hope to achieve significant improvements in population health since social inequality is the fundamental cause of illness. Broad based social policies aimed at minimizing social disparity would have dramatic effects on the general health and well-being of the entire population.

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CHAPTER 3

SOCIOECONOMIC STATUS, AGE AND MASTERY

3.1 INTRODUCTION

In his article, "The Three Faces of Social Psychology", House (1977) describes the sociological approach to social psychology as the systematic examination of the consequences of position within the social structure for self-identity. This uniquely sociological approach is part of a long tradition within the social sciences that views the social environment as an important determinant of self and identity (Durkheim 1951; Marx 1976; Weber 1958). Indeed, it is this link between the social world and the subjective or inner experience of the individual that connects sociology to psychology thus creating a distinctly psychological sociology (House 1977).

Psychological sociology or the social structure and personality perspective (House 1977; Thoits 1995) has had a significant impact on the development of theory that links individuals' positions in the social structure to their health outcomes (Williams 1990). For example, over the past few decades in the sociology of mental health, researchers have developed the stress process model as a mechanism to explain social inequalities in rates of mental illness in the population (Dohrenwend and Dohrenwend 1981; Billings and Moos 1982; Pearlin et al. 1981; Pearlin 1989). This model links socioeconomic status to mental health through an array of social psychological variables including personality predispositions. Pearlin (1989) argues that the structure of the social world, reflected in both the formal and informal social statuses and roles that individuals occupy, determines not only the kinds of stressors and strains that individuals are

exposed to, but also the way or means by which individuals cope with such stress. These coping behaviours or mechanisms include psychological attributes that are linked to socioeconomic position. One of the most common personal attributes identified in the literature is mastery. The sense of control over one's own actions is a personal characteristic that is associated with advantaged social circumstances. Mastery acts both as a mediator of the potentially negative impact of stressful events and chronic stressors on mental health and as a buffer of this relationship. It is clear that it is this dual connection of mastery to both social position and health status that accounts for the widespread attention this factor has received from sociologists.

Yet, while there is substantial evidence of a relationship between socioeconomic position and mastery (see Turner and Roszell 1994 for a review), little consideration has been paid to considering how the relationship between socioeconomic status and this psychosocial resource may vary by age. This is surprising since there is sufficient reason to hypothesize that such an interaction may exist. For example, research has documented changes in mastery with age (Mirowsky 1995; Rodin and Timko 1992; Schieman and Turner 1998; Wolinsky and Stump 1996). Because we know mastery to be correlated with measures of social position, a reasonable question for inquiry concerns whether changes in psychosocial resources with age are experienced by all socioeconomic groups or whether age-related differences in personal efficacy differ by relative position in the social structure. Stated in a slightly different way, are socioeconomic status differences in mastery the same regardless of age? Or, do age and socioeconomic status operate interactively to produce differences in this attribute in the population?

In this study, I examine the cross-sectional relationship between age, socioeconomic status and mastery. Specifically, I determine whether or not age and socioeconomic status interact to predict sense of personal control among a sample of adults aged twenty years and older. In doing so, I hope to correct a tendency in the literature to view age and socioeconomic status as independent predictors of mastery. In the sections that follow, I review the literature on the relationships between typical measures of social stratification and mastery, and age and this personal attribute. An identification of the bias that underlies both of these literatures is specified, and a model for subsequent testing is offered.

3.1.1 Socioeconomic Status and Mastery

Pearlin and Schooler (1978, p. 5) describe mastery as the "extent to which one regards one's own life chances as being under one's control in contrast to being fatalistically ruled." The attribution of causality to events in one's life in terms of external versus internal sources has been described in a number of ways including powerlessness (Seeman 1959), effectance motivation (White 1959), locus of control (Rotter 1966), personal control (Bandura 1977), helplessness (Seligman 1975), instrumentalism-fatalism (Wheaton 1980), and sense of control (Mirowsky 1995). Attempts have also been made to find a single label that subsumes all of these concepts such as personal efficacy (Turner and Roszell 1994). A quick scan of these references allows one to see the varied origins of the underlying construct of the perception of personal control. Researchers from both psychology (e.g. Bandura 1977) and sociology (e.g. Seeman 1959) have contributed to the conceptualization of mastery. Moreover,

within psychology, the construct has been defined from both behaviourist (e.g. Seligman 1975) and cognitive (Rotter 1966) perspectives. While such differences have been emphasized by some (Gecas 1989; Mirowsky and Ross 1986), Turner and Roszell (1994, p. 182) note that such differences are of more "historical" rather than "practical significance." While this latter position is almost certainly understating the differences between these constructs, I argue that the essence of personal efficacy is the perception of control over one's life and that each of these constructs, including mastery, has that feature at its core. Mastery, however, is a general orientation to the world and therefore cannot be used to examine domain specific issues of efficacy like the health locus of control (Wallston and Wallston 1981). For practicality and clarity of presentation, these constructs will be referred to as mastery because the definition provided by Pearlin and Schooler (1978) adequately captures the essence of this construct.

Issues of definition aside, the connection between position in the social structure and mastery has been well documented in the literature. Individuals from more advantaged socioeconomic positions tend to feel they have greater personal control over their lives and are less likely to believe in fate or the influence of powerful others in determining their own actions than individuals who occupy less advantaged positions in the social structure (Gurin and Brim 1984; Gurin and Gurin 1970; Gurin, Gurin and Morrison 1978; Lachman 1986; Lachman and Weaver 1998; Levinson 1981). The objective conditions that accompany socioeconomic positions shape personal beliefs about the self and one's ability to act in the social world. Several authors have attempted to link education, household income and, to a lesser extent, race and gender to mastery to

capture this basic premise. Kohn and Schooler's (1983) work, for example, has furthered our understanding of how social structure influences individual psychological processes by describing the mechanisms through which the workplace contributes to the formation of self-identity. Most notably, their research shows that workers whose jobs are high in self-direction and substantive complexity tend to value individual freedom and possess a greater sense of control than workers from jobs where these characteristics are absent. Their work supports the hypothesis that a sense of personal mastery is shaped by socioeconomic status since jobs high in self-direction and complexity tend to be associated with advantaged social position.

Researchers in the sociology of mental health have also used mastery as a mechanism to link position in the social structure to mental well-being. For example, Wheaton's (1980) sociogenic model of mental illness focuses on "fatalism" as a response to socio-environmental conditions. As noted above, fatalism is synonymous with mastery in that it refers to a "predisposition" to interpret the cause of events as external rather than the result of personal actions. Individuals from low socioeconomic groups learn to be fatalistic in their orientation to the world through a cumulative history of blocked opportunities, frustration, and failures. As Wheaton (1980, p. 106) notes: "one's status will help determine the particular pattern of deference, respect, positive reinforcement versus derogation, punishment or even inattention that the individual becomes used to." The experiences of success and failure anchored in socioeconomic status determine one's subjective perception of the world as either fair or unfair, threatening or supportive and

so on. A sense of mastery over one's personal circumstances then is a learned response to the social environment.

Where Kohn and Wheaton have used occupation as a measure of social status that influences mastery, Mirowsky (1995) focuses on the role that educational attainment plays in fostering a sense of control or mastery among individuals. Through the education process, individuals learn to solve increasingly complex and subtle problems that in turn builds self-confidence and assurance. Individuals who successfully advance through the formal education system acquire a greater sense of personal control as they come to realize that their success is tied in large part to their own personal efforts. Education reinforces the need to face problems pro-actively and persist until a solution is obtained. It also enhances communication and analytic skills, the necessary tools to solve problems and act autonomously in the world. Finally, education is often the minimum necessary requirement to better paying jobs that tend to reinforce a sense of mastery. For example, occupations that have the desirable qualities of self-direction and control identified by Kohn and Schooler (1983) are generally more accessible to those with high levels of formal education. Education then, provides a means to secure more advantaged social positions which in turn enhance the perception of personal control.

Each of these perspectives, while focussing on different aspects of stratification, share a common theme - advantaged social positions lead to the perception that one has control over one's life. Conversely, those from disadvantaged positions experience circumstances that are less conducive to feelings of personal control.

3.1.2 Age and Mastery

As stated at the outset, research has reported an association between age and mastery (Baltes, Wahl and Schmid-Furstoss 1990; Lachman 1986; Mirowsky 1995; Rodin and Timko 1992). What is unclear is the direction of this association. Some research reports a decline in mastery with age while other studies find a positive relationship between age and a sense of control over one's life. We can subsume both sets of findings under two general perspectives - theories of personal loss versus theories of personal gain - each of which is tied to more general theories in the sociology of aging.

Theories of personal loss associated with age focus on age-related changes and transitions in terms of what is lost or "taken away" from the individual. Perhaps the most frequently cited example of "loss" associated with age, although not always agreed upon, concerns the decline in health and well-being associated with the aging process (Mirowsky and Ross 1992). Chronic disease, functional impairment, cognitive decline and other physiologic changes are more common in older persons than among the young (Cockerham 1997; Maddox and Clark 1992). However, the "loss" model also focuses on non-physiological factors such as changes in social status position and informal and formal roles. Retirement, loss of particular family roles like parent, death of friends and the loss of intimate others in addition to new adjustments in norms and role expectations also describe events in later life that can threaten one's sense of personal control over self (Rodin 1986; Rodin and Timko 1992; Rowe and Kahn 1987).

The proposition that the loss of social roles and declining health status result in the diminishment of mastery with age can be related to adaptation theories in aging. How

individuals react to loss has been examined by gerontologists for decades. Some of the earliest work in social gerontology involves the adaptation of role theory to studying adjustments to aging (e.g. Cavan et al. 1949; Cottrell 1942). The focus of inquiry in this tradition is to examine the relinquishment of roles characteristic of adult life and the subsequent adoption of roles typical of later life such as retirement. This work stresses, however, that older adults are much more likely to lose roles than to acquire new ones. Also, the loss of many roles in later life, such as the "worker role," results in a loss of social identity and lower self-esteem (Rosow 1985). The idea of "loss" is also consistent with disengagement theory (e.g. Cumming and Henry 1961).While this theory includes psychological as well as social disengagement, it is clear that the concept of role loss is one of the core themes in this body of work. Furthermore, the idea that disengagement from social roles is normal and beneficial to society figured prominently. While not explicitly stated, the loss model is consistent with the core tenets of this theory. The loss of valued social roles, coupled with declining health, produce a lowered sense of control. Since health decline and role transitions are inevitable and natural, so is the decline in mastery with age.

Theories of personal gain associated with age emphasize what is acquired as the individual passes through the life course. The positive association of age with mastery may "symbolize the attainment of personal and institutional resources" that serve to enhance the individual's sense of control over their environment (Schieman and Turner 1998: 170). This is particularly true when one considers the career paths of many white collar professionals. As Schieman and Turner (1998) note, achievement in one's

occupation frequently does not emerge until mid-life. We may expect then that mastery may increase, relative to younger cohorts, in mid-life as occupationally related successes emerge for members of some groups.

The proposition that with age comes a greater sense of mastery over own's life is consistent with adult developmental stage theories.[6] The origin of stage theory can be traced back to the work of Buhler (1935), Jung (1958) and Erickson (1963, 1982). In gerontology, the work of Levinson and his colleagues (1978) and their attempt to map out an age-linked sequence of human development, is particularly influential (Dannefer 1984). Levinson et al. (1978) depict aging as a progression through different stages broadly categorized or defined as childhood/adolescence, early, middle and late adulthood. Human development is viewed as a kind of maturational unfolding that is regular, predictable and, above all else, universal. With age comes greater maturity and acceptance that increases positive self-image. In the case of mastery, individuals learn to master their environments, or alternatively, learn to accept limitations or change and hence perceive situations in a more positive light than younger persons. Although this model predicts a greater sense of mastery among the old relative to the young as opposed to the prediction of the "loss model," both of these models share a common theme -- the process that links age to a sense of personal control is essentially the same for all

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While some Developmental Psychologists may well object to these references because they are somewhat dated, my argument is not that these theories define the current state of thinking in Lifespan Developmental Psychology. Rather, an examination of the current explanations used to account for either declines or increases in mastery with age are framed, at least implicitly, within a stage model of personal development (e.g. Mirowsky 1995; Schieman 2001).

individuals. In other words, regardless of the model, changes in mastery are viewed as part of the normal path of adult development. From a social structural perspective, these models make no allowance for the influence of factors like socioeconomic status in altering age-related changes/differences in mastery.

3.1.3 Empirical Evidence on the Age-Mastery Relationship

There is evidence of both declining and increasing levels of mastery with age in the literature (Rodin and Timko 1992). However, several recent studies have found support for the "loss" hypothesis in that they have demonstrated a decline in mastery with age (e.g. Mirowsky 1995; Schieman and Turner 1998; Schieman 2001; Wolinsky and Stump 1996). It is important to consider these works because the designs of the study are able to address many of the limitations believed to be responsible for prior inconsistencies in the literature, most notably, age-truncated or small samples (Lachman 1986; Mirowsky 1995; Rodin 1986; Rodin and Timko 1992). In order to examine age-related changes across the life course, a necessary requirement is a sample of individuals across the whole adult life span with enough cases in each age group to meaningfully examine differences in mastery. Four recent studies have met these requirements in their examination of the age- mastery relationship (Mirowsky 1995; Schieman 2001; Schieman and Turner 1998; Wolinsky and Stump 1996). Each of these studies confirm that mastery declines after the age of 50. There are, however, some discrepancies in these works concerning the rate of decline in mastery after this age. Two of the studies report a step drop in mastery after age 50 (Mirowsky 1995; Schieman and Turner 1998). Wolinsky and Stump (1996), however, find that the decline in mastery is somewhat

more gradual - captured by a straight line. Despite the differences in rate of decline, all of these works provide partial support for the loss hypothesis. However, none of these studies is able to account for age-related differences in mastery by using measures of health and role status. Thus, the negative relationship between age and mastery persists even after controlling for health and role based transitions such as retirement and widowhood -- events thought to be responsible for declining levels of mastery with age.

3.1.4 Toward an Interactive Model of Socioeconomic Status, Age and Mastery

This review highlights what I consider to be problematic in the current literature on age, socioeconomic status and mastery: the failure to conceive, and, therefore, model an interactive rather than additive relationship between age, socioeconomic status and personal efficacy. There is sufficient theoretical rationale for hypothesizing that age and social class will interact to predict mastery and this can be illustrated by considering how the additive relationship between age, socioeconomic status and mastery is conceptualized in the literature.

First, as noted above, theory in the sociology of aging predicts that as individuals age, their sense of control over their lives will change. As we have seen, the direction of the change is contingent upon whether aging itself is viewed in terms of personal loss (Rodin 1986; Mirowsky 1995) or personal growth (e.g. Gove, Ortega and Style 1989; Levinson et al. 1978; Schieman and Turner 1998). While the debate on loss versus growth continues, both of these perspectives suffer from what Dannefer (1984) has called an ontogenic bias. Both perspectives assume aging to be an individual process that is universal and invariant. From a sociological perspective, no attention is paid to how

either of these processes (loss or growth) is connected to position in the social structure. For example, if it is true that with age comes ill health which, in turn, leads to lower perceived control (Rodin 1986), we may ask if this is the same for individuals regardless of socioeconomic position? Much previous research has determined that social position is linked to health such that those from lower socioeconomic positions suffer greater rates of morbidity and mortality (Link and Phelan 1995; Williams 1990). Recent work shows that when age and socioeconomic status are considered together, illness and disability among individuals from higher social class groups is postponed until well into old age whereas morbidity emerges much earlier in the lower social class groups (House et al. 1994). If illness is connected to both social position and mastery, then it seems reasonable to hypothesize that changes in either of these personal resources with age will be contingent on socioeconomic position. Indeed, it seems unlikely that the models of personal growth or loss can be generalized to all individuals regardless of social structural position.

While the literature on mastery in the sociology of aging tends to overlook position in the social structure, the literature concerning social structure and personality largely ignores the importance of age. For example, while social position is regarded as a fundamental determinant of mastery (Turner and Roszell 1994), little attention is given to how age may influence the class-personal efficacy relationship. As noted at the outset, one of the fundamental concerns of classical sociology is to link individual level phenomena, generally thought to be the domain of psychology, to position in the social structure. This task remains the *raison on d'etre* of the personality and social structure

perspective (House 1977), and of the stress process paradigm (Pearlin 1989). Yet, in the research that has attempted to link social factors like age and social class to psychological attributes such as mastery, it is apparent that social position remains an underdeveloped concept, both theoretically and empirically, in the vast majority of this work. Specifically, it is generally recognized that the traditional markers of social position - education, income and occupation - are not the only ways in which societies are stratified. Age, like education for example, is also a system of social stratification (Riley 1971; 1987). As Riley, Johnson and Foner (1972) note, age is both a process which occurs within the individual, and an indicator of his/her location in a social system. This duality of age (its biologic and sociologic properties) implies that "aging", as a process, will interact with systems of inequality (based upon education, income or occupation) to predict outcomes like health (House et al. 1994) and personal resources. There is good reason to hypothesize that the relationship between social class and mastery may vary with age. Thus, like the criticism of the aging literature above, we must not assume that the experience of social inequality, reflected in social status positions like education, will be the same regardless of age. Whether considered from an aging or social structure perspective, differences in mastery in the population are likely to be the result of both age and social structural differences.

Theoretically, many sociologists direct attention to the importance of considering how measures of social position such as age and socioeconomic status cross-cut one another. McMullin (1995) argues for a re-conceptualization of gerontological theories to include the notion that systems of stratification such as gender, social class and race form

interlocking webs of social inequality that shape the aging experience. Similarly, the multiple jeopardy hypothesis in medical sociology directs attention toward the health consequences of occupying two or more disadvantaged social statuses (e.g. Clark and Maddox 1992; Dowd and Bengtson 1978; Ferraro and Farmer 1996; Markides, Timbers and Osberg 1984). Together, this body of work provides further support for the investigation of age differences in the relationship between socioeconomic status and mastery.

To my knowledge, only one paper has been published to date that examines the possibility of an interactive relationship between age, education and sense of control. Schieman (2001) finds support for the cumulative advantage hypothesis (see Ross and Wu 1996). Specifically, for individuals with the highest levels of educational attainment, mastery actually increases, albeit slightly, across the lifespan. Conversely, he finds that the overall decline in sense of personal control with age observed in the whole population can largely be attributed to declining levels of mastery after ages 50-60 among average and below average level education groups. Moreover, the gap between education groups is widest among the oldest age cohort in his sample. He concludes that education appears to buffer the negative impact of aging on sense of personal control.

In the this paper, I examine whether age and measures of socioeconomic status interact to predict mastery. Next, I control for factors which may account for age-class differences in this personal resource.

3.2 METHOD

3.2.1 Sample

The sample is taken from the 1994-95 National Population Health Survey (NPHS) conducted by Statistics Canada. The NPHS was a 1994 telephone survey of a national probability sample of Canadian residents across all 10 provinces. Using a multi-stage, stratified random sampling procedure, Statistics Canada surveyed 19,600 households. One person from each household was selected to provide detailed personal information. Persons living on Native reserves, military bases, institutions and some remote areas in Ontario and Quebec were excluded. Of the 18,342 possible respondents aged 12 and older, 17,626 participated (a response rate of 96.1%). Because the primary focus of the study is on adults, and to be consistent with previous work, only those aged 20 and older were selected reducing the sample to 15, 789. After a listwise deletion of cases with missing values, the total sample was further reduced to 14, 390 (13,523 weighted). Chi-square and t-tests for differences between the full and list-wise deleted samples for age, gender and marital status were conducted. The results of these tests show that the reduced sample was virtually identical to the composition of the full sample in terms of these demographic variables. Further analyses revealed that household income was the variable that was responsible for a substantial proportion of the missing cases. In order to assess if there was a systematic pattern to the loss of particular cases on household income, a logistic regression procedure was used. A dummy variable was created differentiating "lost" cases (equal to "1") from those cases where household income was reported (scored as "0"). This variable was then regressed on age (in ten year

intervals), gender, marital status, main activity at time of survey, and education. The results show some pattern to the missing data for household income. Older adults and those with higher levels of education are more likely not to report their household incomes. However, the size of these effects are relatively small (Odds Ratios less than 2.0) and that the p-values, at least in the case of the age dummies for 50 to59, 60 to 69 and 80 and over, are greater than .01 ($p>.01$). Given our large sample size, the chances of detecting a significant effect are high, usually necessitating a more stringent criterion for rejection ($p<.001$ for example). Under such a criterion, only the dummy variables for the 30 to 39 age group and the less than high school group would qualify as evidence for statistically significant effects. On the basis of this, I conclude that the loss of cases on income has little effect on the findings presented here. There are no significant patterns that would affect the overall findings.

3.2.2 MEASUREMENT

3.2.3 Mastery

The measure of mastery is based upon the work of Pearlin and Schooler (1978). The seven-item measure asked respondents: "Now I am going to read you a series of statements that people might use to describe themselves: (1) you have little control over the things that happen to you (2) there is really no way you can solve some of the problems you have (3) there is little you can do to change many of the important things in your life (4) you often feel helpless in dealing with the problems of life (5) sometimes you feel that you are being pushed around in life (6) what happens to you in the future mostly depends on you (7) you can do just about anything you really set your mind to."

Respondents answered each statement by selecting one of the following responses; "strongly agree," "agree," "neither agree nor disagree," "disagree" or "strongly disagree." The measure is scored such that higher scores indicate a greater sense of mastery (0 to 28). Items number six and seven were reverse coded. The internal reliability of the scale is 0.76 (mean=19.62, s.d.=4.37).

3.2.4 Socioeconomic measures

Socioeconomic status is measured by two different variables in these analyses - education and household income. Education is based on an item involving a combination of qualitative and ordinal categories. The original measure was a 12 category variable reflecting different levels of education attainment. While some categories appeared to be ordered, other did not. Thus, the original variable was re-coded into 8 categories: (1) no formal schooling, (2) elementary level education, (3) some secondary level education, (4) high school diploma, (5) some education beyond high school, (6) college diploma or trade certificate, (7) undergraduate university degree, and (8) graduate degree (M.A. or Ph.D.) or a degree in medicine. For multivariate analysis, this measure was treated as a continuous variable (mean=4.79, s.d.=1.57).

Household income was coded into the following 11 intervals in the 1994 NPHS: (0) no income, (1) less than $5000, (2) $5,000 to $9,999, (3) $10,000 to $14,999, (4) $15,000 to $19,999 (5) $20,000 to $29,999 (6) $30,000 to $39,999 (7) $40,000 to $49,999 (8) $50,000 to $59,999 (9) $60,000 to $79,999 (10) $80,000 and more. An 11 item scale was created by setting each scale value to the midpoint of the interval. For

multivariate analysis, this variable was treated as continuous (mean=44,900, s.d.=27,700).

3.2.5 Health Measures

Because declining health status with age has been posited as an explanation for declining levels of mastery, this analyses will control for three health status variables. First, self-rated or perceived health is a global assessment of one's health in relation to others of the same age. Respondents were asked: "how would you rate your health compared to others your same age?" Respondents answered the question by selecting one of the following: "excellent", "very good", "good", "fair" and "poor". Higher scores indicate better self-perceived health (mean=3.73, s.d.=1.00).

The second measure of health status is an index of chronic conditions. Respondents were asked a series of yes or no questions about the presence of chronic conditions, for example, "Do you have diabetes diagnosed by a health professional? A list of 17 chronic conditions was selected from a larger list generated by Statistics Canada. Following previous work, an additive index was created summing "yes" responses to each health condition (0 to 17). Higher scores indicate a greater number of chronic conditions (mean=1.00, s.d.=1.32).

Finally, a measure for limitations in daily activities was included. Respondents were prompted to answer "yes" or "no" to six questions: "Do you need the help of another person with ...: (1) preparing meals (2) grocery shopping (3) normal housework (4) heavy housework (5) personal care (6) moving about in your home." All "yes"

responses were summed together to create an index. High scores represent more limitations in daily activities (mean=0.19, s.d.=0.74).

3.2.6 Age and the Sociodemographic Controls

Age was an ordinal variable coded in five- years intervals (20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79) except for the last interval that includes those aged 80 and over. A continuous measure was created by setting each interval to the midpoint of the range. In the last interval (80 and over), all respondents were set to 90 years of age (mean=44.88, s.d.=16.63). Gender was coded 1 for females (n=7117), 0 for males (n=6407). Marital status included three dummy variables for married (including common-law)(n=9188), previously married (including widowed, divorced and separated)(n=1930) and single is the reference category (n=2405). A variable for "main activity" was also included in these analysis. Four dummy variables were created: "working at home" (n=2046), "unemployed" (n=1589), "retired" (n=2170) and "employed" (reference category) (n=5491).

3.2.7 Analyses

The first analyses examine the bivariate relationship between age and mastery. Next, a series of regression equations are fit to the data to see whether or not the relationship between age, socioeconomic status and mastery is additive or interactive after controlling for gender and marital status:

$$Y = a - b_1 (age) + b_2 (SES) + b_3 (age*SES) + b_4 (gender) + b_5 (marital\ status)$$

where Y represents the predicted values for mastery and SES represents either education or income.

In the final analyses, I examine whether the inclusion of health and role (main activity) status variables affects the relationship between age, socioeconomic status and mastery.

3.2.8 Tests for Interactions

All tests for the presence of interactions followed the procedures described by Jaccard, Turrisi and Wan (1990). Equations with interactions are entered into a base line model containing all lower order terms. To test for the presence of a statistical interaction, R-squared values for base line models and those models containing interaction terms are compared using a incremental, or hierarchal F test procedure. The null hypothesis is that the regression coefficient for the interaction term is zero in the population.

The regression approach to modelling interactions between continuous variables assumes that the variables are measured at the interval-ratio level. While some have suggested that bias is introduced when the data are not interval-ratio (Busemeyer and Jones, 1983), others argue that the assumption of linearity of responses is appropriate with non-interval level data (Borgatta and Bohrnstedt, 1980). Although, strictly speaking, the data in these analyses are ordinal, the variables approximate interval-level characteristics and therefore, it is reasonable to proceed with a standard regression approach (Jaccard, Turrisi and Wan, 1990). Steps have been taken in these analyses to address the potential problem of multicolinearity. Following the advice of Cronbach (1987), and Jaccard, Turrisi and Wan (1990), all independent variables are "centred" (i.e. the mean score for education is subtracted from each education score for all respondents) prior to forming interaction terms.

3.3 RESULTS

3.3.1 Bivariate relationships between age and psychosocial resources

Before constructing multivariate models, it is important to first establish bivariate correlations between constructs thought to be theoretically important. Table 1 shows the correlation matrix between all variables included in the present study. Consistent with previous research, there is a significant, but weak correlation between age and mastery. Also consistent with previous work, education and income are also positively correlated with mastery. The strength of the relationship between both education and mastery, and income and this personal resource is moderate. Finally, there is a moderate to strong relationship between age and chronic conditions, and age and restrictions in daily living; as age increases, so do the count of chronic conditions and the number of restrictions in daily living. Education and income are also negatively correlated with the health measures in these data.

3.3.2 Age and Mastery

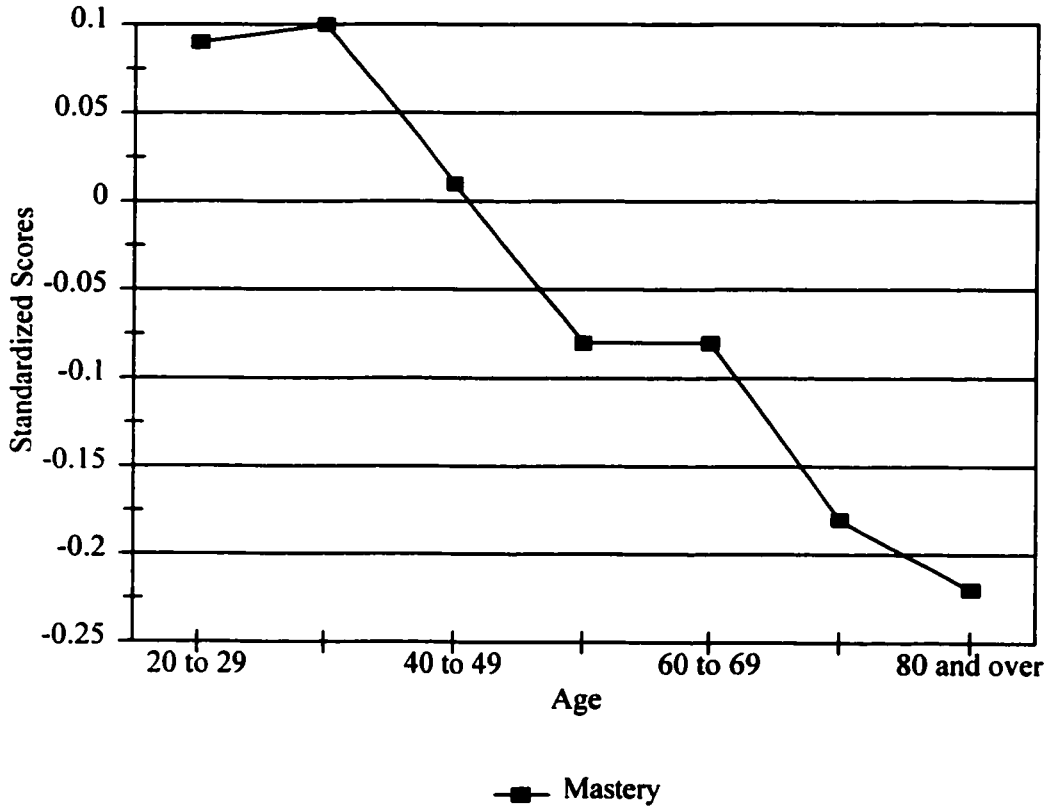
Previous research has produced equivocal results regarding the relationship between age and mastery. The first step in this analysis is to determine the direction and nature of the bivariate relationship between age and this psychosocial resource. Mean scores for mastery within age cohorts (10 year cohorts to age 80 and over) are calculated. Mastery is standardized to illustrate relative effects by age. Mean standardized scores are then plotted by age (see Figure 1). Mastery declines with age after 30 to 39 with the lowest reported scores found among those in the 80 and over age cohort.

Table 1. Correlation Matrix for Age, Income, Education, Mastery, Chronic Conditions and Restrictions in Daily Living

Variables	Age	Income	Education	Mastery	Chronic Conditions	Restrictions in Daily Living
Age	1.00					
Income	-0.176 ***	1.00				
Education	-0.276 ***	0.341 ***	1.00			
Mastery	-0.094 ***	0.200 ***	0.189 ***	1.00		
Chronic Conditions	0.253 ***	-0.172 ***	-0.167 ***	-0.192 ***	1.00	
Limitations in Daily Living	0.391 ***	-0.134 ***	-0.112 ***	-0.175 ***	0.383 ***	1.00

*** p<.001

FIGURE 1. Standardized Mean Scores for Mastery by Age



3.3.3 Multivariate Models for Mastery

Prior to testing for interactions between age and social class on mastery, we must establish a base line model to test for additive associations between age, education and income with mastery in the presence of other demographic controls. The results of the first part of this analyses are displayed in Table 2. Model 1 shows the effect of age on mastery. As indicated in Figure 1, the relationship is significant and negative. Consistent with previous work, the variance in mastery attributable to age is small (about 1 percent). Additional analyses (not shown) were conducted to test whether the relationship between age and mastery was non-linear. Mirowsky (1995), for example, reported that the rate of decline in mastery by age is not linear but is best captured by a cubed function. Schieman and Turner (1998) and Schieman (2001) also find that the functional form of age and mastery is best modelled with an equation including a quadratic term for age. In light of this work, two separate models are fit; one including a quadratic term for age, the other with an additional cubed term added. In both cases, the addition of the non-linear components for age fail to reach statistical significance in the model. The additional terms also do not show a statistically significant improvement to the overall fit of the model. On the basis of these results, the linear model of age and mastery was retained for further analyses.

In model 2, income is introduced into the base line model containing age. The coefficient for age is unchanged. The coefficient for income is also significant and positive suggesting that as income increases, so too does the sense of mastery or control. Adding income into the base model also significantly increases the amount of explained

TABLE 2. OLS Regression of Mastery on Age, Income, Education, Gender, Marital Status, Age by Income and Age by Education: 1994-95 National Population Health Survey (N=13,523 weighted)[1]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Age	-0.02 *** (-.09)	-0.02 *** (-.06)	-0.01 *** (-.05)	-0.01 *** (-.03)	-0.01 *** (-.03)	-0.01 *** (-.04)	-0.01 *** (-.04)	-0.01 *** (-.05)
Income		2.98E-5 *** (0.19)		2.37E-5 *** (0.15)	2.24E-5 *** (0.14)	2.16E-5 *** (0.14)	2.25E-5 *** (0.14)	2.20E-5 *** (0.14)
Education			0.49 *** (0.18)	0.36 *** (0.13)	0.36 *** (0.13)	0.37 *** (0.13)	0.38 *** (0.14)	0.38 *** (0.14)
Female					-0.39 *** (0.07)	-0.39 *** (-.04)	-0.40 *** (-.05)	-0.40 *** (-.05)
Single					-0.11 (-.01)	-0.16 (-.01)	-0.15 (-.01)	-0.17 (-.01)
Previously Married					-0.21 (-.02)	-0.27 * (-.02)	-0.22 * (-.02)	-0.26 * (-.02)
Age* Income						3.26E-7 *** (-.03)		2.03E-7 * (-.02)
Age* Education							-7.12E-3 *** (-.04)	-6.10E-3 *** (-.04)
Intercept	20.74	19	17.8	17.2	17.5	19.87	19.8	19.8
R^2 (adjusted)	0.01	0.04	0.04	0.06	0.06	0.06	0.06	0.06

[1] unstandardized regression coefficients are reported along with standardized coefficients in parentheses; E represents an exponent to the base 10.

*** p<.001 ** p<.01 * p<.05

variance. Similarly, in model 3, the coefficient for age remains largely unchanged after the addition of education. The coefficient for education is both significant and positive suggesting that as education increases mastery also increases. As well, the explained variance in mastery is higher after including education in the base model (equation 1). Model 4 shows the effect of age net of education and income. Once again, the age coefficient remains unchanged from previous models. Both education and income are significantly related to mastery net of each other and age. The values for both coefficients for education and income are reduced slightly from the previous two models suggesting that part of the effect of education on mastery is due to income. Together, these three variables account for about 6 percent of the total variance in mastery. In model 5, controls for gender and marital status are added. The coefficients for age, education and income remain statistically significant and relatively unchanged suggesting that gender and marital status do not account for observed differences in mastery by these variables. Of the new variables entered in model 5, only gender is statistically different. Women, on average, report lower mastery scores than men net of age, education, income and marital status.

Models 6 through 8 are the formal tests for interactions between age and socioeconomic status. In model 6, an interaction term for age by education is added into the equation. The term is statistically significant. Similarly, in model 7, an interaction term for age by income is entered. Again, the coefficient for the term is significant. While the contribution of these terms to the overall explained variance is slight, incremental F-tests reveal that both of these predictors make statistically significant contributions to the

overall fit of the model. Model 8 shows the effect of entering both interactions into the base equation containing all lower order terms. Both interactions remain statistically significant net of the other terms. The addition of the interaction terms, both separately and together, alters the effect of marital status on mastery. After partialling out the effect of age by education and age by income, those who were previously married report lower mastery levels on average compared to those who are married.

Having established that age interacts with education and with income to predict mastery, we must now examine the nature of this association. To facilitate this, graphs showing how the relationship between age and mastery varies by education and income are presented (see Figures 2 and 3). Figure 2 shows the relationship between age and mastery within three different education levels. Low, middle and high educational levels are determined by standardized scores from the mean. Low education is equal to -1 standard deviation below the mean, middle education is equal to the mean and high education is equal to 1 standard deviation above the average education score in this sample. Using equation 7 in Table 2, the predicted values of mastery are plotted at three age points: each value for age also represents the middle two thirds of the data.

The widest gap in mastery by education occurs in the youngest age cohort. This gap becomes successively smaller across age cohorts until the oldest cohort (+1 standard deviation above the mean age). Overall, the pattern of educational differences in mastery is one of convergence with age. In fact, among the oldest cohort, the lines cross; individuals from the highest education group actually report lower mastery scores than individuals from the lowest education grouping.

FIGURE 2. Age by Predicted Mastery Scores within Education Levels, Controlling for Gender and Marital Status

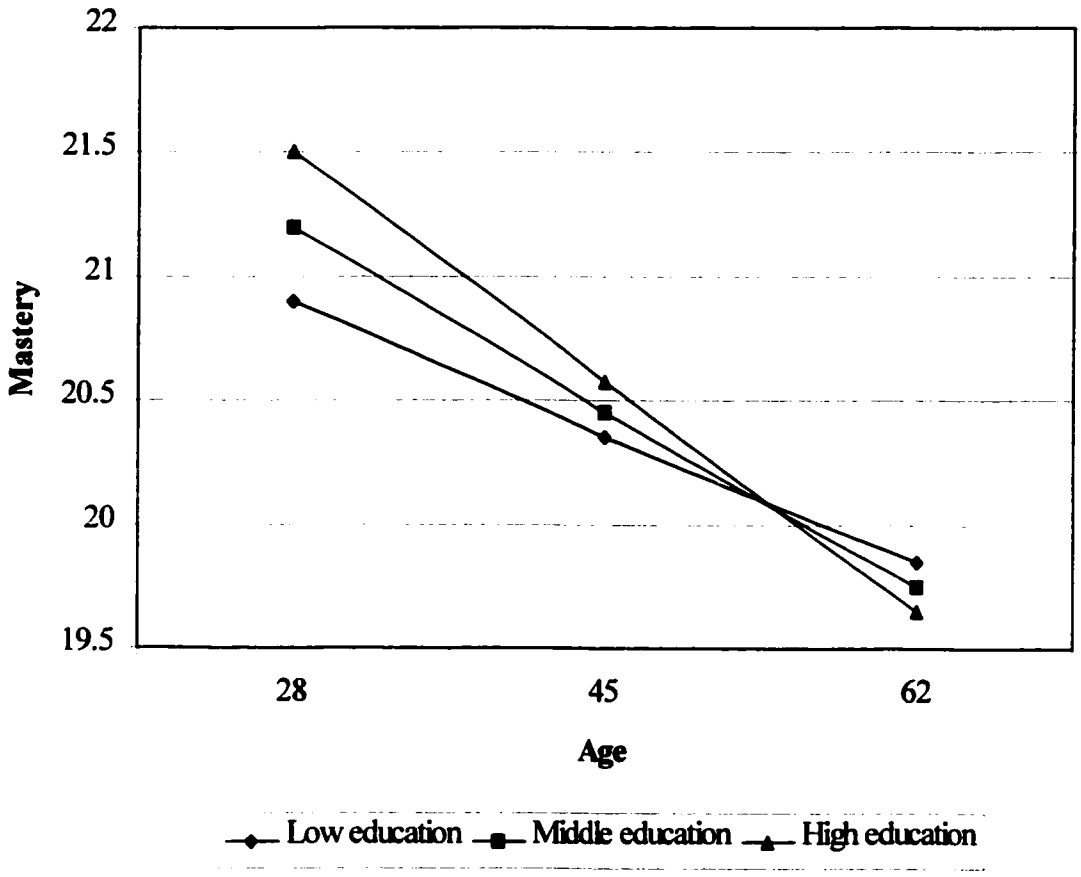


FIGURE 3. Age by Predicted Mastery Scores within Income Levels, Controlling for Gender and Marital Status

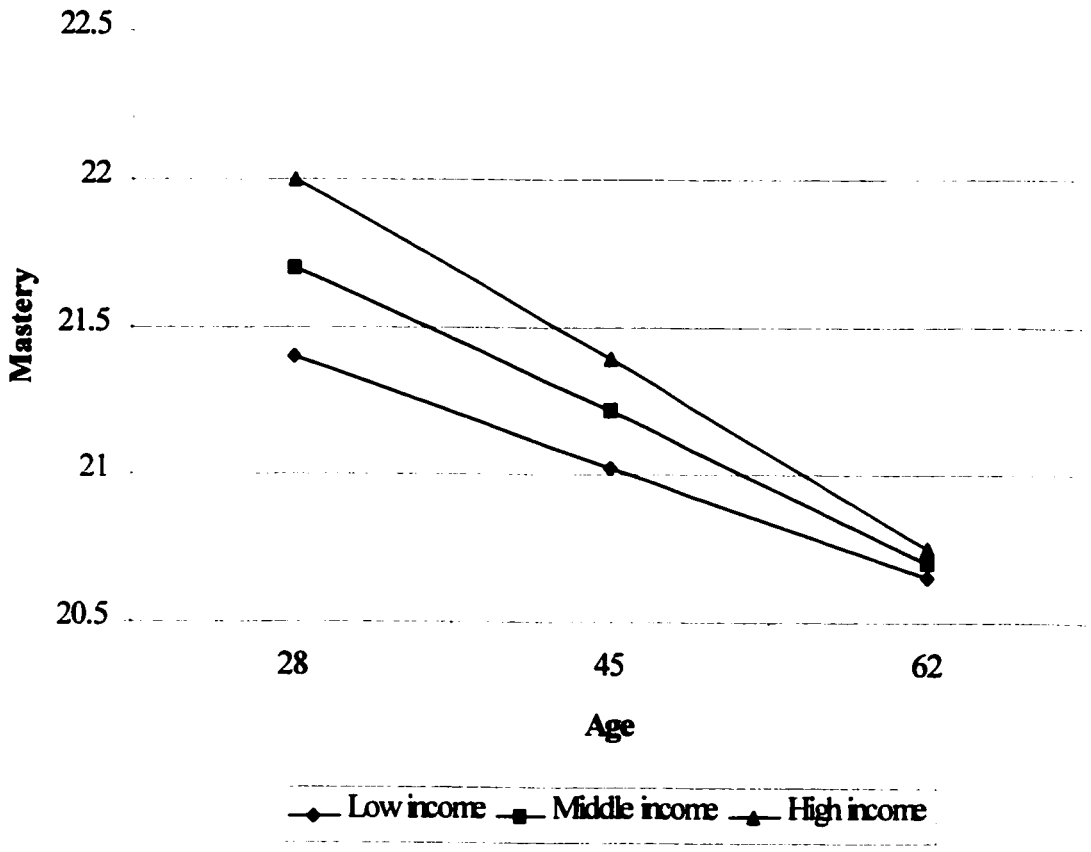


Figure 3 shows the relationship between age and mastery within three different levels of household income. Again, these income levels reflect standardized scores in the range of -1 to +1 standard deviation units. The widest gap in mastery occurs among the youngest cohort. The lines representing income levels converge across successively older cohorts reaching the most narrow point among the oldest age grouping. Perhaps the most notable difference is the degree of convergence. In the age by income interaction model, there is evidence of convergence, but not the cross-over effect observed in the model with the age by education interaction.

In the next part of the analysis, I control for role status or activity measures and health status variables to determine whether these factors can account for age by socioeconomic differences in mastery (see Table 3). Models 1 through 5 show the effect of introducing health and roles status variables both individually and simultaneously. I also include interaction terms for each of the health and role status variables by education and income. This procedure accounts for the possibility that the impact of chronic conditions, for example, on the age by education interaction may not be the same across all levels of education (Kessler and Essex 1982).

In the first model, a measure of chronic health problems and the interaction terms for this variable with both education and income are entered into the model containing the age by education and age by income interactions. Comparing model 1 (the base line model) to model 2, the coefficient for age by income increases after controlling for chronic health conditions (from -2.03E-7 to -2.85E-7). Similarly, the coefficient for

Table 3. OLS Regression of Mastery on Age by Socioeconomic Interactions Controlling for Role Status and Health Status: 1994-95 National Population Health Survey (N=13,523 weighted)[1]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Age by Income	-2.03E-7 * (-.02)	-2.85E-7 ** (-.03)	-3.00E-7 ** (-.03)	-3.26E-7 ** (-.03)	-9.77E-8 (-.01)	-2.12E-7 (-.02)
Age by Education	-6.10E-3 *** (-.04)	-6.68E-3 *** (-.04)	-7.11E-3 *** (-.04)	-5.37E-3 *** (-.03)	-1.05E-2 *** (-.07)	-1.00E-2 *** (0.00)
Chronic Conditions		-0.48 *** (-.15)				-0.14 *** (-0.04)
Chronic by Education		2.13E-2 (.01)				1.34E-2 (.01)
Chronic by Income		1.04E-6 (.01)				-8.02E-7 (-.01)
Limitations in Daily Living (LDL)			-0.81 *** (-.14)			-0.32 *** (-.05)
LDL by Education			5.37E-2 (.02)			9.87E-2 ** (.03)
LDL by Income			1.68E-7 (.00)			-2.52E-6 (-.01)
Self-rated Health (SRH)				1.19 *** (0.27)		1.04 *** (0.126)
SRH by Education				3.50E-2 (.01)		7.36E-2 ** (.03)
SRH by Income				-5.50E-6 *** (-.03)		-4.46E-6 ** (-.03)

Table 3. Continued

Working at Home (WH)					-0.23 (-.02)	-6.89E-2 (-.01)
WH by Education					-1.59E-2 (-.00)	2.07E-3 (.00)
WH by Income					1.53E-5 *** (.04)	1.01E-5 * (.02)
Unemployed (UE)					-1.25 *** (-.09)	-.56 *** (-.04)
UE by Education					0.27 ** (.03)	.14 (.02)
UE by Income					3.63E-6 (.01)	-6.08E-7 (-.00)
Retired (R)					0.83 *** (0.07)	1.07 *** (.09)
R by Education					0.36 *** (.06)	.30 ** (.05)
R by Income					5.26E-8 (.00)	-1.46E-6 (-.00)
Intercept	19.8	20.25	19.93	19.8	19.9	19.87
R^2	0.06	0.08	0.08	0.13	0.07	0.14

[1] unstandardized regression coefficients are reported along with standardized coefficients in parentheses. All models control for age, education, income, gender and marital status.

*** p<.001 ** p<.01 * p<.05

education also increases after controlling for this set of variables (from -6.10E-3 to -6.68E-3). The coefficient for chronic conditions suggests, consistent with the literature, that as chronic health problems increase, mastery decreases. Neither of the interaction terms are significant suggesting the impact of chronic conditions on mastery is consistent across different levels of education and income.

Models 3 and 4 show the effect on the age by socioeconomic interactions after controlling for limitations in daily living and self-rated health respectively. Again, the coefficients for age by income and age by education increase from model 1. As well, increases in limitations in daily living are associated with decreases in mastery. Better self-rated health, conversely, is associated with higher average mastery scores. Once again, neither of the interaction terms for limitations in daily living are significant. However, the interaction between income and self-rated health is significant in this model. Overall, across models 2 to 4, the introduction of the health status variables increases the effects of age by education and age by income on mastery. This suggests that failing to control for these variables results in an underestimate of the effect of age by class differences in mastery.

In model 5, the variables representing role status or main activity are entered into the base equation containing the age by socioeconomic interactions. The inclusion of these variables results in a significant decrease in the effect of the age by income interaction. In fact, the interaction is no longer significant once the variance due to main role activity has been partialled out. This suggests that the age by income effect on mastery can be accounted for by role status. More specifically, it seems that the age by

income interaction is accounted for by the interaction of working at home by income. This is most likely a function of more people working at home as they grow older. In particular, women who have always worked at home are likely to continue to report their status in this way. They do not report being retired because their status has not changed. However, their household income levels are apt to be lower than younger home-makers thereby accounting for overall differences in income with age. In short, it is differences in this group that appear to be accounting for the overall age by income differences in mastery.

The interaction between age and education again increases from model 1 once again demonstrating that similar to health status, failing to control for role status results in an underestimation of the effect of age by education differences in mastery. Several coefficients for role status by class interactions are significant. This suggests that the impact of role status on age by class effects on mastery varies across different levels of socioeconomic status.

Finally, model 6 again demonstrates that the age by income differences in mastery is attributable to the working at home by income interaction. Alternatively, the interaction term age by education has actually increased significantly from model 1. Age by education differences in mastery are actually underestimated when health and role status are not controlled for in the model; the effect of age by education on mastery is stronger once differences in role and health status are taken into consideration. So, the results of the age by socioeconomic status interactions predicting mastery cannot be said to be artifacts of health and role status variations by socioeconomic status.

3.3.4 Testing for Three-Way Interactions Between Gender, Socioeconomic Status and Age

There are both theoretical and empirical rationales for examining whether or not the patterns observed for mastery by the socioeconomic status and age interactions are the same for both men and women. As with age, gender is an important determinant of position in the social structure. In order to test for this possibility, three-way interactions between gender, age and socioeconomic status were entered into a model containing each of these variables and marital status predicting mastery. The coefficient terms for both three-way interactions were not statistically significant. In addition, the results of an incremental F-test also showed that the introduction of these interactions did not make a significant contribution to the overall fit of the model.

3.4 DISCUSSION

The findings of this study support the hypothesis that the relationship between age and mastery is contingent upon position in the social structure. The relationships between education, age and mastery are particularly striking in this regard. If we examine the distributions of age and mastery by education groups (see Figure 2), we see that the socioeconomic gap in mastery converges with age and then switches, so that older adults with high levels of educational attainment actually report lower mastery scores than individuals with average and below average levels of education. For the highest education group, there is a pattern of decline similar to the bivariate relationship between age and mastery in Figure 1 whereas the decline in mastery with age in the below average

education group is much less steep. It appears that the overall decline in mastery with age is in large part due to the decline in mastery among those with higher levels of education.

This has important implications for building a sociogenic theory of age and mastery. Specifically, as noted in the review, theories of age related changes in mastery, whether they predict an increase or decrease in mastery, reflect an ontogenic bias in their implicit assumption that the process of aging is the same for all individuals regardless of position in the social structure (Dannefer, 1984). Clearly, the findings of this study challenge such an assumption. The steepness of the decline in mastery is contingent upon socioeconomic status. Moreover, the prediction that mastery declines with age, and the explanations forwarded for such a hypothesis, are clearly not universal if the rate of decline in mastery is dependent upon position in the social structure. For example, the theories of "loss" identified in the literature hinge on role related transitions and health status to account for declining levels of mastery with age. Retirement, for example, was long viewed in social gerontology as a role transition that may lead to "crisis" or loss of identity in old age (Rosow 1985). However, in a sociogenic model that considers the interactive effect of age and social class, such a proposition becomes, at best, contingent on social position. In other words, it may be the case that retirement from the labour force reduces personal efficacy among the elderly, but not for everyone. Individuals from disadvantaged social circumstances may not be affected by the "loss" of employment especially if the job was not desirable or rewarding in the first place. Indeed, retirement from low paying, low-autonomy, low self-directed jobs may bring happiness or relief (Wheaton 1990). Stated simply, role transitions like retirement, when viewed from a

middle and upper class perspective, may embody the notion of "loss" depicted above. When viewed from different social structural locations, role transitions may signal no change in identity, or perhaps even positive changes. The fulcrum upon which all of this depends is position in the social structure. It is also important to note, however, that in the analysis presented here, controlling for main role status activities and health status did not alter the relationship between socioeconomic status, age and mastery. Thus, while mastery levels are lowest for the above average education group by the age of 62, this decline is not correlated with health or role status- contrary to the explanations associated with the "loss" theory. However, the measures available to assess role status and health are somewhat limited. In the cases of the latter, all measures are based upon self-reported health status information. Further research must explore the possible mechanisms that account for age by socioeconomic differences in mastery.

The failure to find a second-order interaction with gender in these data must be interpreted carefully. The fact that the socioeconomic gap in mastery with age is the same for both men and women in no way suggests that gender is not a significant social structural predictor of sense of personal control. Socioeconomic status itself is structured by gender, age and race/ethnicity (McMullin 1995). Therefore, the socioeconomic status differences in mastery reported in this paper, at least in part, reflect these deeper structured social relations.

Another important finding concerns the functional relationship between age and mastery. Unlike other studies (Mirowsky 1995), in this study, the functional form of age is best captured using a linear model, not an accelerated rate of decline model (e.g. a

cubed or squared function). This is consistent with the results of another study that found that the relationship between age and mastery was negative and linear after the age of 50 (Wolinsky and Stump, 1996). Wolinsky and Stump (1996) feel that the discrepancy between their study and Mirowsky's is due to the fact that the age range of their sample is from 50 to 96. In their view, the accelerated rate of decline in mastery in Mirowsky's (1995) data is due to the inclusion of younger subjects (ages 20 and up). A close examination of Figure 1 in Mirowsky's (1995) work clarifies the point. If those under the age of 50 were removed from the analyses, the relationship between age and mastery would be negative and linear, similar to the findings reported by Wolinsky and Stump (1996). In other words, from early adulthood to middle age, there is no relationship between age and mastery - the line is flat. After age 50, mean scores for mastery across age groups drop significantly. This pattern produces the accelerated rate of decline model, or the cubed function of age mastery, described by Mirowsky (1995). The importance of this is the congruence with Mirowsky's findings. Specifically, age 50 seems to be the crucial point at which mastery starts to decline. Therefore, they suggest that research should focus attention on the social, psychologic and biologic factors associated with time of life that may drive the downward trend in mastery observed after this age.

The results from this study raise important challenges to previous research concerning both the functional form of age by mastery, and age 50 as the point at which mastery or sense of control starts to decline. Regarding functional form, the sample used in this study included individuals from age 20 and up but was still unable to find the

accelerated rate of decline in mastery observed by others (Mirowsky 1995; Schieman 2001; Schieman and Turner 1998). Rather, the relationship between mastery and age is negative and linear in these data. The results from this study indicate that the decline in mastery begins at a much earlier age than 50, as indicated by previous research (Mirowsky 1995; Schieman 2001; Wolinsky and Stump 1996). Our results show that mastery starts to decline after the 30 to 39 age cohort. Among those aged 20 to 39, then, mastery levels are highest. Focussing on the psychosocial events associated with life after age 50, then, may be misleading. This is particularly true of those perspectives that suggest that mid-life is a time where individuals feel most in control of their lives largely through successful achievements related to work (Schieman and Turner 1998). In support of this, Schieman (2001) found an inverted u-shape relationship between age and sense of control; younger and older people reporting lower levels of control relative to middle aged adults. My data suggests that decline begins much earlier in life, but that the rate of decline varies by socioeconomic position. These findings indicate that global or universalizing assumptions about personal control at mid-life are very problematic. Rather, we must frame explanations of age-related differences in mastery in the context of social structural inequalities between groups in society. While mid-life may be the "pinnacle" of achievement for the white collar professional, this depiction cannot be generalized to other social groups.

Although differences in the population from which each sample was drawn may also be the cause of these disparities in the age-mastery relationship, this is unlikely for a number of reasons. Both Mirowsky's samples were based upon community residents like

the National Population Heath Survey. The sample used by Wolinsky and Stump (1996), however, was a clinical sample. While this may explain differences between our findings and those reported by Wolinsky and Stump, it cannot account for the similarity in results between the other studies. In short, it seems unlikely that differences in the age-mastery relationship between studies is due to differences in the use of clinical versus community samples. It may be the case, however, that the differences observed between studies are the result of other discrepancies between the populations sampled. The most notable difference between these three studies is that two were conducted in the U.S., while this one used a sample of Canadians. One may question whether age-mastery disparities between studies could simply be the result of U.S-Canadian differences. This is of course, is difficult to answer without designing a study for cross-national comparisons but one point is noteworthy. First, one of the most often cited differences between U.S. and Canada is the difference in racial composition of the population and the economic disadvantage experienced by minority groups in America. Here, the most obvious group is African Americans. Could the differences observed be due to racial differences between populations? The measure of race available in the NPHS was not adequate for inclusion, therefore, I could not adjust for this important variable in multivariate analyses. However, while both Mirowsky (1995) and Wolinsky and Stump (1996) controlled for race, the variable did not alter the age-mastery relationship observed. Thus, it seems unlikely that differences in racial composition are causing the inconsistencies between studies in terms of the age-mastery relationship. Further research should examine the possibility that differences can be attributed to cross-national variations.

Finally, the data used in this study are cross-sectional and, as a result, it is not possible to explain the observed patterns in terms of an aging effect. Differences between age groups could be attributable to period or cohort effects although in the case of the former, the possibility of a direct period effect on age differences can largely be ruled out with cross sectional data (Gove, Ortega and Style 1989). Longitudinal data are required to disentangle aging from cohort effects. Unfortunately, no such data currently exist. Whether we interpret the observed patterns between age, socioeconomic status and mastery as the result of either aging or cohort effects, the fact that the relationship between age and mastery is conditioned by socioeconomic status reinforces the importance of social structure in shaping identity. Thus, whether or not changes in mastery with age are due to historical effects or part of the psychosocial process of aging, position in the social structure has an important moderating effect in the social distribution of this important psychosocial resource.

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CHAPTER FOUR

THE SOCIAL STRATIFICATION OF AGING AND STRESS: A FURTHER EXPLORATION OF THE EPIDEMIOLOGY OF SOCIAL STRESS

4.1 INTRODUCTION

One of the principal tasks of sociologists of mental health has been to examine the social distribution of psychological illness in the general population. Early research demonstrated that psychological distress and psychiatric disorders were differentially distributed by socioeconomic status, marital status and gender (see Dohrenwend and Dohrenwend 1969; Faris and Dunham 1939; Gove 1972; Hollingshead and Redlich 1958). As Turner and his colleagues note, interest in the social patterning of psychological distress and disorder is guided by the belief that important etiologic clues are to be found in these correlations (cf. Turner and Avison 1989; Turner, Wheaton and Lloyd 1995). This is part of a larger tradition in the sociology of mental health where the explicit intent is to elucidate the connection between position in the social structure and psychological distress and impairment (Aneshensel 1992; Link and Phelan 1995; Pearlin 1989).

The demonstration of correlations between social and economic position and psychological distress, however, does not represent the end point of sociological inquiry. Sociologists have sought to identify and explain the linkages between social status positions and mental health. Indeed, the search for how socio-environmental factors contribute to psychological distress marks the unique contribution that sociology can make to the more biologically and individually orientated disciplines of psychiatry and

psychology (Pearlin 1989). One of the most compelling hypotheses concerning the link between social position and psychological distress and disorder is that the social distribution of mental health problems results from differential exposure to stress (Dohrenwend and Dohrenwend 1974; Pearlin 1989; Pearlin et al. 1981; Turner, Wheaton and Lloyd 1995). According to this perspective, it is argued that individuals from low socioeconomic status positions suffer much greater levels of stress and strain than individuals from more advantaged social positions. In turn, differential exposure to stress accounts for the observed social inequalities in mental health identified above.

While this explanation has been widely accepted by medical and psychiatric sociologists, there has been surprisingly little empirical research to assess how much of the variation in psychological distress and disorder by social position can be attributed to stress exposure, particularly when stress is not defined solely in terms of acute life events (but see Turner, Wheaton and Lloyd 1995, Turner and Lloyd 1999). This has been attributed to the fact that most early work in the field focused almost exclusively on life events as a measure of stress and that the correlations between life event inventories and social variables such as occupation, income and education were typically quite low (Maclean and Link 1994; Turner, Wheaton and Lloyd 1995; but see Brown and Harris 1978). As a result, some researchers turned their attention from stress exposure to stress vulnerability and began to examine how differential response to undesirable life events may shed light on the social distribution of psychological distress and disorder (see Kessler 1979).

Recently, however, Turner and his colleagues have called for a re-examination of the exposure-vulnerability debate. Following Pearlin's (1989) invitation, they have systematically examined the social distributions of many of the important mediating and moderating variables in the stress process model: social stress (Turner, Wheaton and Lloyd 1995), social support (Turner and Marino 1994), psychosocial resources (Turner, Lloyd and Roszell 1999) and all the components simultaneously (Turner and Lloyd 1999). They have returned to the early work of sociologists in the field by examining the social patterning of these variables and their relation to psychological distress and disorder, in light of the many methodological advances that have occurred over the past few decades, particularly in the measurement of social stress. In all of these papers, they examine how closely the principal components of the stress process model (i.e. stress, psychosocial resources and social support) mirror the social distribution of psychological distress and disorder. Following classic works, the social variables they include are social class (occupation), gender, marital status and age. Their findings support the sociological interest in community studies of mental health. They demonstrate, particularly in the case of social stress (Turner, Wheaton and Lloyd 1995) that a substantial amount of the variation in psychological distress and depression is attributable to the social patterning of exposure to social stress (life events, chronic strain and early traumas). Their findings remind sociologists not to lose sight of social conditions, reflected in social statuses and roles, as fundamental determinants of psychological well-being (Link and Phelan 1995).

While the importance of the work of Turner and his colleagues cannot be overstated, most, if not all, of this work treats the traditional markers of social structural

position (socioeconomic status, gender, marital status and age) as separate rather than interconnected predictors of mental distress and disorder. In this paper, I examine how two important indicators of social position, socioeconomic status (education and income) and age, interact to predict stress levels using three of the most common measures of social stress found in the contemporary literature. In the sections that follow, I first review the literature on the various domains of stress that have been developed in the stress process literature over the past couple of decades. Next, I review the literature on socioeconomic status and stress, and age and stress in order to propose a model that links age, social position, and stress in an interactive rather than additive manner. Finally, an empirical test of the model is presented and discussed.

4.1.1 The varieties of Social Stress: Life Events and Chronic Strains

4.1.2 Life Events - Recent and Remote

As Wheaton (1994) notes, it is remarkable how often stress researchers use the term stress without clearly defining what the term means. In light of this criticism, I define what are generally considered to be the major domains of the stress universe found in the current stress process literature.

Although a number of definitions abound in the stress literature, three definitions capture quite adequately what is meant by the term "stress", and the sociological nature of the construct. The first definition of stress is derived from George (1980) and House and Robbins (1983) who define stress as any "condition" that "threatens or challenges" the well-being of individuals (cf. George 1989, p. 243). The second definition comes from the pioneering work of Holmes and Rahe (1967) who define stressors as "demands"

on the individual. The origin of these "demands" may be social, environmental or internal and they almost always necessitate behavioural re-adjustment (Thoits 1995). The focus in both of these definitions is clearly on the origins of stress (internal versus external) and the behavioural demands created by exposure to stressful stimulus. On the response side of the stimulus-response equation however, behavioural change may not be the only possible outcome of stress. The work of Brown and Harris (1978) has been particularly influential in identifying the psychological consequences of stress rather than behavioural adaptation per se (McLean and Link 1994). Therefore, stress is any stimulus produced by social, psychological or environmental conditions that require/demand a response, either in terms of behavioural adaptations or by evoking a strong emotional response. The final contribution to this definition of stress comes from Pearlin (1989, p. 242) and his reminder of the distinction between social stressors and other kinds or sources of stress:

> Many stressful experiences, it should be recognized, don't spring out of a vacuum but can typically be traced back to surrounding social structures and people's location within them. The most encompassing of these structures are the various systems of stratification that cut across societies, such as those based upon social and economic class, race and ethnicity, gender and age. To the extent that these systems embody the unequal distribution of resources within them may itself be a source of stressful conditions.

According to this view, stress is not a random event or process that strikes individuals in a haphazard manner. Rather, many stressors arise from the social environment, what Pearlin calls systems of social stratification.

A review of the literature reveals two important domains of the stress universe - life events, both recent and remote, and chronic strains (McLean and Link 1994). While

there are many more kinds of stressors like daily hassles (Lazarus and Folkman 1984; Folkman, Lazarus, Pimley and Novacek 1987), and macro-level stressors like unemployment (e.g. Brenner 1974; Dooley and Catalano 1980, 1984a, 1984b), the majority of work in the stress process literature has focused on life events and chronic strains (Pearlin 1989). The focus of this paper will also be on life events and chronic strains.[7]

Life events are usually defined as objective, discrete events that disrupt the normal pattern of daily life and can lead to either psychological distress or other physiologic changes in individual well-being. Until about a decade and half ago, the principal focus in this area was on the connection between life events and mental well-being (Dohrenwend and Dohrenwend 1974; Jemmott and Locke 1984; Jenkins 1976). While the intellectual origins of this work can be traced to physiology, most notably the work of Cannon (1929) and Selye (1956), it was not until the development of the Schedule of Recent Experiences (SRE) by Holmes and Rahe (1967) that widespread use of life events as stressors came into prominence in studies of physical and mental health in human populations. The SRE inventory provides researchers with a concise, objectively defined set of events that adheres to the classic biologic model of stress as an "insult" to the homoeostatic balance of the organism (Wheaton 1994). What underlies this approach, both in the biologic and psychosocial traditions, is that *change qua change*

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Not only are they the most common measures of stress in the literature, daily hassles and macro-level stressors were not included in the 1994-95 National Population Health Survey.

leads to psychologic or physiologic disturbances regardless of the nature of the event (positive or negative).

The idea that change per se is sufficient to produce stress has been effectively disputed as a theoretical supposition (see Pearlin 1989). Wheaton (1990) is able to show that the loss of important roles, such as the transition from work to retirement or from marriage to divorce, is not necessarily stress provoking, especially if the individual is leaving an undesirable job or unsatisfying marriage. Another approach that challenges the *change qua change* assumption in life events research is the work of Turner and Avison (1992). They argue that life events have the potential to generate both positive and negative consequences and that the outcome is contingent on the active coping response of the individual. In support of this argument, Turner and Avison find that only unresolved life events lead to psychological distress - events which are resolved do not.

The idea that underlies all of this work is the notion that change, in and of itself, is not a sufficient cause of stress. This has led to a focus on negative events rather than change per se. In the area of mental health research, it is now firmly established that the clustering of one or more negative life events in the 12 months prior to the time of the survey leads to increased symptoms of psychological distress and psychiatric disorder (Brown and Harris 1978; Kessler, Price and Wortman 1985; Thoits 1983, 1995).

While life events are most often operationalized as recent occurrences (generally within a one year period), researchers are also aware that some events consequential to individual well-being, occur earlier in an individual's personal biography (McLean and Link 1994). Recently, attention has been directed toward examining events in childhood

such as early loss or separation from a mother (e.g. Brown and Harris 1978; Kendler, Neale, Kessler, Heath and Eaves 1992), sexual or physical abuse (e.g. Kessler and Magee 1993) and the cumulative effect of early traumas on adult depression and psychological distress (e.g. Turner and Lloyd 1995). It is clear from this work that childhood adversities have important consequences for psychological well-being and that their influence extends well beyond the traditional one year period for "recent" life events. This has led many in the field to pay greater attention to the history of negative life events including the inter-relationships between remote stressors, more recent life events and chronic strains (e.g. Wheaton 1994), and the relationship between early events and the onset of depression and other disorders (e.g. Kendler et al. 1992; Kessler and Magee 1993; 1994).

4.1.3 Chronic Stress

Another significant shift in theory from the traditional life-events model concerns the second type of stressor identified in the literature, *chronic strains*. Wheaton (1994) notes that the modern conception of stress owes much of its theoretical underpinnings to an engineering model rather than the biologic or physiologic model like the behavioural adaptation theories associated with life events research. This engineering metaphor is aptly captured in Wheaton's (1994: p. 80) definition of stress as the "load " imposed upon an individual "in relation to the capacity to resist" that load. Under this engineering model, we can conceive of stress in two ways. First, stress may be conceptualized in terms of a sudden, devastating force that overcomes the adaptive capacities of the individual. However, stress may also be conceptualized as a continuous force that slowly overcomes the individuals capacity to cope. For Wheaton, the first conception of stress

maps readily onto what we refer to as life events whereas the continuous force analogy represents more chronic forms of stress. We can define chronic stress, therefore, as "long-term conditions" that "challenge or threaten" the well-being of individuals (George 1989: p. 243). It is also important, however, to remember Pearlin's (1989) assertion concerning the social origins of stress. In this regard, we can think of chronic strains arising from the workplace (e.g. House 1981), from chronic financial problems (e.g. Ross and Huber 1985) or as the problems that ensue from social roles and roles sets (e.g. Pearlin and Schooler 1978).

4.1.4 Socioeconomic differences in social stress

As stated at the outset of the paper, the starting point for sociological inquiry into the determinants of psychological distress and disorder is the well-established relationship between position in the social structure and perceived well-being. This however, is not the endpoint of sociologic inquiry. Why do individuals from less advantaged social circumstances suffer a greater share of psychological distress than more advantaged persons? There are at least two competing explanations that have been offered to answer this question: social causation and social selection or the "drift" hypothesis. Simply stated, the social causation argument holds that variations in mental health in the population can be attributed to differential exposure to a variety of noxious environmental factors that produce distress. These include, but are not limited to, the relative and absolute effects of material deprivation including the stressors that arise from disadvantaged social position (e.g. unstable employment, financial strains and the like). The alternative explanation, social selection, holds that individuals are placed within

social hierarchies based, at least in part, upon their physical and mental capacities. Therefore, the social gradient in mental health observed in populations is simply the result of the inability of "distressed" individuals to rise to the top of the "social ladder". It has also been suggested that mental impairment may cause a "drift" down the social hierarchy that quite possibly stretches across generations (Fox 1990). The debate over these competing hypotheses formed the basis for much of the early work in the sociology of mental health. Although the debate remain active among some sociologists, the general consensus in the field is that the processes associated with the social causation hypothesis play a much larger role in explaining the relationship between socioeconomic status and mental health (Aneshensel 1992). However, this statement is disorder specific; for schizophrenia, the processes of social selection appear to provide a more accurate account for the relationship between social class and the prevalence of this disorder (Dohrenwend et al. 1992).

Establishing the causal importance of social factors in the etiology of mental illness refined the research process to focus on identifying those features of the social environment that may produce psychological distress and impairment. Stress emerged as one of the most important of the so-called "social risk factors". The perspective is that stress, both in the form of acute life events and the more enduring or chronic strains, provides one of the explanatory links connecting position in the social structure to mental well-being (Dohrenwend and Dohrenwend 1969; Kohn 1972).

The plausibility of this hypothesis rests on two points. First, there is a causal relationship between stress and mental health (Turner, Wheaton and Lloyd 1995). While

some research has documented that prior psychological distress does influence the reporting of stress (e.g. Turner and Noh 1988), an important part of the relationship between stress and mental health appears to flow from the former to the latter (Thoits 1983; 1995; Turner, Wheaton and Lloyd 1995). Second, the social distribution of stress in the population mirrors the social distribution of psychological distress (Turner and Marino 1994; Turner, Wheaton and Lloyd 1995; Turner and Lloyd 1999). In regard to this point, there are inconsistencies in the literature with some research reporting a negative correlation between socioeconomic status and stress (e.g. Brown and Harris 1978; Kessler 1979) and others reporting no association at all (Dekker and Webb 1974; Myers, Lindenthal and Pepper 1974; Uhlenhuth and Paykel 1973). It is important to note that all of this work uses acute life events as the measure of social stress. Much less work has considered other "forms" of stress.

Despite these inconsistencies, much of the literature in the area has focussed on life events as the explanatory mechanism connecting socioeconomic status to mental health. As noted in the previous section, while perceived limitations with the life-events model lead, at least in part, to a search for other kinds of stressors, another fact also helped to change the course of stress-mental health research. Many authors have noted that during the late 1970s and early 1980s, an important shift in thinking occurred regarding the relationship between life events and psychological distress. The impetus for this shift has been linked to the findings of an important review by Rabkin and Struening (1976) that concluded that the consistently low correlations between life events and indices of mental health (between .10 and .30) indicate that differences in stress exposure

between socioeconomic groups as an explanation for class differences in mental health were of relatively minor importance (cf. McLean and Link 1994; Thoits 1983; Turner, Wheaton and Lloyd 1995). This conclusion was subsequently supported by a series of papers that supplanted the exposure explanation in favour of the vulnerability perspective (Aneshensel 1992; Kessler 1979; Kessler and Clearly 1980; Thoits 1987). The vulnerability explanation states that differences in stress exposure between socioeconomic status groups is of much less importance than differential vulnerability to eventful stressors. In other words, higher rates of distress and disorder are evident in lower class groups because individuals are more responsive to the impact of the stressors that they experience.

An extended consideration of the relative merits or weaknesses of the vulnerability argument is beyond the scope of this paper. I will focus instead on the recent work of Turner and his colleagues (1995) that has re-directed the vulnerability versus exposure debate. Specifically, their work has made a substantial contribution to the field by arguing for a re-consideration of the exposure argument in light of more recent advances in the conceptualization and measurement of social stress. As I have noted in earlier sections of this paper, our understanding of the nature of the relationship between stress and mental health has been considerably expanded as researchers have uncovered a much wider universe of social stressors. Indeed, research has shifted from an almost exclusive focus on life events, to a consideration of the impact of chronic strains

and early childhood adversities[8] on psychological distress and disorder. This growth or expansion in the conceptualization of stress has necessitated a re-consideration of the vulnerability argument. Indeed, initial work supporting the vulnerability hypothesis focused exclusively on class differences in re-activity to life events (Kessler 1979; Kessler and Cleary 1980).

Although there is some evidence to suggest that individuals from lower socioeconomic status groups are more vulnerable to negative life events than individuals from higher socioeconomic groups (Aneshensel 1992; Thoits 1987), Turner and his colleagues (1995) argue that this work has tended to lead researchers away from adequately testing the exposure hypothesis. They argue that by focusing on a single source of stress (e.g. acute, negative life events) researchers may have unwittingly underestimated the exposure to stress and hence over-estimated the influence of vulnerability in explaining class differences in mental health. Using a much more comprehensive measure, what they define as the cumulative and operant burdens of stress (composite measures that include recent life events, chronic stress and early childhood traumatic events), Turner, Wheaton and Lloyd (1995) find that between twenty-three and fifty percent of observed differences in psychological distress and major depressive episode by age, sex, marital status and occupation can be accounted for by differences in

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[8] Although the word "trauma" is the most common term in this area of mental health research, I prefer the term "adversity" since it emphasizes the fact that while negative events in childhood have the potential to lead to psychological problems, it is only a potential. Trauma, conversely, implies negative psychological impact regardless of the response from the individual. For the remainder of this paper, I will refer to trauma as adversity.

exposure to social stress alone. The fact that their expanded measure of stress accounts for more of the variance in depression than is typically the case with measures of life events alone supports the contention that the importance of vulnerability cannot be adequately assessed when exposure is underestimated. Although their work does not reject the vulnerability hypothesis, it does restore the importance of differential exposure to stress as a viable explanation for class differences in mental health.

Notwithstanding this important contribution, it is my contention that their conceptualization of social stratification is also the principal weakness of their important work. Specifically, while they identify the most common systems of social stratification (e.g. marital status, age, gender and occupation), they treat these fundamental organizing features of social life as separate systems of social inequalities, rather than inter-locking webs forming complex social hierarchies. Being poor, for example, is associated with higher exposure to stress regardless of gender, age or marital status. There is good reason to hypothesize, however, that the relationship between socioeconomic status and social stress does vary by other markers of social position. In particular, the relationship between age and social stress suggests that the socioeconomic status and social stress relationship may not be invariant with regard to life span.

4.1.5 Age differences in social stress

Like the literature on socioeconomic status and stress, research has also examined the connection between age and stress exposure. Again, similar to the socioeconomic status and stress literature, most of the work in this area has focused on life events rather than other "forms" of social stress. Studies conducted using life events that are

commonly found in most standardized measures show that, consistently, older persons report fewer life events than younger and middle aged adults (Chiriboga and Dean 1978; Dean and Ensel 1982; Dekker and Webb 1974; Ensel 1991; Goldberg and Comstock 1980; Hughes, Blazer and George 1988; Lazarus and DeLongis 1983; Lowenthal et al. 1975; Murrell, Norris and Hutchins 1984; Uhlenhuth, Lipman, Balter and Stern 1974).

Although the consistency of these findings seems to leave little doubt of the relationship between life events and age, several authors have cautioned against concluding that exposure to life events declines with age. The most frequent criticism concerns the potentially age-biased nature of most life-event inventories (Aldwin 1990). As Pearlin and Skaff (1996, p. 240) note, most life events inventories contain events that are most likely to "erupt" in the early stages of adulthood (e.g divorce, changing or losing a job, having children etc). Conversely, older adults are more likely to report "health" problems and general hassles than younger adults (Aldwin, Sutton, Chiara and Spiro 1996). While the argument that life event inventories may not be relevant for older adults, it is equally mistaken to conclude that the items on such measures do not capture some of the generic events that occur in individual's lives. For example, life events measures contain items about health, both in regard to the individual and in relation to health of close intimates in the person's social network. These inventories also contain items related to financial and marital or relationship problems as well as problems with children. It would seem, as Pearlin and Skaff (1996, p. 240) suggest, that while life event measures may "oversample" events more likely to occur early on in life, much of the available evidence indicates that the "organization of older people's lives probably does

expose them to fewer eventful stressors." In fact, as one study found, the most frequently cited event among a sample of older people was a trip outside the city in which they live (Murrell, Norris and Hutchins 1984).

Of the many studies that examine the relationship between life events and age in the literature, only a handful examine the more chronic forms of social stress. These studies focus exclusively on daily stressors or hassles. Similar to the age-life events research, older people report fewer hassles than younger adults (Aldwin 1990; Folkman et al. 1987).This finding supports the argument that old age is characterized by a loss of social roles (Rosow 1985). Aldwin et al. (1996) argue that the fact that hassles are linked to occupancy in social roles and older people tend to occupy fewer social roles than young adults, may explain the decline in daily hassles associated with age. According to both George (1989) and Pearlin and Skaff (1996), there has been no published work examining the relationship between chronic stress and age. To my knowledge, since the date of these reviews, only one study reports age changes in chronic stress (Turner, Wheaton and Lloyd 1995). While chronic stress declines with age, it is important to note that the sample includes only individuals to age 55. Therefore, it is not clear whether this declining trend in reporting chronic stress with age continues past the age of retirement.

4.1.6 Toward an Interactive model of age, socioeconomic status and social stress

The differential distribution of social stressors (i.e. chronic, acute and remote) by position in the social structure, coupled with the apparent age-related differences in stress exposure suggest the possibility that the relationship between age, socioeconomic status and stress may be interactive. Specifically, these findings raise the question, are

differences in stress exposure by age the same for all individuals regardless of their socioeconomic status? In the following analyses, I examine whether age and two traditional measures of social position interact to predict three different measures of social stress.

4.2 METHOD

4.2.1 Sample

The sample is taken from the National Population Health Survey (NPHS) conducted by Statistics Canada. The NPHS was a 1994 telephone survey of a national probability sample of Canadian residents across all 10 provinces. Using a multi-stage, stratified random sampling procedure, Statistics Canada surveyed 19,600 households. One person from each household was selected to provide detailed personal information. Persons living on Native reserves, military bases, institutions and some remote areas in Ontario and Quebec were excluded. Of the 18,342 possible respondents aged 12 and older, 17,626 participated (a response rate of 96.1%). Because the primary focus of the study is on adults, and to be consistent with previous work, only those aged 20 and older were selected reducing the sample to 15,789. After a listwise deletion of cases with missing values, the total sample was further reduced to 14,459. This reduced sample is virtually the same in composition as the original sub-sample in terms of age, gender and marital status.

4.2.2 MEASUREMENT

4.2.3 Chronic Stress Index

This measure of chronic stress is based upon Wheaton's (Turner and Wheaton 1990) measure. The index measures the total number of stressors individuals experience on a regular or on-going basis. Higher scores reflect greater exposure to chronic stresses and strains. Since not all respondents would have answered every question, Statistics Canada adjusted the original index as if all items were applicable to each respondent. This was accomplished by multiplying the score from the index by the total number of items, and then dividing by the total number of questions that were relevant[9] to the individual participant (mean= 3.00, s.d.= 2.68). (The wording for each item for each of the measures of social stress is found in Appendix B)

4.2.4 Recent Life Events

This index is based on the number of negative life events which the respondent or someone close to the respondent experienced in the last 12 months. All "yes" responses were given a value of "1" and added together to form the index (range 0 to 10). Higher scores indicate exposure to negative life events. Again, because not all respondents would have answered every question, Statistics Canada adjusted the original index in the manner described above (mean=0.60, s.d.= 1.02).

4.2.5 Childhood Adversities

The childhood adversities index measures the number of adverse events to which the respondent was exposed during childhood, adolescence or early adulthood (before the respondents moved out of their parents/primary care-givers home). All "yes" responses

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9 Relevant, in this context, means applicable to the respondent. For example, items that measure marital discord would be excluded for those respondents who are not married.

were given a value of "1" and added together to form the index (range 0 to 7). Higher scores indicate a greater exposure to negative, remote or distal life events (mean= 0.90, s.d.= 1.20).

4.2.6 Socioeconomic measures

Socioeconomic status is measured by two different variables in these analyses - education and household income. Education is based on an item involving a combination of qualitative and ordinal categories. The original measure was a 12 category variable reflecting different levels of education attainment. While some categories appeared to be ordered, others did not. Thus, the original variable was re-coded into 8 categories: (1) no formal schooling, (2) elementary level education, (3) some secondary level education, (4) high school diploma, (5) some education beyond high school, (6) college diploma or trade certificate, (7) undergraduate university degree, and (8) graduate degree (M.A. or PhD) or a degree in medicine. For multivariate analysis, this measure was treated as a continuous variable (mean= 4.79, s.d.= 1.57).

Household income was coded into the following 11 intervals in the 1994 NPHS: (0) no income, (1) less than $5000, (2) $5,000 to $9,999, (3) $10,000 to $14,999, (4) $15,000 to $19,999 (5) $20,000 to $29,999 (6) $30,000 to $39,999 (7) $40,000 to $49,999 (8) $50,000 to $59,999 (9) $60,000 to $79,999 (10) $80,000 and more. An 11 item scale was created by setting each scale value to the midpoint of the interval. For multivariate analysis, this variable was treated as continuous (mean= 43,700, s.d.= 25,400).

4.2.7 Age and Sociodemographic Controls

Gender was coded 1 for females (N=7164), 0 for males (N=6436). Age was an ordinal variable coded in five- year intervals (20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79) except for the last interval that includes those aged 80 and over (mean= 45 s.d.= 16.7). Marital status included three dummy variables for married (including common-law) (N=9244), previously married (including widowed, divorced and separated) (N=2412) and single (reference category)(N=1945). A variable for "main activity" was also included in these analysis. Four dummy variables were created: "working at home"(N=2068), "unemployed" (N=1589), "retired" (N=2200) and "employed" (references category)(N=7742).

4.2.8 Analyses

The first part of the analyses examines the bivariate relationship between age and the three measures of social stress. Next, a series of regression equations are fit to the data to see whether or not the relationship between age, socioeconomic status and social stress is additive or interactive after controlling for gender, marital status and main activity:

$$Y_1 = a + b_1\,(age) + b_2\,(SES) + b_3\,(age*SES) + b_4\,(gender) + b_5\,(marital\ status) + b_6\,(main\ activity)$$

where Y_1 represents the predicted values for one of the measures of social stress (e.g. chronic stress) and SES represents either education or income.

4.2.9 Tests for Interactions

All tests for the presence of interactions followed the procedures described by Jaccard, Turrisi and Wan (1990). Equations with interactions were entered into a base line model containing all lower order terms. To test for the presence of a statistical interaction, R-squared values for base line models and those models containing interaction terms were compared using an incremental, or hierarchal F test procedure. The null hypothesis is that the regression coefficient for the interaction term is zero in the population.

The regression approach to modelling interactions between continuous variables assumes that the variables are measured at the interval-ratio level. While some have suggested that bias is introduced when the data are not interval-ratio (Busemeyer and Jones, 1983), others argue that the assumption of linearity of responses is appropriate with non-interval level data (Borgatta and Bohrnstedt, 1980). Although, strictly speaking, the data in these analyses are ordinal, the variables approximate interval-level characteristics and therefore it is reasonable to proceed with a standard regression approach (Jaccard, Turrisi and Wan, 1990). Because these sample sizes in this analysis are large enough to achieve adequate statistical power, steps have been taken in these analyses to address the potential problem of multicolinearity. Thus, following the advice of Cronbach (1987), and Jaccard, Turrisi and Wan (1990), all independent variables were "centred" prior to forming interaction terms.

4.3 RESULTS

In the first part of the analysis, I examine the bivariate relationship between age and each of the measures of social stress. Figure 1 graphically displays the association between age and the standardized measures of chronic stress, recent life events and childhood adversities. Mean standardized scores for each 10 year age group are reported to assess changes in reported stress across age cohorts. Consistent with the literature, the reporting of major life events declines with age. However, what is also of interest is the relationship between age and chronic stress and childhood adversities; similar to life events, the prevalence of these reported stressors also declines across successively older age cohorts. The use of z-scores for the calculation of mean scores, rather than raw values for each scale allows for meaningful comparison of these independent measures. The gap between mean scores is small within each age group suggesting remarkable similarity in the relationship between age and each of these measures of social stress.

In the next part of the analysis, bivariate correlations are reported between each of the dependent and independent variables included in the multivariate regression analyses (see Table 1). Non-significant correlations ($p>.01$) are not in bold print. All other correlation coefficients are statistically significant at the $p<.001$ level (in bold print). These results show that age is significantly and negatively correlated with each of the three measures of social stress. In other words, the prevalence of each measure of social stress declines with age. The bivariate correlations between education and social stress,

FIGURE 1. Mean Differences in Chronic Stress, Recent Life Events and Childhood Adversities by Age

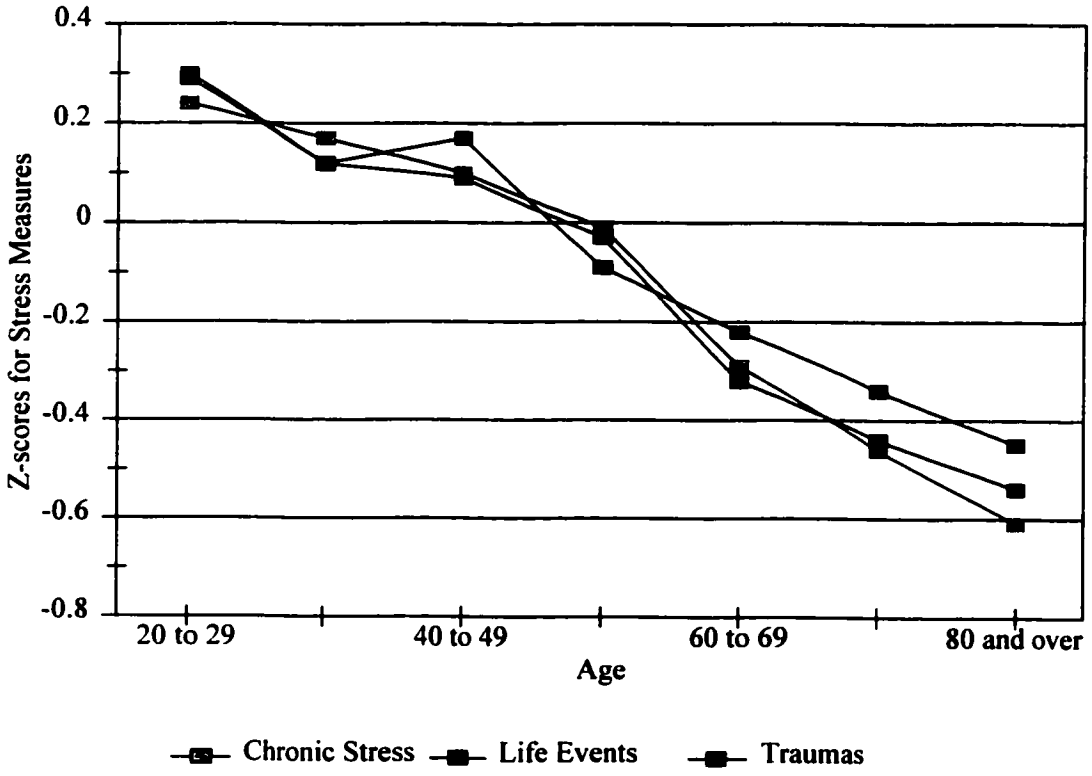


TABLE 1. Correlation Matrix [a]

Variables	CS	LE	CAS	Age	Income	Educ	Female	Male	Married	Single	PM	Work	Not-work	Retired	WAH
CS	1.00														
LE	**0.40**	1.00													
CAS	**0.37**	**0.33**	1.00												
Age	**-0.25**	**-0.30**	**-0.21**	1.00											
Income	**-0.10**	0	**-0.10**	**-0.21**	1.00										
Educ	**-0.03**	**0.10**	0	**-0.31**	**0.34**	1.00									
Female	**0.06**	0	**0.06**	**0.05**	**-0.09**	0	1.00								
Male	**-0.06**	0	**-0.10**	**-0.10**	**0.09**	0.02	**-1**	1.00							
Married	**-0.11**	0	**-0.10**	**-0.10**	**0.34**	**0.05**	**-0.07**	**-0.10**	1.00						
Single	**0.10**	**0.10**	**0.07**	**-0.33**	**-0.11**	**0.08**	**-0.08**	**0.08**	**0.23**	1.00					
PM	**0.04**	0	0	**0.37**	**-0.30**	**-0.15**	**0.16**	**-0.16**	**-0.63**	**-0.25**	1.00				
Work	**0.06**	0	**0.01**	**-0.44**	**0.37**	**0.3**	**-0.2**	**0.20**	**0.12**	**0.05**	**-0.2**	1.00			
Not work	**0.11**	**0.15**	**0.10**	**-0.18**	**-0.13**	0	**-0.08**	**0.08**	**-0.15**	**0.23**	0	**-0.40**	1.00		
Retired	**-0.20**	**-0.2**	**-0.15**	**0.72**	**-0.28**	**-0.26**	0.01	0	**-0.16**	**-0.14**	**0.33**	**-0.50**	**-0.20**	1.00	
WAH	**0.06**	**0.10**	**0.06**	**-0.10**	**-0.07**	**-0.11**	**0.34**	**-0.34**	**0.16**	**-0.12**	0	**-0.50**	**-0.10**	**-0.21**	1.00

[a] Significant coefficients ($p<.01$) are shown in bold type.

CS=chronic stress; LE=life events; CAS=child and adult stressors; PM=previously married; WAH=working at home

and income and social stress are much weaker. The direction of the association between socioeconomic status and stress is consistent with the literature which suggests that as education and income increase, levels of stress decline. However, the strength of the correlations is very modest. In fact, the Pearsons correlation coefficient for education and childhood and adult stress is insignificant at the $p>0.01$ level. Finally, there is a significant, modest negative relationship between age and income and age and education (-0.21 and -0.31 respectively) suggesting that as age increases, income and education decreases.

4.3.1 Examining the Relationship Between Age, Socioeconomic Status and Chronic Stress

In the next part of the analysis, I fit regression equations to the data to model both the additive and interactive relationships between the measures of socioeconomic status, age and each of the three measures of social stress controlling for demographic factors and main activity. If the unstandardized regression coefficients representing the interaction between socioeconomic status and age are significant, then this is evidence for the hypothesis that age moderates the relationship between socioeconomic status and stress.

Table 2 presents the results of the first series of regression equations using chronic stress as the outcome variable. Model 1 shows the bivariate relationship between age and chronic stress. As was noted with figure 1, age is negatively associated with chronic stress. The value for the adjusted r-squared statistic shows that age alone accounts for five percent of the variation in chronic stress in this

TABLE 2. OLS regression of Chronic Stress on Age, Income, Education, Gender, Marital Status and the Interactions for Age by Education and Age by Income: National Population Health Survey N=13, 559 [1]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Age	-0.03 * (-.22)	-0.04 * (-.24)	-0.04 * (-.25)	-0.04 * (-.26)	-0.03 * (-.20)	-0.03 * (-.19)	-0.03 * (-.19)	-0.03 * (-.19)
Income		-1.39E-5 * (-.14)		-1.12E-05 * (-.11)	-9.13E-6 * (-.09)	-9.21E-6 * (-.09)	-1.88E-5 * (-.18)	-1.52E-5 * (-.15)
Education			-0.20 * (-.12)	-0.14 * (-.08)	-0.14 * (-.09)	-0.37 * (-.22)	-0.15 * (-.09)	-0.34 * (-.20)
Female					0.28 * (.05)	0.29 * (.06)	0.29 * (.06)	0.29 * (.06)
Married					-0.13 (-.02)	-0.15 * (-.03)	-0.15 * (-.03)	-0.16 * (-.03)
Previously married					0.53 * (0.07)	0.52 * (.07)	0.54 * (.07)	0.53 * (.07)
Working at Home					-0.03 (-.01)	-0.05 (-.01)	-0.04 (-.01)	-0.05 (-.01)
Unemployed					0.28 * (.03)	0.29 * (.03)	0.27 * (.03)	0.27 * (.03)
Retired					-0.75 * (-.11)	-0.72 * (-.10)	-0.70 * (-.10)	-0.69 * (-.10)
Age by education						4.59E-3 * (.14)		3.94E-3 * (.12)
Age by income							2.27E-7 * (.04)	1.47E-7 † (.07)
Intercept	4.53	5.31	5.71	6	5.47	6.51	5.89	6.62
R-squared	0.05	0.07	0.06	0.07	0.09	0.09	0.09	0.09

[1] weighted N value; unstandardized coefficients are reported with standardized coefficients in parentheses; * p<.001 † p<.05

sample. In model 2, the variable for household income is entered into the base model equation containing age. The slope for age remains virtually unchanged from model 1 suggesting that income does not mediate the relationship between age and chronic stress. The unstandardized coefficient for income suggests that as income increases, chronic stress declines. The addition of income to the model results in an additional two percent in total explained variance in chronic stress. Model 3 shows the effect of introducing education into the base model containing age (model 1). Similar to model 2, the slope coefficient for age remains virtually unchanged. The slope coefficient for education, like income, shows a significant negative relationship between education and chronic stress. The equation containing both age and education accounts for six percent of the total variance in chronic strain. The effect on age of introducing both income and education is demonstrated in model 4. Consistent with previous models, the effect of age on chronic strain remains largely unchanged from model 1. Both education and income continue to be significantly related to chronic stress although the unstandardized coefficients for each variable are reduced somewhat demonstrating the shared variance between these two predictors. Together, these variables account for seven percent in the explained variation of chronic stress.

Model 5 shows the effect of controlling for gender, marital status and main activity on the variables contained in the equation under model 4. The addition of these variables has an impact on the relationship between age and chronic stress (it is reduced by about 25%). The slope coefficients for education and income remain

largely unchanged from model 4. The dummy variables for female and previously married are significantly related to chronic stress. Only two of the three dummy variables for main activity showed a significant effect in predicting chronic stress scores; individuals who are unemployed report higher levels of stress than those who are employed in the labour force. Retired individuals report fewer chronic strains than those who are employed. Finally, models 6 through 8 show the effect of introducing interaction terms for age by education and age by income into the full equation shown under model 5. The interaction terms for education by age and income by age are significant at the $p<.001$ level both in the unsaturated models (6 and 7) and in the saturated model (8). This suggests that age does moderate the relationship between socioeconomic status and chronic stress. It is also important to note that the slope coefficients for the dummy variables for gender, marital status and main activity all remain relatively unchanged from model 5 suggesting that the introduction of the interaction terms do not mediate the relationship between these variables and chronic stress. The inclusion of the interactions, both separately and together, does change the relationship between the variable representing those who are married and chronic stress; in models 6 through 7, after partialling out the effect of age by socioeconomic status interactions, those who are married have lower levels of chronic stress than those who are single. The total amount of explained variance in chronic stress in the saturated equation (model 8) is nine percent.

TABLE 3. OLS regression of Recent Life Events on Age, Income, Education, Gender, Marital Status and the Interactions for Age by Education and Age by Income: National Population Health Survey N=13, 559 [1]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Age	-0.01 * (-.21)	-0.01 * (-.23)	-0.01* (-.22)	-0.01* (-.23)	-0.01 * (-.19)	-0.01 * (-.18)	-0.01 * (-.18)	-0.01 * (-.17)
Income		-4.92E-6 * (-.12)		-4.75E-6 * (-.12)	-4.37E-6 * (-.11)	-4.41E-6 * (-.11)	-1.14E-5 * (-.28)	-9.74E-6 * (-.24)
Education			-0.03 * (-.05)	-0.01 (-.01)	-0.01 (-.01)	-0.12 * (-.19)	-0.01 (-.02)	-0.10 * (-.15)
Female					0.03 (.01)	0.03 (.02)	0.03 (.01)	0.03 (.02)
Married					0.13 * (.06)	0.12 * (.06)	0.12 * (.05)	0.12 * (.05)
Previously married					0.21 * (.07)	0.20 * (.07)	0.22 * (.07)	0.21 * (.07)
Working at Home					0.06 † (.02)	0.05 (.02)	0.05 (.02)	0.04 (.02)
Unemployed					0.30 * (.09)	0.30 * (.09)	0.29 * (.09)	0.30 * (.09)
Retired					-0.19 * (-.07)	-0.18 * (-.06)	-0.16 * (-.06)	-0.15 * (-.05)
Age by education						2.35E-3 * (.19)		1.78E-3 * (.14)
Age by income							1.64E-7 * (.19)	1.26E-7 * (.15)
Intercept	1.2	1.48	1.4	1.52	1.24	1.77	1.54	1.87
R-squared	0.04	0.06	0.04	0.06	0.07	0.07	0.07	0.08

[1] weighted N value; unstandardized coefficients are reported with standardized coefficients in parentheses; * p<.001 †p<.01

4.3.2 Examining the Relationship Between Age, Socioeconomic Status and Life Events

The same analysis presented above was conducted with the life events measure as the outcome variable (see Table 3). Model 1 shows the effect of age on major life events. The relationship is significant and negative; as age increases, the prevalence of reported life events decreases. Age alone accounts for four percent of the total variation in life events. Models 2 and 3 illustrate the effect of introducing education and income into a base model containing only age. In both equations, the variable for age remains unchanged across models 2 and 3. Also, both education and income are significantly related to life events, net of the effect of age, such that as socioeconomic status increases, the reporting of negative life events decreases. The contribution of the income variable to the overall "fit" of the model is a two percent increase in variance explained. The adjusted r-squared value for model 3 suggests that the explained variance is unchanged from model 1 after the introduction of the variable for education. Model 4 shows the effect of introducing income and education into the same model with age. Again, the slope coefficient for age remains largely unchanged from models 1 through 3; age is still negatively and significantly related to recent life events. The variable for education, however, is no longer significantly related to the outcome variable. Model 5 illustrates the effect of adding indicator variables for gender, marital status and main activity to the previous equation (model 4). The age variable remains unchanged across models. Education also remains insignificant in the equation. The introduction of these variables,

however, does have an impact upon the relationship between income and life events; the slope for income is reduced by about eight percent from model 4. This suggests that part of the relationship between income and life events can be accounted for by gender, marital status and main activity status. Finally, models 6 through 8 show the effect of introducing the interaction terms for age by education and age by income separately (models 6 and 7) and simultaneously (model 8). Consistent with the results for chronic stress, both interaction terms make a significant contribution to the full model. The total amount of explained variance in life events is eight percent (model 8). Those who are married, previously married, and the unemployed report more life events than those who are single and those who are employed. Retired individuals report fewer life events than individuals who are employed in the labour force.

4.3.3 Examining the Relationship Between Age, Socioeconomic Status and Childhood Adversities

Table 4 presents the same analysis shown above substituting Childhood Adversities as the outcome variable. Model 1 is the bivariate relationship between age and this stress measure. Again, congruent with the previous findings, age is negatively related to early childhood adversities. This variable alone accounts for three percent of the total variation in this stress measure. The next two models (2 and 3) show the effect of introducing income and education into the base model containing age (model 1). Both variables are significantly and negatively related to

TABLE 4. OLS regression of Childhood Adversities on Age, Income, Education, Gender, Marital Status and the Interactions for Age by Education and Age by Income: National Population Health Survey N=13, 559 (weighted) [1]

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Age	-0.01 * (-.17)	-0.01 * (-.18)	-0.01* (-.19)	-0.01 * (-.20)	-0.01 * (-.22)	-0.01 * (-.20)	-0.01 * (-.20)	-0.01 * (-.19)
Income		-4.43E-6 * (-.10)		-3.63E-6 * (-.08)	-2.31E-6 * (-.05)	-2.36E-6 * (-.05)	-1.14E-5 * (-.25)	-9.36E-6 * (-.21)
Education			-0.06 * (-.08)	-0.04 * (-.06)	-0.04 * (-.06)	-0.19 * (-.25)	-0.05 * (.06)	-0.15 * (-.21)
Female					0.14 * (.06)	0.14 * (.06)	0.14 * (.06)	0.15 * (.06)
Married					0.11 * (.05)	0.09 * (.04)	0.09 * (.04)	0.09 † (.04)
Previously married					0.26 * (.08)	0.26 * (.08)	0.28 * (.08)	0.27 * (.08)
Working at Home					0.06 (.02)	0.05 (.02)	0.05 (.02)	0.04 (.01)
Unemployed					0.30 * (.08)	0.30 * (.08)	0.29 * (.08)	0.29 * (0.08)
Retired					0.05 (.02)	0.10 (.03)	0.10 † (.03)	0.11 † (.03)
Age by education						2.99E-3 * (.21)		2.23E-3 * (.05)
Age by income							2.13E-7 * (.23)	1.65E-7 * (.06)
Intercept	1.37	1.62	1.74	1.83	1.59	2.27	1.98	2.4
R-squared	0.03	0.04	0.03	0.04	0.05	0.06	0.06	0.06

[1] unstandardized coefficients are reported with standardized coefficients in parentheses; * p<.001 †p<.01

adversities net of the effect of age. The slope coefficient for age remains unchanged across models, suggesting that the influence of age on adversities cannot be accounted for by variation in income and education levels. While income increases the adjusted r-squared value from model 1 by one percent, the addition of education has no effect on explained variance. Model 4 shows the effect of introducing both education and income into the base model containing age; all three of the age, income and education variables continue to be significantly and negatively related to the stress measure. In the next equation (model 5), variables for main status are added to the variables in model 4. While the slope coefficient for age remains unchanged from the previous models, several other coefficients show modest changes. The unstandardized coefficient for income, for example, is reduced by thirty-six percent from model 4 suggesting that part of the relationship between income and childhood adversities is attributable to variations in gender, marital status and main activity. As well, those who are married report having experienced a higher number of adverse experiences than single individuals. The effect of being previously married, relative to those who are single, is also significant. Finally, models 6 through 8 illustrate the effect of entering interaction terms for the socioeconomic variables by age into the full equation in model 5. Consistent with the previous analyses, both age by education and age by income have a significant effect on adversities net of the other variables. Indicator variables for female, married, the previously married, the unemployed and those who are retired continue to show significant effects on this measure of stress. When all variables and both interaction

terms are entered into a predictive equation, six percent of the total variation in childhood adversities is explained.

Finally, what is also noteworthy is the remarkable consistency in findings across all three measures of social stress. This is not only in terms of gross associations like the relationship between age and each of the outcomes. When one examines individual coefficients, they too are markedly similar. It is clear from these data that regardless of the stress measure employed, the relationship of between social status and stress is unvarying.

4.3.4 Examining the Effect of Age on Stress within Different Levels of Socioeconomic Status

Establishing that age interacts with education and with income to predict each of these measures of social stress is only one part of a complete analysis. It is also important to examine the nature of this association. To facilitate this, graphs showing how the relationship between age and each of chronic stress, life events and childhood adversities varies by education and income are presented (see Figures 2a to Figure 4b). Figure 2a shows the relationship between age and chronic stress within three different education levels. Low, middle and high educational levels are determined by standardized scores from the mean. For example, low education is equal to -1 standard deviation below the mean. Middle level education is equal to the mean for education and high education is equal to 1 standard deviation above the mean for education. Using equation 6 in Table 3, the predicted values of chronic

FIGURE 2a. Moderating Effect of Education for the Effect of Age on Chronic Stress

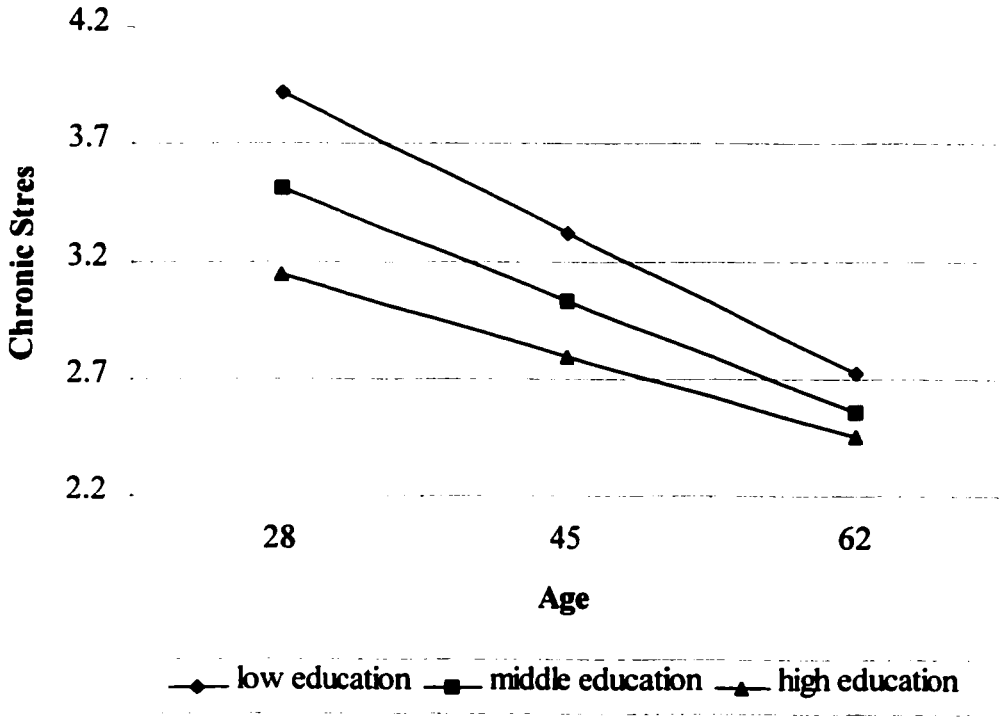
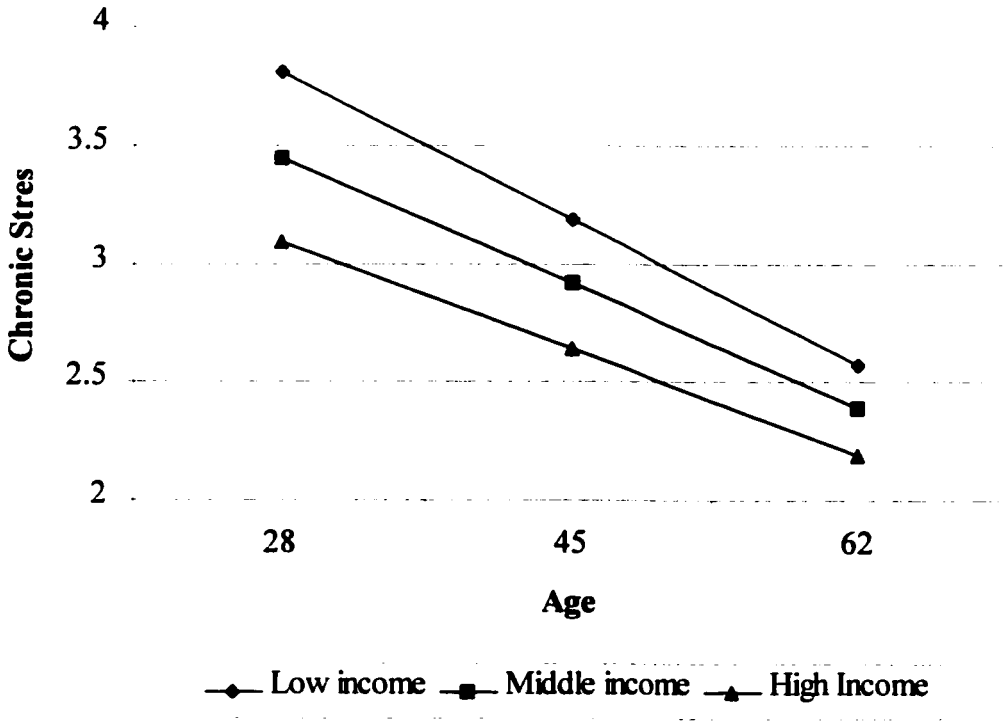


FIGURE 2b. Moderating Effect of Income for the Effect of Age on Chronic Stress



stress are plotted at three age points; each of the age points also represents the range from -1 standard deviation below the mean to +1 deviation above the mean. Consistent with the findings for the bivariate relationship between age and chronic stress (see Figure 1), in each education group, chronic stress declines with age. However, the results show that the widest gap in stress by education groups occurs at age 28. Therefore, among the young, the lowest education group reports the highest levels of chronic stress. The lowest levels of reported chronic stress among the young are reported among those with the highest levels of education. Among older respondents, the differences in reported chronic stress by educational attainment are small. Overall, the relationship between age, socioeconomic status and chronic stress can be described as a convergence model - as age increases, the gap in chronic stress between education groups decreases. A similar pattern is observed for the moderating effect of age on the income-stress relationship (figure 2b). Like the first figure, the income groups of low, middle and high correspond to -1 standard deviation below the mean, the mean and +1 standard deviation above the mean respectively. The largest gap between the income groups occurs within the youngest age cohort. The gap then becomes successively smaller across age groups until the stress scores for all income group converge within the oldest age group. However, the differences between income groups is not as wide across age groups. The same procedure is used to examine moderating effect of age on socioeconomic status and recent life events and childhood adversities (figures 3a, 3b, 4a and 4b

FIGURE 3a. Moderating Effect of Education for the Effect of Age on Recent Life Events

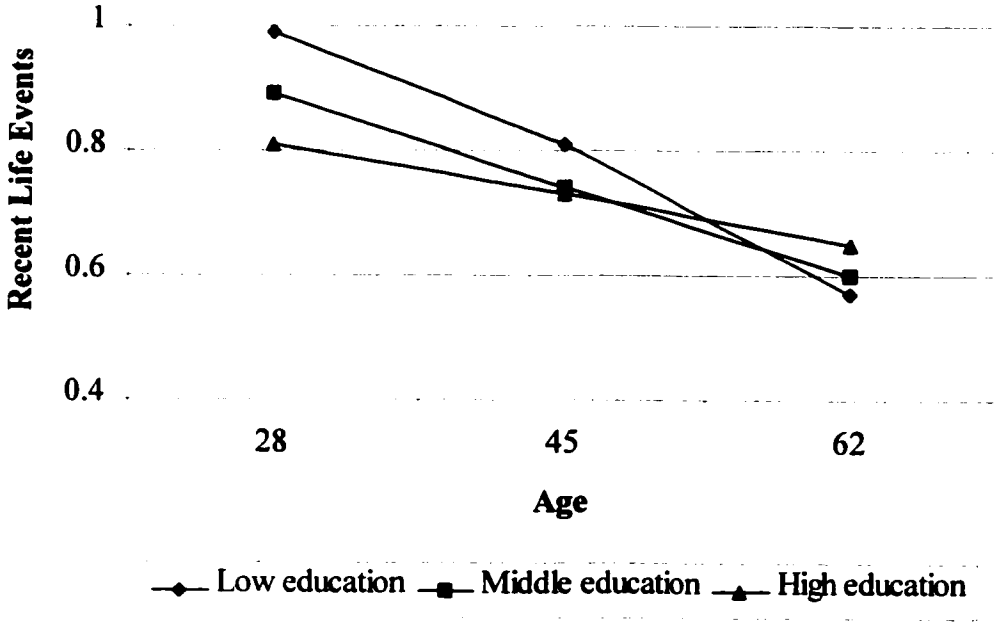


FIGURE 3b. Moderating Effect of Income for the Effect of Age on Recent Life Events

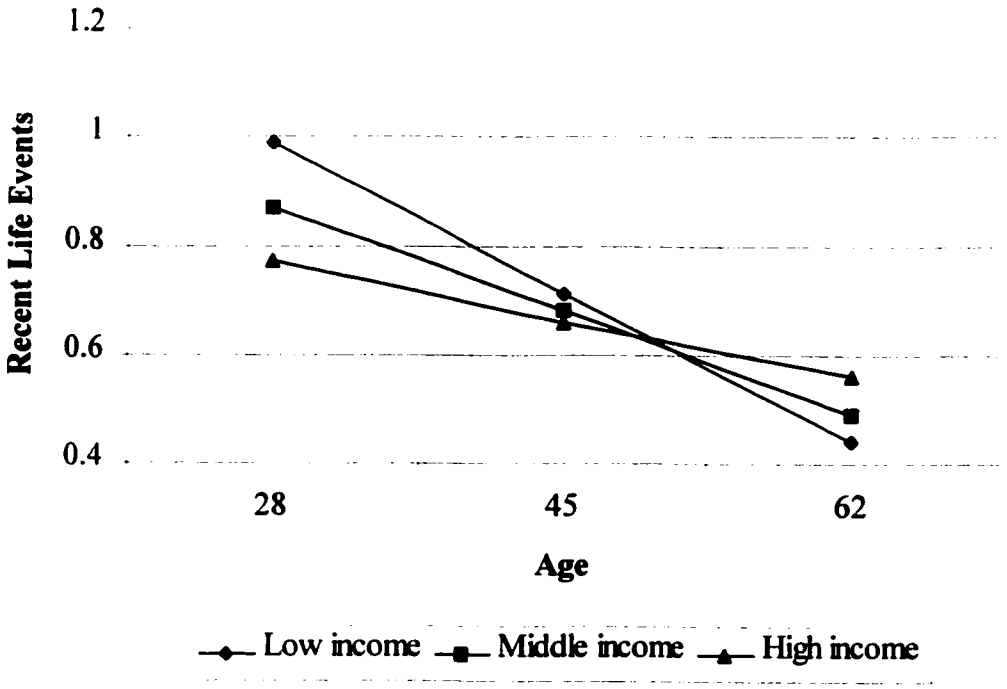


FIGURE 4a. Moderating Effect of Education for the Effect of Age on Childhood Adversities

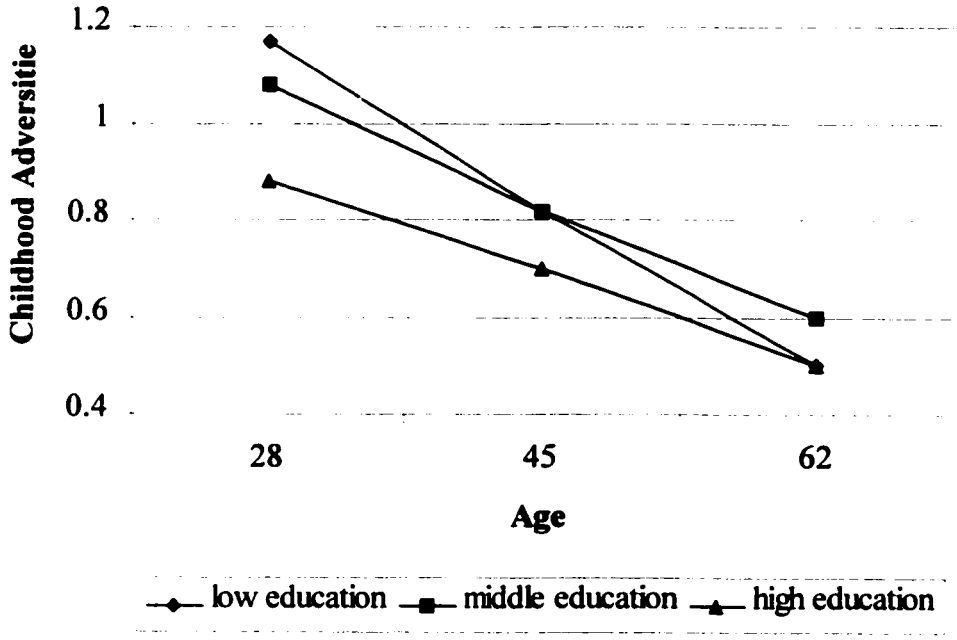
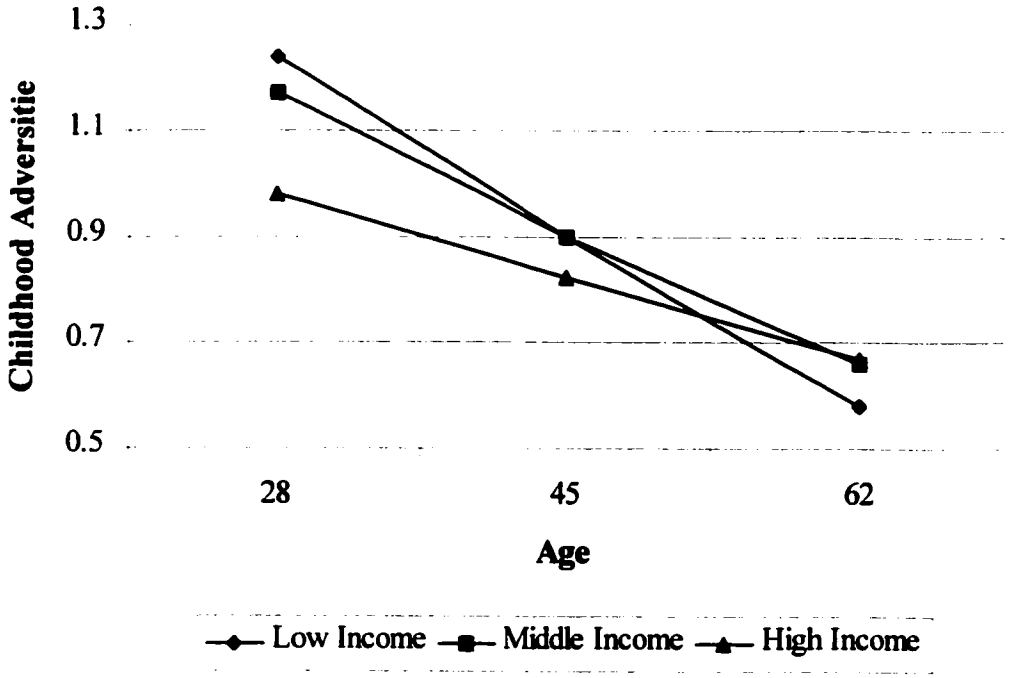


FIGURE 4b. Moderating Effect of Income for the Effect of Age on Childhood Adversities



respectively). While there are some subtle differences, the relationship between these variables is consistent with what was observed in figure 2a and 2b. The largest differences in stress between socioeconomic status groups occurs within the youngest age cohorts. The gap, in turn, becomes progressively smaller as age increases. Among older respondents, the lines not only converge but cross. The differences, however, are very small. In every case, those in the lowest income and education groups show the steepest rate of decline in reported stress compared to those in the highest income and education groupings. Another notable difference is in the pattern of convergence for life events and traumas. Figures 3a through 4b show that the lines representing the three different education and income groups tend to convergence at age 45. This is different from the pattern observed for chronic stress where convergence between socioeconomic groups does not occur until the oldest cohorts.

4.4 DISCUSSION

The results of this study suggest that the relationship between socioeconomic status, age and social stress is interactive rather than additive. Consistent with the literature, I find that stress declines with age and that there are significant socioeconomic differences in stress exposure. Most important however is the finding that socioeconomic status differences in social stress vary by age. The gap in stress between socioeconomic status groups is widest among young adults and subsequently narrows across successively older age groups. While this provides some evidence for the argument that age and social class must be considered as inter-

locking rather than separate systems of social inequality when examining stress exposure, the question of why socioeconomic differences in stress exposure are evident among the young and not older adults remains unanswered. Typically in studies involving age differences in social phenomena, researchers are sensitive to explanations associated with period, cohort and aging effects. While it is difficult, if not impossible, to disentangle the relative contribution of these effects to the question at hand with cross-sectional data, it is possible to speculate on how these explanations might explain the findings presented here. Moreover, age differences may also be an artifact of methodological issues associated with measurement and/or interview effects rather than real differences. I will also scrutinize these findings in light of these possibilities.

4.4.1 The Healthy Survivor Effect

One possible interpretation of these results is that the data reflect an aging effect. The fact that the socioeconomic gap in life events, chronic stress and childhood adversities tends to convergence with age supports the healthy survivor hypothesis (House et al. 1994; Ross and Wu 1996). The argument is that only the healthiest individuals in each social strata survive to old age thereby minimizing or eliminating class differences in health. Since social stress is an important determinant of health and well-being, I expect that the healthiest surviving members of each social group will report lower levels of social stress. Moreover, the uniform decline in reported stress with age across all socioeconomic status groups may also reflect a hardiness among older adults that is also consistent with a selection

interpretation: those who survive to old age are better equipped to deal with life's challenges and thus have developed personal and social resources to buffer the impact of stress, and/or avoid stressful circumstances. This hypothesis accounts for both the overall decline in stress with age observed in these data, and the convergence in the socioeconomic gap in stress with age. Previous evidence exists to support the healthy survivor hypothesis. Most notably, House and his colleagues (1992; 1994) find that socioeconomic status differences in physical health ceased to exist after the age of 75, thereby demonstrating that social position is not a significant determinant of morbidity among the elderly. These researchers were also able to replicate this pattern using longitudinal data although the time between surveys was relatively modest (two and a half years). Contradictory evidence, however, is also evident in the literature. Ross and Wu (1996) find that socioeconomic status (measured using education) differences in physical health increased across successively older age groups. They argue that the increasing gap with age is likely the result of a history of cumulative disadvantages among the lowest educational groups. In other words, the accumulation of social disadvantages across a lifetime of experiences results in a widening gap in poor health with age between the most and least educated in society. Since increased exposure to stress is one of the social disadvantages associated with position in the social structure, the cumulative advantage hypothesis suggested by Ross and Wu (1996) predicts that stress exposure differences between socioeconomic status groups should diverge with age. The evidence presented here does not support this contention. The pattern

of convergence I observe in these data more clearly fits the healthy survivor hypothesis.

4.4.2 A Period-Cohort Interpretation of Stress Exposure Differences Across Age Groups

Another possible interpretation for these findings is that age-class differences in stress reflect a period or cohort effect. Specifically, the observed patterns in these data raise the question of whether or not the higher prevalence of reported stress among younger adults reflects fundamental changes to the social structure of our society that result in age differentiated stress by socioeconomic status variations. Possible examples include increases in the prevalence of single parent families (Avison 1995) and high unemployment rates throughout the early and mid part of the 1990s. Both of these are apt to affect younger adults more than older adults and may account for age differences in stress. Moreover, because a greater proportion of single parent mothers live below the poverty line than married mothers, and individuals from low socioeconomic status backgrounds are more likely to suffer from the effects of unemployment and recession, social structural changes like these may also explain the socioeconomic differences in reported stress levels by age. While this hypothesis is compelling, there is one problem that needs to be raised. Similar to the memory recall problem, would we necessarily expect to see the same pattern for each measure of stress? The period-cohort explanation offered here would predict a higher prevalence of recent life events and chronic strains for younger and lower socioeconomic status groups compared to older and more advantaged social

groups. This is because the kind of structural changes identified above (i.e. increase in single parent families) are most likely to affect the contemporaneous circumstances that are reflected in chronic strains and recent life events measures (i.e. loss of job, divorce or separation). It is not clear, however, that period effects like times of high unemployment would have any effect on remote stressors like early child adversities. I see, essentially, the same pattern of decline for each measure of stress. Assuming that the pattern of decline for traumas is not solely a function of recall problems, the findings suggest a general rather than period-specific pattern of age and socioeconomic status differences in stress. Clearly, further work is needed to address this issue. For example, it would be interesting to examine age and class differences in stress using a sample of adults collected in a different decade. That way, it would be possible to control for contemporaneous circumstances that may influence the reporting of stress levels. Unfortunately, to my knowledge, no such data set exist in Canada. The 1994-95 NPHS was the first national survey of Canadians to use these measures of social stress.

4.4.3 The Primacy of Social Structure on Stress Exposure in the Population

Whether the decline in stress with age observed in this study can be attributed to aging, period and/or cohort processes, the fact remains that there are significant social structural variations in the age-stress relationship. We therefore have support for the theoretical argument that age or aging differences are not the same for all individuals in our society. Following Link and Phelan (1995), the results of this study suggest that social conditions are fundamental determinants of health and

health-related phenomena. However, one's position in the social structure of society is not simply a function of a single status (e.g. educational attainment or one's income level). Our traditional markers of social position (socioeconomic status, age, gender) overlap assigning individuals to stratified positions based upon occupying multiple statuses at once. In this study, I have demonstrated that age and socioeconomic status interact to predict three different stress measures (domains). In other words, to better understand age differences in stress, we need to assess how socioeconomic status conditions the experience of stress exposure. This is not a new idea in sociology of health or social gerontology. McMullin (1995) has discussed the importance of considering how social experience is shaped simultaneously by gender, age and social class. Along a similar vein, researchers have been interested in testing the "multiple jeopardy" hypothesis which examines the consequences of both race and age on mortality and morbidity (Clark and Maddox 1992; Dowd and Bengtson 1978; Ferraro and Farmer 1996; Markides, Timbers and Osberg 1984). This work recognizes that there are multiple systems of stratification at work in society and no one individual occupies only one status at any one time. The importance of this fact is demonstrated presently in this work. The social epidemiology of stress is better understood when we acknowledge that social position is not reflected by occupancy in single categories, but rather, social position is the intersection of multiple statuses and roles at once. In this paper, we have focused on two status positions - age and socioeconomic status. Clearly, these are not the only two of importance. Further work must be done to continue to understand

how position in the social structure (reflected by multiple statuses) influences health and well-being.

4.4.4 METHODOLOGICAL LIMITATIONS

4.4.5 Age, Stress and the Problem of Recall

The pattern of declining stress with age, coupled with the convergence of socioeconomic differences in stress, also supports the proposition that declining stress levels are simply an artefact of the methodological techniques used in community research with older adults. Questionnaire and interview-based research on stress and mental health require individuals to be able to accurately recall particular episodic events. As a result, some researchers have raised the concern that information collected from older adults may be less reliable due to a higher incidence of memory problems among this age group. This explanation may also account for the lack of socioeconomic differences in reported stress among the oldest old in the sample, as memory decline is a global, rather class specific phenomenon in old age. The pattern observed in these data, then, is simply a reflection of the limitations of current stress instrumentation.

While deficits in recall ability are of concern to gerontological researchers, evidence does exist that casts some doubt on the true impact of recall problems in survey research. For example, Rodgers and Herzog (1987) found no differences in accuracy on survey measures between younger and older adults. In a more direct test of the recall issue, Aldwin, Sutton, Chiara and Spiro (1996) also failed to support the proposition that loss of memory affects older adults' ability to recall stressful

events. These authors hypothesized that interview based stress measures (e.g. Brown 1989) with extensive probing would overcome any deficits in episodic recall of significant life events. Using a sample of men aged 45 and older, they found that while extensive probing did increase the number of reported events ("problems") in the sample, the old-old (75 years of age and older) were still less likely to report having had a problem than younger respondents. Thus, while we cannot rule out the possibility that memory problems may produce lower estimates of stress exposure among older adults, in light of research that has examined the issue directly, it would be imprudent to completely disregard the hypothesis that stress does decline with age.

The congruence in findings across three different measures of stress also contradicts the hypothesis that age differences are simply a function of recall problems. The research by Aldwin et al. (1996), for example, only considered the recall of recent stressors. I find that both recent and remote stressors show a similar pattern. If recall ability were a significant factor, we might expect to see a decline in remote stressors (i.e. childhood adversities) but not necessarily in recent life events and/or on-going stressors and strains. To the contrary, however, a decline is evident for both kinds of stressors.

4.4.6 The Over-Sampling of Age-Specific Stressors on Survey Based Stress Inventories

The fact that socioeconomic differences in stress are greater among younger age groups also supports the idea that stress inventories like these may be biased

toward younger adults (Aldwin 1991; Pearlin and Skaff, 1996). A quick scan of the items included in both the life events inventory, and the index of chronic stressors used in this study provides some support for this hypothesis. Several of the items in both inventories tap into stress domains that are more likely to affect younger adults (e.g. work and family especially child rearing related stressors). Yet, to focus only on these items is to ignore the relative age-generic items related to health, financial and relationship problems, all of which are likely to affect an individual regardless of age. In short, it would be erroneous to conclude that these measures contain no stress domains relevant to older persons. Nevertheless, because some of the items are clearly more pertinent to younger adults, and the items applicable to older adults are also applicable to younger adults, it remains a distinct a possibility that a greater number of events and strains will be reported by younger adults simply because there is more opportunity for events to occur. There is surprisingly little research that examines whether the kinds of stress to which individuals are exposed changes as they age (Pearlin and Skaff 1996). More research, perhaps of a qualitative nature, is required to ensure that the full range of stressful experiences (life events and chronic strains) are captured for all age groups.

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CHAPTER FIVE

AGE AND THE STRESS PROCESS: EXAMINING THE MODERATING EFFECT OF AGE ON THE SOCIAL ANTECEDENTS OF PSYCHOLOGICAL DISTRESS

5.1 INTRODUCTION

Does age have an impact on the relationship between stress, psychosocial resources and psychological distress? There is good reason to hypothesize that it might. Yet, the vast body of research on the stress process model in the sociology of mental health has not examined this question. In this paper, I examine whether or not age moderates the relationship between the various components of the stress process model and psychological distress using a large sample of adults from Canada.

5.1.1 THE STRESS PROCESS MODEL

For several decades now, research has been directed toward examining the consequences of social stressors on psychological well-being. The goal of this research has been to better understand how stress manifests itself in psychological distress and psychiatric disorders. The result of these endeavours has been the creation of a model that connects stress to psychological outcomes through the mediating influences of several factors - social support, psychosocial resources and coping skills. While many versions of the stress process exist (e.g. Billings and Moos 1982; Pearlin Lieberman, Menaghan and Mullan 1981), and there is some variability in the content of these models, all of these versions share a focus on the effects of stress on psychological well-being (Avison and Gotlib 1995). Moreover, almost all

identify the importance of psychosocial resources, coping and social support as mediators in the stress-distress relationship. Literally hundreds of studies on the effects of stress on health have been published using the stress process paradigm (for reviews see Aneshensel 1992; Thoits 1995).

In the sociology of mental health, the work of Pearlin and his colleagues has been particularly influential in developing the stress process model as an explanatory framework for the study of the effect of socially-induced stressors on psychological distress. In what has become a touchstone article in the field, Pearlin (1989) argues that the stress process model should be used to attend to the uniquely sociological features of the stress-distress relationship. In other words, while stressful events and circumstances can be due to random processes (e.g. automobile accidents), these should be of little interest to the sociologist. Rather, sociologists should consider the stressors that arise from normal social relations, for these enable us to examine how the social structure of daily life affects health and well-being. In light of this, Pearlin (1989) then identifies and reviews the principal components of the stress process model including the different varieties of social stressors (life events, chronic strains and childhood adversities), mastery, self-esteem, coping resources and social support. A review of the literature on the development of each of these components in the stress process literature is beyond the scope of this paper but, there are many excellent reviews of the many studies that have been influenced by this important theoretical perspective (Aneshensel 1992; Thoits 1995; Link and Phelan 1995). However, a detailed consideration of another of Pearlin's influential papers (Pearlin

et al. 1981) will illustrate one of the more common conceptualizations of the stress process.

5.1.2 The Process of Stress

In what would come to be regarded as one of the original formulations of the stress process model, Pearlin and his colleagues (1981) demonstrate how major life events (job disruption), chronic strains (economic strain), self-concepts (mastery and self-esteem), coping strategies and social support flow together to form a process of stress-distress. The motivation for this work is their observation that although many researchers had examined various components of the stress process independently (e.g. the relationship between life events and depression), much less consideration had been paid to understanding the connections between each of the three domains of the stress process; stress, mediating factors (personality characteristics) and manifestations (psychological distress). Using longitudinal data, Pearlin et al. (1981) found that job disruption leads to economic strain and stress. In turn, this chain of events leads to significant increases in depressive symptomotology. The demonstration that a significant life event such as job loss can initiate a chain of other negative stressors like economic strains Pearlin (1989) would later define in terms of primary and secondary stressors. These concepts, in turn, would lead Pearlin and his colleagues to develop the concept of stress proliferation, which extends the idea that stressors are interconnected and have the potential to produce changes across different domains of stress (Pearlin, Aneshensel and LeBlanc 1997).

As well as linking life events to chronic strains, the authors demonstrate that disruptive job events and the resultant changes in economic strain not only lead to stress, but also tend to erode a person's sense of mastery and self-esteem. This is an especially important contribution in describing the pathway from stress to distress. Pearlin and his colleagues (1981, p. 345) describe how chronic or enduring stressors, particularly those attached to specific social roles or role sets, act as either a lasting "testimony of one's lack of success or to the inadequacy of one's efforts to avoid problems." It is not surprising then, that the tenacity of enduring strains ultimately wears away one's belief in control over one's circumstances and feelings of self-worth, leading in turn to psychological distress. In short, stress does not only exert a direct effect on depression, it also erodes personal resources that are also connected to psychological well-being.

Finally, Pearlin and his colleagues (1981) examine the buffering effects of certain coping strategies and social support on depressive symptomotology. In this part of the process, they are interested in examining the degree to which the effects of stress on distress are moderated by individual differences in certain coping behaviours (e.g. positive comparison with others and devaluation of economic achievement) and perceived emotional support. While the authors show that coping strategies and social support mediate the relationship between stress and distress, they also demonstrate the interactive effects of coping and support on changes to psychosocial resources such as self-esteem and mastery and changes in depression. For example, among individuals who lost their jobs, those who compare themselves

positively with others and those who tend to devalue economic or monetary achievement report lower levels of economic strain, higher levels of self-esteem, and lower levels of depressive symptomotology Similarly, high levels of perceived emotional support seem to ameliorate the negative impact of job disruption on subsequent chronic economic strains, as well as increase self-esteem and mastery. They do not, however, have a direct effect on changes in psychological distress.

Although there have been many elaborations since this seminal work (see Pearlin 1989; 1999, Thoits 1995 for reviews), the three domains identified above remain the core elements in the model. In the next few sections, I review research literature that has examined how age influences each of these core domains separately.

5.1.3 THE INFLUENCE OF AGE ON THE PRINCIPAL COMPONENTS OF THE STRESS PROCESS MODEL

Although very few studies examine the effect of age on the stress model as a whole, there is a considerable body of work that examines the influence of age on each of the core components of the stress process. I will review each of these literatures below.

5.1.4 Age and Social Stress

The available literature on the relationship between stress and age consistently finds that average stress levels decline across successively older age groups (Chiriboga and Dean 1978; Dean and Ensel 1982; Dekker and Webb 1974; Ensel 1991; Ensel, Peek, Lin and Lai 1996; Goldberg and Comstock 1980; Lazarus

and DeLongis 1983; Hughes, George and Blazer 1988; Lowenthal et al. 1975; Murrell, Norris and Hutchins 1984; Uhlenhuth, Lipman, Balter and Stern 1974). It is important to note, however, that the majority of this work has focussed on life events rather than chronic stress or remote events that occur in childhood. Two recent reviews on the relationship between stress and age note that there has been only a handful of studies that examines age-related changes in chronic stress and daily hassles (see Aldwin 1990; Folkman et al. 1987), and no published work regarding age and exposure to traumatic events in childhood (George,1989; Pearlin and Skaff, 1996).

Several authors have cautioned, however, that this findings may simply be an artifact of the way stress is measured (Aldwin 1990; George 1989; McLean and Link 1994; Pearlin and Skaff 1996). They suggest that the "events" found on most acute life event inventories underestimate exposure to stress among older adults. Although it is true that many of the events found in these measures sample "problems" of working-age adults, there are also items (e.g. health and financial issues) that are not age-limited. Therefore, it may be overstating the case to suggest that declines in life events with age are simply an artifact of measurement. Pearlin and Skaff (1996) argue, consistent with the theory that old age is associated with role loss (Rosow 1985), that the organization of older people's lives (e.g. retirement) is associated with relatively low exposure to stress. Indeed, research has shown that older people report fewer daily hassles than do younger adults (Aldwin 1990; Folkman et al. 1987).

Another concern related to the measurement of eventful stressors among older adults concerns recall (Aldwin et al. 1996). Again, these authors suggest that declining stress exposure with age may simply represent an increase in the incidence of memory problems among older adults. However, there is contrary evidence to this claim (Rodgers and Herzog 1987). In a recent study, Aldwin et al. (1996) found that, even after extensive probing, the reported prevalence of stress still declines with age. The other problem with the recall argument is that its failure to acknowledge that certain events may be easier to recall than others. For example, for some older adults, the ability to recall mundane events diminishes over time. By definition however, the life events found on most inventories sample stressful incidents -- those that demand a response, either adaptation or strong psychological or emotional responses (McLean and Link 1994).

5.1.5 Age and Mastery

Previous research finds an association between age and mastery (Baltes, Wahl and Schmid-Furstoss, 1990; Lachman 1986; Mirowsky 1995; Rodin and Timko 1992) but the nature of this association is unclear. Some research shows a decline in mastery with age. For example, the association between increasing age and declining health and social status are used as potential factors accounting for declining mastery (Mirowsky and Ross 1992). Chronic disease, functional impairment, cognitive decline and other physiologic changes are more common among older persons (Cockerham, 1997; Maddox and Clark, 1992). Loss of family roles, retirement, death of friends and the loss of marital partners, as well as

adjustments to new norms and role expectations also characterize later life and may help to explain why mastery declines with age (Rodin, 1986; Rodin and Timko, 1992; Rowe and Kahn, 1987).

Contrary to the literature that demonstrates a decline in mastery with age, research has also found a positive correlation between age and mastery. This is particularly true when one considers the career trajectories of many white collar professionals. As Schieman and Turner (1998) note, achievement in one's occupation frequently does not emerge until mid-life. We may expect then that mastery may increase, relative to younger cohorts, as occupational successes emerge for some groups. The proposition that with age comes a greater sense of mastery over one's life is also consistent with adult developmental stage theories (e.g. Levinson et al. 1978). These theories depict aging as a progression through different stages broadly categorized as childhood/adolescence, early, middle and late adulthood. Human development is viewed as a kind of maturational unfolding that is regular, predictable and, above all else, universal.

With age comes greater maturity and acceptance which, in turn, increase positive self-image. In the case of mastery, individuals learn to master their environments, or alternatively, they learn to accept limitations or change and hence perceive situations in a more positive light than younger persons.

Although both explanations seem plausible, recent research finds that mastery declines with age (Mirowsky 1995; Wolinsky and Stump 1996). Moreover, these findings go a long way in resolving the debate over age differences in personal

control because they are able to address many of the methodological limitations (e.g. small, unrepresentative samples) that have limited our ability to address this question.

5.1.6 Age and Self-Esteem

Very little work has examined the relationship between age and self-esteem. Similar to mastery, however, one could predict that self-esteem either increases or declines with age, depending upon the theoretical perspective adopted. Role theory, for example, posits that, as individuals disengage from social roles as they age, the resultant loss will lead to declines in positive self-image. Conversely, maturational development theories predict that with age comes maturity and a greater sense of self-esteem. Gove, Ortega and Style (1989) tested both of these propositions in their analysis of the relationship between age and self-concept. They found that the weight of evidence in their analyses supports the predictions based upon maturational life-span development theory. Using several different measures of self-concept including self-esteem, they found that positive self-regard increases across older cohorts net of a variety of factors thought to confound the relationship. That self-esteem is higher among the old relative to the young is a popular conception in gerontology (Atchley, 1988). In one review, Bengston et al. (1995) find that most studies in aging and positive self-concept or image support the proposition that older persons have higher levels of self-esteem compared to younger adults.

5.1.7 Age and Social Support

As George (1989, p. 247) notes, social support "refers to the provision and receipt of tangible and intangible goods, services and benefits in the context of informal relationships (e.g. family and friends)." This definition subsumes two elements that other authors have used to describe the many facets of the complex construct -- the receipt of support and the perception of the availability of social support if needed (what has also been referred to as subjective versus objective social support). Similarly, Barrera (1986) identifies three different domains of social support: the frequency of contact with others, specific types of assistance exchanged between members of a social network, and the subjective assessment of available support. Barrera's formulation includes the distinction between objective and subjective social support. He also draws attention to the degree to which an individual is integrated in a social network (frequency of contact) to the variability in the kinds of support that can be exchanged within a network of friends and family (e.g. emotional versus instrumental support). Barrera's framework also points to the fact that not all forms of support are positive. Being a member of a social network may also subject individuals to undesirable or negative exchanges (e.g. Krause 1995a).

From these broad definitions, it is clear that social support is a complex, multi-dimensional construct (George 1989; Krause, 1987; 1995) and the literature on the relationship between age and support mirrors this complexity. Whether or not social support -- objective or subjective -- increases or decreases with age remains

unclear. Classic works in the sociology of aging, like disengagement theory (Cumming and Henry 1961) predict a decline in one form of social support -- social involvement -- as older individuals withdraw from different role and status positions. Conversely, other studies in social gerontology find older individuals are part of extensive social networks and generally satisfied with the support that they receive from others (e.g. Markides, Boldt and Ray 1986). The equivocal findings in the extant literature is likely the result of differences in the measurement and conceptualization of support. For example, as Vaux (1988) has noted, most age-related research focusses on support networks rather than on perceived social support. Some research in this vein finds that social networks may decrease with age (Fischer 1982). However, not all components of one's social network may diminish with age. For example, research has shown that contact with friends may decline with age, but contact with kin remains relatively constant (Henderson et al. 1986; Lang and Carstensen 1994). In terms of perceived support, again, the findings are inconclusive with regard to age; some studies report no change in perceived social support with age (Turner and Noh 1988), others report an increase (e.g. Lin et al. 1986), still others report a decline in perceived support with age (e.g. Zautra 1983).

5.1.8 Age as a Moderating Variable in the Stress-Distress Relationship

The considerable variation in the individual domains of the stress process across age groups raises the possibility that the effect of psychosocial antecedents on psychological distress may be conditional on age. Yet, as George (1989) recognizes, very little research has examined the hypothesis that age may act as a moderator in

the stress process model. Citing a small body of work (Chiriboga 1982; Glick, Weiss and Parkes 1974; Palmore et al. 1985), George (1989) reviews some research that suggests that age may moderate the relationship between stress and psychological well-being, particularly in regard to life events and adjustment to status transitions. For example, Chiriboga's (1982) work on differences in the adjustment to divorce/separation between younger and older adults serves as one example. Consistent with the age-as-moderator hypothesis, the negative effects of divorce were greater among older adults. In more contemporary work, the attention that has been recently paid to the effect of early childhood traumas, in terms of both specific events (Kessler and Magee 1993) and the cumulative effect of multiple traumas (Turner and Lloyd 1995), on psychological distress in adulthood, directs our attention toward life course trajectories and the timing of life events as important to the stress-distress relationship. The timing of events in the life course suggests again the potential for age to act as a moderator of the social determinants of psychological distress.

The only direct test of the age-as-moderator hypothesis is by George, Landerman and Blazer (1987) who examine the effect of age on some of the major domains of the stress process model including social stress (chronic physical illness and life events) and social support (network size, frequency of contact, instrumental assistance and the subjective perception of support) on depressive symptoms using a community sample of adults. George and her colleagues find, however, only one significant interaction between age and the major domains of the stress process they

had available for analyses; the effect of chronic illness on depressive symptoms is stronger among younger than middle age and older adults. They did not find any age interactions by life events for any of the four different measures of social support.

Because, to my knowledge, this is the only study that has examined age interactions with multiple measures typically found in the stress process literature, it is important to further examine the age-as-moderator hypothesis. While George and her colleagues were able to examine age interactions with a fairly extensive number of psychosocial measures, some key components of the stress process model were not examined. For example, although these researchers included a measure of negative life events and a measure of chronic illness as an indicator of chronic stress, there are many other stress domains that have been identified in recent years as predictors of psychological distress that were not included in their analyses, such as role-related stressors. Remote stressors (McLean and Link 1994), especially early childhood and adolescent adversities (Brown and Harris 1978; Kendler, Neale, Kessler, Heath and Eaves 1992; Kessler and Magee 1993; Turner and Lloyd 1995), and chronic stressors other than physical health (see Wheaton 1994) are two such domains. Also, George and her colleagues did not examine age interactions with self-esteem or mastery, two personal resources that play a central role in stress process research (Turner and Roszell 1994). Finally, although they present preliminary evidence of the age-specific effect of some antecedent psychosocial variables on depression, a replication and extension of their work is necessary to demonstrate the robustness of their findings. Toward this end, the following paper is

a test of the age-as-moderator hypothesis. I test for age interactions with each of the three major domains of the stress process model -- social stress, psychosocial resources and social support.

5.2 METHOD

5.2.1 Sample

The sample is taken from the National Population Health Survey (NPHS) conducted by Statistics Canada. The NPHS was a 1994 telephone survey of a national probability sample of Canadian residents across all 10 provinces. Using a multi-stage, stratified random sampling procedure, Statistics Canada surveyed 19,600 households. One person from each household was selected to provide detailed personal information. Persons living on Native reserves, military bases, institutions and some remote areas in Ontario and Quebec were excluded. Of the 18,342 possible respondents aged 12 and older, 17,626 participated (a response rate of 96.1%). Because the primary focus of the study is on adults, and to be consistent with previous work, only those aged 20 and older were selected reducing the sample to 15, 789. After a listwise deletion of cases with missing values, the total sample was further reduced to 14, 277 (N=13,397 weighted). This reduced sample is virtually the same in composition as the original sub-sample in terms of age, gender and marital status.

5.2.2 MEASUREMENT

5.2.3 SOURCES OF SOCIAL STRESS

5.2.4 Chronic Stress Index

This measure of chronic stress is based upon Wheaton's (Turner and Wheaton 1990) index of the total number of stressors individuals experience on a regular or on-going basis. Respondents were read a series of statements related to various aspects of a person's physical, emotional and mental health (see Appendix A) and answered each statement either "yes" or "no." All "yes" responses were given a value of "1" and added together to form the index. Higher scores reflect greater exposure to chronic stresses and strains. Because not all respondents would have answered every question, Statistics Canada adjusted the original index by multiplying the score from the index by the total number of items, and then dividing by the total number of questions that were relevant to the individual participant (mean=3.0, s.d.=2.6).

5.2.5 Recent Life Events

This index is based on the number of negative life events which the respondent or someone close to the respondent experienced in the last 12 months (items are shown in Appendix A). Respondents answered each statement either "yes" or "no." All "yes" responses were given a value of "1" and added together to form the index (range 0 to 10). Higher scores indicate exposure to negative life events. Again, because all respondents would not have answered every question, Statistics Canada adjusted the original index as above (mean=0.6, s.d.=1.0).

5.2.6 Childhood Adversities

The index is a count of the number of negative events to which the respondent has been exposed during childhood, adolescence or early adulthood (before the respondents moved out of their parents/primary care-givers home)(items are shown in Appendix A). Respondents answered each statement either "yes" or "no." All "yes" responses were given a value of "1" and added together to form the index (range 0 to 7). Higher scores indicate a greater exposure to negative, remote or distal life events (mean=0.9, s.d.=1.2).

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5.2.7 Mastery

The sense of mastery index was based upon the work of Pearlin and Schooler (1978). The seven item measure was assessed by asking respondents about the degree to which they feel they exert influence/control over situations in their lives (items are shown in Appendix A). Respondents answered each statement by selecting one of the following responses; "strongly agree", "agree", "neither agree nor disagree", "disagree" or "strongly disagree." The measure is scored such that higher scores indicate a greater sense of mastery (0 to 28). Item numbers six and seven were reverse coded. The internal reliability of the scale is alpha=0.76 (mean=20.0, s.d.=4.4).

5.2.8 Self-Esteem

Self-esteem is a subset of six items that were derived from Rosenberg's (1965, 1979) original 10-item scale measuring perceptions of self and self-worth (see

Appendix A). The six item measure was assessed by reading respondents a series of questions related to perceptions of self-worth. Respondents answered each statement by selecting one of the following responses; "strongly agree", "agree", "neither agree nor disagree", "disagree" or "strongly disagree." The measure is scored such that higher scores indicate a greater sense of mastery (0 to 24). Item number six was reverse coded. The internal reliability of the scale is alpha=0.85 (mean=20.3, s.d.=3.0).

5.2.9 Social Involvement

Social involvement is measured using two items both of which reflect the frequency of participation and attendance at association and religious services respectively during the previous year. Respondents were asked: "Are you a member of any organizations or associations such as school groups, church social groups, community centres, ethnic associations or social, civic or fraternal clubs? How often did you participate in meetings or activities sponsored by these groups in the past 12 months?" and "Other than on special occasions (such as wedding, funerals or baptisms), how often did you attend religious services or religious meetings in the past 12 months?" Respondents answered each question by selecting one of the following responses; "at least once a week", "at least once a month", "at least 3 or 4 times a year", "at least once a year" and "not at all." Higher scores indicate a greater level of social involvement (0-8) (mean=2.7, s.d.=2.6).

5.2.10 Average Frequency of Social Contact

The average frequency of contact is a derived variable that measures the average number of contacts that the respondent has had in the previous 12 months with family members and friends who do not live with the respondents, and with neighbours (see Appendix A). Respondents were read a series of statements identifying potential network members and asked to answer each question by selecting one of the following responses regarding how much contact they have with the individual in question; "don't have any", "every day", "at least once a week", "2 or 3 times a month", "a few times a year", "once a year" or "never." Average contact was then calculated by dividing contact (a value that indicates the total number of contacts for each of the eight categories listed above) by the size of the respondent's social network (a value that represents the total number of possible persons determined by positive responses to each category like "yes" to grandparents). Higher numbers indicate more contacts (mean=4.1, s.d.=0.9).

5.2.11 Perceived Social Support

This measure is based upon four different dimensions of perceived social support. Respondents were prompted to answer "yes" or "no" to four questions asking them whether they had someone: (1) who they could confide in, (2) who they could count on, (3) who could give them advice and (4) who made them feel loved. High scores indicate greater perceived social support (mean=3.7, s.d.=0.7).

5.2.12 Socioeconomic measures

Socioeconomic status is measured by two different variables in these analyses -- education and household income. Education is a combination of qualitative and ordinal categories. The original measure was a 12 category variable reflecting different levels of educational attainment. While some categories appeared to be ordered, others did not. Thus, the original variable was re-coded into 8 categories: (1) no formal schooling, (2) elementary level education, (3) some secondary level education, (4) high school diploma, (5) some education beyond high school, (6) college diploma or trade certificate, (7) undergraduate university degree, and (8) graduate degree (M.A. or Ph.D.) or a degree in medicine. For multivariate analysis, this measure was treated as a continuous variable (mean=4.8, s.d.=1.6).

Household income was coded into the following 11 intervals in the 1994 NPHS: (0) no income, (1) less than $5000, (2) $5,000 to $9,999, (3) $10,000 to $14,999, (4) $15,000 to $19,999 (5) $20,000 to $29,999 (6) $30,000 to $39,999 (7) $40,000 to $49,999 (8) $50,000 to $59,999 (9) $60,000 to $79,999 (10) $80,000 and more. An 11 item scale was created by setting each scale value to the midpoint of the interval. For multivariate analysis, this variable was treated as continuous (mean=43700, s.d.=25,400).

5.2.13 Age and Sociodemographic Variables

Gender was coded 1 for females (53%), 0 for males (47%). Age was an ordinal variable coded in five- year intervals (20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79) except for the last interval that

includes those aged 80 and over (mean=44.8, s.d.=16.6). Marital status included three dummy variables for married (including common-law)(68%), previously married (including widowed, divorced and separated)(14%) and single (reference category) (18%). A variable for "main activity" was also included in these analyses.

5.2.14 Analyses

In the first part of the analyses, I use the technique of progressive adjustment to regress psychological distress on age, socioeconomic status, gender, marital status, three measures of social stress, mastery, self-esteem and two measures of social support (e.g. social involvement and frequency of contact with others).

$$Y_1 = a + b_1\,(age) + b_2\,(age\text{-}squared) + b_3\,(education) + b_3\,(income) + b_4\,(gender) + b_5\,(marital\ status) + b_6\,(social\ stress) - b_7\,(psychosocial\ resources) + b_8\,(social\ support)$$

where Y_1 represents the predicted values for psychological distress, social stress represents chronic strains, life events and childhood adversities, psychosocial resources represents both mastery and self-esteem, and social support represents social involvement, frequency of contact with others and perceived social support.

Next, I fit a series of regression equations to the data to examine the moderating influence of age on each of the separate components of the stress process model identified above.

$$Y_1 = a + b_1\,(age) + b_2\,(age\text{-}squared) + b_3\,(education) + b_3\,(income) + b_4\,(gender) + b_5\,(marital\ status) + b_6\,(social\ stress) + b_7$$

(psychosocial resources) + b_8 *(social support)* + b_9 *(age*stress process component)* + b_8 *(age-squared*stress process component)*

where the components are identical to the first model, only an interaction term is created for each combination of age and age squared with each measure of social stress, psychosocial resources and social support.

5.2.15 Tests for Interactions

All tests for the presence of interactions followed the procedures described by Jaccard, Turrisi and Wan (1990). Equations with interactions were entered into a base line model containing all lower-order terms. To test for the presence of a statistical interaction, R-squared values for base line models and those models containing interaction terms were compared using a incremental, or hierarchal F test procedure with the assumption that, under the null hypothesis, the regression coefficient for the interaction term is zero in the population.

The regression approach to modelling interactions between continuous variables assumes that the variables are measured at the interval-ratio level. While some have suggested that bias is introduced when the data are not interval-ratio (Busemeyer and Jones, 1983), others argue that the assumption of linearity of responses is appropriate with non-interval level data (Borgatta and Bohrnstedt, 1980). Because the data in these analyses are ordinal, the variables approximate interval-level characteristics and therefore it is reasonable to proceed with a standard regression approach (Jaccard, Turrisi and Wan, 1990). Following the advice of

Cronbach (1987), and Jaccard, Turrisi and Wan (1990), all independent variables were "centred" prior to forming interaction terms.

5.3 RESULTS

5.3.1 Bivariate Correlations

The bivariate correlations reported in Table 1 are consistent with the stress process model. Of note, the three measures of stress are significantly and negatively correlated with psychological distress. The strength of these correlations is moderate, ranging from .28 to .31. The measures of psychosocial resources (mastery and self-esteem) are also positively and moderately correlated with psychological distress. Finally, the three measures of social support are also negatively correlated with psychological distress. However, the strength of the correlations is relatively modest (between -.09 to -.19).

If we examine the correlations between age and the major components of the stress process, we also see some congruence with other research. First, age is negatively related to psychological distress. Second, age is negatively related to self-esteem and mastery, suggesting that perceived control and self-worth decline across successively older age cohorts. Third, there is a negative relationship between age and each of the three measures of social stress. Again, this is consistent with the extant literature which reports a decline in reported stress with age. Finally, the relationship between age and the three levels of social support is more complex. Age is negatively related with perceived social support but positively related to involvement and average frequency of contact. The strongest association

TABLE 1. Correlation Matrix for Continuous Variables [a]

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1.00											
2. Income	**-0.21**	1.00										
3. Educ	**-0.31**	**0.37**	1.00									
4. CS	**-0.24**	**-0.10**	**-0.03**	1.00								
5. LE	**-0.25**	**-0.06**	**0.04**	**0.40**	1.00							
6. CA	**-0.21**	**-0.05**	0.00	**0.37**	**0.33**	1.00						
7. SE	-0.02	**0.12**	**0.13**	**-0.18**	**-0.10**	**-0.10**	1.00					
8. Mastery	**-0.10**	**0.22**	**0.19**	**-0.35**	**-0.17**	**-0.15**	**0.48**	1.00				
9. SI	**0.19**	**0.02**	**0.05**	**-0.11**	**-0.08**	**-0.10**	**0.06**	0.03	1.00			
10. SC	**0.05**	-0.02	**-0.10**	**-0.13**	**-0.10**	**-0.13**	**0.06**	**0.06**	**0.16**	1.00		
11. Distress	**-0.13**	**-0.13**	**-0.05**	**0.46**	**0.29**	**0.28**	**-0.31**	**-0.42**	**-0.10**	**-0.12**	1.00	
12. PSS	**-0.08**	**0.10**	**0.12**	**-0.20**	**-0.11**	**-0.08**	**0.13**	**0.20**	**0.07**	**0.17**	**-0.19**	1.00

[a] Significant coefficients ($p<.01$) are shown in bold type.

CS=chronic stress, LE=life events, CA=childhood adversities, SE=self-esteem, SI=social involvement, SC=social contact, PSS=perceived social support.

is between age and social involvement although the correlation is still relatively modest ($r=0.19$, $p<.001$).

5.3.2 Regression of Psychological Distress on Age, Socioeconomic Status, Social Stress, Psychosocial Resources and Social Support

After establishing the bivariate connections between each of the components in the model, I regressed psychological distress on each of the major domains of the stress process model: social stress, psychosocial resources and social support. The results are found in Table 2. The first model shows the relationship between age and psychological distress. Consistent with previous research, the relationship between age and distress is best captured using a quadratic term for age. As Wade and Cairney (1997) have reported, the relationship between age and distress is largely negative and linear to ages 65-69, when average distress levels again start to increase. However, average levels of reported distress after ages 65-69 never reach the level of reported distress among the young (ages 20 to 29). Thus, this produces an inverted j-shaped rather than the u-shaped pattern observed in some other studies (Kessler, Foster, Webster and House 1992; Mirowsky and Ross 1992). The total variance accounted for in distress by age is very modest at about two percent.

In model two, I introduce measures of socioeconomic status (income and education) and control for gender and marital status. Once the effect of these covariates is partialled out, the coefficient for age-squared is no longer statistically significant ($p>.10$). This suggests that after adjusting for socioeconomic status, gender and marital status, the relationship between age and distress is essentially

TABLE 2. OLS Regression of Psychological Distress on Age, Socioeconomic Status, Social Stress, Psychosocial Resources and Social Support, 1994-95 National Population Health Survey, (N=13,397 weighted).[a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Age	-0.03 ***	-0.04 ***	-0.01 ***	0.02 ***	-0.02 ***
	(-.17)	(-.18)	(-.06)	(-.10)	(-.10)
Age-squared	6.15E-04 ***	8.76E-05	5.29E-04 ***	5.31E-04 ***	5.71E-04 ***
	(.07)	(.01)	(.06)	(.06)	(.06)
Income		-1.46E-05 ***	-7.24E-02 ***	-2.96E-06 **	-2.54E-06 *
		(-.11)	(-.05)	(-.02)	(-.02)
Education		-0.12 ***	-0.03	0.05 **	0.05 **
		(-.06)	(-.01)	(.02)	(.02)
Female		0.59 ***	0.39 ***	0.35 ***	0.39 ***
		(.09)	(.06)	(.05)	(.06)
Single		0.42 ***	0.31 ***	0.25 ***	0.19 ***
		(.05)	(.03)	(.03)	(.02)
Previously married		0.67 ***	0.27 ***	0.31 ***	0.27 ***
		(.07)	(.03)	(.03)	(.03)
Chronic Strain			0.48 ***	0.35 ***	0.34 ***
			(.37)	(.27)	(.26)
Life Events			0.35 ***	0.28 ***	0.27 ***
			(.10)	(.08)	(0.08)
Childhood Adversities			0.27 ***	0.24 ***	0.22 ***
			(.09)	(.08)	(.08)

TABLE 2. Continued

Mastery				-0.20 *** (-.26)	-0.19 *** (-.25)
Self-esteem				-0.12 *** (-.11)	-0.12 *** (-.11)
Social Involvement					-0.01 (-.00)
Average Frequency of Contact					-0.06 * (-.02)
Perceived Social Support					-28 *** (-.06)
Constant	3.2	4.08	3.37	2.84	2.79
R-squared	0.02	0.06	0.25	0.33	0.33

[a] unstandardized b coefficients are reported. Standardized coefficients are in parentheses.

*** p<.001 **p<.01 *p<.05

negative and linear. Thus, it appears as though any increase in psychological distress among the older adults can be attributed to differences in education, income gender and marital status. Again, consistent with previous research, income and education are both negatively related to distress ($p<.001$). Women report higher average distress scores than men ($p<.001$), and never married and previously married individuals report higher levels of psychological distress than married or common-law individuals ($p<.001$). The addition of these variables increased the explained variance by four percent (six percent total explained variance).

In the next stages of the analyses, I introduce each of the major domains across successive models beginning with social stress (model 3). The coefficient for age-squared is again significant suggesting that once the differential effects of exposure to stress are removed from the model, distress levels among older adults again rise. The coefficient for the age-squared terms is reduced from model 1 by about fourteen percent suggesting that some of the increase in distress among older adults can be attributed to stress exposure. Similarly, stress exposure also appears to account for educational differences in distress and a substantial proportion of the effect of income. Similar effects are noted for the coefficients for gender and marital status, all of which remain significant in model 3 ($p<.001$) but are reduced significantly across models. Chronic stress, life events and early childhood and adolescent traumas are all positively associated with distress in this model.

In model 4, I introduce mastery and self-esteem in the equation. Both of these variables are statistically significant and both are negatively related to psychological

distress. In total, thirty-three percent of the total variation in psychological distress is accounted for by all of the variables in model 4. The inclusion of these two measures of psychosocial resources also has a significant impact on the other measures already in the model. Of particular note are the variables for age. The coefficients representing age and age squared remain largely unchanged across models. It would seem that the inclusion of mastery and self-esteem have little impact on the functional relationship between age and distress controlling for social stress and the other sociodemographic variables. Mastery and self-esteem also have a significant impact on education and income. The coefficient for household income is further reduced from model 3 by about fifty-eight percent. In model 3, the introduction of the measures of social stress reduced the education variable to insignificance. In model 4, with the introduction of mastery and self-esteem, the coefficient for education is once again significant. However, the direction of the relationship has changed. This suggests that at similar levels of mastery and self-esteem, the well educated have higher levels of distress. The coefficients for female and never married also decreased from model 3 (ten percent and nineteen percent respectively), also suggesting that higher distress scores among women and those who never married, relative to men and those who are married, can be partially attributed to variations in self-worth and sense of personal control. The coefficient for previously married increased slightly from model 3, suggesting that were it not for the protective effects of self-esteem and mastery, distress would be higher among this group relative to those who are married. Finally, the impact of chronic strain, life

events, and, to a lesser extent, early traumas, on psychological distress are reduced after the inclusion of self-esteem and mastery. This confirms one of the formulations of the stress process model that posits personal resources as mediating factors in the link between stress and distress.

In the final model, I introduce three measures of social support, -- perceived social support, social involvement and frequency of contact with others -- into the full equation (model 4). Consistent with previous work, these measures of social support are negatively related to psychological distress. However, perceived social support and frequency of contact are the only measures of support that are statistically significant in model 5. The inclusion of these variables has little impact on the functional relationship between age and distress. The coefficients for income and the coefficients for single and the previously married decline slightly indicating that some of the relationship between these variables and distress is accounted for by differences in social support. Further analyses (not shown) revealed that the decline in these variables is attributable to the addition of perceived support only. The coefficients for chronic strain, life events, traumas, mastery and self-esteem remain largely unaltered from model 4 suggesting that the inclusion of social support does not have much of an impact on the other components of the stress process model.

5.3.3 Testing for the Moderating Effect of Age on the Principal Components of the Stress Process Model

Following the analyses employed by George, Landerman and Blazer (1987), I computed interaction effects of age on each of the socio-demographic variables in

the analyses. For each combination of the demographic variables with age, I calculated two multiplicative interaction terms -- one for age and one for the age squared term. Both interaction terms were then added to the final equation found in Table 3 (full model). None of the interactions reached the minimum threshold of statistical significance ($p<.01$).

Next, I computed interaction effects of age on each of the variables for the principal components of the stress process model on psychological distress following the procedure identified above. Only one of the age interaction pairs was found to be statistically significant -- social involvement. While the coefficient for the age by mastery term was significant ($p<.01$), the interaction term for the age-squared by mastery variable was not ($p>.10$). This indicates that the relationship between mastery and age reflects a linear by linear rather than non-linear by non-linear interaction. However, the age by mastery interaction is only significant at the $p<.01$ level. Moreover, in order to assess whether the "set" of interactions with mastery made a statistically significant contribution to the overall fit of the model, I calculated an incremental F-test. The results showed that the inclusion of these variables did not make a significant ($p>.10$) contribution to the model as a whole. Therefore, in order to be conservative, I will only consider the age by social involvement interaction. For simplicity of presentation, I report only the unstandardized coefficients and standard errors for the interaction coefficient for social involvement ($p<.01$).

TABLE 3. Interaction Effects of Age, Age-Squared and Psychosocial Correlates on Psychological Distress

	Age		*Age-Squared*	
Psychosocial Correlates	*b*	*s.e.*	*b*	*s.e.*
Chronic Stress	n.s.	-	n.s.	-
Life Event	n.s.	-	n.s.	-
Child and Adult Stress	n.s.	-	n.s.	-
Mastery	-1.24E-03 **	0	n.s.	0
Self-Esteem	n.s.	-.	n.s.	-
Social Involvement	-3.32E-03 ***	0	8.93E-05 **	0
Social Contacts	n.s.	-	n.s.	-
Perceived Social Support	n.s.	-	n.s.	-

Notes: [1] Age x psychosocial correlate moderating effects were computed by adding each of the eight interactions pairs (age and age squared) to Model 3 of Table 3.
b= unstandardized regression coefficient
s.e.=standard error

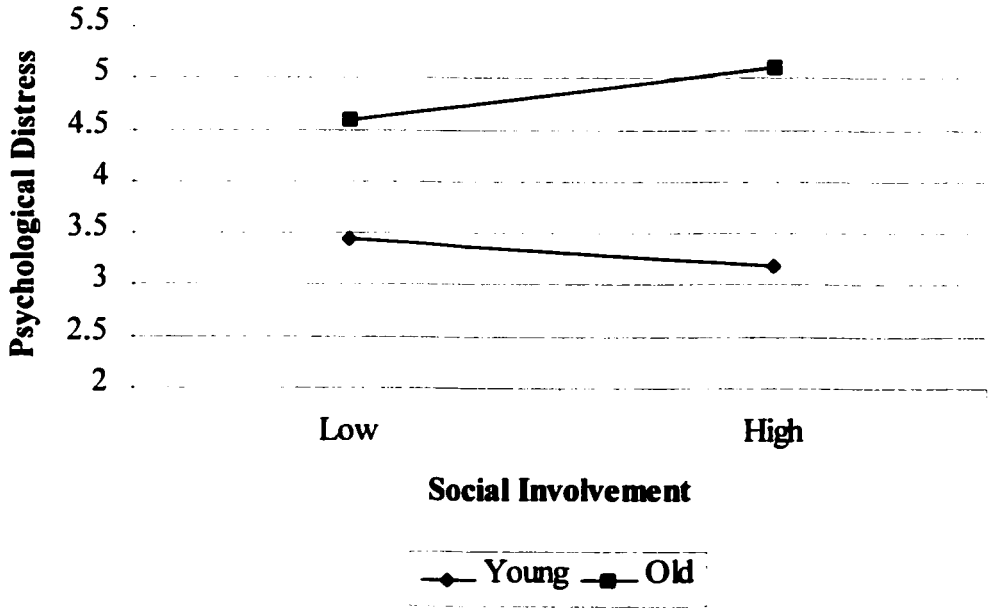
*** p<.001 **p<.01

Figure 1 shows the effect of age on the social involvement-distress relationship. Low and high levels of social involvement correspond to -1 and +1 standard deviations about the mean respectively. The age patterns are quite striking. Among young adults, greater involvement in social activities (e.g. church attendance and volunteer work) reduces psychological distress. The opposite, however, is true for older adults. Greater social involvement actually produces higher levels of psychological distress. Together, this suggests that social involvement produces a protective effect on distress among younger adults but actually increases distress among the old.

5.4 DISCUSSION

Past research confirms the importance of social factors such as social class, gender and age on psychological distress (Turner, Wheaton and Lloyd 1995) and thereby supports the general proposition that position in the social structure has important consequences for individual well-being (Pearlin 1989; Link and Phelan 1995). Moreover, recent research (Turner and Lloyd 1999) suggests that stress process variables (i.e. social stress, psychosocial resources and social support) explain a substantial part of the variation in psychological distress by these same social factors. Together, this research demonstrates not only the etiological importance of the stress process model, but also the importance of social factors as fundamental causes of psychological distress (Pearlin 1999). Drawing upon research that has examined the influence of age on the various components of the stress process model, and following the work of George (1989), I argue that age may be an

FIGURE 1. Psychological Distress and Social Involvement within different levels of Age



important moderator of the relationship between the psychosocial antecedents and symptoms of psychological distress.

The findings of this paper address two important issues in the relationship of age to the stress process. First, similar to the findings of George and her colleagues, I find that for most of the major components of the stress process model age is not a significant, modifying factor in the stress-distress relationship. In fact, only one variable -- social integration -- shows a significant interaction with age in predicting psychological distress. By contrast, the only significant age interaction that George and her colleagues (1987) found was age by physical illness (chronic conditions). Because the stress process model typically treats physical illness as an outcome rather than predictor (Thoits 1995), I did not include it in my analysis. For the sake of comparison with the George et al. (1987) study, I added a count of chronic conditions and tested for age and age squared interactions with this variable in the same manner identified in the methods and results section (analysis not shown). Unlike George and her colleagues (1987), I find no significant interaction between age and chronic illness in these data.

However, like George, the results here confirm that age is not a significant moderator of social stress, mastery or self-esteem. While statistically non-significant relationships are often a source of disappointment in research, the fact that age does not moderate the stress process model is an important finding in its own right. The findings of this study, and of George, Landerman and Blazer (1987), suggest that exposure to major life events, chronic strains and childhood adversities are risk

factors for depression and distress regardless of chronological age. The fact that the relationship between social stress, psychosocial resources and psychological distress is not affected by age is particularly interesting in light of the research that documents age differences in these important psychosocial antecedents. As mentioned earlier, research has documented a decline in both stress (Chiriboga and Dean 1978; Dean and Ensel 1982; Dekker and Webb 1974; Ensel 1991; Ensel et al. 1996; Goldberg and Comstock 1980; Hughes, George and Blazer 1989; Lazarus and DeLongis 1983; Lowenthal et al. 1975; Murrell, Norris and Hutchins 1984; Uhlenhuth et al. 1974). On this basis, one may postulate that a decline in stress, for example, may suggest that the relationship between stress and distress may change with age.

Similarly, as some research has documented a decline in mastery with age (Mirowsky 1995; Wolinsky and Stump 1996), this suggests the possibility that the effect of mastery on distress may also vary across age groups. The failure to find evidence for either of these hypotheses suggests that, while overall levels of mastery and stress decline with age, stress exerts a negative effect on distress and mastery a positive one across the entire life course. Why might this be so?

Previous research has documented that major depressive disorder and symptoms of psychological distress generally decline with age (Wade and Cairney 1997; but see Mirowsky and Ross 1992; Kessler et al. 1992). The fact that psychological distress declines with age helps us to better understand why the effects of stress and psychosocial resources do not vary with age. Assuming that if social

stress and psychosocial resources (i.e. mastery and self-esteem) are causally prior to symptoms of distress and depression, then age would have little impact on the stress-distress relationship, for the decline in stress with age parallels the decline in psychological distress. In other words, age does not impact on the stress-distress relationship because both are declining in a similar manner. Moreover, although the decline in mastery with age should lead to increases in psychological distress across age groups, this appears to be off-set by the parallel decline in social stress. If one of the principal functions of mastery (and self-esteem) in the stress process is to counter the negative effects of stress exposure then, as stress declines, mastery and self-esteem are less taxed in the system, thereby counteracting the otherwise negative psychological effects of declining personal resources. Even though mastery declines with age, so too does its significance in preserving mental well-being because stress exposure also declines.

The second key issue raised by this paper concerns the effect of age on the relationship between social involvement and psychological distress. The only significant interaction with age indicates that social involvement has a protective effect on psychological distress but only among young adults. For older adults, greater involvement is associated with higher levels of psychological distress. Assuming that social involvement is causally prior to psychological distress, then the age specific effects identified here suggest the potential impact of multiple role occupancies on psychological well-being across the life-course. The measure of social involvement available in these data taps into role domains outside of the

workplace and family such as church involvement and social club membership. That participation in these roles leads to higher psychological distress among older but not younger adults suggests the possibility that the former may be experiencing role overload. This is surprising since role overload is more often associated with younger adults, particularly women, who have to juggle the conflicting responsibilities of work and family. Because social roles, particularly those associated with work and family, tend to decline with age (Cumming and Henry 1961), the assumption would be that, freed from labour force and familial constraints, participation in volunteer activities would lead to positive mental well-being among older adults.

One possible explanation for this finding may be found by re-considering some core assumptions about successful aging that exist in our society. Calasanti (2001) argues that proponents of successful aging focus on active engagements (e.g. participation in leisure and physical activities) as a sign of effective adjustment to old age; to be active is to be well adjusted because activity is the mark of youthfulness. According to her, this perspective regards passive activities such as reading or reflective contemplation as inactivity which is synonymous with unsuccessful aging. Thus, Calasanti argues that our notions about successful adjustment in old age reinforce ageist attitudes because they place value on the ability to engage in youthful activities. This raises the point that social involvement per se may not hold any psychological benefit if the only reason a person engages in such activities is because they feel that they should (i.e. in order to conform to these ageist assumptions that

characterize our society). If older adults succumb to the notion that they have to volunteer, join social groups or attend church groups in order to age successfully, greater participation in these activities may lead to distress simply due to the demands imposed upon them by a youth (sic active) orientated society.

Another explanation may be related to what sociologists in mental health have referred to as the "cost of caring" hypothesis (Kessler, McLeod and Wethington 1985). This hypothesis has been used to explain gender differences in depression. Turner and Avison (1989) found that differential rates in depression between men and women could be partially accounted for by women's greater exposure and vulnerability to significant life events that occur to others in their intimate social networks. The cost of emotional involvement in the lives of individuals close to them carries a cost in terms of psychological distress for some women.

A similar process may be occurring for older adults who engage in civic and religious activities. Specifically, older adults who have above average levels of social involvement may be more vulnerable to events that occur as a result if their participation in these interactions. Like the cost of caring about others for women, the cost of greater social participation for older adults may be their psychological well-being.

The final explanation for high levels of social involvement being associated with greater distress among older adults is a version of the selection argument. Greater social involvement may be associated with higher distress among older adults because individuals with pre-existing physical or mental health problems may

be engaging in such activities as a coping mechanism. It is possible to conceive of, for example, a situation where an individual with cancer may increase his/her frequency of attendance at church, or volunteer with local organization, as a way of coping with the stress of having a serious potentially life threatening disease. The fact we are observing high levels of distress alongside high levels of social involvement among older adults simply reflects the co-occurrence of distress due to problems associated with other health concerns.

Unfortunately, it is not possible with these data to test these possible explanations. Obviously, more work is required to better understand why social involvement in old age does not have the positive impact it appears to have for younger adults.

One final comment on the overall limitations of the present study is warranted. These data are cross-sectional and therefore, it is not possible to ascertain causal order in this analysis. We do not know, for example, whether social involvement is causally prior to psychological distress. We can, however, make assumptions of causal ordering based upon previous work. Although selection processes certainly play a role in the determination of social position (Mirowsky and Ross 1995) particularly in the case of schizophrenia, for other disorders such as depression and substance alcohol addiction, social causation is the favoured explanation for observed relationships between social position and mental disorder (Dohrenwend et al. 1992). Research with longitudinal data has shown social sources of stress to cause changes in depressive symptoms (Pearlin et al. 1981). I follow the

lead of the other researchers and assume that the stress process variables are causally prior to psychological distress (see Turner, Wheaton and Lloyd 1995; Turner and Lloyd 1999).

In addition to the problem of causal ordering between variables, there is the problem of disentangling aging from period and cohort effects with cross-sectional data. Although throughout this paper the assumption has been made that age differences in the social correlates of psychological distress are related to the process of aging rather than differences attributable to the unique historical or contemporaneous circumstances affecting individual age groups (cohorts), it is not possible to test this with these data. Unfortunately, very little data exist that allows researchers to examine aging effects over many decades (see Clausen 1993 for example). Moreover, no such data exists for a test of the effect of age on the stress process over several decades. We must therefore be cautious about concluding that the patterns observed here are age effects. However, we must be equally cautious about simply dismissing the findings simply because these data are cross-sectional. Much can be gained theoretically by provisional testing of hypotheses with cross-sectional data. The exploration of theoretical propositions with data such as these can lay the necessary groundwork for further study with prospective data.

Despite its limitations, this is one of only two studies that examines the influence of age on each of the major domains of the stress process model. The findings suggest that age, while significantly correlated with most of the major domains of the stress process, does not appear to influence the direct effect of each

component on psychological distress. The importance of these findings cannot be overstated. Across the lifespan, among the young and the old, the effects of stress and psychosocial resources on distress are the same. Unlike previous work that has focussed largely on working age adults (see Turner and Lloyd 1999), this paper is able to demonstrate the universality of the stress process model across age groups.

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CHAPTER SIX

GENERAL DISCUSSION

I began this dissertation by arguing for the need to consider whether the relationship between socioeconomic status and the social determinants of health is influenced by age. In particular, my work is concerned with how the relationship between socioeconomic status and psychological distress as well as some of the major components of the stress process model (stress and mastery) may be influenced by age. Two questions set the parameters of this study. Are socioeconomic differences in psychological distress and the mediating variables that connect social structure to health outcomes universal? Or, does age moderate the relationship between social structure and these outcome measures? I am now in a position to make some general conclusions based upon this work.

6.1 Conclusion One: The Relationship Between Socioeconomic Status and Psychological Distress is Age Invariant

On the basis of analyses reported in this dissertation, the relationship between socioeconomic position and distress is the same across all age groups (from age 20 to 80 and over). The gap in psychological distress by education and/or income holds across age groups. This is contrary to previous work (Miech and Shanahan 2000) and research in the sociology of physical health which shows that the socioeconomic gap in health either widens or diminishes with age (Ross and Wu 1996; House et al. 1990;1992;1994). As demonstrated in the first article, social status exerts an important influence on psychological well-being from early to late adulthood.

6.2 Conclusion Two: Age Influences the Relationship Between Socioeconomic Status and Two Central Components of the Stress Process Model

Although age does not appear to affect the relationship between socioeconomic status and psychological distress, I conclude that age does moderate two important mediating variables that link position in the social structure to psychological well-being -- mastery and social stress. The overall findings of the two papers on these issues are remarkably similar; socioeconomic status differences in mastery, recent life events, chronic strains and childhood adversities converge across successively older age groups. Among the oldest age group in the sample, there are very small or non-existent socioeconomic differences in each of these mediating variables compared to younger cohorts where the socioeconomic gap in these variables is wider. These findings are consistent with the work of House and his colleagues (1990; 1992) who find that the socioeconomic gap in physical health tends to converge across successively older cohorts.

6.3 Conclusion Three: The Universality of the Stress Process

The results of the fourth paper support the proposition that the stress process model operates in a similar manner regardless of age. This conclusion is consistent with the work of other researchers who have demonstrated the applicability of the stress process model in predicting distress in older adults (Krause 1999; Pearlin and Skaff 1996). When I test for the influence of age on the relationship between each of the principal components of the stress process model and psychological distress, only one significant age interaction is detected -- age by social involvement. The results of

the analysis reveal that greater social involvement actually increased psychological distress among older adults. I hypothesize that this may be due to three processes. First, perhaps older adults who participate in voluntary activities such as volunteer organizations feel more distressed than those who do not because social acceptability is their motivation for participation. Specifically, if older adults feel compelled to be involved in such activities, regardless of their personal desire to do so, then greater social involvement may not benefit psychological well-being. This rests on the argument that successful aging in western culture is based on the ability of the individual to continue to act young (Calasanti 2001). There is no necessary net gain in well-being if the individual is engaging in an activity simply to live up to a cultural stereotype or social prescription.

Another possible explanation is that there is a "cost of caring" associated with increased social activities in old age (Kessler, McLeod and Wethington 1985). Greater social involvement in community organizations and church attendance may carry a high emotional investment that exerts a negative impact on psychological well-being. It may be that older adults who are heavily involved in civic and religious activities may be more vulnerable to problems that arise through these interactions. Their high involvement comes at cost to psychological well-being.

The final explanation is a version of the selection argument. Greater social involvement may be associated with higher distress among older adults because individuals with pre-existing health problems (physical and/or mental) may be using social involvement as a coping mechanism. The fact that we are observing high

levels of distress alongside high levels of social involvement among older adults simply reflects the co-occurrence of distress due to problems associated with other health concerns.

In sum, with the exception of social involvement, there appears to be no differences in the effect of stress, mastery, self-esteem, perceived social support and frequency of contact with family and friends on psychological distress by age. This is especially noteworthy given the sample size of these data; it is simply easier to detect significant interactions in samples as large as the one used here. The fact that I did not lends much support to the idea that there are no age variations in the pathways connecting the components of the stress process to mental well-being. Across the life span, the stress process operates in a markedly consistent manner.

6.4 Conclusion Four: Support for Interlocking Systems of Social Stratification Based upon Age and Socioeconomic Status

In the introduction to this work, I argued that researchers generally treat measures of social position as though there were separate rather than interlocking systems of social stratification. For example, studies on the relationship between socioeconomic status and depression treat age as a control variable rather than as a central organizing principal of social relations. A much different approach is one that seeks to understand how these two measures interact with one another to produce health outcomes. Although there are several bases of social inequality, I was particularly interested in assessing the mental health consequences of position in both the age and social/economic structures of Canadian society.

Again, the findings of these papers allow for some preliminary observations on the empirical support for this theoretical approach. First, as noted above, there is support that age has a significant effect on the relationship of socioeconomic status to mastery and stress (recent and remote). However, I did not find support for this perspective with regard to psychological distress. Theoretically, how might we interpret this? With regard to psychological distress, I interpret the evidence as supportive of Link and Phelan's (1995) argument that social conditions are fundamental causes of disease and illness. In their paper, social conditions are defined in terms of access to resources. They explicitly identify education and income in particular as the means through which individuals protect themselves from health-related risks. Knowledge and purchasing power are the resources through which health can be achieved and maintained. The fact that socioeconomic status differences in distress remain throughout all age groups, even as overall levels of distress decline with age, reinforces the importance of knowledge and purchasing power as fundamental determinants of mental well-being. Across every age group, education and income influence psychological well-being in a similar way.

For mastery and social stress, age and socioeconomic status appear to have synergistic effects on these psychosocial risk factors. This makes sense when one considers the nature of these variables. First, in the case of stress, the fact that there are age variations in the relationship between socioeconomic status and this variable, particularly chronic strains and recent life events, most likely reflects fundamental differences in the organization of daily life across age groups (Pearlin and Skaff

1996). Pearlin and Skaff (1996) propose that declines in stress with age reflect real changes in exposure to stressful circumstances. The structure of daily life for older adults, they argue, simply exposes them to fewer stressors than younger adults. The motivation for further analysis on this subject was to examine whether this was true for everyone regardless of their economic and educational positions in society. In fact, the evidence suggests that not only do younger adults report more stress than older adults, younger adults with lower levels of education and income also report more stress than their more economically and socially advantaged counterparts. Among older adults, stress levels across social and economic positions are very small or non-existent, a pattern that is consistent with Pearlin and Skaff's (1996) argument. There is, however, one further caveat: the structure of daily life for older adults exposes them to fewer stressors and this occurs across all socioeconomic groups. In this sense, age has a leveling effect on socioeconomic status differences in stress. Regardless of social position, older adults report fewer stressors than younger adults. This of course is likely part of the explanation for overall declining distress levels with age observed in these data; as stress declines so too does psychological distress.

Independent of my interpretation for this convergence, the fact still remains that differences in distress by socioeconomic status persist among the oldest age groups despite the fact that the socioeconomic gap in stress declines with age. The reason for this may be that while overall stress and differences in stress across social classes decline with age, factors other than stress account for socioeconomic status differences in psychological distress in old age. In short, the risk factors that produce

distress in the young (e.g. stress) may not be the same as those that produce distress among older adults. Research has documented, for example, socioeconomic differences in physical health among older adults (e.g. Ross and Wu 1996). It may be the case that socioeconomic differences in physical health and functioning may account for socioeconomic status differences in psychological distress. Because the prevalence of physical health problems is relatively low among younger adults, stress is a more salient cause of psychological distress in these age groups. Conversely, physical health problems have a much higher prevalence in older age and have also been shown to be correlated to depression and other symptoms of psychological distress in older adults (e.g. Mirowsky and Ross 1992).

Mastery is influenced by certain role-related transitions that are ubiquitous to the experience of aging in our society. It is here that we see a direct parallel to stress. If lower stress levels are linked to organizational structure of daily life for older adults (e.g. lower exposure to stressful events and strains), lower mastery is also a product of the life situations of older adults. One such example is that of retirement. Role-related transitions such as retirement lead to changes in the structure of everyday life that in turn influence perceptions of control. Ross and Drentea (1998) observe that retired individuals report lower levels of perceived control when compared to non-retired individuals because of differences in the activities of their daily lives. Specifically, the structure of daily life for retirees tends to be more routine, less likely to involve problem solving or involve learning new things, and provides less opportunity for positive social interaction. Together, these

characteristics lead to greater alienation in retirement that in turn accounts for the differences in perceived control between retired and non-retired adults. It may also explain, in part, why mastery levels decline with age; it is commensurate with the changes in activities that accompany status and role transitions for many adults.

The findings from this dissertation on the relationship between age, socioeconomic status, and mastery add an important qualifier to the findings reported by Ross and Drentea (1998). My work demonstrates that the decline in mastery with age is not the same for all individuals, at least in terms of socioeconomic position. This implies that although the structure of daily life may change in old age, the impact of this change is different depending upon the social position of the individual prior to retirement. For example, there is an implicit assumption in Ross and Drentea's (1998) work that the positive characteristics of daily life such as non-routine, socially enriching interaction and active problem solving are characteristic of daily activities for all non-retired individuals. In fact, the convergence in mastery observed in this dissertation suggests that these characteristics may be true for some individuals, particularly those from advantaged socioeconomic backgrounds, but not others. For individuals from low socioeconomic groups, there may be little or no change in the characteristics of either work and/or non-work activities -- they may continue to be routine or provide less opportunity for positive social interaction. This explains the convergence in mastery with age across these groups; the rate of decline in mastery is most pronounced among individuals who have, in one sense, the most to lose. The fact that the largest socioeconomic differences in mastery occurs in early

adulthood further reinforces this interpretation. Assuming the positive characteristics identified by Ross and Drentea (1998) define life for the non-retired and that these characteristics are more descriptive of activities for socially and economically advantaged individuals, we would expect to see the greatest differences among working age adults.

As with the discussion of stress, we may not necessarily be confused by what on the surface appears to be a somewhat contradictory finding -- that socioeconomic status differences in psychological distress persist in old age even though the socioeconomic gap in mastery converges with age. In fact, the parallel decline in both mastery and distress across age groups is itself confusing given that mastery is negatively related to psychological distress. If mastery is lower in older age groups, should this not lead to higher levels of distress in this age group?

Of course, similar to the argument with stress, this is only confusing if we conceive of higher distress as the only possible outcome associated with declining levels of mastery. Again, the increase in physical health problems, coupled with the decrease in mental health problems such as depression documented in several studies (e.g. Wade and Cairney 1997) suggests that the conditions of existence for older adults may have more impact on physical functioning than on psychological well-being. Perhaps lower levels of mastery are associated with physical health impairments rather than psychological distress among older adults. Previous research has demonstrated that such a relationship is plausible (e.g. Mirowsky 1995).

6.5 METHODOLOGICAL CONSIDERATIONS

6.5.1 Aging, Period and Cohort Effects

Throughout each of the papers included in this dissertation, the limitations associated with cross-sectional data are identified as a significant hindrance to a complete understanding of the processes that connect age and socioeconomic status to each of the outcomes. In particular, assuming that age differences, observed from cross-sectional data, are in fact aging effects is problematic for it overlooks other possible explanations. There are two generally accepted ways of addressing this concern. First, the use of longitudinal or panel studies can allow the researcher to capture changes within the individual (aging effect) over a period of time -- often one to two years. This design, however, is not necessarily able to disentangle period from aging effects because of the rather short time interval between waves that is typical of most surveys. Moreover, the short time interval is also problematic when one is interested in studying the effects of factors such as social position (which is also subject to variability due to status mobility) on constructs such as mastery over the adult lifespan. For example, using the logic of panel designs, if one is interested in studying whether mastery declines from early adulthood to retirement, decades of panel data would be required. In fact, very few such studies exist for rather obvious reasons[10]. Needless to say, I was unable to locate any data that met the requirements

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See Clausen (1993) and his discussion and use of the small number of databases that span several decades such as the Berkeley Growth Study, the Berkeley Guidance Study and the Adolescent (Oakland) Growth Study.

specified above. Although the National Population Health Survey is longitudinal, many of the constructs of interest in this study (mastery and stress) were only included in the first wave of data collection. In addition, when I began my work, only the 1994-95 survey (first wave) was available for public use. Since then, the second wave has been released and the third wave of data is slated for distribution shortly. The measure of psychological distress is available in waves two and three and therefore further work can be done with this construct in a longitudinal analysis (see Future work section below).

Another method for addressing the problem of separating aging from period and cohort effects is to use cross-sectional surveys from different time periods. Not only does this allow for testing of the robustness of findings (i.e. replicating patterns with different data sets), it is also a test for aging versus cohort explanations. In effect, cross-sectional surveys of the general population in different years are equivalent to sampling age cohorts across time. If age differences in variables such as psychological distress are attributable to the unique experiences of a particular cohort, then this pattern should be consistent across different surveys. For example, if individuals born in 1920-25 are more likely to be depressed, presumably through a shared common experience such as growing up during the depression, than individuals born in 1960-65, then these differences should be apparent across surveys from different time periods. Even as this cohort ages, higher levels of depression, relative to other groups at least, should be observable across different surveys.

In the first article, I was able to use two different surveys to examine age and socioeconomic status differences in distress. The remarkable similarity across different surveys, using two different measures of distress demonstrated the robustness of the findings. Moreover, because the findings were virtually the same, and the data were collected during different time periods (1990-91 versus 1994-5), there is some support for an aging effect. However, similar to the problem with longitudinal studies, the time interval between studies is small. Greater confidence in the aging effect explanation might be obtained by analyzing studies further apart in time (10 or more years for example).

It should be noted at this point that neither of these approaches is a panacea for the problem of disentangling period, cohort and aging effects. Neither approach, for example, can address the possibility of an interaction effect between period, cohort and aging processes. The best that we can accomplish is to use as many approaches as are available and to remain sensitive to the complexity of social life suggested by these processes.

6.5.2 Magnitude of Effects

Another criticism that can be raised about the work contained in this dissertation concerns the apparent asymmetry between the amount of theoretical attention given to the importance of age effects (i.e. the argument developed for including age as an important determinant and moderating factor in these papers) and the rather modest empirical effects of age that are observed. There are two responses to this criticism. First, this is a general criticism that almost all sociologists who are

interested in social structural effects on health have had to address. It is not at all uncommon for the effect size of variables such as income or education on health related outcomes to be modest. Does this mean that these variables are of little importance? Not at all. The common response from sociologists has been that the reason these effects are slight is that they represent influences that are distal to the outcome. In other words, socioeconomic status variables are contextual effects that condition other factors that are more proximate to the outcome. An example will illustrate.

In the sociology of mental health, researchers argue that position in the social structure influences psychological distress by conditioning exposure to stresses and strains and by affecting the availability of coping resources such as social support and mastery (see Pearlin 1989). Together, exposure to stress and the differential availability of coping resources produces differential rates of distress (for example, income differences in depressive symptoms). In this model, the direct effect of socioeconomic status on distress is small because it is temporally distal from the outcome. The effect of stress, conversely, is much stronger because stress is directly rather than indirectly related to distress (a proximate effect). Despite the size of the effect, socioeconomic status is still held to be important precisely because of its influence on the more proximate predictors of distress. It is fundamental in this model because it defines the context within which the processes that connect stress to distress operate.

In this dissertation, I would not expect socioeconomic status or age to be strongly related to the outcome variables in question. The purpose of the work in this volume was to demonstrate the importance of how the joint occupancy of age and socioeconomic positions in our society influences health and well-being. That the effects are small may simply show that both age and socioeconomic status are contextual factors that are distal to each of these outcomes. In my model, age and socioeconomic status are the variables that set the stage for the relationship between other more proximate effects and health outcomes.

The second point concerns the extant literature. Although small, the effect size for age in these papers is consistent with previous research (e.g. Miech and Shanahan 2000; Mirowsky 1995; Schieman, Van Gundy and Taylor 2001). Therefore, at the very least, the findings are not out of line with previous research. While this is not a justification in and of itself, when coupled with the argument above, there is both precedent and theoretical rationale for expecting age and socioeconomic status to be relatively weakly correlated with the outcome variables of interest in this study.

6.6 FUTURE WORK

6.6.1 Further Exploration of Age by Socioeconomic Status Interactions with Other Components of the Stress Process Model

One of the most obvious directions for future work concerns replicating the analyses presented here with other components of the stress process model. Most notably, measures of social support and self-esteem are two constructs that were not

examined in this work. My selection of mastery and stress instead of other components reflects current interest in the literature on the importance of these two elements of the stress process model. Specifically, the recent work of Turner and his colleagues (Turner, Wheaton and Lloyd 1995; Turner and Lloyd 1999) has sparked renewed interest in the role the stress universe plays in accounting for socioeconomic status, marital, age and gender differences in psychological well-being. It seems timely to further this work by examining how age may influence the relationship between socioeconomic status and psychological distress. With regard to mastery, again, several recent papers (e.g. Mirowsky 1995; Schieman 2001) have also explored age differences in personal control. The recent Penn State University conference on societal impacts on personal control (October 2000) held by the Center for Gerontology also reinforces the current interest in this construct particularly in relation to social influence and aging. Also, given the importance of mastery/personal control to mental health research, it seemed appropriate to examine the joint influences of age and position in the social structure in predicting mastery. Nevertheless, further work must include an examination of the influence of age on the relationship between socioeconomic status and other variables such as social support and self-esteem. In both cases, there is certainly sufficient evidence that these variables are apt to be influenced by age, income and education (see Turner and Roszell 1994; Turner and Marino 1994).

Another important avenue for further research is to explore possible interactions between other dimensions of inequality such as gender and

socioeconomic status. While I did not find evidence for a second-order gender interaction with age by socioeconomic status, it is clear that further work needs to explore how gender may influence distress and the major components of the stress process model. Moreover, further work examining whether the age interactions found in this work are influenced by race and ethnicity is also warranted.

6.6.2 Longitudinal Analysis

Finally, research with longitudinal designs may aid in determining whether or not the age differences observed in this dissertation reflect an aging process. However, it may be some time before such data are available. Unfortunately, the National Population Health Survey does not include mastery or measures of social stress in subsequent waves beyond 1994-95. It will be possible, however, to do further work with psychological distress. Therefore, future work must involve a longitudinal analysis with psychological distress as the outcome measure. It will be possible, for example, to examine changes in psychological distress across three waves of data (each approximately two years apart). Although this is a short time period, it will provide an opportunity to observe whether age and socioeconomic status can predict changes in distress over a six year period. Also, assuming Statistics Canada continues to collect data and that they retain this measure of psychological distress, in the not too distant future, it will be possible to examine the effects of age and socioeconomic status and psychological distress over a much longer time period than has previously been the case.

Notwithstanding the limitations identified above, this dissertation has made an important contribution to the field by attending to two central stratifications processes -- age and socioeconomic status. It is clear from the papers contained in this work that researchers must attend to how mastery and sources of social stress, in particular, are stratified not only by income and education, but by age as well. In particular, greater attention should be paid to examining how these systems of social inequality interact to produce differences in psychosocial resources and stress in the population. The findings of this dissertation also support the theoretical argument that position in the social structure is best conceptualized in terms of interlocking hierarchies of stratification rather than separate measures of social status. Although age and socioeconomic status are not the only systems of stratification, it is clear that they have important influences on mastery and stress. As sociologists increasingly recognize these social patterns, they will be better able to understand the complex effects of social stratification on stress and psychosocial processes.

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APPENDIX A

CORRELATION MATRIX FOR VARIABLES INCLUDED IN ARTICLE ONE [a]

Panel A. 1991 General Social Survey

Variables	1	2	3	4	5	6	7	8
1. Distress	1.0							
2. Age	-.14	1.0						
3. Income	-.15	-.27	1.0					
4. Education	-.07	-.31	.40	1.0				
5. Female	.04	.04	-.16	-.03	1.0			
6. Single	.11	-.29	-.09	.12	-.07	1.0		
7. Married	-.16	-.11	.35	.03	-.10	-.57	1.0	
8. Previously Married	.09	.40	-.32	-.15	.19	-.24	-.65	1.0

Panel B. 1994 National Population Health Survey

Variables	1	2	3	4	5	6	7	8
1. Distress	1.0							
2. Age	-.13	1.0						
3. Income	-.12	-.18	1.0					
4. Education	-.05	-.28	.34	1.0				
5. Female	0.10	.04	-.09	-.05	1.0			
6. Single	.09	-.34	-.08	.06	-.06	1.0		
7. Married	-.12	.05	.26	.04	-.06	-.68	1.0	
8. Previously Married	.05	.30	-.26	-.11	0.14	.19	-.59	1.0

[a] all correlation coefficients are significant at $p<.001$

APPENDIX B

MEASURES OF STRESS, PSYCHOSOCIAL RESOURCES AND SOCIAL SUPPORT

Chronic Stress

"I'll start by describing situations that sometimes come up in people's lives. As there are no right or wrong answers, the idea is to choose the answer best suited to your personal situation."

1. You are trying to take on too many things at once.
2. There is too much pressure on you to be like other people.
3. Too much is expected of you by others.
4. You don't have enough money to buy the things you need.
5. (for married/common law respondents only) Your partner doesn't understand you.
6. Your partner doesn't show enough affection.
7. Your partner is not committed enough to your relationship.
8. (for separated/divorced or widowed respondents only) You find it very difficult to find someone compatible with you.
9. (for respondents who have children only) One of your children seems very unhappy.
10. Your child's behaviour is a source of concern for you.
11. (for everyone) Your work around the home is not appreciated.
12. Your friends are a bad influence .
13. You would like to move but you cannot.
14. Your neighbourhood or community is too noisy or too polluted.
15. You have a parent, a child or a partner who is in very bad health and may die.
16. Someone in your family has a drug or alcohol problem.

17. People are too critical of you or what you do.

Recent Life Events

"Now I'd like to ask you about some things that may have happened in the past 12 months."

1. Were you, or someone in your family, beaten up or physically attacked?
2. Did you or someone in your family have an unwanted pregnancy?
3. Did you or someone in your family have an abortion or miscarriage?
4. Did you or someone in your family have a major financial crisis?
5. Did you or someone in your family fail school or a training program?
6. Did you (or your partner) experience a change of job for a worse one?
7. Were you (or your partner) demoted at work or did you/either of you take a cut in pay?
8. Did you have increased arguments with your partner?
9. Did you go on welfare?
10. Did you have a child move back in the house?

Childhood and Early Adulthood Adversities

"The next few questions ask bout some things that may have happened to you while you were a child or a teenager, before you moved out of the house. Please tell if any of these things have happened."

1. Did you spend 2 weeks or more in a hospital?
2. Did your parent get a divorce?
3. Did your father or mother not have a job for a long time when they wanted to be working?
4. Did something happen that scared you so much you thought about for years after?
5. Were you sent away from home because of something you did wrong?
6. Did either of your parents drink or use drugs so often that it caused problems for the family?
7. Were you ever physically abused by someone close to you?

Mastery

"Now I am going to read you a series of statements that people might use to describe themselves"

1. You have little control over the things that happen to you.
2. There is really no way you can solve some of the problems you have.
3. There is little you can do to change many of the important things in your life.
4. You often feel helpless in dealing with the problems of life.
5. Sometimes you feel that you are being pushed around in life
6. What happens to you in the future mostly depends on you
7. You can do just about anything you really set your mind to.

Self-Esteem

"Now I am going to read you a series of statements that people might use to describe themselves"

1. You feel that you have a number of good qualities.
2. You feel that you're a person of worth at least equal to others.
3. You are able to do things as well as most other people.
4. You take a positive attitude toward yourself.
5. On the whole you are satisfied with yourself.
6. All in all, you're inclined to feel you're a failure.

Average Frequency of Contact with Others

"The next questions are about your contact in the past 12 months with persons who do not live with you either in person, by phone or by mail. If you have more than one person in a category, for example, several sisters, think of the one with whom you have the most contact. How often did you have contact with..."

1. Your parents or parent-in law
2. Your grandparents.
3. Your daughters or daughters-in-law.
4. Your sons or son-in-law.

5. Your brothers or sisters.

6. Other relatives (including in-laws).

7. Your close friends.

8. Your neighbours.

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