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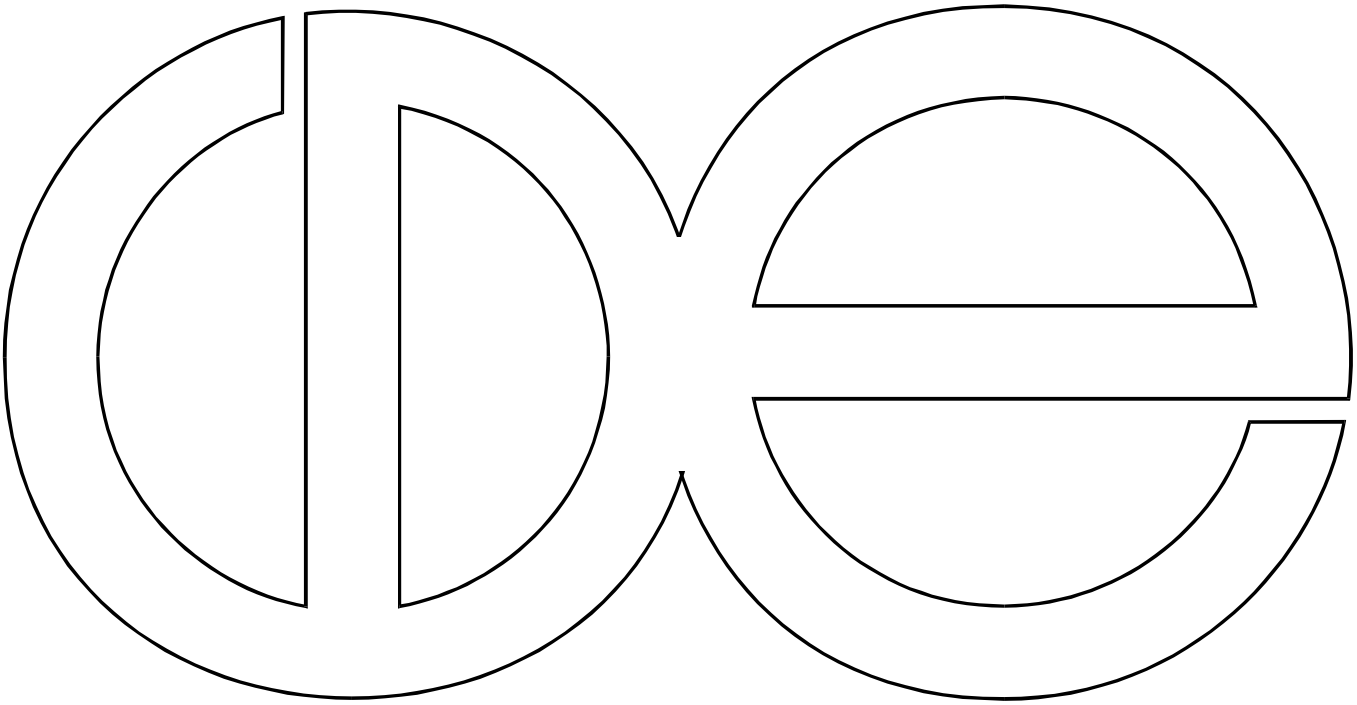

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ABSTRACT

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This paper has substantive and methodological goals. The substantive goals are motivated by two questions: How are occupations graded by age in the United States? How has this changed over the last fifty years? Methodologically, I compare results from two different means of measuring age segregation: the index of dissimilarity and log-multiplicative models.

I find that occupations are age segregated. The best-fitting model suggests that there are two different patterns of occupational age segregation. One pattern is linear, in which workers at a particular age are progressively more segregated from workers who are more distant in age. The other pattern is u-shaped, in which workers in their twenties and sixties are more likely to perform the same occupations, and less likely to share occupations with workers at mid-life.

Among both men and women, occupational age segregation has declined during the last half of the twentieth century. The bulk of the change between 1950 and 1990 comes

from changes in occupations. For example, some occupations were dominated by young workers and now are dominated by older ones. The distances separating different age groups from each other have also shifted.

The choice of method affects the results. The index of dissimilarity conflates the changes in both dimensions governing the association between age and occupation. Log-multiplicative models allow a closer examination of the particular patterns of segregation, as well as the contributions of particular occupations and age groups to those patterns.

Introduction

In this paper, I address two questions: How are occupations graded by age in the United States? How has this changed over the last fifty years?

The paper has substantive and methodological goals. Substantively, I examine expectations regarding how occupations are graded by age. I draw on the theory of age stratification, as well as empirical research regarding the age norms and distributions of occupations and promotions. I consider how changes in the occupational distribution and educational attainment over the last fifty years might have affected the age structure of occupations. Because men and women tend to perform different occupations, I look at occupational age distributions separately by gender.

Methodologically, I begin from the assumption that age grading, and, more broadly, age stratification, can be measured by occupational age segregation. Very little research has examined the age segregation of occupations. Therefore, I rely on methods used to measure occupational segregation by gender and race. I report results regarding occupational segregation using two measures: indices of dissimilarity and log-multiplicative models. Where the results differ, I speculate about the reasons. These comparisons have broader implications for the measurement of occupational segregation.

I find that, for both women and men, the age structure of occupations has shifted over the last fifty years. The change in age stratification stems primarily from shifts in which

occupations are dominated by which age groups. For example, younger workers dominated some occupations in 1950, while older workers dominated those same occupations in 1990. A smaller, though still significant, portion of the change in age segregation stemmed from shifts in the odds of finding workers of one age group performing the same occupations as workers of other age groups. Finally, some of the change stemmed from changes in the overall level of age segregation. Age segregation appears to be dominated by two general patterns: a linear pattern and a U-shaped pattern, both described below. Within this general picture, there are some exceptions and some differences between men and women. I first discuss age segregation in general, then change over the last fifty years, and then point to some gender differences. Finally, I discuss the importance of log-multiplicative models for uncovering the patterns and trends.

The Age Structure of Occupations Over the Last Fifty Years

The age grading of occupations changed between 1950 and 1990. Shifts in the age grading of particular occupations account for the bulk of the change in age stratification over the last fifty years. Some occupations were dominated by younger workers and now are dominated by older ones. Others were dominated by older and now are dominated by younger workers. While overall age relations have remained constant, occupational roles appropriate for workers at different ages have changed.

This suggests that occupational age grading is not functional. A functional argument would mean that the age grading of occupations stems from the worker characteristics

needed for occupations. For example, occupations that require strength would tend to be performed by younger workers. Occupations that require experience would tend to be performed by older workers. According to the functional argument, occupations should retain these age structures. Young workers should perform the same occupations in all periods. It may be, of course, that the functional requirements of occupations change over time.

The relative positioning of workers in particular age groups and the overall extent of age segregation have changed somewhat over the last fifty years, though not as much as the age character of particular occupations. Throughout the period, workers at particular ages have retained much the same pattern of occupational segregation from workers at other ages. Workers in each age group are relatively more likely to perform the same occupations as workers in adjacent age groups, and less likely to perform the same occupations as older or younger workers. This can be thought of as the linear segregation of occupations.

So far, I have referred to the age structure of occupations as if there were only one pattern of age segregation. However, the preferred model suggests that there are two different patterns of age segregation. The first dimension of age segregation exhibits the pattern of segregation just described, in which there is a linear segregation of occupations by age. This dimension corresponds to the common sense conception of a career, in which workers are promoted as they age. In the second dimension there is a U-shaped pattern of

segregation. Here the oldest and youngest workers, those in their twenties and sixties, tend to perform the same occupations, while workers in their thirties and forties tend to perform the same occupations. There is less segregation overall between workers at different ages in this dimension. Segregation in this dimension could result from secondary labor markets.

Though these general conclusions hold regardless of gender, there are differences in male and female workers' experiences of age segregation. Men and women tend to perform different jobs. Women have only recently begun to participate in the labor force at the same levels as men. Thus, I estimate models based on different occupational classifications for men and for women. Given these different occupational classifications, it is not surprising that the specific occupational changes driving the changes in age segregation differ by gender. In addition, the youngest male and female workers exhibit different patterns and trends. In 1950, male workers in their twenties were the most segregated from male workers at other ages. By 1990, they had become even more segregated. For the youngest women workers the trend was the opposite. Between 1950 and 1990, women workers in their twenties became more likely to perform the same occupations as women workers in their thirties than was the case for workers in any two other age groups.

The Importance of Methods for Measuring Occupational Segregation

As mentioned above, I analyze occupational age segregation both with indices of dissimilarity and with log-multiplicative models. In the present case, with multiple age

groups, I calculate the index of dissimilarity for each age group with each other age group. I then average these indices and compare these averages across time. This average represents the extent of segregation captured in one number.

In the log-multiplicative models, I calculate a multiplicative constant that describes the overall extent of age segregation. Similar to the average index of dissimilarity, this can be used to make temporal comparisons. The models also generate parameters that represent the relative positioning of each group relative to all of the others. These could be compared roughly to the individual pair-wise indices of dissimilarity. The final set of parameters estimated by the models are the occupational parameters. These refer to the patterns of age dominance of particular occupations. Similar to the other parameters, these can be compared across time. The index of dissimilarity does not provide analogous statistics. The models can also be adjusted to allow for more than one underlying pattern of segregation. Using constraints on these parameters, the log-multiplicative models allow the testing of assumptions to see the source of change or stability across time.

Two general substantive conclusions rest on the flexibility provided by the log-multiplicative models. One of the most important substantive findings, that changes in occupational age grading have driven the change in age segregation, depends on the ability to estimate occupational parameters, which is only possible in the log-multiplicative framework. Another finding, that there are two patterns governing age segregation, rests on the ability to describe two dimensions.

Choice of method also affects the general conclusions. The index captures the sometimes opposite trends in age segregation in the two dimensions. For example, when age segregation in the second dimension is increasing, the index records a smaller decline in age segregation than recorded by the measure of age segregation in the first dimension.

In the rest of the paper, I review previous research and my findings regarding the age segregation of occupations over the last fifty years. In the next section, "Background on the Age Grading of Occupations," I review theory and research related to the nature of and probable changes to the age grading of occupations. In the third section, I review the data and methods used in the current analysis. Following that, in the section titled "Continuity and Change in the Age Structure of Occupations," I discuss results from various models of age segregation and compare these to results using the Index of Dissimilarity. Finally, I conclude with a brief review of the initial expectations and suggestions for future research.

Background on the Age Grading of Occupations

In this section, I review previous research and theory related to the age structure of occupations. Previous work does not offer specific predictions for how occupation should be ordered by age. Nor does it provide explicit expectations for how age grading should have changed.

The topic derives from the theory of age stratification. This theory describes how age, cohort and period effects intersect to produce age grading. Previous research suggests that age effects stem from the ideal type of the career. In the ideal type, workers advance through a sequence of occupations, accumulating status and money as they age. Age norms apply to promotions. For the most part, workers are promoted when they are young. This should, in turn, determine the relative positions of members of different age groups. Young workers should be most separated from middle-aged and older workers. In addition, research in Britain in the 1960s and the United States in the 1970s suggests that many occupations do have characteristic age structures, at least in the short term.

The period effects of the most consequence for the age structure of occupations are changes in the occupational distribution. Distributional changes mean that workers confront different occupational choices as they enter and progress through the work world. Previous research suggests that these choices disproportionately affect workers at the beginning and ending of their work-lives, though possibly also at mid-career. Over the last

half century, work shifted from the manufacturing to service sectors. This transition appears to have slowed since the early 1970s.

The transition may have translated into a cohort effect to the extent that different occupational distributions affect a particular cohort more than other cohorts. For example, the members of a cohort may enter and age in an occupation that was growing at the time they began work. As time passes the occupation will change from being dominated by young workers to being dominated by older workers. Other cohort effects include the general trend toward upgrading of educational attainment and the particular experiences of Generation X. Education may have increasingly come to replace experience as a qualification for high status jobs, meaning these jobs will be dominated by younger workers from relatively more recent cohorts. More recently, however, educational and occupational upgrading have leveled off, which means that young workers in more recent cohorts may experience diminished expectations.

In the final sub-section of this section, I review how occupational processes and distributions differ by gender. Women tend to perform different occupations from men. Age appears to have less of an effect on female than on male workers' patterns of intra-generational mobility. The feminist revolution of the 1970s may have at least temporarily raised female workers' occupational prospects.

Age Stratification and the Age Distribution of Occupations

The theory of age stratification suggests that roles, resources, and rewards are allocated at least in part by age. The theory incorporates the observation that individuals tend to perform specific roles at particular ages, that these roles are "age graded." For example, individuals tend to go to school when they are young, retire when they are old, and work in between (Riley, Johnson, and Foner 1972; Riley 1987). These broad categories contain finer gradations. For instance, schooling begins at five, when most children start kindergarten. Most students begin high school at 14. In some workplaces, workers can retire "early" when they are 55. Or they may wait to the normative age of retirement: 65.

The specific ages at which individuals occupy specific roles may shift over time. This leads to social change (Ryder 1964). For instance, today men retire earlier than in the past (Siegel 1993). Age stratification theory suggests that such changes stem from the intersection of age, period and cohort effects. Riley (1987:4-5) has described three principles guiding the theory of age stratification. The "principle of cohort differences" in aging suggests that there is not one immutable pattern of age grading. The "principle of cohort effects on social change" reflects the fact that differences in cohort size or composition can lead to larger changes in society. Finally, the "principle of asynchrony" refers to the fact that changes in how cohorts experience age grading will not translate directly into larger social change. Cohorts exist beside other cohorts, and so there is a lag in the translation of cohort-specific changes to the larger society (Riley and Riley 1994).

Within this framework, little has been written about the age stratification of work roles, or the age grading of occupations. Yet, research suggests that work roles are governed by age norms. That is, within a firm, certain jobs are deemed appropriate for workers of particular ages. How jobs are allocated is complex and may change over time (Schrank and Waring 1983:57). Yet, it is likely that occupations are allocated on the basis of age across firms and industries. Individuals of particular age groups may tend to dominate particular occupations. Based on the principles outlined above, different cohorts may experience age norms for particular occupations differently. In the aggregate, these cohort differences will translate into social change. Over time, occupational age grading will alter. This social change will lag behind changes in how particular cohorts experience aging.

Age Norms and Distributions of Promotions and Occupations

Previous theory and research suggest that the progression of careers should translate into occupational age grading. In the following sub-section, I first outline the concept of "orderly" or "age-graded" careers. I then review what is known about age norms and the age distributions of promotions. This leads to a discussion of previous research regarding age norms and the age distribution of occupations.

The general concept of a career includes an element of age stratification. Spilerman (1977:578) describes "orderly" careers as those in which individuals move from one job to the next in a well-defined progression. Workers in "later" jobs are older than are workers in "earlier" jobs. Earnings increase over time. Another term for this concept is the "fully

insulated age-graded career" (DiPrete and Forristal 1995:395). If there were no changes in the occupational distribution over time, the members of all cohorts would face the same occupational choices at entry and later points in their careers. In this case, in the aggregate, each cohort would experience the same sequence of occupations over the life course. Members of each age group would hold the same position relative to members of other age groups for all cohorts. Each occupation would be governed by the same age norms over time. Age grading, in this case, would be the consequence of age effects.

Some past research has focused on age as a proxy for experience. In a strong version of this position, Clogg suggests that age represents all the proximate determinants of occupational standing, such as education, training, experience, and other unobservables that tend to accumulate with age (1982). In the following discussion, I will use age to refer to the length of time that the worker has been alive. Experience will refer to the length of time that the worker has been working. Seniority or tenure will mean the length of time that a worker has been with a particular employer.

Promotional Age Norms

Age norms partly determine promotions at work. In general, age norms are judgements about age-typical behavior and do not necessarily reflect age distributions. Age norms can apply to the best ages to marry or to retire (Lawrence 1996:211). Most of the research regarding age norms at work has focused on promotions. The general conclusion is that younger workers should be promoted more frequently than older workers. The types of

promotion prospects that an individual faces will be a function of age (Spilerman 1977: 563).

The Age Distribution of Promotions

These norms translate into expectations and experience. Younger workers expect and receive more promotions than do older workers (Riley, et al., 1972; Lashbrook 1996). The promotional timetable is bimodal. The first promotion occurs within roughly the first decade of the working career, by the time the worker reaches age thirty four. Employers promote workers again in mid-career, the years between the mid-thirties and the early fifties. By their fifties, workers expect to reach their peak. After that people work until retirement (Lashbrook 1996). Younger employees are more likely to be promoted than are older employees (DiPrete and Soule 1988:31, 33, 38, 39). Promotions increase in the first decade of employment as on the job training increases human capital, but after the first decade promotions start to decline (Rosenbaum 1979:24-5). Based on cross-sectional observations, earnings, status, and satisfaction rise most sharply over the first decade of the work life, when workers are in their twenties, then rise more slowly to a peak in mid-life, and tail off when workers are in their sixties (Spilerman 1977:565).

College education appears to moderate the relationship between age and promotions. Workers with college degrees have the highest probability of any workers of being promoted when they are younger, but their probability of being promoted drops to near zero by the time the workers are in their mid-forties. Those without college degrees see a

similar peak in promotion probabilities when they are younger, but a more gentle decline in promotion prospects as they age (Rosenbaum 1979:43-5).

The relationship between youth and promotion applies to mobility more generally. Older workers are less likely to change positions than are younger workers (DiPrete and Nonnemaker 1997:398-401). Individuals are less likely to change institutions the older they are, though this observation is only statistically significant for men and not for women (Rosenfeld and Jones 1986:218-9).

Some research suggests that the relationship between age and promotions is less a function of age than of total experience or seniority with a particular employer. Tuma (1976:347) argues that age is a proxy for tenure. Older workers are likely to have held their jobs for longer. Workers who have been in a particular occupation longer may be less likely to be promoted out of that position (Tuma 1976:357). Rosenfeld (1992:53) argues that total experience or seniority with a particular employer are more important than age for predicting promotions. Increases in tenure with a particular employer decrease the likelihood that a worker will leave that employer more than do increases in age per se (DiPrete, de Graaf, Luijkx, Tahlin, and Blossfeld 1997:345-51). However, Krecker (1994:266-9) finds that increases in seniority increase attachment to a particular firm more for older than for younger workers. In other words, younger workers are more likely to move despite seniority.

These findings suggest a particular pattern in the relations between members of various age groups to each other. The prevalence of promotions at the beginning of the work-life implies that younger workers will dominate particular occupations, while mid-life and older workers will hold relatively similar jobs to each other. These relatively older workers will tend to stay in the same jobs as their promotion and mobility possibilities decline. If the occupational distribution remained the same, and workers followed age-graded careers, then the age pattern would reveal that workers at the beginning of the work-life are segregated from middle-aged and old workers.

Occupational Age Norms

Age norms may also apply to jobs or occupations. Certain occupations may be considered inappropriate for younger or older workers. Neugarten, Moore, and Lowe (1965:712) found slightly less agreement regarding work norms than marital and other norms, in a mid-1960s survey of middle-class, middle-aged respondents. Within this sample, however, two thirds of the women, and three quarters of the men agreed on the age at which a man should be "settled on a career." Lawrence finds general agreement about the age ranges at which individuals should hold particular positions within organizations (Lawrence 1996:215).

The Age Distribution of Occupations

Occupational and promotional age norms may stem from and affect the distribution of occupations. Some past research has looked at the age distribution of occupations. Smith (1969; 1973) used British census data from 1961 to predict occupational age distributions in the census of 1966. For the majority of the occupations studied, the age structures stayed the same over the time period, indicating that workers were not simply growing old within the occupations, but moving on to more "age-appropriate" occupations as they aged. Smith concluded that the age structures of occupations were therefore determined functionally by the need for age related characteristics, such as strength or eyesight.

Kaufman and Spilerman (1982) expanded this research to the United States of the early 1970s. They used 1970 census data to classify approximately 200 occupations by the ages of the people in them. In some jobs, young workers were over-represented relative to their presence in the labor-force, in others middle aged workers were over-represented, and still others older workers were over-represented.

The authors also described the forces leading to some of these age distributions in functional terms with reference to the age distribution of promotions. Young people tend to get jobs considered entry level and those that require strength. Middle age people have risen up occupational ladders and are at the peak of the careers. Old people look for jobs that offer flexibility and few physical requirements. Kaufman and Spilerman also accounted for organizational change, classifying some occupations as growing and others

as declining. Older workers should dominate contracting occupations, while younger workers dominate growing occupations (Kaufman and Spilerman 1982: 841).

Exceptions to the Age Graded Career

Even within a particular cohort, all workers do not follow the same career trajectories as they age. Career lines have different points of entry. Thus, individuals holding the same job may be of different ages (Spilerman 1977:560). In reality, workers of a wider range of ages hold positions than suggested by age norms (Lawrence 1996:215). Workers may also follow "flexible" (DiPrete and Forristal 1995:395) or "chaotic" careers, in which workers "cycle through positions" (Spilerman 1977:578). Certain types of occupations lead to certain types of careers. Spilerman (1977) suggests that some workers follow craft/professional careers in which individuals stay in an occupational category throughout their work-lives. Blossfeld (1987:101-3) finds that German workers in more skilled occupations tend to stay longer in those occupations. Workers in the service class in the US between 1980 and 1990 tended to stay in such positions longer than workers in unskilled or semi-skilled positions (DiPrete and Nonnemaker 1997:392-3). Younger workers in jobs with high in- and out-flow rates are more likely to leave those jobs than are older workers (DiPrete and Nonnemaker 1997).

Kaufman and Spilerman found that workers of particular ages did not dominate two other categories of occupations: those characterized by uniform age distributions and those with U-shaped distributions, reflecting disproportionate numbers of both young and old

workers. Uniform age distributions are found in occupations that require a life-long commitment, such as the professions or those dominated by craft unions. U-shaped distributions characterize jobs in the secondary labor market, with little chance of promotion and some flexibility. When Kaufman and Spilerman (1982:841) looked at the age structure of 200 occupations in the 1970 census, they were able to classify approximately half of the occupations as being dominated by either young, middle-aged, or old workers.

Period Changes

In the following sub-section, I look at how period changes may have affected the age distribution of occupations. In particular, I look at the shift from farming and manufacturing to the service sector. This shift most likely increased the demand for high-skill occupations. The changing occupational distribution surely increased total inter- and intra-generational mobility. The changes occurred primarily prior to the early 1970s. They likely affected workers at the beginning and ending of their work lives, and particularly shaped the future careers of those just entering the labor force.

Changes in the Industrial and Occupational Distributions

Over time, career trajectories result in part from the contraction and expansion of particular occupations and industries (Spilerman 1977:552). DiPrete and Forristal (1995:395) introduce a useful heuristic device for thinking about how occupational distribution affects age stratification. Among other ideal types, they introduce the concept of “flat careers,” in

which members of a cohort stay in the occupation they first enter after leaving school. This is analogous to what Spilerman (1977:578) calls a craft or professional career, in which a worker receives a credential and then stays in the first job throughout the work life. If all workers experienced their work-lives this way, occupational age grading would reflect the different occupational opportunities available to each cohort. Age grading, in this case, would be a consequence of cohort effects. The particular character of age grading would be different at different periods.

Changes in the distribution of occupations stem, in part, from changes in the industrial distribution. A variety of theorists agree that modern industrial societies are shifting from the primary to the tertiary industrial sectors (Blossfeld 1987:90). This shift was marked in the last century by the decline in farming. In inter-generational mobility surveys, half the population had farming fathers at the turn of the century. This proportion had dropped to 28 percent by 1962, and 14 percent by 1973 (Guest, Landale, McCann 1989:358-9). Between 1979 and 1989 the manufacturing sector declined in the United States and the service sector grew (DiPrete, et al. 1997: 334-9).

Yet researchers disagree about the consequences of this industrial shift for the occupational distribution. Bell (1976) argues that the shift will expand the top of the occupational distribution: the professions, and engineering, technology and scientific occupations. Braverman (1975) emphasizes the concept of deskilling, which suggests that the industrial shift will also increase manual and unskilled jobs. In fact, both may be happening.

Previous research suggests that the occupational distribution changed markedly up until the early 1970s, shifting from less to more skilled occupations, and from manual to non-manual labor. Between 1930 and 1980, occupations that required "gross motor activity" declined and occupations that required "cognitive complexity" and "verbal activity" increased (Hunter 1988:759). Research on intergenerational mobility has shown that the occupational distribution shifted in the first two thirds of the century, and more slowly after 1972. Changes in the occupational structure led to the bulk of intergenerational mobility uncovered by the 1962 Occupational Changes in a Generation (OCG) survey (Hauser, Koffel, Travis, and Dickinson 1975:283-5). This represents changes in the occupations held by men born in the early part of the twentieth century, and men born, for the most part, in the latter half of the nineteenth century (Blau and Duncan 1967:83). In the 1973 OCG, sons tended to upgrade from manual to non-manual, and from lower to upper non-manual occupations (Featherman and Hauser 1978:89). Between 1972 and 1985, there was less change in the occupational distribution (Hout 1988:1369-72, 1382). The demand for workers to perform high skill jobs increased after World War II, but, since the 1970s, has leveled off (Halaby 1994:47).

Changes in the occupational distribution lead to increases in both total inter- and intra-generational mobility. When job creation rates are high, new workers are pulled into these new jobs (Stewman 1988:185, 192-3). As the occupational distribution shifts, increased opportunities will increase workers' rates of quitting a job to get a better job (Tuma

1976:347). Conversely, when industries and occupations are contracting, workers will be pushed out of the affected occupations. This will also increase occupational mobility (DiPrete, et al. 1997:342).

Previous research suggests that these period changes in the occupational distribution may affect workers at different ages differently. Factors that affect labor force participation affect workers who are at the beginning and ending of their careers more than those in the middle of their careers. Workers between 35-49 are unaffected by "shocks" that may temporarily reduce labor force participation (Clogg 1982:465). Thus short-term changes in occupations may also have a more dramatic effect on younger and older, than on middle-aged workers.

Despite the variability in career trajectories, workers generally upgrade their occupations with age. That is, once started, workers tend to follow the same relative age paths with respect to occupations (DiPrete and Forristal 1995:398-402). In Germany, Blossfeld finds that different initial occupational opportunities translate into different careers. In other words, changes in the occupational distribution affect the intercept rather than the slope of the career. These long lasting changes are felt throughout the work-life (Blossfeld 1987:100-2, 107). Changes in the occupational distribution should affect the overall age distribution of occupations.

Cohort changes

In the previous sub-sections, I have looked at age and period effects on the age distribution of occupations. To summarize: Most promotions occur in the first decade or so of the work life, and so does most intra-generational or career mobility. This suggests that the youngest workers will hold occupations that are more different from the occupations held by middle-aged and older workers. Changes in the occupational distribution over time are also likely to affect the overall age distribution of occupations. The occupational distribution changed most radically prior to 1972 and more slowly after. This suggests that period driven changes will have occurred in those earlier years.

The "principle of cohort differences in aging" suggests that there may also be cohort effects on the age distribution of occupations. Clogg (1982:475-6) finds that sociodemographic variables determine labor force participation. Stewman and Konda (1983:671) point out that cohort size partly determines occupational opportunities. For instance, members of relatively small cohorts have relatively greater probabilities of being promoted than do members of medium sized and large cohorts.

Education and Occupational Opportunities

Education clearly affects the kinds of occupations that workers can perform. Education increases the chances of getting a high skill job in Canada, and decreases the chances of getting a job with gross motor activity (Hunter 1988:760). In research looking at intergenerational mobility in the United States, Hout (1988:1381) finds that education is an

important qualification for certain more technologically sophisticated, "new" occupations, while ascription dominates entry into other occupations. Education does not substitute for occupation and firm specific training. In fact, workers with higher education tend to get jobs that involve more training (Halaby 1994:50).

Research is mixed regarding whether education has become a more important occupational qualification over time. As described above, high skill jobs, those that require a college education, increased their share of the occupational distribution through at least the first two thirds of the twentieth century. Focusing on US government clerical workers over the last two centuries, DiPrete suggests that there have traditionally been two routes to getting administrative jobs: obtaining a college degree; or getting promoted. The college degree is "becoming increasingly dominant" as the means to an administrative job (DiPrete 1988:742-3). Thus, for certain occupations, education may increasingly substitute for experience. Yet, among Canadian men, education has not become more important for getting an entry-level job when male members of cohorts born before 1946 are compared to those born after. There is, however, some evidence that it has become more important for women (Hunter 1988:762-3).

Increases in education, coupled with the growth in high skill occupations, may mean that members of more recent cohorts dominate these occupations. Throughout the twentieth century cohort educational levels have steadily risen, though this appears to have leveled off for cohorts born since the 1950s (Mare 1995:161-4). In general, then, the members of

more recent cohorts should tend to follow different career trajectories when compared to previous cohorts. Thus, some age segregation should result from educational upgrading. If other factors were held constant, we would expect to see an increase in occupational age segregation based on shifts in educational supply and occupational demand after World War II. Starting in the 1970s, however, we should see members of more recently born cohorts following similar trajectories to those of their predecessors.

Generation X

This leveling off since the 1970s evokes the popular treatment of "Generation X." The label, made popular by Doug Coupland (1991), was applied to the cohort following the baby boom. The novel centers on three members of the cohort born in the sixties and seventies. These characters confront diminished expectations at work. The novel captured a popular perception. Little research has yet tested the actual occupational prospects of the generation. The perception, however, may be reflected in the feelings of members of the cohort dubbed Generation X. Carr (1999:20, 25-6) finds that the members of the baby bust generation (born 1960-1980) tend to report being treated unfairly at work independent of job characteristics. In other words, even when members of Generation X hold the same jobs as members of other cohorts, they tend to feel more downtrodden.

Gender Differences

Women tend to hold different types of occupations from men. It is therefore reasonable to expect that occupational age distributions will differ by gender.

Previous research suggests that women do not stop changing jobs after the early part of their careers as do men. Age appears to be more consistently related to mobility for men than for women (DiPrete and Nonnemaker 1997:398-400). As mentioned above, seniority tends to decrease men's, but not women's mobility (Krecker 1994:271-2). That is, women who have been in a position for a while are not less likely to leave that position, as are men. For example, female psychologists change institutions more readily than do male psychologists (Rosenfeld and Jones 1986:224). Based on these findings, we would not expect to find younger female workers more occupationally segregated from middle-aged and older female workers than the workers are from each other.

Female workers have been affected by two important period effects: the decline in occupational sex segregation and increased labor force participation. Occupational sex segregation was stable between 1900-50, but declined since the 1950s. The bulk of this decline came between 1970 and 1980 (Goldin 1990:75-6). In the 1950s, college educated women were restricted to teaching, nursing, library and social work, and not recruited to career jobs. This is no longer the case (Goldin 1990:206). While older men have been decreasing their labor force participation, women's overall labor force participation has increased dramatically since the 1950s (Siegel 1993:374-384; and Quinn and Burkhauser 1994:51-54).

The Impact of the Feminist Movement

The feminist movement affected women's expectations and experiences of work. Around the time of the "feminist revival of the 1970s," women began to predict their future labor force participation with more accuracy. Up until that time, they had under-predicted whether and how long they would work (Goldin 1990:157). During the same period, the government began to spend more money on creating equal opportunities at work, through job training programs and the Equal Employment Opportunity Commission. DiPrete and Grusky find that these expenditures translated into socioeconomic status gains for women and losses for men, with most of this change coming in the 1970s. Older workers, those already in the labor force, were buffered from the change (DiPrete and Grusky 1990:114-6, 122, 127-30). Looking at the same time period, DiPrete and Forristal (1995:402) found that women upgraded their occupations at a greater rate than men, both at entry and mid-career.

These findings suggest that there should be a cohort effect on the age distribution of occupations for women entering the labor force during the 1970s. There may also be an overall period effect on the occupational standing of women.

Note on Measuring Age Stratification

In this paper, I assume that age stratification can be at least partially described by age segregation. As the preceding discussion demonstrates, sociologists have not empirically described the extent of occupational age segregation in the United States. Researchers have looked at the extent of gender segregation. They use a variety of methods to uncover

occupational segregation. Below, I discuss two rival methods: the index of dissimilarity and log-multiplicative models. In the following section on "Data and Methods," I discuss the analytic strategy that I have chosen in more detail.

The Index of Dissimilarity was developed to measure residential segregation. Despite common use for this purpose (e.g., Farley 1977), debate regarding the mathematical implications and theoretical interpretation of the index has been common (see, for example, Duncan and Duncan 1955; Cortese, Falk, Cohen 1976). The index represents the proportion of one population group that would have to move in order to ensure that each neighborhood has the same proportion of that group as the overall population.

Comparative research describing the extent of gender segregation has relied most commonly on the Index of Dissimilarity. In this context, the index represents the proportion of women that would have to change occupations in order for the distribution across occupations to resemble that in the work force at large. For example, Treiman and Roos (1983) compared the indices of dissimilarity for nine industrial countries. In long-term analyses of gender segregation in the United States, Jacobs (1989) and Reskin (1993) used the index of dissimilarity to examine change in the extent of segregation between the turn and the end of the twentieth century. Both these historical studies also used a standardized form of the index to control for changes in the size of different occupations over time.

In the early 1990s, the use of the index in this way became controversial. Various alternative indices and decompositions have been proposed (Blackburn, Jarman, and Siltanen 1993; Deutsch, Fluckiger, and Silber 1994; Boisso, Hayes, Hirschberg, and Silber 1994; Spriggs and Williams 1994; Hakim 1993; Carlson 1992).

Watts (1992; 1998) has argued that the index (or its variant, the Karmel-Maclachlan index) is a valid measure of occupational gender segregation. For purposes of comparison, the index must be decomposed into structural and compositional, as well as other effects. Structural effects refer to the impact of changes in the occupational distribution. Compositional effects refer to the change in segregation when the change in occupations has been controlled.

Charles and Grusky (1995) have introduced a log-multiplicative modeling approach to the comparative analysis of occupational sex segregation. This approach has also been applied to the analysis of historical data in the United States (Weeden 1998). The log-multiplicative models produce an index that can be compared to other more commonly used indices.

In general, the log-linear and log-multiplicative approach gives the researcher more control over explanatory factors. The approach contains more descriptive power than a simple index. Researchers can estimate models with few or many parameters. For instance, Hout (1984; 1988) has shown that the status, authority and training dimensions of occupations

have different effects on the inter-generational transmission of occupations. Of course, more parameters make the results less easy to interpret (see exchange between Goodman and Hout 1998; Yamaguchi 1998; and Xie 1998).

In occupational segregation, the approach has a number of advantages over the traditional use of a single index to describe segregation. By definition, log-linear models are not dependent on changes in the margins. In the case of, for instance, gender segregation, this means that changes in the occupational distribution do not lead to changes in the estimates of the degree of association between gender and occupation. As Weeden (1998) demonstrates, these models enable researchers to look more closely at the differences across time or place in the relative positioning of groups, as well as the effects of particular occupations on the overall extent and shape of segregation. Different models can be estimated and compared using log-likelihood and BIC statistics to arrive at a preferred model describing the factors that affect segregation.

The Contribution of this Paper

Previous literature suggests an occupational structure that is guided by age norms that are loosely reflected in the actual age distribution across occupations. Different age groups will dominate different occupations. The age distribution of occupations should be affected by changes in the occupational distribution over time, and in educational attainment. Female workers will most likely experience a different occupational age

distribution from that faced by male workers. Because of the feminist revolution, women's occupational prospects most likely improved in the 1970s.

This paper extends previous research by answering the questions: How are occupations graded by age in the United States? How occupationally segregated are members of different age groups from each other? How has this changed over the last fifty years? Does this differ by gender?

Data and Methods

Data: The 1950-1990 Censuses

The data are from the 1950-1990 censuses. I use the one percent samples, accessed through the Integrated Public Use Microdata Series (IPUMS). The IPUMS contains 25 samples from 13 censuses between 1850 and 1990 (Ruggles and Sobek 1998).

The 1950 census serves as the base year for theoretical and practical reasons. Situated in the middle of the century, 1950 reflects the beginning of the period of post-war prosperity. Both productivity and average real wages began to increase after the Second World War, though this trend seems to have tailed off starting in the 1970s (Morris and Western 1999).

The 1950 census also presents the solidification of the new concept of occupation. Following a tradition dating back to the early part of the century, Edwards (1933) argued for workers to be classified into socioeconomic groups. The 1940 census was the first to adopt this classification. This and the following censuses code occupations primarily based on the duties of workers, rather than a combination of worker functions and industry (Edwards 1933).

The sample is limited to avoid confusing race and gender with age segregation. Workers of different races are segregated into different occupational categories (Fossett 1984). So, I limit the sample to non-hispanic whites. Occupational sex segregation has also been

extensively documented (Jacobs 1989; Reskin 1993; Weeden 1998). Therefore, I conduct the analyses separately for men and for women.

The sample is restricted to individuals currently employed at the time of the census. In several censuses, including 1950, occupations were recorded for anyone who was "in the labor force," whether they were working or not. In 1980 and 1990, anyone who had worked in the previous five years received an occupation code. Thus, individuals of one age could have reported occupations that they held when they were a different age. In 1960 and 1970, the Census ascertained occupations of anyone who had worked in the previous ten years. For these years, workers might be double-counted across censuses, once for the year they held the occupation, and a second time when they were unemployed and retrospectively reporting the occupation they held ten years earlier.

I use two age categorizations, one with five and the other with four age categories. In the first categorization, employed workers are grouped into five groups: twenty year olds, 20-29; thirty year olds, 30-39; forty year olds, 40-49; fifty year olds, 50-59; and sixty year olds, 60-69. These groupings serve a methodological and substantive purpose. Substantively, research and theory suggest that workers may fall into the general categories defined as those 20-34, 35-50 and those over 50 (Riley, et al.1972; Lashbrook 1996). But these general age groupings may be an artifact of a particular period. This pattern may have changed over the fifty year period. Methodologically, the ten-year age groupings further ensure that individuals are not double-counted in the same age category in two

different censuses. For example, all of the twenty year old workers in the 1950 census will be in the thirty year old category by the 1960 census.

Unfortunately, several of the log-multiplicative models fail to converge using this preferred categorization. They will only converge with a categorization that covers all workers grouped into the following four categories: younger than 29; 30-39; 40-49; and older than 50. I use this categorization in the comparison of fit statistics as well as to report some of the parameters. Whenever I compare statistics, I use the models or indices constructed from the same categorization. Models that do converge with the five categories are: the Class I models of associational invariance and systemic change and the Class II model. (See description of models below.)

This paper describes the broad outlines of changes in the age stratification of occupations over the second half of the twentieth century. This task is made more difficult by changes to the census occupational classification. For instance, the occupational codes were radically changed in the 1980 census. Therefore, workers are classified according to the 1950 Occupational categories contained in the IPUMS-98. For purposes of comparison, IPUMS presents the original occupations beside a recoding of those occupations into 1950 classifications. The 1950 census followed the "status-hierarchy classification," advocated by Edwards, in which professionals preceded clerical workers who preceded skilled workers who preceded laborers. To recode the occupations, IPUMS staff relied on technical documents produced by the census. After 1950, each time occupations were

changed, the census produced a comparison showing how the occupations would have been coded according to the previous scheme (Priebe 1990; U.S. Bureau of the Census 1968, 1972, 1989). IPUMS staff used these translations to work backward. So, incumbents in 1980 occupations were coded back into the 1970 occupations that a plurality would have been classified as performing, these were then coded back into 1960 occupations in the same fashion, which were coded back into 1950 occupations (Ruggles and Sobek 1998). Using these 1950 occupations implies a continuity in the occupational structure that may not accurately reflect reality. This scheme sacrifices accuracy to gain comparability. Within this continuous occupational structure, I examine how age determines the distribution into occupations. More fine grained comparisons of one year to the next using contemporaneous coding could give better evidence about changes over shorter periods of time.

Within the 1950 occupational classification scheme, I use the most detailed categories, the three digit occupational codes. In 1950, there were 269 occupational categories at this level of detail. Unfortunately, a number of occupations had no incumbents in one or several years. The problem of zero cells differs by gender. Among male workers, the later years are more likely to have empty occupational categories. For women, the problem is the opposite. In later years, women are more likely to hold occupations that were not held by women earlier.

I therefore recode these detailed occupations into an intermediate categorization developed for the 1950 census (U.S. Bureau of the Census 1953:54-57). Because of the different patterns of male and female participation in occupations, there are two schemes. The male intermediate occupational classification has 101 occupational categories. The female intermediate occupational classification has 49 categories. (See appendices A and B for intermediate occupational classification for male and female workers, including detailed components.)

The final step in the analysis is to assign socioeconomic status to the occupational categories. Socioeconomic status plays a role in one of the models. The basis for the assignment is the 1950 Socioeconomic Index (SEI) scores developed by Duncan (1961). These scores result from the regression of prestige characteristics on proportions of male occupational incumbents who had incomes above $3,500, and who had at least a high school degree. The resulting regression weights allowed an extension of the SEI beyond the initial 90 occupations included in the original 1947 prestige survey (for a history of the SEI in all of its incarnations, see Hauser and Warren 1997). The SEI has recently been criticized as inaccurately including prestige and income in the calculation of status. In leveling this charge, Hauser and Warren (1997) argue that unitary status measures are no longer scientifically useful. Yet, it is an aim of the current study to test the broad outlines of various regimes in which age determines occupational characteristics. In this case, the use of an established measure like the SEI can serve as a useful benchmark for comparison.

For the intermediate occupational categories that combine several detailed categories, I calculate a weighted SEI based on the relative numbers of all workers in each category for the entire period, 1950-1990. For instance, the intermediate occupational category "authors, editors and reporters" is a combination of the detailed occupational categories, "authors," which has an SEI of 76, and "editors and reporters," which has an SEI of 82. I calculate the total number of employed individuals in the constituent categories, then weight the original SEI scores of the component occupational categories. (Appendices A and B also include the weighted SEI scores of the intermediate occupational categories.)

Methods: Log-multiplicative Models and Indices of Dissimilarity

As described in the previous section, this paper uses methods that expand on those used to measure occupational sex segregation. I compare results from a traditional index of dissimilarity analysis to those derived from log-multiplicative models.

I construct indices of dissimilarity for men and for women for each of the 5 census years. As mentioned in the preceding section, the index reflects the share of workers that would have to change occupations in order to achieve distributions within occupations that reflect the age distribution of all workers. The index reveals whether workers of a certain age tend to perform the same occupations as workers in other age groups. For each census year, I compute indices for the comparison of each age group with each other age group. For instance, I compute the index of dissimilarity for twenty year old and thirty year old workers. The index is calculated in the following way:

$$D = 50*\left(\sum_{i=1} |P_{i1} - P_{i2}| \right)$$

where:

$$P_{i1} = \frac{X_{i1}}{\sum_{i=1}^{n} (X_{i1})}$$

$$P_{i2} = \frac{X_{i2}}{\sum_{i=1}^{n} (X_{i2})}$$

where X_{i1} is the number of workers in the first age group in the i-th occupation and X_{i2} is the number of workers in the second age group in the i-th occupation.

The value of the index ranges from 0, in which the age distribution of the two groups across occupations reflects that across the labor force, to 100, in which no workers of the two age groups share the same occupations. Mean indices are averages for each age group of all four comparisons of the occupation distribution of that age group with each other age group. In order to compare the extent of segregation, I then calculate average indices of dissimilarity for each year. These indices are then compared to a similar measure derived from the log-multiplicative models.

The index has a number of disadvantages in the current case. Most basically, I look at multiple age groups, not just two. Use of the index of dissimilarity thus requires pair-wise comparisons of each age group to each of the four other age groups. The procedure

described, of pair-wise comparisons and averages, is inelegant at best. In addition, the index cannot be tested against other models.

I also estimate a series of log-multiplicative models. These models estimate coefficients for age and occupational values, as well as an overall association parameter similar to the index of dissimilarity. (All equations for the log-multiplicative models are from Grusky and Pager 1999.)

One of the main virtues of the log-linear and log-multiplicative strategy is that it allows the association between age and occupation to remain uncontaminated by changes in the overall occupational or age structure. Thus, the rise of certain occupations and the fall of others do not influence the results. Another advantage of this approach is that it provides goodness of fit criteria that assist in the search for the model that best describes the data.

The first of the log-multiplicative models is the Class I model of associational invariance, $m_{ijk} = \alpha_k \beta_{ik} \gamma_{jk} e^{(\phi \mu_i \upsilon_j)}$. In this model, m_{ijk} is the expected frequency in the ijk-th cell, that is the expected value in the cell for the i-th age group in the j-th occupation at the k-th time period. Age groups are i={1, 2, 3, 4, 5}, that is, workers in age groups 20-29, 30-39, 40-49, 50-59, and 60-69. Occupations are j={1, 2, 3 … J}. The total number of occupations, as described above, is different for men and for women. Time periods are k={1, 2, 3, 4, 5}, that is 1950, 1960, 1970, 1980 and 1990. Within the model, α_k represents the main effect in the k-th time period, β_{ik} is the time specific marginal effect in the i-th age group,

γ_{jk} is the time-specific marginal effect in the j-th occupation, and e is an error term. The following are scale parameters: ϕ is the overall scale parameter, which measures the extent of segregation; μ_i is the scale parameter for the i-th age group; υ_j is the scale parameter for the j-th occupation. The first row and column marginal effects are equal to 1 in each time period ($\beta_{1k} = \gamma_{1k} = 1$ for all k). The row and column effects sum to zero, and the sum of the squares of the parameters is 1.[1]

The Class I Model of Systemic Change, $m_{ijk} = \alpha_k\beta_{ik}\gamma_{jk}\, e^{(\phi_k\mu_i\upsilon_j)}$, is a variant of the preceding model, except that now ϕ, the overall segregation parameter, is allowed to vary across the k time periods.

The Class I Model of Requeuing, $m_{ijk} = \alpha_k\beta_{ik}\gamma_{jk}\, e^{(\phi_k\mu_{ik}\upsilon_j)}$, represents a further refinement. In this model, μ_i, the scale parameter for the i-th age group, varies across the k time periods. In this case, the μ_{ik} time-specific scale parameters sum to zero within each time period, and the sum of the squares of the parameters is 1 within each time period. [2]

The final Class I Model, that of Complete Variability, $m_{ijk} = \alpha_k\beta_{ik}\gamma_{jk}\, e^{(\phi_k\mu_{ik}\upsilon_{jk})}$, allows υ_j, the scale value for the j-th occupation, to vary across the k time periods. In this model, υ_{jk},

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[1] $\sum_{i=1}^{I} \mu_i = \sum_{j=1}^{J} \upsilon_j = 0; \qquad \sum_{i=1}^{I} \mu_i^2 = \sum_{j=1}^{J} \upsilon_j^2 = 1;$

[2] $\sum_{i=1}^{I} \mu_{ik} = 0$ for all k; $\qquad \sum_{i=1}^{I} \mu_{ik}^2 = 1$ for all k

the time-specific occupation scale parameters also sum to zero within the k time periods, and the sum of the squares is 1 within the time period.[3]

In the Class II model of Complete Variability, $m_{ijk} = \alpha_k \beta_{ik} \gamma_{jk} e^{(\phi_k \mu_{ik} \upsilon_{jk}) + (\theta_k \omega_{ik} \eta_{jk})}$, there are two orthogonal dimensions governing the age segregation of occupations. This model extends the Class I model of complete variability, in which all of the scale parameters vary across time periods. In the second dimension, θ_k refers to the overall segregation parameter for the k-th time period, ω_{ik} is the age scale parameter for the i-th age group in the k-th time period, and η_{jk} is the occupation scale parameter for the j-th occupation in the k-th time period. As above, these scale parameters sum to 0 within each time period, and the sum of the squares is 1 within each time period.[4] Because the dimensions are set to be

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[3] $\sum_{i=1}^{I} \mu_{ik} = \sum_{j=1}^{J} \upsilon_{jk} = 0$ for all k;

$\sum_{i=1}^{I} \mu_{ik}^2 = \sum_{j=1}^{J} \upsilon_{jk}^2 = 1$ for all k;

[4] $\sum_{i=1}^{I} \mu_{ik} = \sum_{j=1}^{J} \upsilon_{jk} = \sum_{i=1}^{I} \omega_{ik} = \sum_{j=1}^{J} \eta_{ik} = 0$ for all k;

$\sum_{i=1}^{I} \mu_{ik}^2 = \sum_{j=1}^{J} \upsilon_{jk}^2 = \sum_{i=1}^{I} \omega_{ik}^2 = \sum_{j=1}^{J} \eta_{jk}^2 = 1$ for all k;

orthogonal, the age scale and occupation scale parameters do not covary across dimensions, within each time period.[5]

The Class III model of Complete Variability, $m_{ijk} = \alpha_k\beta_{ik}\gamma_{jk}\, e^{(\phi_k\mu_{ik}T_j) + (\theta_k\omega_{ik}\eta_{jk})}$, is a variant of the Class II model, except that, in this dimension, the occupation scale parameters in the first dimension, T_j, are fixed to the socioeconomic index scores across time periods. The scale parameters are further constrained as above. Each T_j is orthogonal to the corresponding occupation scale parameter in each time period.[6]

In order to test the choice to use intermediate, rather than detailed occupational categories, I compare selected results using data from both classifications. Aggregating the occupational categories necessarily attenuates the association between age and occupation. For instance, in the model of associational invariance for men, the global association between age and occupation drops from 9.5 to 5.8 when the intermediate, rather than detailed classification is used. The specific scale parameters are also muted when

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[5] $\sum_{i=1}^{I} \mu_{ik}\omega_{ik} = \sum_{j=1}^{J} \upsilon_{jk}\eta_{jk} = 0$ for all k;

[6] $\sum_{j=1}^{J} T_j = 0;$

$\sum_{j=1}^{J} T_j^2 = 1;$

J

occupational categories are combined. The lowest values are slightly less low. The highest values are slightly less high.

In order to estimate some of the models, it is necessary to add a constant to the cells. Following the discussion in Agresti (1990:249-50), I began by adding a small constant to the cells. The smallest constant at which all of the models would converge was .5. Therefore I estimate all of the models twice, once with and once without the constant added. The addition of the constant attenuates the strength of the connection between age and occupation, that is, the global association parameter. It also affects fit statistics, as well as parameters. The addition of the constant has little effect on the normalized scale parameters. Whenever I make comparisons between models, therefore, I only compare parameters or fit statistics derived in a consistent way, either with or without the constant.

$\sum_{j=1} T_j \eta_{jk} =$ 0 for all k;

Continuity and Change in the Age Structure of Occupations

In this section, I examine changes between 1950 and 1990 in the association between occupation and age. Age segregation has changed over the period. Most of this change can be accounted for by changes in the tendency for particular occupations to be dominated by particular age groups. The changes in the overall extent of age stratification and the changes in the positioning of groups have led to moderate changes in age segregation. To the extent that such changes have affected the occupational structure, they have mostly affected workers at the beginning of their careers, in their twenties. For men, these youngest workers have become less likely to perform the same occupations as older workers. For women, they have become more likely to do so. In general age segregation exhibits two patterns: a linear one, in which each group is relatively segregated from older and younger workers; and a U-shaped one, in which the oldest and youngest workers are most likely to perform the same occupations. (See Appendices C and D for distributions of male and female workers by age.)

I begin by presenting fit statistics for a series of log-multiplicative models. A two dimensional model fits the data best, suggesting that there is not a homogeneous labor market, at least as far as cross-sectional assignment of age groups to occupations is concerned. I then compare results from measures of association in the best-fitting model to results from calculations of the index of dissimilarity. The choice of method affects the results. The index captures changes in both dimensions. When the changes in the two dimensions indicate opposite trends, this means that the index will over- or under-state the

change in the dimensions. I then discuss, in more detail, the parameters from a few of the log-multiplicative models.

Arriving at the Two-Dimensional Model

The models for female and male workers show similar patterns in their fit statistics. I therefore review the fit statistics for both sets of models at the same time. This leads to the same general conclusions. Changes in the age grading of occupations explain much of the change in age segregation in one dimension. In other words, most of the change in the association between age and occupation between 1950 and 1990 stems from changes in the tendency of particular occupations to be dominated by younger or older workers. Changes in the distances separating workers in different age categories and the overall association between occupation and age explain a smaller, though still significant, portion of the change in age segregation. A two dimensional model fits the data well. In this sub-section, I touch on the differences by gender in the strengths of these conclusions.

First, I present fit statistics from four one dimensional models: associational invariance, systemic change, age requeuing, and complete variability. (See the previous section for more complete descriptions of the models.) Comparisons of these nested models allow a decomposition of the log-likelihood ratio $?^2$ into its different components. Changes in the model can therefore be said to account for portions of the lack of fit of the original model. (All models are estimated using the four age categories, with a constant added.)

Model 1, the model of associational invariance says that there has been a constant pattern of age segregation throughout the period. This model fits the data poorly. As shown in tables 1 and 2, it has a likelihood ratio χ^2 of 81,020 with 1,398 degrees of freedom for men and 50,369 with 670 degrees of freedom for women. This suggests that the age segregation of occupations has changed between 1950 and 1990. To see what accounts for the change, I compare the fit of this first model to the fit of the other models.

For both women and men, overall period effects explain a small portion of the change. The model of systemic change, model 2, says that the overall pattern is affected by only a multiplicative constant. This constant refers to the stretching or compressing of the distance between age groups. Thus, comparison of this model to model 1 represents overall period effects. This comparison does not account for much of the log likelihood ratio χ^2. For men, overall period effects explain less than one percent of the change. For women, the effect is slightly larger. Overall period effects explain four percent of the change. An examination of BIC shows a greater contrast. BIC drops by 123 for men and 1,872 for women with only four degrees of freedom.

Similarly, changes in the relative positioning of age groups explain some of the change in the age segregation of occupations for women and for men. Model 3, the model of age requeuing, allows the age scale parameters to change from census to census. The age scale parameters represent the relative odds of finding workers of a particular age group in occupations with workers of all other age groups. In model 3, these are allowed to vary

across time. Thus a comparison of this model to model 2 represents the portion of the change in age segregation explained by period changes in age effects. For men, again, period changes in the age scale values explain less than one percent of the change in the age segregation of occupations. For women, these changes account for five percent of the change. BIC drops by 327 for men and 2,434 for women.

By contrast, period changes in the age grading of occupations accounts for a relatively large share of the overall change in age segregation. Model 4, the model of complete variability, allows the occupational scale values to change over time. These parameters represent the patterns of age dominance of particular occupations. Changes in these parameters may stem from changes in the odds of finding younger or older workers in an occupation. Thus, comparison of this model to model 3 represents the portion of the change in age segregation represented by changes in the types of workers, classified by age, found in particular occupations. For men, period changes in occupations explain 38 percent of the change in the age segregation of occupations. For women, the improvement in fit is even more dramatic. When occupation effects are allowed to vary over time the likelihood ratio χ^2 drops by half. For both women and men, BIC drops by more than 20,000, though the increase in complexity is relatively greater for these than for the previous models.

The comparisons of these models suggest a consistent overall age structure, with changes in the occupations that are dominated by particular age groups. The relationships between

age groups have changed somewhat over time. Changes in the distance between age groups, as well as changes in their relative positions, account for some of the change in age segregation. The existence of occupations that can be characterized as predominantly "young" or predominantly "old" has remained relatively constant. But changes in which occupations are dominated by which age groups account for a large share of the change. Occupations may come to be redefined as "young" or "old" from one period to the next.

These one dimensional models, despite the improvement in fit when occupational values are allowed to vary across time, still do not fit the data remarkably well. This suggests the possibility that age and occupation may be associated in more than one way. There may be two patterns of age segregation. Such patterns are suggested by the literature on segmented labor markets. Kaufman and Spilerman (1982) uncovered several age patterns in the occupations they surveyed.

I therefore compare fit statistics for models that contain two dimensions. The fit of these two-dimensional models suggests that, while there may be two dimensions determining the age segregation of occupations, it is not likely that one is fixed by socioeconomic status. Model 6, the Class III model, specifies two dimensions, and fixes the first to the SEI scores of the occupations. This model does not fit the data well. The model fits worse than model 4, the one-dimensional model of complete variability. For men, model 6 has a BIC statistic of 53,182 compared to 35,302 for model 4. For women, the corresponding figures are 22,466 compared to 16,308. This should not be too surprising, as the bulk of the change in

age segregation in one dimension stems from changes in occupational categories. Thus fixing occupational categories ignores the most important source of the change.

In contrast, the two-dimensional model that allows occupations to vary in both dimensions fits the data remarkably well. Model 5, the Class II model of complete variability, like model 6, says that there are two dimensions determining age segregation. However, all the parameters are allowed to change in both dimensions. That is, for both dimensions, the overall strength of association, the relative positioning of age groups, and the occupational patterns vary over time. The model says that there are two patterns of occupational age segregation that obtain at each point in time, and that these patterns have changed over time. For men, the BIC statistic for this model is –3,602, and for women it is –1,272. This is the preferred model of age segregation in the United States between 1950 and 1990.

How Choice of Method Affects the Results

In this sub-section, I compare results from the log-multiplicative models to results using a more traditional measure of occupational segregation, the index of dissimilarity. For both women and men, age segregation has declined in the first dimension, while it has risen in the second dimension between 1950 and 1990. The comparison reveals that the index of dissimilarity conflates the sometimes opposite changes in the two dimensions governing age segregation.

To make temporal comparisons with the index, I calculate average indices. These average indices are most similar to the overall segregation parameters. The average indices are based on relations between age groups and occupations that can shift over time, similar to the model of complete variability. In addition to measuring differences in the distributions of workers across occupations over time, the index captures changes in both the age and occupational distributions, or the margins of the frequency tables.

Tables 3 and 4 show the trends in four measures of occupational age segregation for men and for women between 1950-1990. Columns one and two show results from phi, the measure of overall association in the first dimension of the log-multiplicative model of complete variability in two dimensions. As described above, this is the best fitting model. Columns three and four show results from theta, the measure of overall association in the second dimension of the same model. The last two columns show the trends for the index of dissimilarity. As described in the data and methods section, I average the index of dissimilarity for each group relative to all other groups. As in the comparison of models above, all parameters are calculated using the four all-inclusive age categories.

For women, as shown in Table 3, the index of dissimilarity primarily captures changes in age segregation in the first dimension, but is somewhat affected by the countervailing changes in the second dimension (see Appendix F for detailed indices of dissimilarity for women). All measures show a decline in the extent of age segregation except for theta, which measures segregation in the second dimension. The measure of the overall

association between age and occupation in the first dimension registers the largest decline. In the first dimension, age segregation for women declined by almost half between 1950 and 1990. The index of dissimilarity registers a similarly large decline. Age segregation, according to the index, declined by 33 percent between 1950 and 1990. The index records a small increase in age segregation between 1980 and 1990. This reflects the fact that, similar to the case for women, age segregation in the second dimension increased by more than a third for the same period. In general, these measures suggest that, for women, there has been an overall decline in age segregation.

For men, as shown in Table 4, the index again captures changes in both dimensions (see Appendix E for detailed indices of dissimilarity for men). The indices of dissimilarity and phi both suggest that age segregation has decreased between 1950 and 1990. The decline in age segregation was somewhat smaller in the index than in the measure of segregation in the first dimension. This reflects the fact that age segregation increased in the second dimension.

Taken together, these results suggest that the index of dissimilarity conflates the changes in the first and second dimensions measuring occupational age segregation.

Female Age Segregation over the Last Fifty Years

The one-dimensional models reveal a linear pattern of age segregation for women. The model of associational invariance shows the dominant age scale pattern for female workers. As shown in figure 1, women workers are segregated by age according to a linear pattern. Each age group is relatively equally segregated across occupations from the next oldest (and youngest) age group. Twenty year old workers are only slightly more segregated from thirty year old workers than are thirty year old workers from forty year old workers. The separation between forty and fifty year old workers mirrors that between fifty and sixty year old workers. Thus, viewed in one dimension, age segregation cumulates, with the youngest workers most unlikely to work in the same occupations as the oldest workers. Workers under forty have negative age scale values, while workers over fifty have positive ones.

These age scale values reveal which types of workers dominate which types of occupations. Figures 2 and 3 show the occupational parameters from the model of associational invariance. Occupations with negative values tend to be dominated by workers under forty. Occupations with positive values tend to be dominated by workers over fifty. Occupations with values close to zero will have an age distribution similar to the age distribution for all women workers.

Figure 2 shows that there is a lot of variation in age scale values within each intermediate occupational category. The professional and clerical occupations are weakly dominated by

women workers younger than forty. The scale values for these occupations are primarily negative. In particular, the entertaining, scientific and para-medical professions appear to be performed by younger women workers. The remaining occupational categories are not strongly negative. These occupations may be relatively more age integrated.

In general, the farmers, operatives and service workers categories tend to be dominated by somewhat older women workers. In particular, as shown in Figure 3, workers over fifty dominate the dressmakers, farmers, and private household workers categories. The medical technician, therapist, and chemist occupations tend to be performed by younger workers.

As mentioned above, much of the change in the association between occupation and age can be traced to changes in occupational patterns over the period. Some occupations were once dominated by younger workers and are now dominated by older workers. Others tended once to be performed by older workers and now are performed by younger ones. More commonly, occupations fluctuated throughout the period. In one census an occupation may have been dominated by younger workers, while in the next census it was dominated by older ones, only to be dominated by younger workers once again in the following census. To capture these fluctuations, I sum the absolute value of the changes in occupational scale values from census year to census year. The results are shown in Figure 4. The largest absolute change over fifty year period was in the counter workers

occupational category. By contrast the store buyers category remained relatively constant in terms of the age character of incumbents.

Figure 5 shows four occupations that experienced among the largest overall changes in their occupation scale parameters over the period (see Appendix G for complete occupation scale values from the Class I model of complete variability). For example, in 1950 and 1960, housekeepers tended to be over fifty. In the 1970 and 1980 census, this occupational category was dominated by workers younger than forty. By 1990 housekeepers had an age distribution the same as that of the larger population.

As shown in Figure 6, the estimates from the one-dimensional model of complete variability show that the overall age segregation of women workers declined between 1950 and 1990. This resulted from a monotonic decline between 1950 and 1970. Between 1970 and 1980, segregation remained constant. More recently, age segregation began to rise.

The results from the preferred, two-dimensional, model reveal competing patterns of age segregation. The first dimension shows many of the same patterns observed in the one-dimensional model. A subsidiary pattern of age segregation operates in the second dimension. This suggests some support for the concept of segmented labor markets, at least as measured by cross-sectional occupational outcomes.

In the first dimension, as in the one dimensional model, there is a linear pattern of age segregation. That is, each age group is relatively more segregated from age groups that are more distant in age. The only new finding to be added to the previous discussion is a recent tendency for all workers under forty to be less occupationally segregated. As shown in figure 7, starting in 1980, women workers in their twenties began to be more likely to be found in the same occupations as women workers in their thirties. This supports the hypothesis that the feminist revolution improved the occupational prospects of women workers entering the labor force in the 1970s and 1980s.

The pattern revealed in the second dimension is more striking. Figure 8 shows the cross-sectional results of the Class II model for this dimension. This reflects the U-shaped pattern described by Kaufman and Spilerman (1982). Workers in their twenties are most segregated from workers in mid-life, and relatively less segregated from workers in their sixties. There is a general tendency for women workers in their thirties and forties to perform the same jobs.

As Figure 9 makes clear, the relative positions of different age groups in the second dimension have been changing over time. This second dimension shows a repositioning of different age groups across census years. For instance, for all years except 1970, workers in their twenties were the most segregated from workers at mid-life. In 1970, however, workers in their sixties slightly more segregated. In 1950 and 1980, women in their thirties

were most unlikely to share occupations with the oldest and youngest workers. In the remaining years, workers in their forties were most separated from these workers.

This relatively chaotic dimension may increasingly come to characterize age segregation for women workers. The global distance between age groups in this second dimension is relatively less than that in the first dimension. Figure 10 shows that global segregation in the second dimension has remained stable throughout the time period. Global segregation in the first dimension has been declining during the period.

Male Age Segregation over the Last Fifty Years

In this sub-section, I review results from the same series of models estimated for male workers.

Estimates from the model of associational invariance show an age profile that corresponds with expectations from theory. As shown in Figure 11, the twenty year old workers are the most segregated from workers at all other ages. The difference in age scale values between the twenty and thirty year old workers is .7. In contrast, the difference between the values of the thirty and forty year old workers is only .3. Workers in the remaining age groups are separated by values of .1. To the extent that this model describes the data, then, it says that, as workers age, they are increasingly likely to perform the same occupations as workers who are older than them. Workers over thirty are relatively unlikely to perform the same occupations as those in their twenties.

The occupation scale parameters show a similar pattern for men as that for women. As shown in Figure 12 the age character of occupations varies within intermediate occupational categories. Among professionals, dentists, physicians and clergymen tended to be older, while surveyors, medical technicians and designers tended to be younger. Among the crafts occupations, tailors, locomotive engineers, and foremen tended to be older, while linemen and auto mechanics tended to be younger. Despite the general lack of a relationship between the intermediate classification of occupations and their age character, the relatively less skilled occupations, operatives and laborers, tend to be dominated by people under thirty. In the main, these occupations have relatively low or negative scale values, revealing the preponderance of twenty and thirty year old workers.

In Figure 13, the occupations are arrayed according to their age scale values. This shows that the apprentices category is the most strongly segregated occupational category and tends to be performed by younger workers.

As shown in Figure 14, the parameters from the one-dimensional model of complete variability suggest that global segregation of male workers has increased. The value of the global segregation parameter fluctuates around a value of 7 between 1950 and 1980. More recently, in 1990, age segregation has risen to a value of 9. Of course, as discussed in the sub-section on model fit, less of the change in age segregation is explained by this parameter than by the changes in the occupation scale parameters.

Much of the change can be attributed to changes in the occupational values. I have summed the changes that took place and ordered the occupations according to the amount of overall change experienced during the fifty year period. Occupations with the most change in their age scale values include shoemakers, tailors and locomotive and aeronautical engineers. The age character of the electrotypers and accountants occupations showed little change.

Figure 15, shows selected occupational categories with large changes in their age character over the period (see Appendix H for complete occupation scale values from the Class I model of complete variability for men). In 1950 and 1960, aeronautical engineers tended to be under forty, while in the remaining census years, they tended to be older than forty. The reverse is true of shoemakers, who tended to be over forty during the beginning of the period and under forty starting in 1970.

As with the models estimated for women, the age scale values in the two dimensions of the Class II model reveal different general shapes. The first dimension exhibits a pattern similar to the one-dimensional model. This could be characterized as the dimension of life course segregation. This dimension dominates the association between age and occupation.

Over time, within this dimension, workers under thirty have become increasingly segregated from workers at other ages. As shown in figure 16, the last two censuses have

shown a marked decrease in the likelihood that these younger workers will share occupational categories with workers at all other ages.

The second dimension exhibits the U-shaped pattern that could be characterized as the dimension of entry and exit. As shown in Figure 17, workers under twenty and those over sixty, at the beginning and end of the work life, are relatively less segregated from each other. Workers in midlife, those between 30 and 49, are less segregated from each other. Figure 16 shows the cross-sectional age scale values for all of the census years. Again, we see evidence of requeuing in this dimension. As shown in Figure 15, in 1950, workers in their twenties were least likely to share occupations with workers at mid-life. However, they exchanged this position with workers in their sixties starting in the 1980 census and continuing through the most recent census. Workers in their thirties and forties show a switching pattern, alternating their position by census year as the most segregated from the oldest and youngest workers.

The findings from the comparison of the global parameters regarding age segregation show similar results to those for women. That is, segregation is higher in the first, dominant dimension, and somewhat lower in the second dimension. Over time, segregation appears to have declined in the first dimension (see Figure 16), though most recently to have increased again, similar to the overall pattern. The second dimension shows no clear trend regarding age segregation.

Conclusion

This paper began with substantive and methodological goals. The substantive goals were motivated by two questions: How are occupations graded by age in the United States? How has this changed over the last fifty years? Methodologically, I compared results from two different means of measuring age segregation: the index of dissimilarity and log-multiplicative models.

I found that occupations are age segregated. The best-fitting model suggests that there are two different patterns of occupational age segregation. One pattern is linear, in which workers at a particular age are progressively more segregated from workers who are more distant in age. The other pattern is u-shaped, in which workers in their twenties and sixties are more likely to perform the same occupations, and less likely to share occupations with workers at mid-life.

For men, the age segregation of workers has remained relatively stable over the period. For women, this segregation has declined. The bulk of the change between 1950 and 1990 came from changes in how particular occupations were age graded. For example, some occupations were dominated by young workers and now are dominated by older ones. Changes in the relative segregation of age groups from each other, and in the overall association between occupation and age, accounted for a smaller, though still significant, portion of the change.

The choice of method affected the results. The index of dissimilarity conflated changes in the association between age and occupation in both dimensions. The log-multiplicative models allowed a closer examination of the particular patterns of segregation, as well as the contributions of particular occupations to those patterns.

Extensions

The results of this examination of age stratification at work perhaps suggest more questions. I now turn to strategies for extending the analysis. Where appropriate, I suggest revisions to the models to answer these questions more directly.

One set of extensions concerns redefining the second dimension of age stratification. In the class III model, I chose to fix the first dimension to socioeconomic status. The poor fit of this model indicates that this was probably not the correct choice. However, there may be other indices or categories at work determining age segregation. Hout's (1984) research on intergenerational mobility has pointed to the importance of authority and training for determining occupational outcomes.

Another set of extensions concerns expanding the temporal and spatial comparisons. I could, for example, extend the present models back in time, as far back as 1850. Or the current models may be applied cross-nationally in a comparison of the age structure of occupations in the United States to other countries.

The preceding analysis showed that the bulk of the change in age segregation stemmed from changes in the age structures of occupations over time. It may be that the occupations themselves are changing and requiring new capabilities. For example, an occupation in 1950 might be very different from the same occupation in 1990. The simplest explanation for this could be that my choice to use the 1950 census occupational codes obscures the real changes that are more accurately reflected in the changing census codes. Another explanation could be that the occupation was more commonly found in one industry and now is more commonly found in another. Changes in the age patterns of occupations may stem from changes in industry. One way to address this directly would be to combine the occupational categories with industrial categories. This would allow a more detailed examination of the changes in occupational definitions. Ironically, this would represent a return to the old census definition of occupation, which combined the requirements of the occupation with its industrial location.

Another way of examining this more carefully would be fixing the age scale or overall segregation parameters in one or the other dimension of the two dimensional model. This would allow a more careful analysis of the source of change in two dimensions, similar to that obtained for one dimension.

The preferred model suggests that there are two dimensions determining age segregation. In the first dimension, age is related linearly to occupation. Workers in each age group are more likely to be performing the same occupations as workers in age groups that are closer

in age, and less likely to be performing the same occupations as workers in more distant age groups. The second dimension exhibits a u-shaped pattern. Here the oldest and youngest workers were most likely to be found in the same occupations. Overall age segregation was greater in the first than the second dimension.

I found that the general patterns for women and men were relatively similar throughout the period. Yet, these vague similarities rested on different occupational classifications and patterns for women and for men. For men age segregation increased, while for women it declined. This may be partially a consequence of my initial decision to estimate the models separately by gender. I made this choice based on the assumption that age and gender would interact. It may be the case, however, that age segregation operates independently of gender segregation. To the extent that men and women do perform the same occupations it may be the case that age operates independently. For instance, all nurses may be older, and all apprentices may be younger regardless of gender. One way of looking at this more directly would be to pool the data for men and women.

For women there has been a steady decline in age segregation and for men there has been an increase. Yet as currently constructed, the models do not speak directly to the issue of the relationships between employers and employees. An examination of the redefinition of occupations, for instance looking at the intersection of occupation and industry, could more directly address the question.

In this paper, I have examined the extent of and changes to age grading of occupations in the United States over the last fifty years. The results suggest a relatively stable pattern of relationships between workers at different ages. Yet age grading has changed over time, primarily because of changes in the age patterns of particular occupations.

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Figure 1. Female Age Scale Values, Model of Associational Invariance

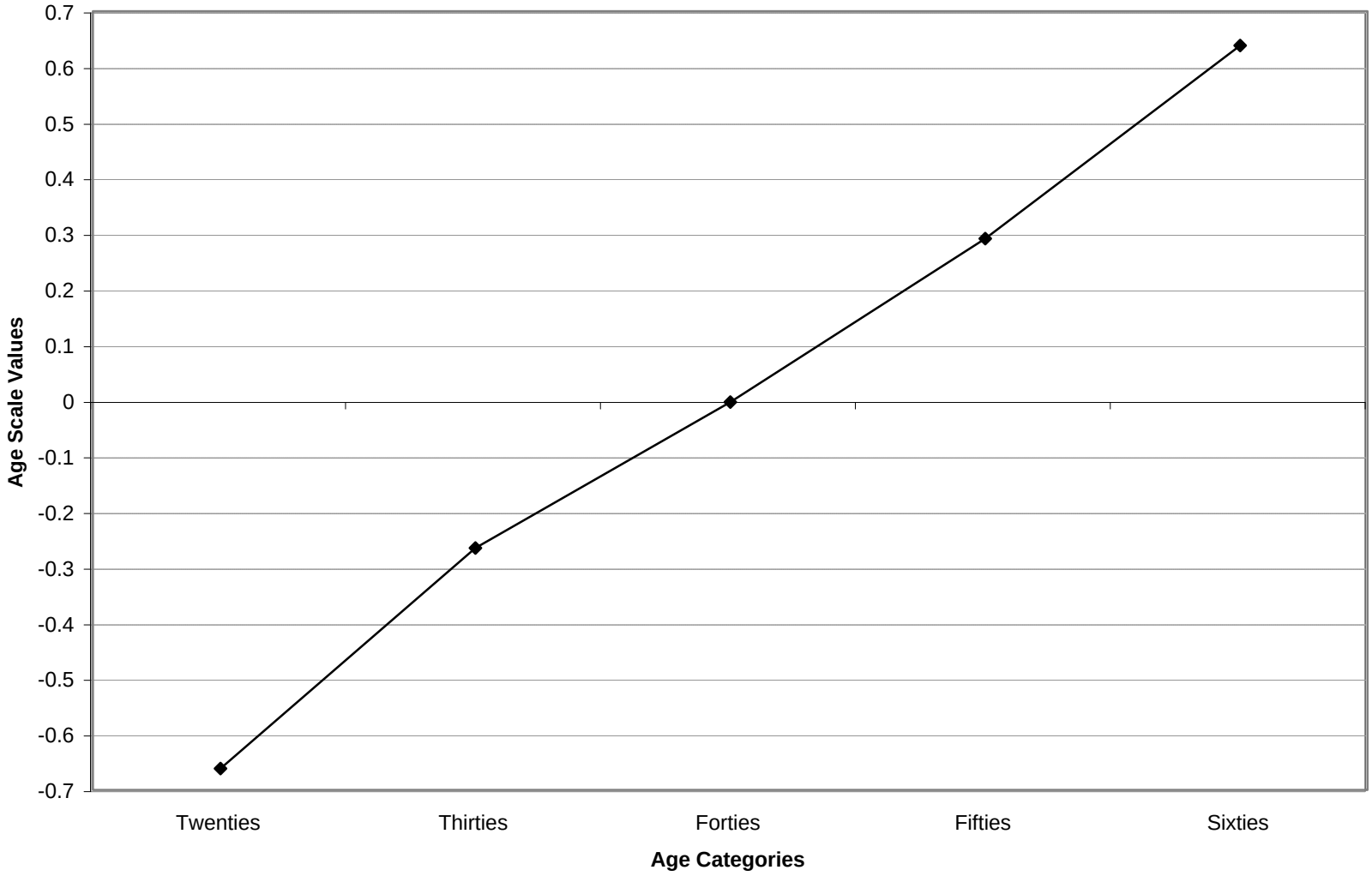


Figure 2. Female Occupational Scale Values by Major Occupational Category

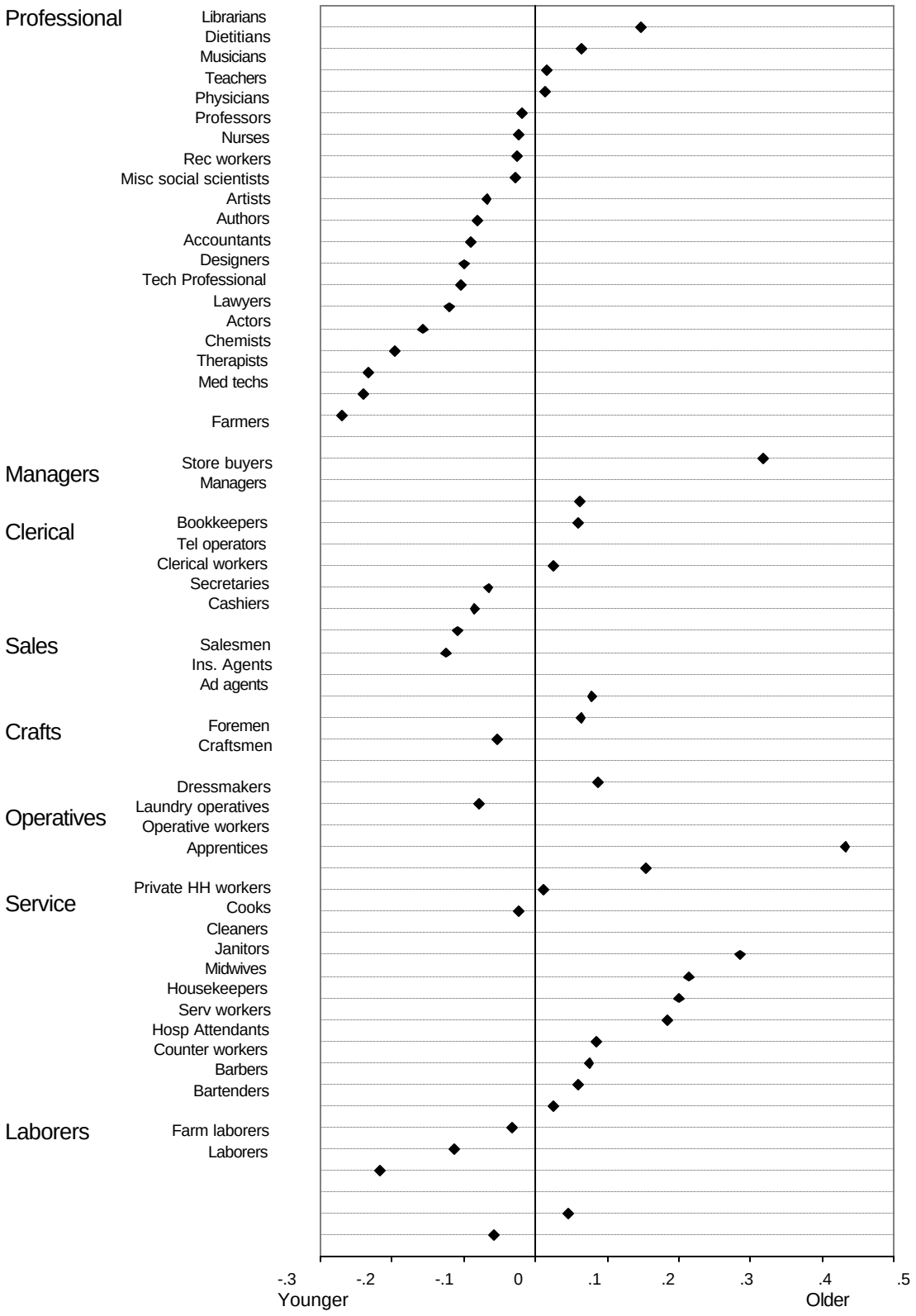


Figure 3. Female Occupational Scale Values by Scale Value

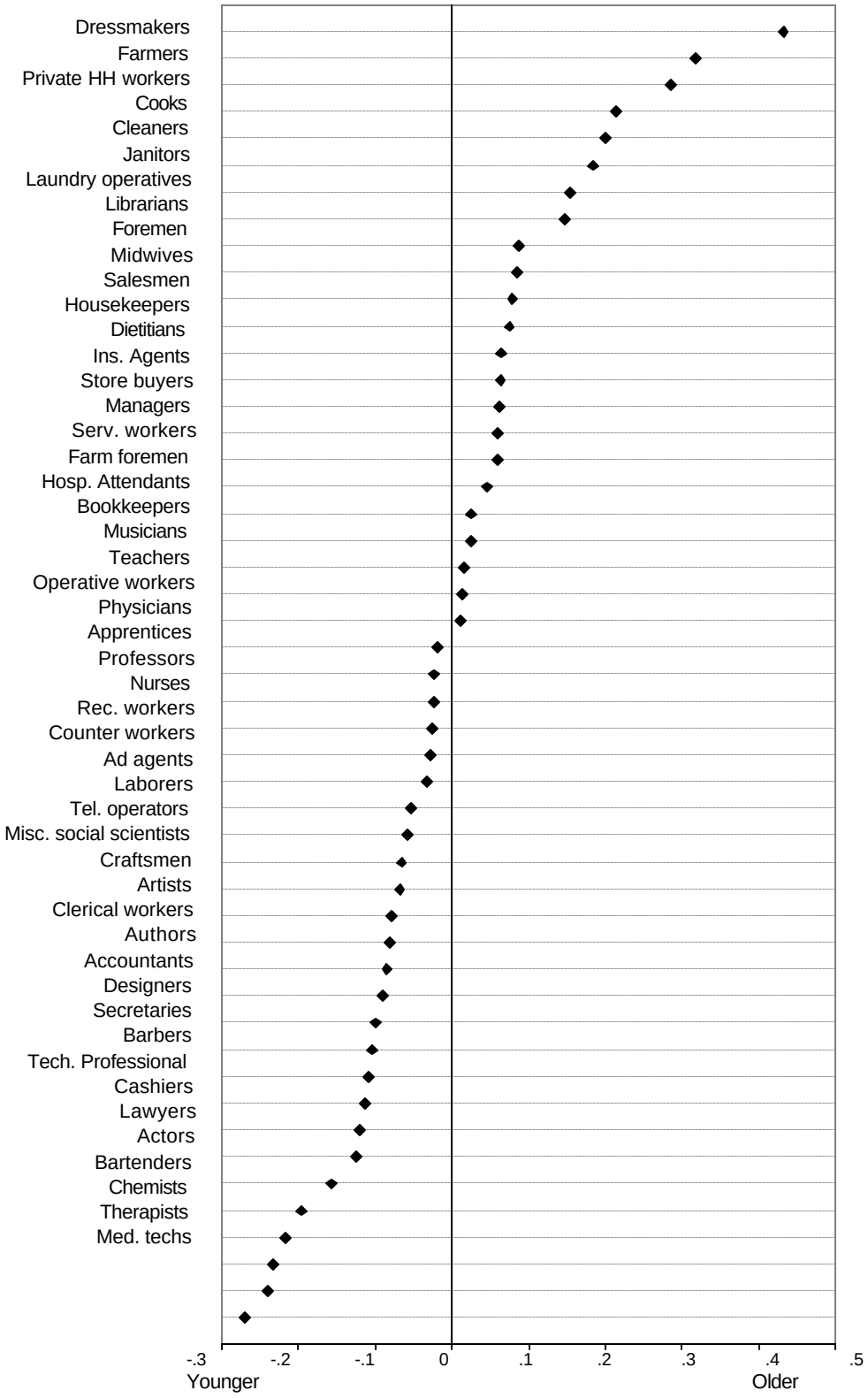


Figure 4. Changes in Female Occupational Scale Values between 1950-1990

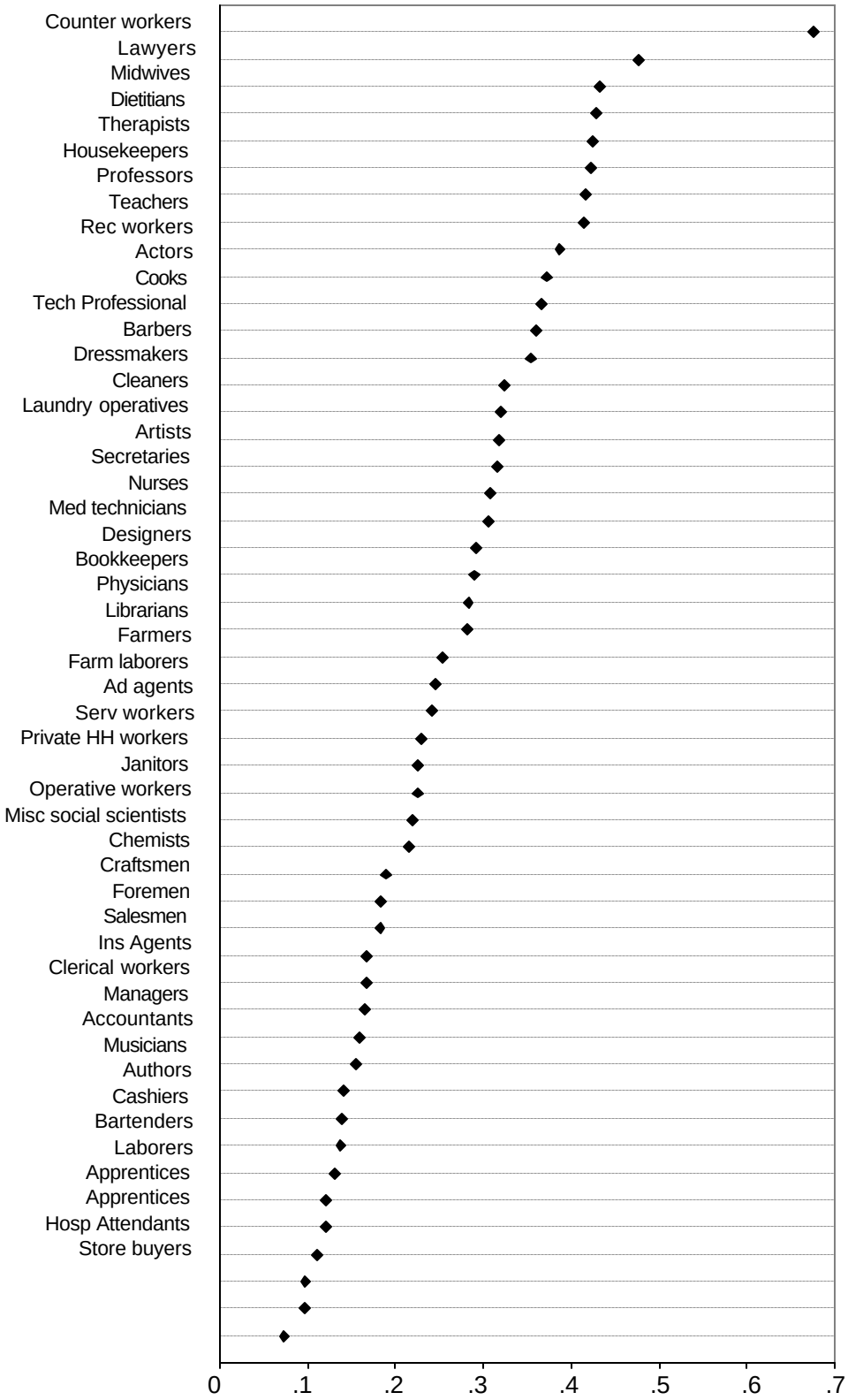


Figure 5. Selected Occupational Scale Value Changes, Women

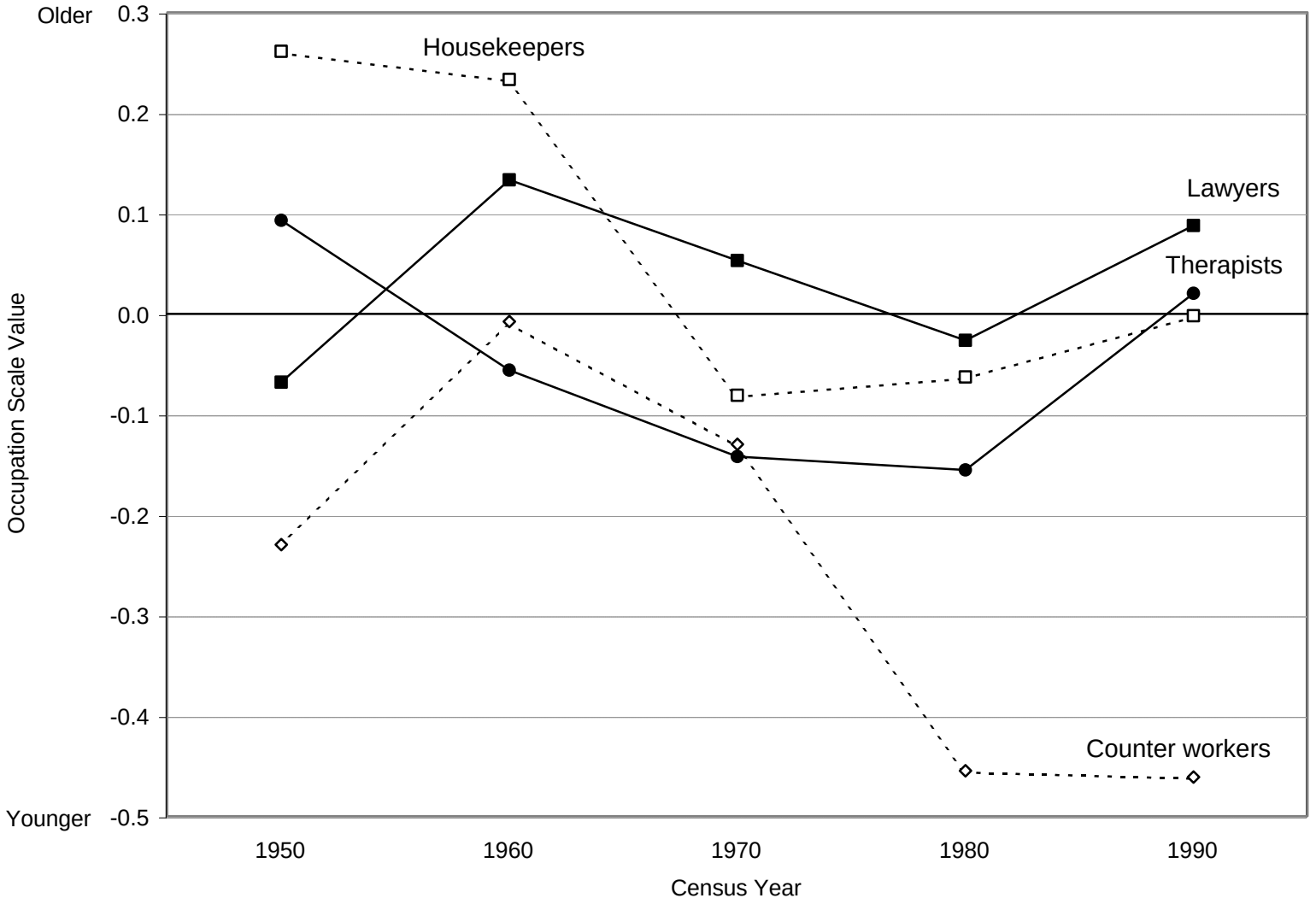


Figure 6. Change in Female Age Segregation, Model of Complete Variability

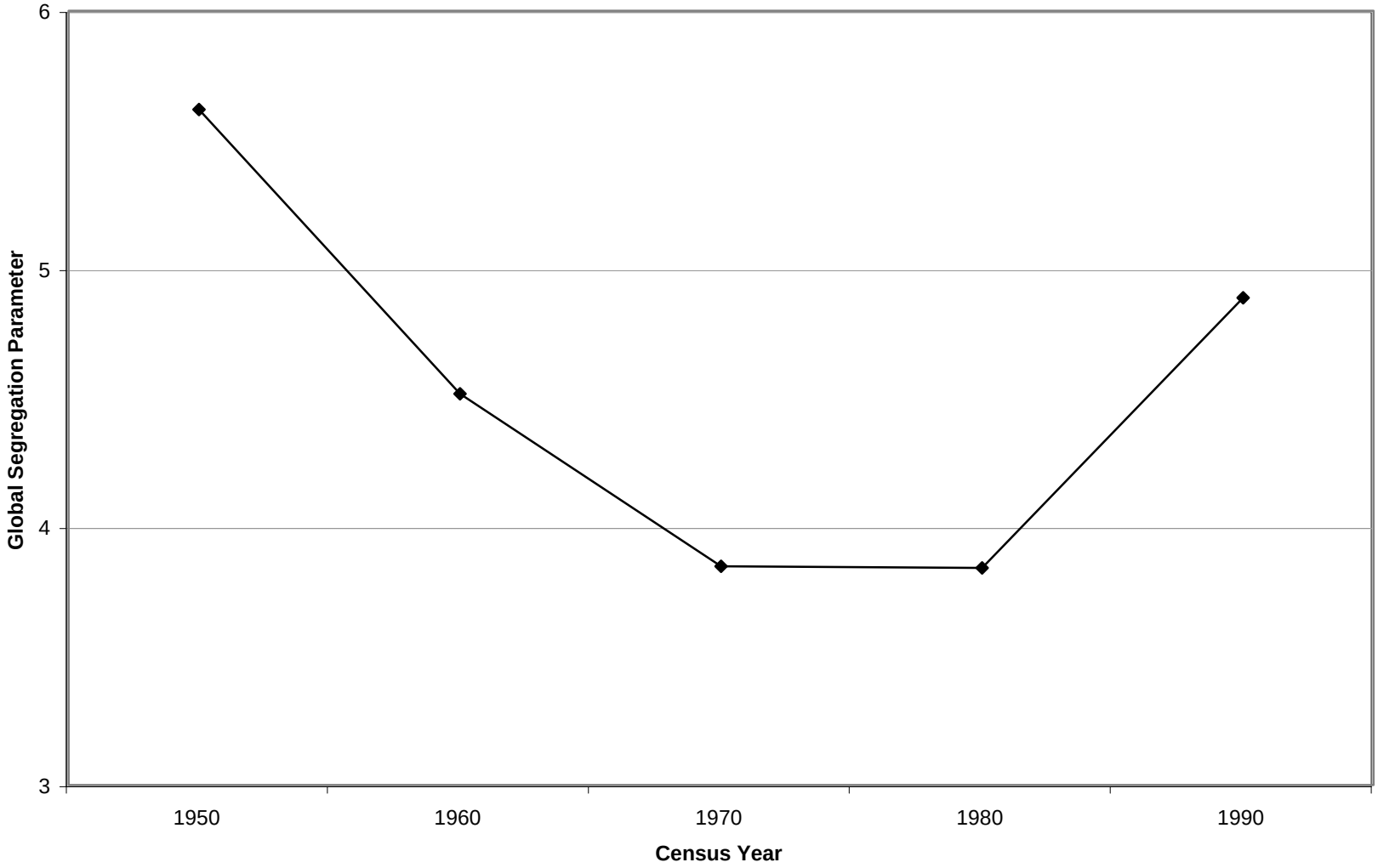


Figure 7. Change in Female Age Scale Values, Dimension 1, Class II model

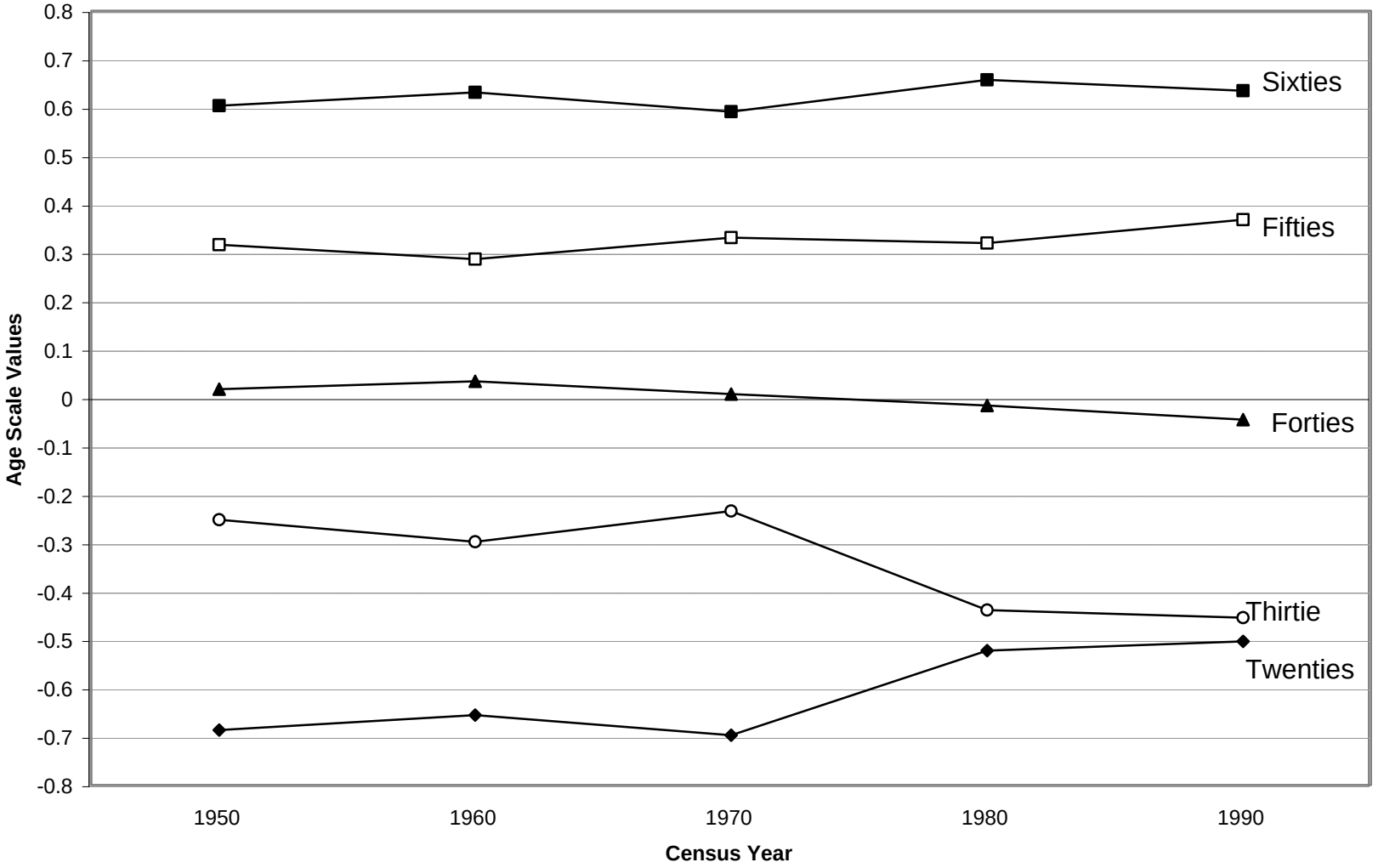


Figure 8. Female Age Scale Values, Dimension 2, Class II model

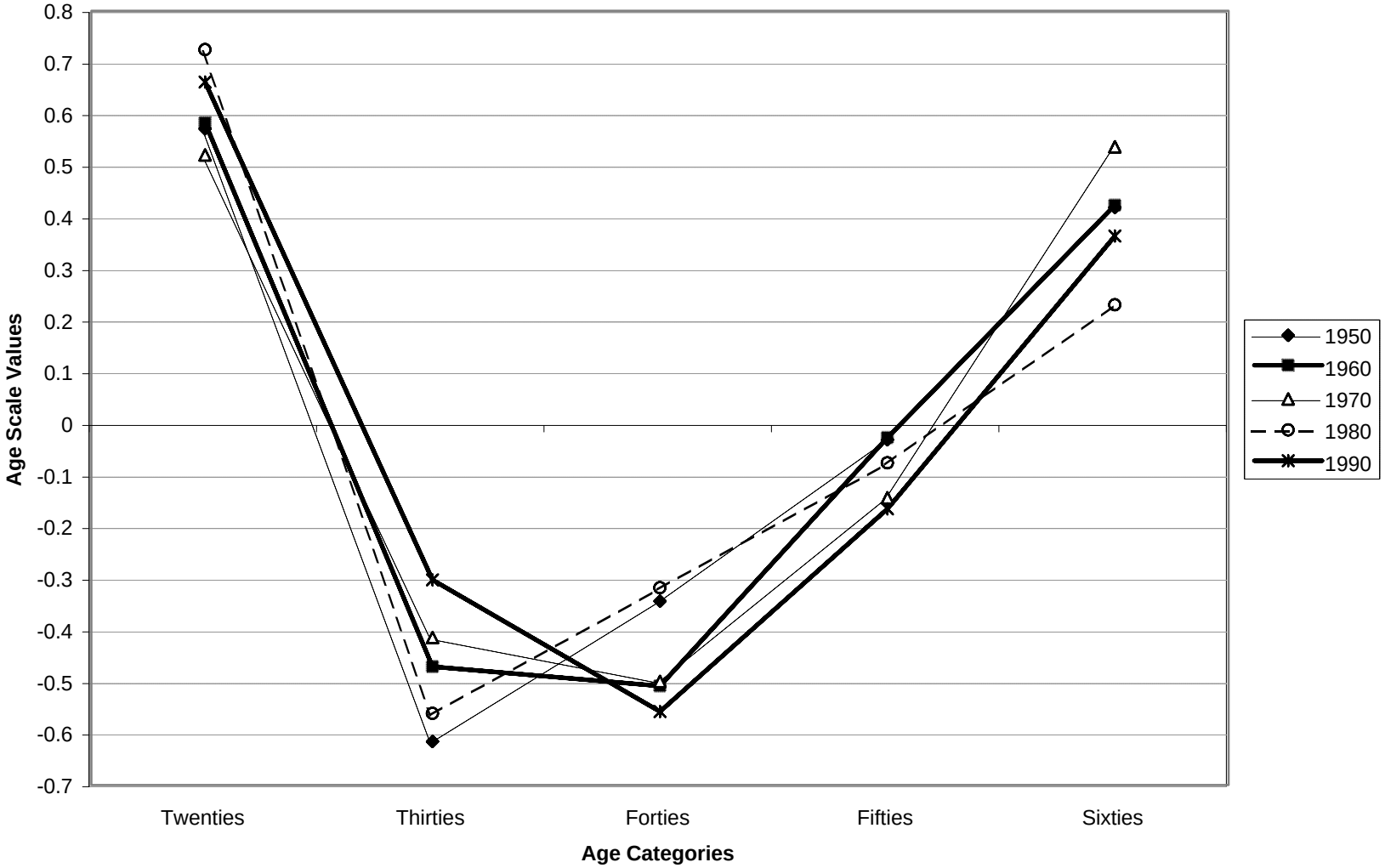


Figure 9. Changes in Female Age Group Positioning, Dimension 2, Class II model

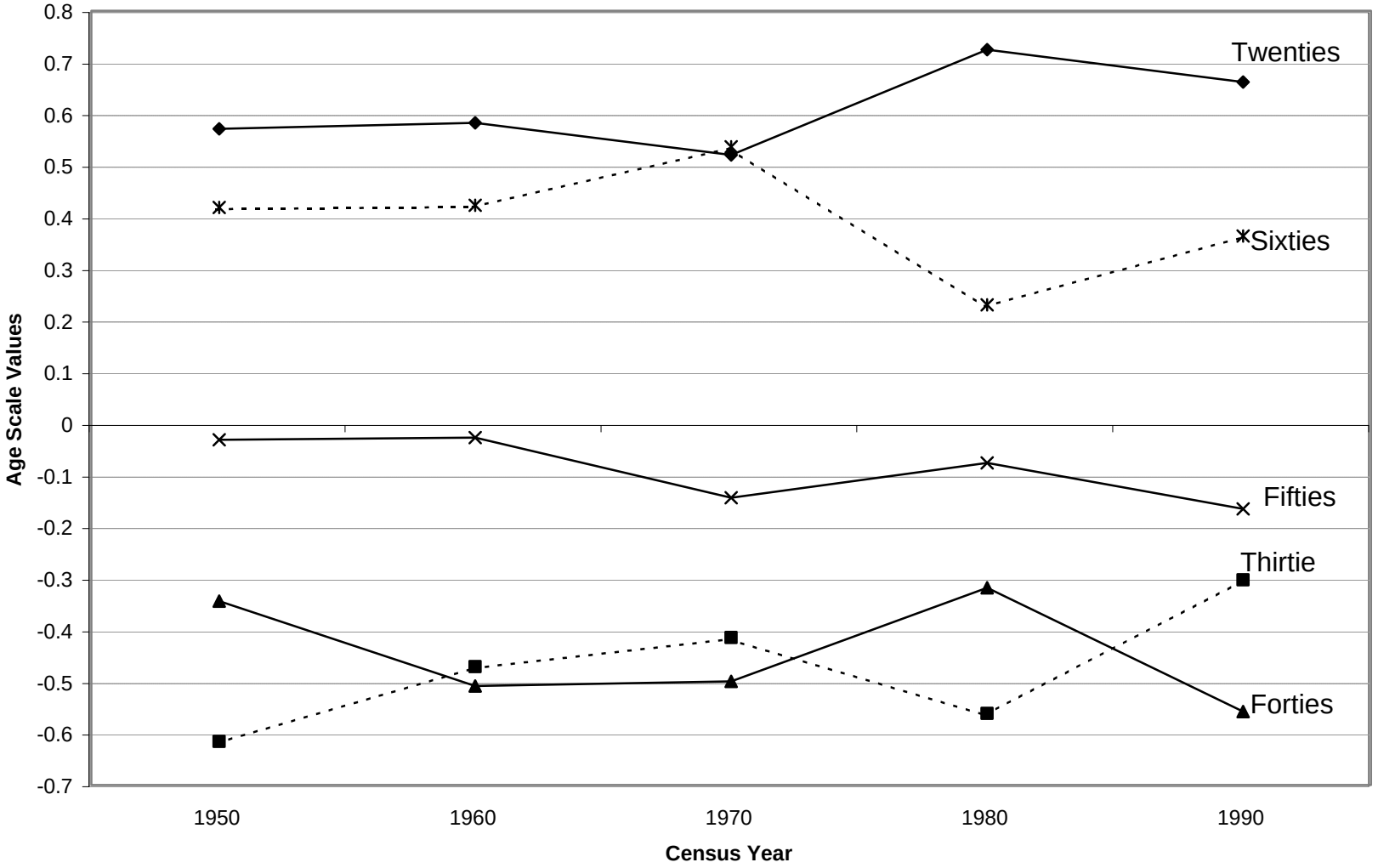


Figure 10. Changes in Female Age Segregation, Class II model

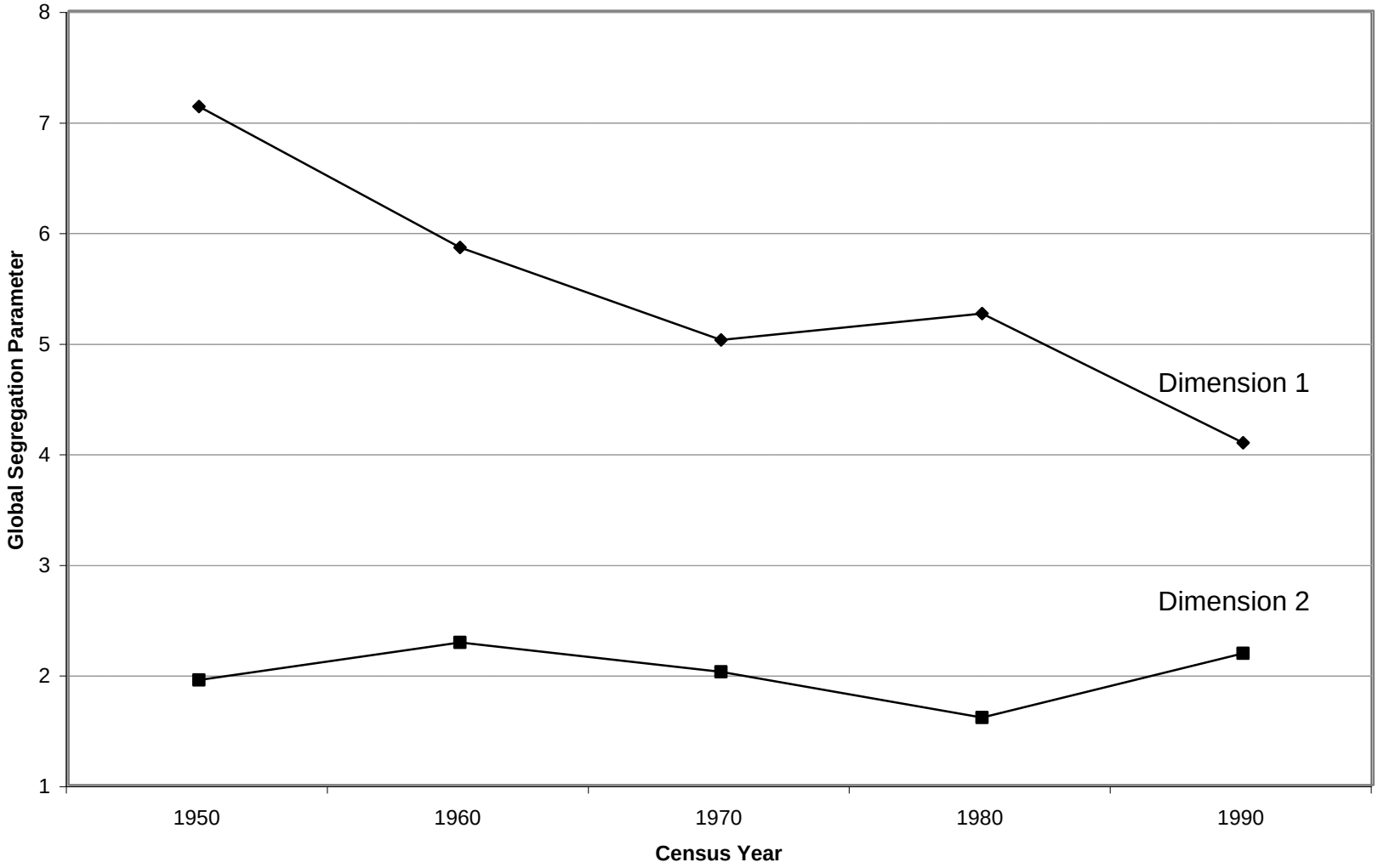


Figure 11. Male Age Scale Values, Model of Associational Invariance

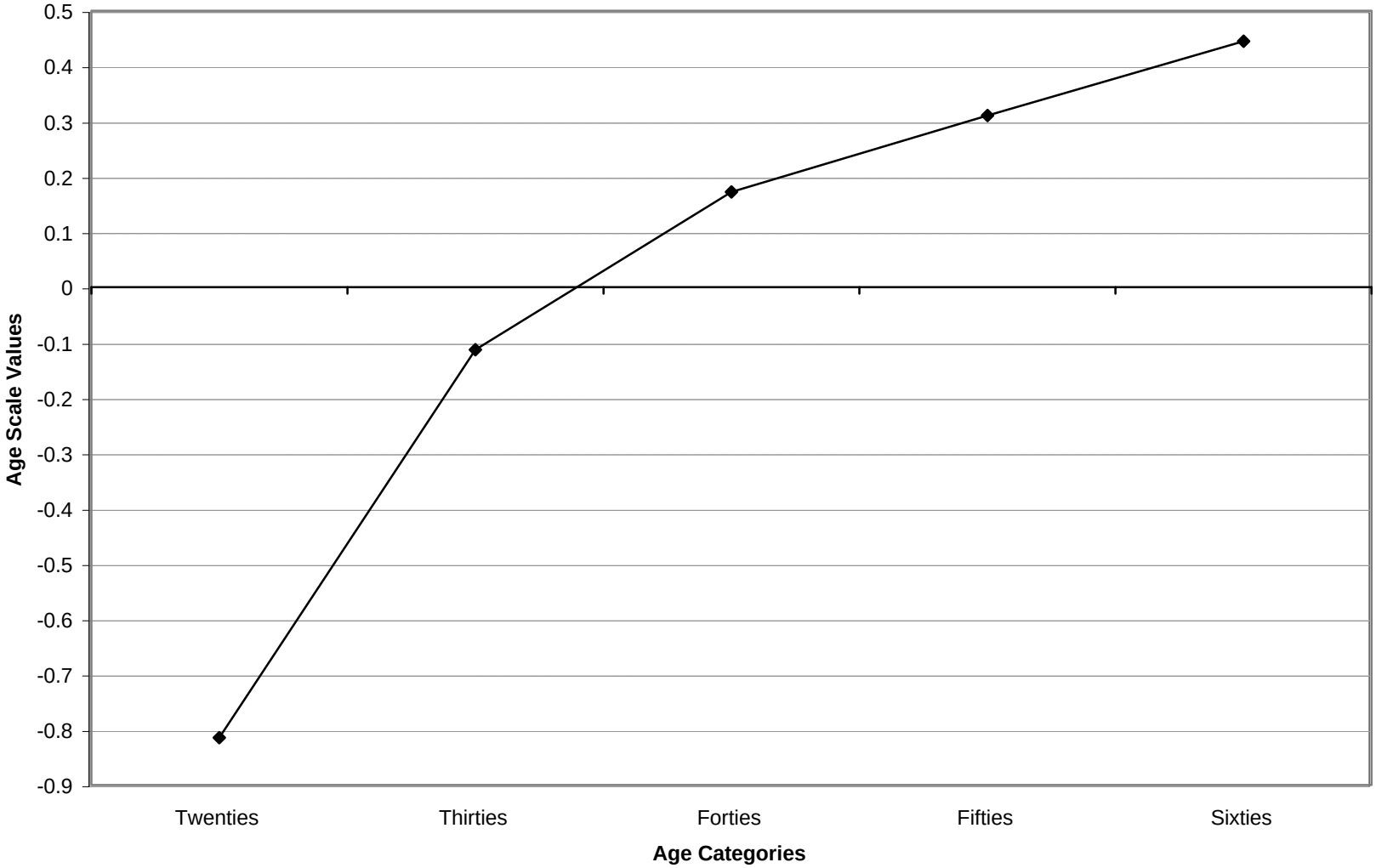


Figure 12. Male Occupational Scale Values by Major Occupational Category

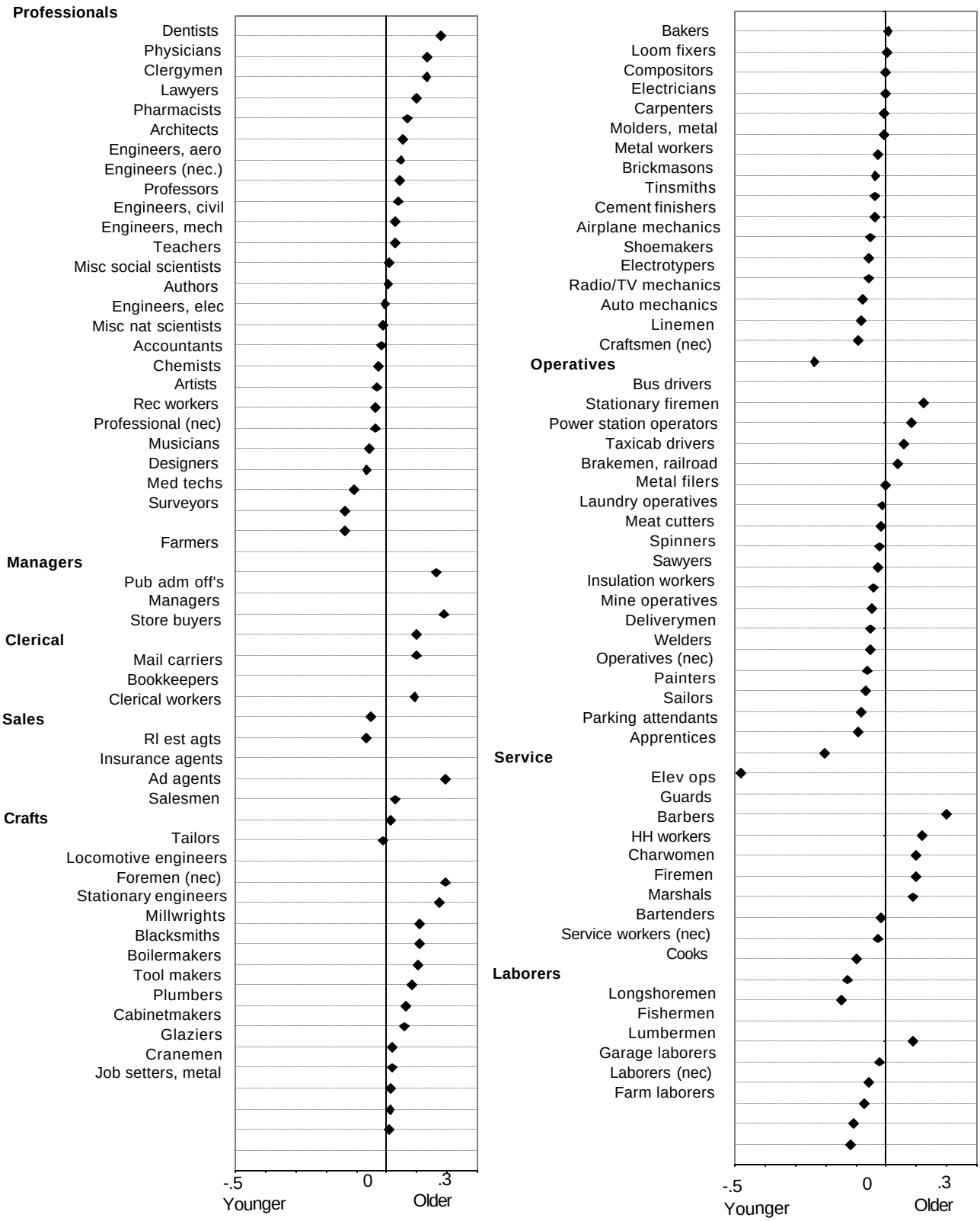


Figure 13. Male Occupational Scale Values by Scale Value

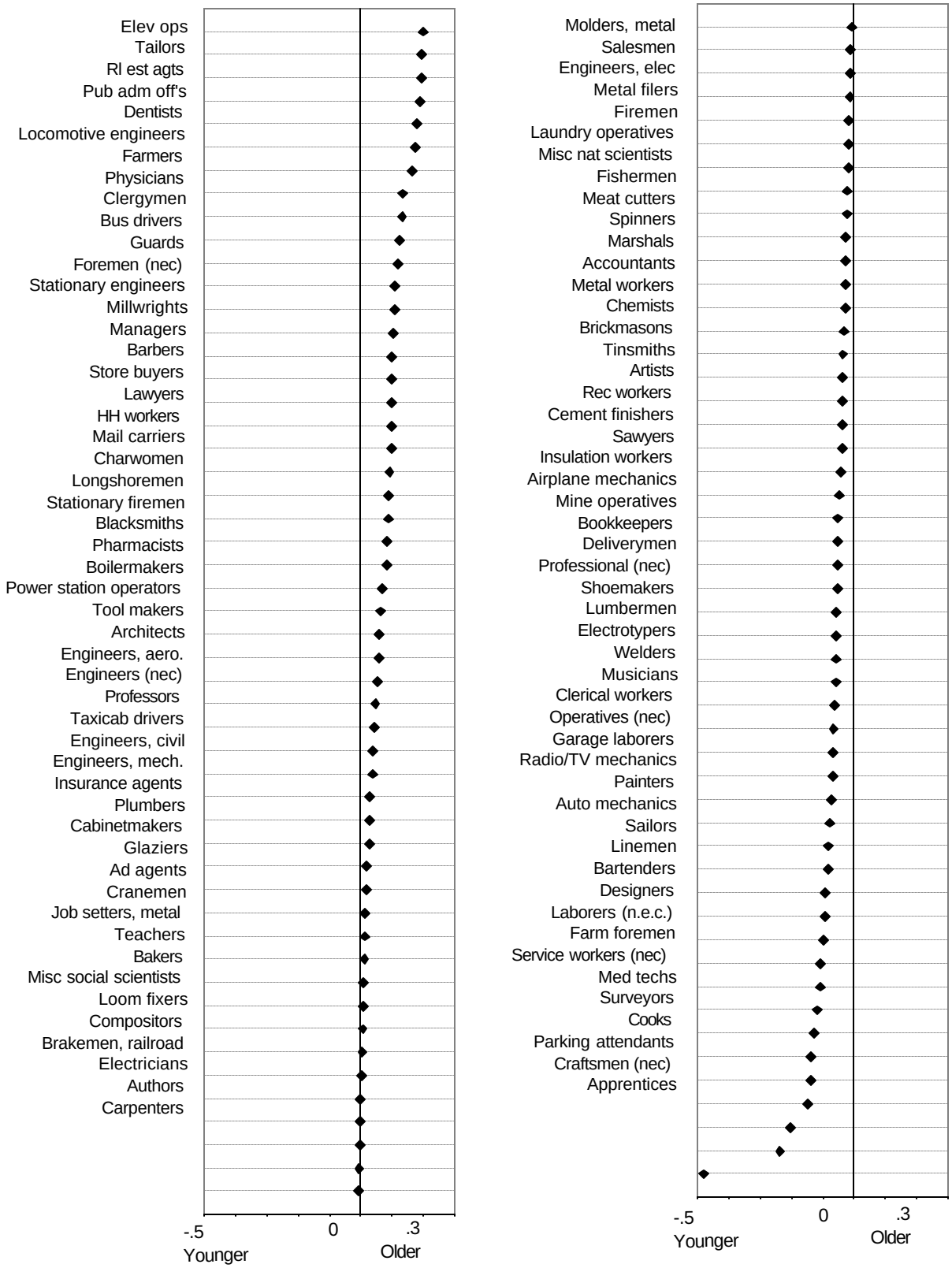


Figure 14. Change in Male Age Segregation by Census Year, Model of Complete Variability

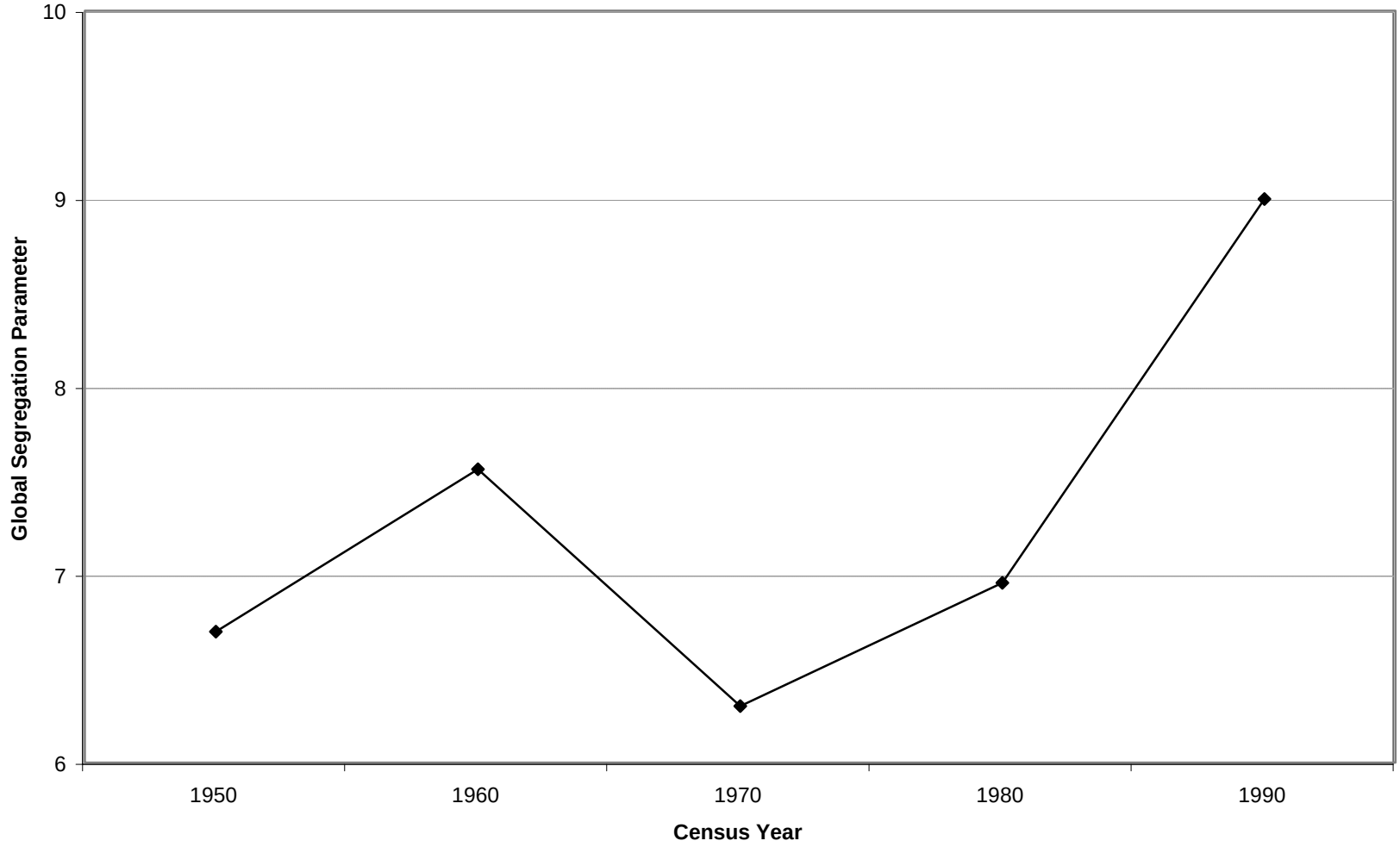


Figure 15. Changes in Male Occupational Scale Values between 1950-1990

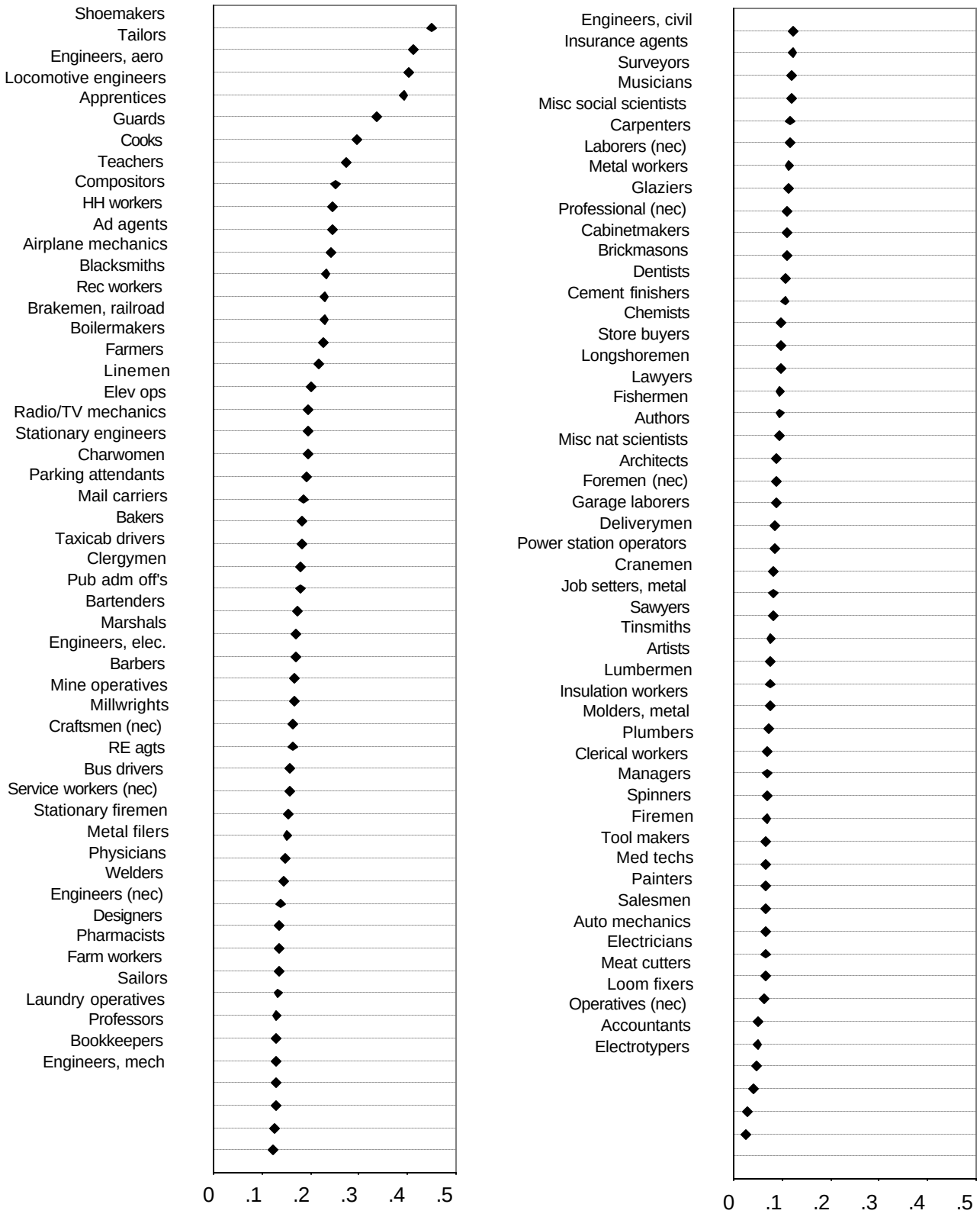


Figure 16. Selected Occupation Scale Value Changes, Men

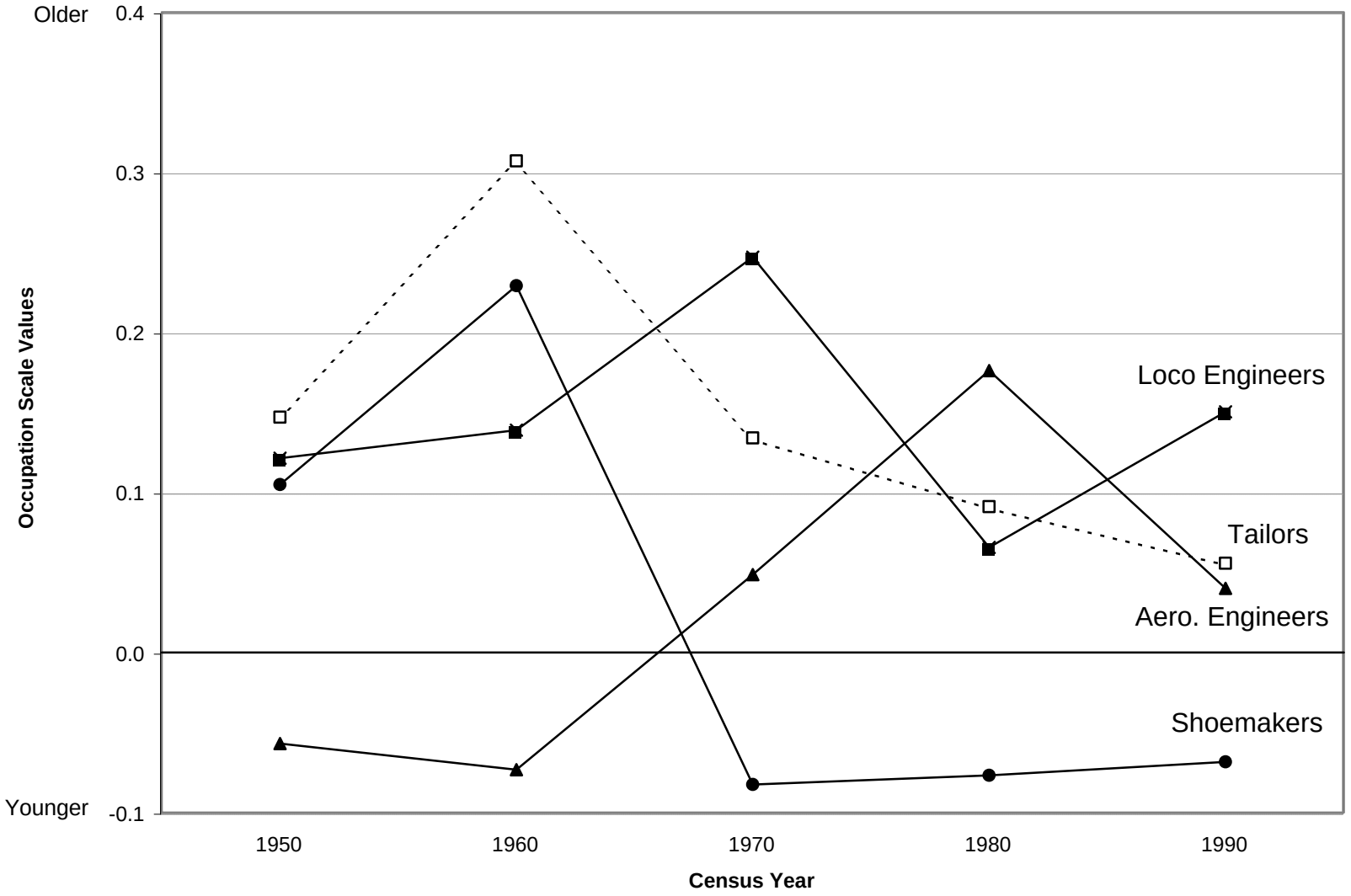


Figure 17. Change in Male Age Scale Values, Dimension 1, Class II model

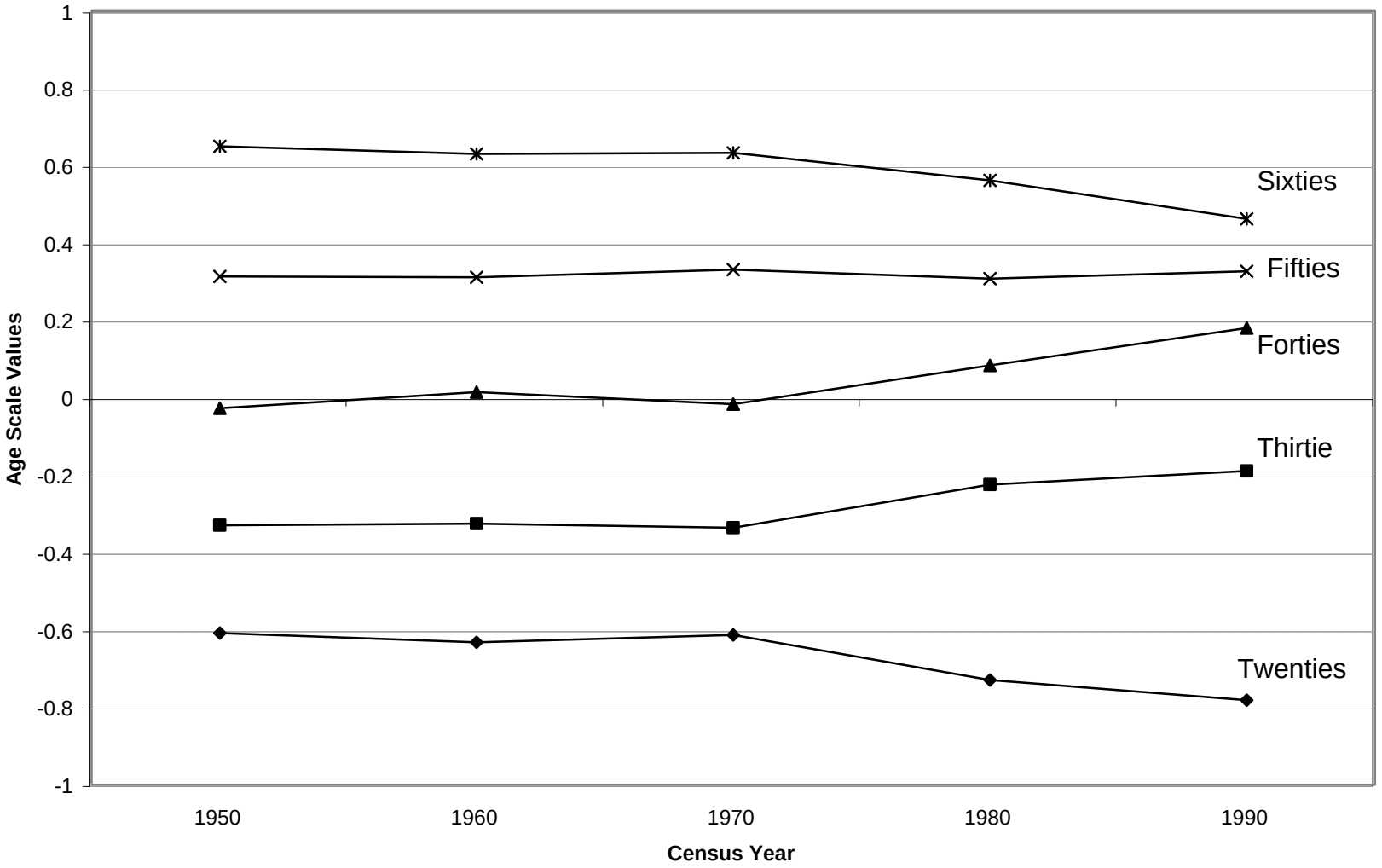


Figure 18. Male Age Scale Values, Dimension 2, Class II model

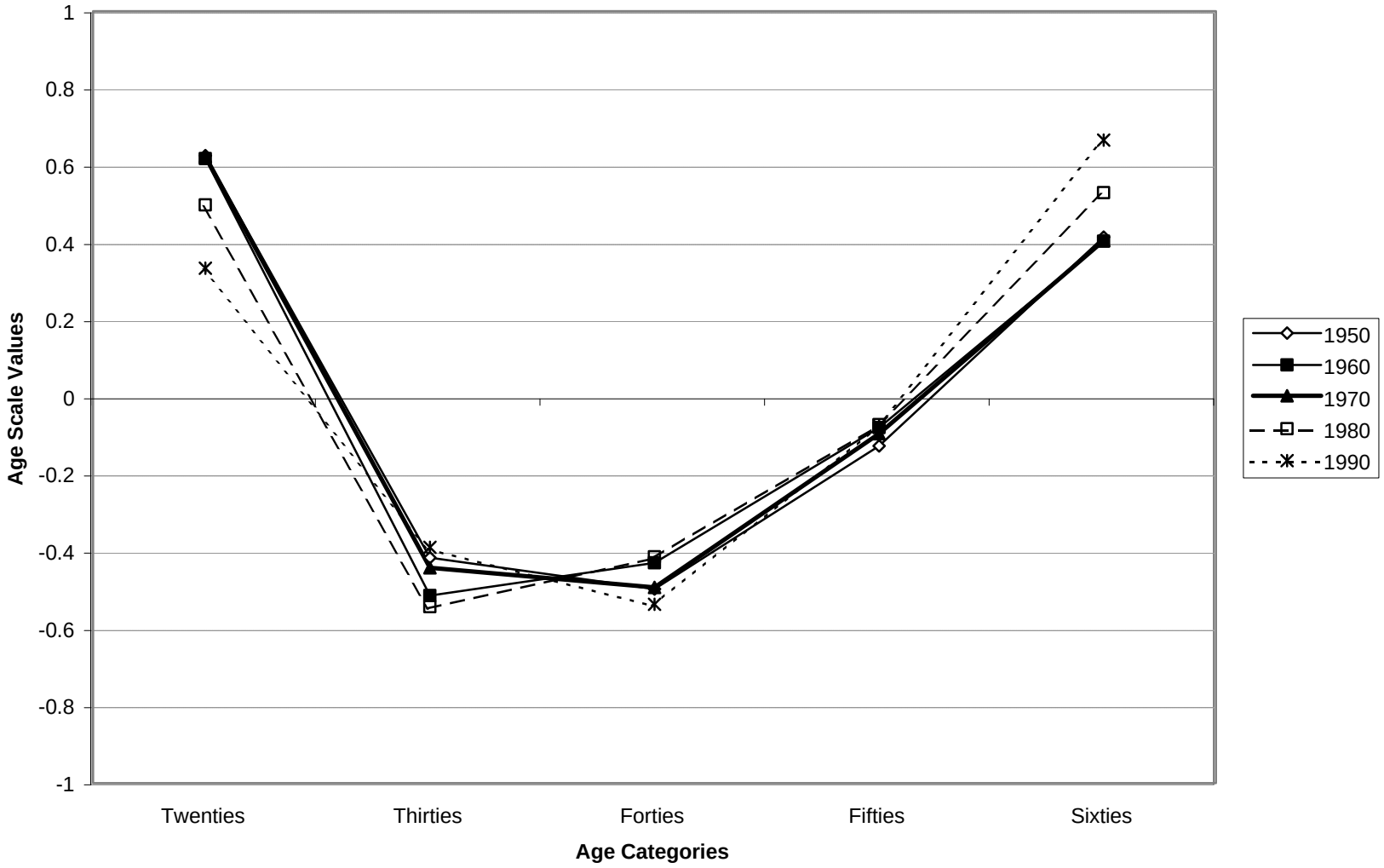


Figure 19. Changes in Male Age Group Positioning, Dimension 2, Class II model

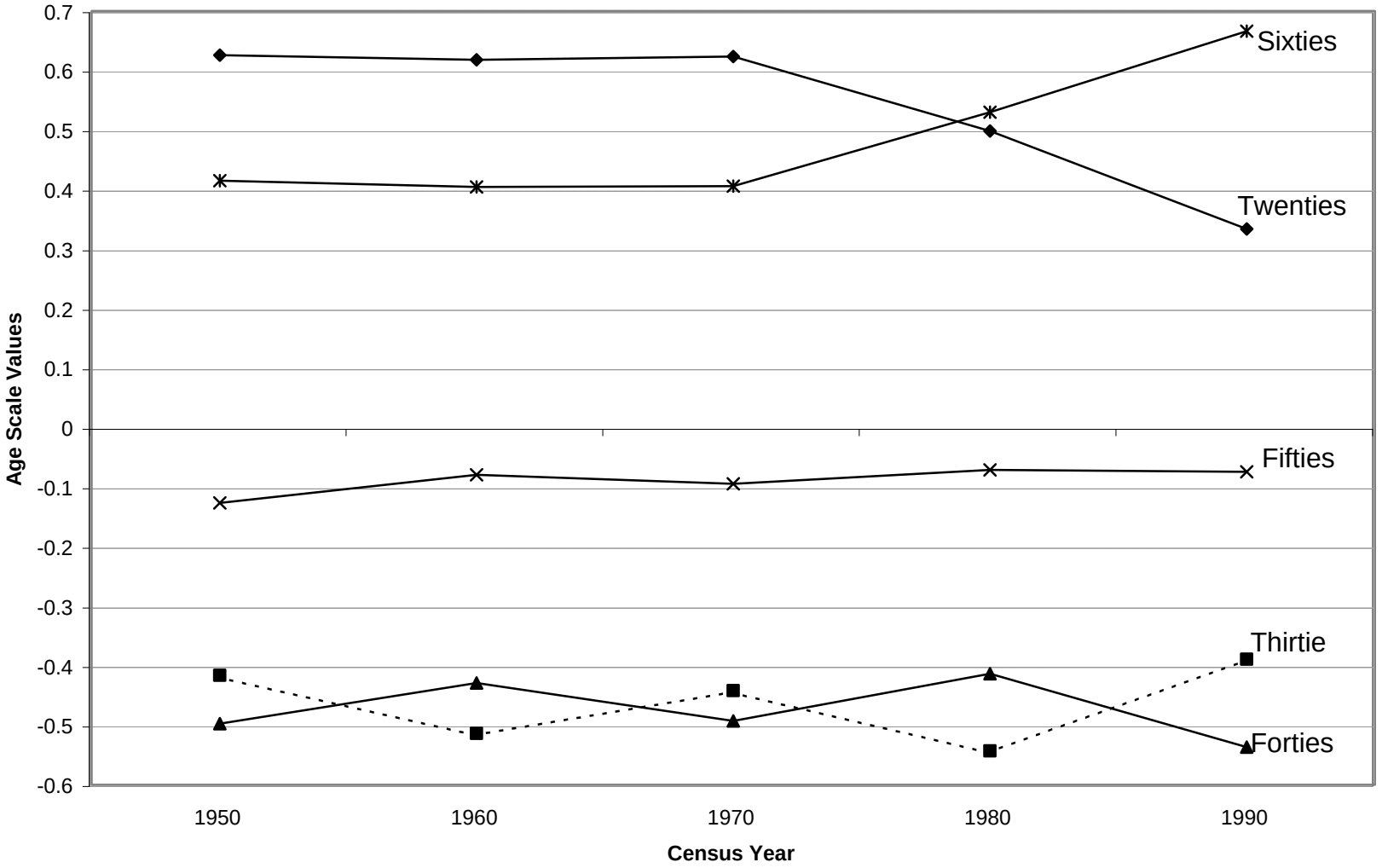
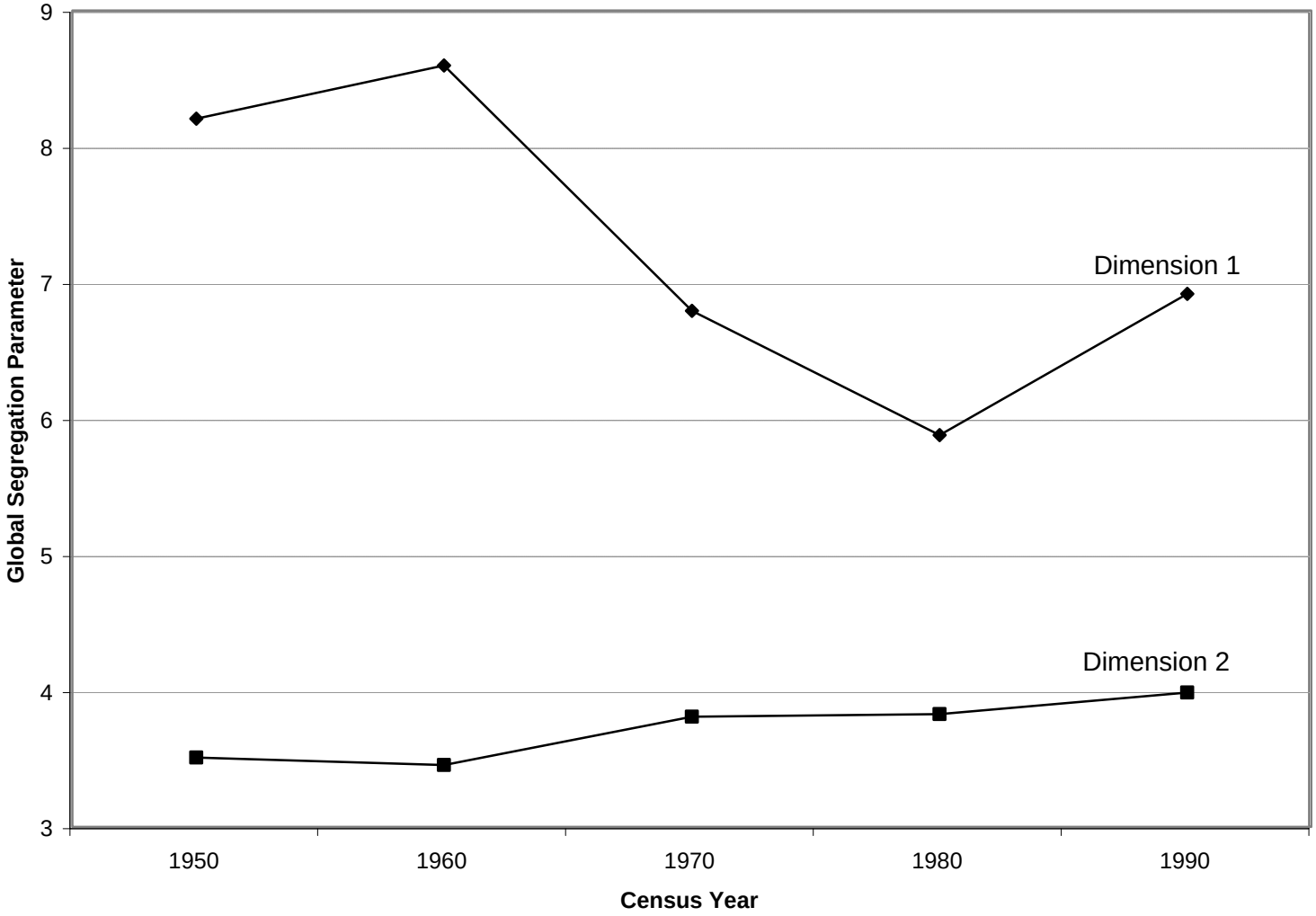


Figure 20. Changes in Male Age Segregation, Class II model



Appendix A. Intermediate Occupational Classification for Males

Occ. Code	Weighted SEI	Primary Detailed Category	Additional Detailed Categories
		Professional, Technical	
1	78	Accountants and auditors	
2	90	Architects	
3	67	Artists and art teachers	
4	81	Authors	Editors and reporters
5	79	Chemists	
6	52	Clergymen	
7	84	College presidents and deans	Professors and instructors:
8	96	Dentists	
9	70	Designers	Draftsmen
10	87	Engineers, aeronautical	
11	84	Engineers, civil	
12	84	Engineers, electrical	
13	82	Engineers, mechanical	
14	87	Engineers (n.e.c.)	Engineers, chemical Engineers, industrial Engineers, metallurgical, metallurgists Engineers, mining
15	93	Lawyers and judges	
16	52	Musicians and music teachers	
17	80	Miscellaneous natural scientists	Agricultural scientists Biological scientists Geologists and geophysicists Mathematicians Physicists
18	82	Pharmacists	
19	92	Physicians and surgeons	
20	64	Recreation and group workers	Social and welfare workers, except group
21	81	Miscellaneous social scientists	Economists Psychologists Statisticians and actuaries
22	48	Surveyors	
23	72	Teachers (n.e.c.)	
24	48	Technicians, medical and dental	
25	58	Professional, technical and kindred workers (n.e.c.)	Actors and actresses Airplane pilots and navigators Chiropractors Dancers and dancing teachers Dietitians and nutritionists Entertainers (n.e.c.) Farm and home management advisors Foresters and

			conservationists Funeral directors and embalmers Librarians Nurses, student professional Nurses, professional Optometrists Osteopaths Personnel and labor relations workers Photographers Radio operators Religious workers Sports instructors and officials Technicians, testing Technicians (n.e.c.) Therapists and healers (n.e.c.) Veterinarians
		Farmers	
26	15	Farmers (owners and tenants)	Farm managers
		Managers, Officials, and Proprietors	
27	64	Buyers and department heads, store	Buyers and shippers, farm products Conductors, railroad Credit men Floormen and floor managers, store Managers and superintendents, building Officers, pilots, pursers and engineers, ship Officials, lodge, society, union, etc. Postmasters Purchasing agents and buyers (n.e.c.)
28	65	Officials and administrators (n.e.c.), public administration	Inspectors, public administration

29	68	Managers, officials, and proprietors (n.e.c.)	
		Clerical and Kindred	
30	51	Bookkeepers	
31	53	Mail carriers	
32	48	Clerical and kindred workers (n.e.c.)	Agents (n.e.c.) Attendants and assistants, library Attendants, physician's & dentist's office Baggagemen, transportation Bank tellers Cashiers Collectors, bill and account Dispatchers and starters, vehicle Express messengers & railway mail clerks Messengers and office boys Office machine operators Shipping and receiving clerks Stenographers, typists, and secretaries Telegraph messengers Telegraph operators Telephone operators Ticket, station, and express agents
		Sales workers	
33	39	Advertising agents and salesmen	Auctioneers Demonstrators Hucksters and peddlers Newsboys Stock and bond salesmen
34	66	Insurance agents and brokers	
35	62	Real estate agents and brokers	
36	47	Salesmen and sales clerks (n.e.c.)	
		Craftsmen	
37	22	Bakers	
38	19	Blacksmiths	Forgemen and hammermen
39	39	Boilermakers	
40	27	Brickmasons, stonemasons, and tile setters	Stone cutters and stone carvers
41	31	Cabinetmakers	Pattern and model makers, except paper
42	19	Carpenters	

43	22	Cement and concrete finishers	Plasterers
44	52	Compositors and typesetters	
45	23	Cranemen, derrickmen, and hoistmen	Excavating, grading, and road machinery operators
46	44	Electricians	
47	51	Electrotypers and stereotypers	Photoengravers and lithographers Pressmen and plate printers, printing
48	49	Foremen (n.e.c.)	
49	25	Furriers	Tailors and tailoresses
50	16	Glaziers	Machinists Painters, construction and maintenance Paperhangers
51	33	Job setters, metal	
52	49	Linemen and servicemen, telegraph, telephone, and power	
53	54	Locomotive engineers	Locomotive firemen
54	27	Loom fixers	
55	48	Mechanics and repairmen, airplane	Mechanics and repairmen, office machine Mechanics and repairmen, railroad and car shop Mechanics and repairmen (n.e.c.)
56	19	Mechanics and repairmen, automobile	
57	36	Mechanics and repairmen, radio and television	
58	31	Millwrights	
59	12	Molders, metal	
60	34	Plumbers and pipe fitters	
61	12	Shoemakers and shoe repairers, except factory	
62	47	Stationary engineers	
63	34	Structural metal workers	
64	33	Tinsmiths, coppersmiths, and sheet metal workers	
65	50	Tool makers, die makers, and setters	
66	10	Craftsmen and kindred workers (n.e.c.)	Bookbinders Decorators and window

			dressers Engravers, except photoengravers Heat treaters, annealers, temperers Inspectors, scalers, and graders, log and lumber Inspectors (n.e.c.) Jewelers, watchmakers, goldsmiths, and silversmiths Millers, grain, flour, feed, etc Motion picture projectionists Opticians and lens grinders and polishers Piano and organ tuners and repairmen Rollers and roll hands, metal Roofers and slaters Upholsterers Members of the armed services
		Operatives	
67	35	Apprentices, trade not specified	Apprentice auto mechanics Apprentice bricklayers and masons Apprentice carpenters Apprentice electricians Apprentice machinists and toolmakers Apprentice mechanics, except auto Apprentice plumbers and pipe fitters Apprentices, building trades (n.e.c.) Apprentices, metalworking trades (n.e.c.) Apprentices, printing trades Apprentices, other specified trades [i.e., trade n.e.c.]
68	24	Asbestos and insulation workers	Blasters and powdermen Boatmen, canalmen, and lock keepers Chainmen, rodmen, and axmen, surveying Conductors, bus and street

			railway Dressmakers and seamstresses except factory Dyers Fruit, nut, and vegetable graders, and packers, except factory Furnacemen, smeltermen, and pourers Heaters, metal Milliners Motormen, mine, factory, logging camp, etc. Motormen, street, subway, and elevated railway Oilers and greaser, except auto Photographic process workers Switchmen, railroad Truck and tractor drivers Weavers, textile
69	19	Attendants, auto service and parking	
70	43	Brakemen, railroad	
71	24	Bus drivers	
72	18	Deliverymen and routemen	
73	22	Filers, grinders, and polishers, metal	
74	15	Laundry and dry cleaning operatives	
75	29	Meat cutters, except slaughter and packing house	
76	10	Mine operatives and laborers	
77	18	Painters, except construction or or maintenance	
78	50	Power station operators	
79	16	Sailors and deck hands	
80	5	Sawyers	
81	6	Spinners, textile	
82	17	Stationary firemen	
83	10	Taxicab drivers and chauffeurs	
84	24	Welders and flame cutters	

85	18	Operative and kindred workers (n.e.c.)	
		Service Workers (private household)	
86	8	Private household workers (n.e.c.)	Housekeepers, private household Laundresses, private household
		Service Workers (not household)	
87	17	Barbers, beauticians, and manicurists	
88	17	Bartenders	Waiters and waitresses
89	9	Charwomen and cleaners	Janitors and sextons Porters
90	15	Cooks, except private household	
91	10	Elevator operators	
92	37	Firemen, fire protection	
93	18	Guards, watchmen, and doorkeepers	Watchmen (crossing) and bridge tenders
94	38	Marshals and constables	Policemen and detectives Sheriffs and bailiffs
95	16	Service workers, except private household (n.e.c.)	Attendants, hospital and other institution Attendants, professional and personal service (n.e.c.) Attendants, recreation and amusement Bootblacks Boarding and lodging house keepers Counter and fountain workers Housekeepers and stewards, except private household Midwives Practical nurses Ushers, recreation and amusement
		Farm Laborers	
96	9	Farm foremen	Farm laborers, wage workers Farm laborers, unpaid family workers Farm service laborers, self-employed
		Laborers	

97	10	Fishermen and oystermen	
98	11	Garage laborers, car washers and greasers	Gardeners, except farm, & groundskeepers Teamsters
99	11	Longshoremen and stevedores	
100	4	Lumbermen, raftsmen, and woodchoppers	
101	8	Laborers (n.e.c.)	

Appendix B. Intermediate Occupational Classification for Females

Occ. Code	Weighted SEI	Primary Detailed Category	Additional Detailed Categories
		Professional	
1	78	Accountants and auditors	
2	36	Actors and actresses	Dancers and dancing teachers
			Entertainers (n.e.c.)
3	67	Artists and art teachers	
4	81	Authors	Editors and reporters
5	79	Chemists	Miscellaneous natural scientists
6	84	College presidents and deans	Professors and instructors:
7	70	Designers	Draftsmen
8	39	Dietitians and nutritionists	
9	93	Lawyers and judges	
10	60	Librarians	
11	52	Musicians and music teachers	
12	46	Nurses, professional	
13	92	Physicians and surgeons	
14	64	Recreation and group workers	Social and welfare workers, except group
15	81	Miscellaneous social scientists	Economists
			Psychologists
			Statisticians and actuaries
16	72	Teachers (n.e.c.)	
17	48	Technicians, medical and dental	
18	58	Therapists and healers (n.e.c.)	
19	72	Professional, technical and kindred workers (n.e.c.)	Airplane pilots and navigators
			Architects
			Athletes
			Chiropractors
			Clergymen
			Dentists
			Engineers, aeronautical
			Engineers, chemical
			Engineers, civil
			Engineers, electrical
			Engineers, industrial
			Engineers, mechanical
			Engineers, metallurgical, metallurgists
			Engineers, mining
			Engineers (n.e.c.)
			Farm and home management advisors
			Foresters and conservationists

			Funeral directors and embalmers
			Nurses, student professional
			Agricultural scientists
			Biological scientists
			Geologists and geophysicists
			Mathematicians
			Physicists
			Optometrists
			Osteopaths
			Personnel and labor relations workers
			Pharmacists
			Photographers
			Radio operators
			Religious workers
			Sports instructors and officials
			Surveyors
			Technicians, testing
			Technicians (n.e.c.)
			Veterinarians
		Farmers	
20	15	Farmers (owners and tenants)	Farm managers
		Managers, Officials, and Proprietors	
21	65	Buyers and department heads, store	Buyers and shippers, farm products
			Conductors, railroad
			Credit men
			Floormen and floor managers, store
			Inspectors, public administration
			Managers and superintendents, building
			Officers, pilots, pursers and engineers, ship
			Officials and administrators (n.e.c.), public administration
			Officials, lodge, society, union, etc.
			Postmasters
			Purchasing agents and buyers (n.e.c.)
22	68	Managers, officials, and proprietors (n.e.c.)	
		Clerical and Kindred	
23	51	Bookkeepers	

24	44	Cashiers	
25	61	Stenographers, typists, and secretaries	
26	45	Telephone operators	
27	43	Clerical and kindred workers (n.e.c.)	Agents (n.e.c.)
			Attendants and assistants, library
			Attendants, physician's & dentist's office
			Baggagemen, transportation
			Bank tellers
			Collectors, bill and account
			Dispatchers and starters, vehicle
			Express messengers & railway mail clerks
			Mail carriers
			Messengers and office boys
			Office machine operators
			Shipping and receiving clerks
			Telegraph messengers
			Telegraph operators
			Ticket, station, and express agents
		Sales workers	
28	39	Advertising agents and salesmen	Auctioneers
			Demonstrators
			Hucksters and peddlers
			Newsboys
			Stock and bond salesmen
29	64	Insurance agents and brokers	Real estate agents and brokers
30	47	Salesmen and sales clerks (n.e.c.)	
		Craftsmen	
31	49	Foremen (n.e.c.)	
32	25	Craftsmen and kindred workers (n.e.c.)	Bakers
			Blacksmiths
			Bookbinders
			Boilermakers
			Brickmasons, stonemasons, and tile setters
			Cabinetmakers
			Carpenters
			Cement and concrete finishers
			Compositors and typesetters
			Cranemen, derrickmen, and hoistmen

Decorators and window dressers

Electricians

Electrotypers and stereotypers

Engravers, except photoengravers

Excavating, grading, and road machinery operators

Forgemen and hammermen

Furriers

Glaziers

Heat treaters, annealers, temperers

Inspectors, scalers, and graders, log and lumber

Inspectors (n.e.c.)

Jewelers, watchmakers, goldsmiths, and silversmiths

Job setters, metal

Linemen and servicemen, telegraph, telephone, and power

Locomotive engineers

Locomotive firemen

Loom fixers

Machinists

Mechanics and repairmen, airplane

Mechanics and repairmen, automobile

Mechanics and repairmen, office machine

Mechanics and repairmen, radio and television

Mechanics and repairmen, railroad and car shop

Mechanics and repairmen (n.e.c.)

Millers, grain, flour, feed, etc

Millwrights

Molders, metal

Motion picture projectionists

Opticians and lens grinders and polishers

Painters, construction and maintenance

Paperhangers

			Pattern and model makers, except paper
			Photoengravers and lithographers
			Piano and organ tuners and repairmen
			Plasterers
			Plumbers and pipe fitters
			Pressmen and plate printers, printing
			Rollers and roll hands, metal
			Roofers and slaters
			Shoemakers and shoe repairers, except factory
			Stationary engineers
			Stone cutters and stone carvers
			Structural metal workers
			Tailors and tailoresses
			Tinsmiths, coppersmiths, and sheet metal workers
			Tool makers, die makers, and setters
			Upholsterers
			Members of the armed services
		Operatives	
33	20	Apprentice auto mechanics	Apprentice bricklayers and masons
			Apprentice carpenters
			Apprentice electricians
			Apprentice machinists and toolmakers
			Apprentice mechanics, except auto
			Apprentice plumbers and pipe fitters
			Apprentices, building trades (n.e.c.)
			Apprentices, metalworking trades (n.e.c.)
			Apprentices, printing trades
			Apprentices, other specified trades [i.e., trade n.e.c.]
			Apprentices, trade not specified
			Asbestos and insulation workers

		Attendants, auto service and parking
		Blasters and powdermen
		Boatmen, canalmen, and lock keepers
		Brakemen, railroad
		Bus drivers
		Chainmen, rodmen, and axmen, surveying
		Conductors, bus and street railway
		Deliverymen and routemen
		Dyers
		Filers, grinders, and polishers, metal
		Fruit, nut, and vegetable graders, and packers, except factory
		Furnacemen, smeltermen, and pourers
		Heaters, metal
		Meat cutters, except slaughter and packing house
		Milliners
		Mine operatives and laborers
		Motormen, mine, factory, logging camp, etc.
		Motormen, street, subway, and elevated railway
		Oilers and greaser, except auto
		Painters, except construction or maintenance
		Photographic process workers
		Power station operators
		Sailors and deck hands
		Sawyers
		Spinners, textile
		Stationary firemen
		Switchmen, railroad
		Taxicab drivers and chauffeurs
		Truck and tractor drivers
		Weavers, textile
		Welders and flame cutters
34	23	Dressmakers and seamstresses except factory
35	15	Laundry and dry cleaning operatives

36	18	Operative and kindred workers (n.e.c.)	
		Service Workers (private household)	
37	8	Private household workers (n.e.c.)	Housekeepers, private household
			Laundresses, private household
		Service Workers (not household)	
38	13	Attendants, hospital and other institution	
39	17	Barbers, beauticians, and manicurists	
40	19	Bartenders	Waiters and waitresses
41	9	Charwomen and cleaners	Porters
42	15	Cooks, except private household	
43	17	Counter and fountain workers	
44	31	Housekeepers and stewards, except private household	
45	9	Janitors and sextons	
46	22	Midwives	Practical nurses
47	20	Service workers, except private household (n.e.c.)	Attendants, professional and personal service (n.e.c.)
			Attendants, recreation and amusement
			Bootblacks
			Boarding and lodging house keepers
			Elevator operators
			Firemen, fire protection
			Guards, watchmen, and doorkeepers
			Marshals and constables
			Policemen and detectives
			Sheriffs and bailiffs
			Ushers, recreation and amusement
			Watchmen (crossing) and bridge tenders
		Farm Laborers	
48	9	Farm foremen	Farm laborers, wage workers
			Farm laborers, unpaid family workers
			Farm service laborers, self-employed
		Laborers	
49	8	Laborers (n.e.c.)	Fishermen and oystermen
			Garage laborers, car washers and greasers

Gardeners, except farm, & groundskeepers

Longshoremen and stevedores

Lumbermen, raftsmen, and woodchoppers

Teamsters

Appendix C. Distribution of Male Workers Using Five Age Categories

Table 1. Male Workers by Age and Census Year

	1950	1960	1970	1980	1990
Twenties	102999	81206	109733	151741	144885
Thirties	117288	99269	92776	129162	162942
Forties	98252	91757	98005	90989	123227
Fifties	65155	70474	81978	84985	77202
Sixties	32053	34878	38391	35723	36350

Table 2. Male Occupational Distribution by Census Year

	1950	1960	1970	1980	1990
Professional					
0	3321	3879	4925	5651	6341
3	235	272	505	917	1183
4	481	627	609	685	888
5	781	1054	1520	1755	2243
7	737	725	948	667	810
9	1437	1754	1903	2453	2397
10	837	1280	3177	3615	3773
32	663	753	770	1080	1212
33	1502	2501	3213	3787	4659
41	184	516	670	802	1073
43	1268	1529	1707	1763	2036
44	1150	1716	2723	2836	3503
46	1184	1567	1779	2008	1742
49	1808	3101	4926	6068	6976
55	1704	1882	2485	4194	5331
57	726	711	1034	2208	2830
69	315	558	763	1335	1529
73	810	840	881	953	1044
75	1838	1953	2352	3133	3733
77	319	517	871	1359	1681
84	257	388	978	1499	1993
92	241	390	535	709	815
93	2791	4467	8201	10719	10639
94	352	472	827	1458	2099
99	5102	9170	17744	22184	29583
Farmers					
100	42610	20231	11963	10514	7849
Managers					
200	4127	4918	8945	10188	9552
250	1606	2091	2936	3240	4064
290	39444	37335	36535	57088	71792
Clerical					
310	1717	1351	2452	1486	1498
335	1654	1678	2077	1929	1865
390	23085	22984	24682	29318	33177

Sales						
	400	828	940	1803	2401	3836
	450	2839	3722	4565	4529	4918
	470	1205	1361	1582	3318	3417
	490	20997	20209	21709	22593	25907
Crafts						
	500	1105	815	615	575	620
	501	632	290	257	121	142
	503	422	233	276	320	210
	504	1823	1776	1779	1873	2121
	505	1261	1019	939	899	848
	510	10296	8261	7980	11226	12176
	511	969	762	738	735	905
	512	1709	1574	1123	270	185
	513	2540	3215	4298	4938	4442
	515	3598	3451	4406	5694	6193
	520	1086	1037	1666	2203	2731
	523	8806	10844	13913	17693	13554
	525	898	278	420	321	274
	530	4789	3740	3373	3999	5368
	535	6030	5180	4011	4827	4946
	540	2258	2656	3637	3519	2925
	541	1412	950	576	617	396
	543	10314	12504	11294	14064	14980
	545	774	1089	1381	891	1307
	550	7578	6107	7748	10877	12092
	552	838	986	1159	1367	1438
	560	678	631	805	1177	867
	561	620	403	359	255	138
	574	3179	3168	3539	4377	4358
	582	526	264	555	894	1111
	583	2382	2682	1629	1418	1850
	585	598	594	805	939	751
	591	1448	1362	1439	1419	1481
	592	1744	1824	1853	1784	1302
	594	10641	17736	24348	13537	14865
Operat’s						
	615	1345	604	893	460	290
	620	3438	2034	2028	1325	1345
	621	2073	2334	2271	1720	1689
	624	1593	1147	881	784	317
	625	1714	1430	1277	1429	1533
	632	16895	16960	16768	20607	22995
	635	1637	1305	1974	1891	1030
	643	1008	618	701	548	879
	644	1775	1593	1681	2002	1757
	650	7058	3073	1938	2695	1823
	670	1299	1117	922	1285	1195
	672	246	249	181	251	312

673	463	316	256	296	188
674	937	731	719	731	654
675	963	477	185	170	162
680	1289	781	807	1197	758
682	2007	1302	1131	1130	1180
685	3138	3493	4693	6078	5285
690	40670	36974	38609	38724	36214
Service					
720	261	181	130	104	148
740	1767	1778	1788	1318	1057
750	2834	2148	1946	2678	3404
753	3293	3859	7891	11609	13348
754	1531	1358	1700	3144	5885
761	479	357	206	104	68
762	1279	1295	1676	1909	2161
763	2523	2322	2745	4398	6054
771	2430	2732	3703	4775	5375
790	3071	2665	4411	4074	6364
Laborers					
810	15467	6741	4867	4844	4967
910	758	334	229	387	400
920	1818	1577	2000	2379	4864
940	521	347	278	163	97
950	1775	882	595	876	945
970	25283	17597	16587	23244	27299

Appendix D. Distribution of Female Workers Using Five Age Categories

Table 1. Female Workers by Age and Census Year

	1950	1960	1970	1980	1990
Twenties	43630	35700	66997	115180	119650
Thirties	33785	38043	44610	85041	129049
Forties	29140	44378	56765	62196	102571
Fifties	16273	34081	49075	56088	59879
Sixties	6443	13808	20861	22618	26310

Table 3. Female Occupational Distribution by Census Year

	1950	1960	1970	1980	1990
Professional					
1	452	717	1639	3281	7027
2	200	191	241	452	851
3	244	330	343	691	1031
4	256	485	845	1637	2607
5	75	61	132	166	321
6	198	333	1188	1898	2639
7	162	256	462	1893	3541
8	155	205	288	478	628
9	53	71	128	647	1651
10	386	644	939	1357	1747
11	688	920	1262	2270	3887
12	3308	5269	7690	11406	16539
13	87	128	203	453	960
14	472	683	1307	2506	3603
15	116	134	280	920	2011
16	6685	10874	16755	21983	28223
17	368	736	1557	3268	6076
18	91	166	425	1257	2259
19	1442	2510	6788	11043	19306
Farmers					
20	726	850	633	1143	1309
Managers					
21	1038	1559	2474	4657	10799
22	4713	5828	6487	19516	36988
Clerical					
23	5132	7313	11779	15206	14973
24	1661	3203	5084	9371	12621
25	13219	19176	31971	39792	39303
26	3215	3125	3019	2336	1397
27	15337	22786	34122	54204	67795
Sales					
28	238	645	1553	2478	3401
29	369	840	1533	5018	8164
30	11286	13214	15002	15967	18152
Craftsmen					
31	619	787	1266	2575	2325

32	1674	1719	3745	5398	7059
Operat’s					
33	2604	1987	2954	5075	5514
34	1034	963	778	710	665
35	1947	1741	1548	1180	1560
36	24797	25903	31057	31642	26186
Service Workers					
37	5130	5544	4193	2628	3315
38	821	2037	4099	7351	10121
39	1518	2254	3819	4241	5814
40	5102	6169	7591	9997	10302
41	553	848	1516	2720	3608
42	1883	2890	3978	6222	7353
43	320	895	765	570	646
44	600	1044	924	445	678
45	426	559	1008	3223	5695
46	1098	1634	1710	3240	3128
47	2366	3357	8112	10690	16071
Laborers					
48	3395	1593	1112	1690	1651
49	1012	834	2004	4232	5959

Appendix E. Indices of Dissimilarity, Men

Index of Dissimilarity, 1950

	20	30	40	50
20				
30	23			
40	30	9		
50	34	17	11	

Index of Dissimilarity, 1960

	20	30	40	50
20				
30	23			
40	27	9		
50	31	17	11	

Index of Dissimilarity, 1970

	20	30	40	50
20				
30	25			
40	27	8		
50	29	17	12	

Index of Dissimilarity, 1980

	20	30	40	50
20				
30	24			
40	26	7		
50	27	13	10	

Index of Dissimilarity, 1990

	20	30	40	50
20				
30	22			
40	29	9		
50	29	14	10	

Appendix F. Indices of Dissimilarity, Women

Index of Dissimilarity, 1950

	20	30	40	50
20				
30	18			
40	21	11		
50	32	25	16	

Index of Dissimilarity, 1960

	20	30	40	50
20				
30	15			
40	22	10		
50	28	24	15	

Index of Dissimilarity, 1970

	20	30	40	50
20				
30	15			
40	16	6		
50	21	15	11	

Index of Dissimilarity, 1980

	20	30	40	50
20				
30	16			
40	15	7		
50	16	14	8	

Index of Dissimilarity, 1990

	20	30	40	50
20				
30	17			
40	20	7		
50	18	12	11	

Appendix G. Occupational Value Changes by Census Year, Women Class I Model of Complete Variability

	1950	1960	1970	1980	1990
1	-0.0635	0.0136	0.0349	0.016	-0.0065
2	-0.1852	-0.2854	-0.143	-0.0403	-0.0136
3	-0.0537	-0.1114	-0.1	0.0328	0.1379
4	-0.0273	-0.0467	-0.0573	0.0285	0.0429
5	-0.2052	-0.1529	-0.1519	-0.0394	-0.023
6	0.072	0.0297	-0.108	0.1196	0.1286
7	-0.0975	-0.0813	-0.1558	-0.0031	0.036
8	0.0753	0.0119	0.1652	0.0471	0.1403
9	-0.0682	0.1333	0.0529	-0.0267	0.0879
10	0.0468	0.0909	0.0606	0.2117	0.2323
11	0.0665	0.0122	0.0145	0.0565	0.0958
12	-0.063	-0.0753	0.0122	0.0799	0.2037
13	0.118	0.0273	0.0463	0.0945	0.1905
14	0.0246	0.0299	-0.1042	0.0694	0.1435
15	-0.0492	-0.0535	-0.039	0.0357	0.1254
16	0.0622	0.0452	-0.0526	0.1116	0.2463
17	-0.2326	-0.2573	-0.2635	-0.138	-0.0041
18	0.093	-0.0563	-0.1421	-0.1556	0.0202
19	-0.0935	-0.1983	-0.0858	-0.0021	0.0562
20	0.2587	0.2896	0.2718	0.374	0.2837
21	0.1392	0.1482	0.1673	0.1396	0.1221
22	0.1488	0.1853	0.1951	0.1417	0.0999
23	-0.1293	-0.0889	0.0284	0.1308	0.1097
24	-0.1443	-0.1446	-0.1477	-0.1703	-0.2655
25	-0.2381	-0.2224	-0.146	0.0209	0.068
26	-0.1783	-0.1429	-0.1122	0.103	0.0602
27	-0.1615	-0.1384	-0.1042	-0.0133	-0.0195
28	-0.072	-0.0944	-0.051	0.0464	-0.0157
29	0.0903	0.0988	0.1077	0.1831	0.116
30	-0.076	-0.0024	0.0108	0.0059	-0.0677
31	0.0421	0.0736	0.1759	0.1894	0.1704
32	-0.0115	-0.0549	-0.0169	-0.0633	-0.0238
33	-0.0273	-0.0261	-0.0209	0.04	0.0703
34	0.2993	0.3803	0.457	0.3631	0.2948
35	0.0059	0.0785	0.1301	0.2033	0.0844
36	-0.0644	-0.0419	0.0261	0.0982	0.0717
37	0.038	0.0417	0.0281	0.1093	-0.0124
38	-0.0411	-0.0493	-0.0455	0.0206	0.0385
39	-0.0678	-0.0914	-0.1521	0.0571	-0.004
40	-0.1923	-0.2145	-0.1816	-0.2214	-0.2477
41	0.2443	0.1907	0.2652	0.1687	0.0751
42	0.2039	0.2127	0.2684	0.1208	-0.0331
43	-0.2299	-0.0077	-0.1301	-0.4549	-0.4611

44	0.2612	0.2331	-0.0812	-0.0629	-0.002
45	0.2767	0.1883	0.2096	0.1709	0.1045
46	0.2423	0.1922	0.0053	0.0539	0.2009
47	0.0661	0.0811	-0.0074	0.0277	-0.0588
48	-0.0448	-0.039	-0.0772	0.0277	-0.0522
49	-0.0575	-0.111	-0.0562	-0.0568	-0.0583

Appendix H. Occupational Value Changes by Census Year, Men
Class I Model of Complete Variability

	1950	1960	1970	1980	1990
1	0.0034	-0.0086	-0.0114	-0.0023	0.0021
2	0.1276	0.0667	0.0531	0.0503	0.0398
3	-0.0596	-0.0397	-0.0125	0.0086	0.0014
4	-0.0302	0.0055	0.0058	0.0338	0.0087
5	-0.057	-0.0539	0.0013	0.0357	0.0413
6	0.1004	0.034	0.1142	0.1391	0.1364
7	0.0081	-0.01	-0.0209	0.0756	0.0732
8	0.1754	0.1348	0.169	0.1555	0.1379
9	-0.1004	-0.1264	-0.11	-0.0369	-0.0186
10	-0.0569	-0.0732	0.0487	0.1762	0.0401
11	0.0294	-0.0047	0.0353	0.0615	0.039
12	-0.0145	-0.0498	0.0126	0.0467	0.0123
13	-0.0048	-0.0031	0.0405	0.0769	0.0348
14	0.0035	-0.0194	0.0319	0.076	0.0596
15	0.1569	0.0918	0.0847	0.0796	0.0984
16	-0.0597	-0.0742	-0.0963	-0.0509	-0.0134
17	-0.051	-0.0563	-0.0006	0.0202	0.027
18	0.1274	0.0438	0.0519	0.0424	0.0719
19	0.1075	0.0651	0.1293	0.1382	0.1176
20	0.0202	-0.0745	-0.0904	-0.008	0.0271
21	0.0045	-0.0276	-0.0325	0.0386	0.0471
22	-0.146	-0.142	-0.1427	-0.0744	-0.0263
23	0.003	-0.0571	-0.0704	0.0693	0.1067
24	-0.1192	-0.1035	-0.1072	-0.0777	-0.0609
25	-0.0433	-0.0746	-0.0599	-0.0026	-0.0096
26	0.102	0.1337	0.1965	0.1218	0.091
27	0.1159	0.0642	0.0807	0.0921	0.0737
28	0.1717	0.1505	0.2047	0.1398	0.1106
29	0.1165	0.1031	0.0966	0.0807	0.0497
30	-0.1048	-0.0494	-0.0116	-0.0005	-0.0226
31	0.0113	0.0188	0.0872	0.1453	0.0981
32	-0.077	-0.0617	-0.0691	-0.0464	-0.0689
33	-0.2537	-0.2465	-0.1879	-0.0131	-0.0149
34	0.0059	-0.0054	0.0164	0.0785	0.0521
35	0.1313	0.1905	0.1981	0.1417	0.1118
36	-0.0643	-0.0296	-0.0232	-0.0069	-0.0146
37	-0.026	0.0077	0.049	-0.0191	-0.0562
38	0.1116	0.1067	0.0359	-0.0545	0.0076
39	0.0843	0.115	0.0773	-0.01	0.0515
40	-0.0157	-0.0339	0.0079	-0.0238	-0.0402
41	0.028	0.0263	0.0499	-0.0139	-0.0343
42	0.0529	0.043	0.0435	-0.0523	-0.0424
43	0.0237	-0.0102	-0.0015	-0.0553	-0.0578

44	-0.0157	-0.0119	0.0053	0.116	0.0017
45	-0.0028	0.0105	0.033	0.0024	0.0189
46	-0.0042	0.012	0.0234	0.0097	-0.001
47	-0.0336	-0.0276	-0.0428	-0.0398	-0.0421
48	0.1352	0.0982	0.1005	0.0939	0.0531
49	0.1469	0.307	0.1339	0.0911	0.0558
50	0.054	0.0602	0.0433	-0.0349	-0.0445
51	0.0324	0.0193	0.0206	-0.0204	0.0018
52	-0.1386	-0.0999	-0.1068	0.022	0.043
53	0.1214	0.1389	0.2469	0.0657	0.1504
54	0.0109	0.0156	0.0082	-0.0139	-0.0002
55	-0.0942	-0.0478	-0.0061	0.0559	-0.0253
56	-0.0705	-0.043	-0.0526	-0.0668	-0.0544
57	-0.1697	-0.0771	-0.0295	-0.0045	-0.0334
58	0.0837	0.1048	0.1288	0.0496	0.0841
59	0.0307	0.004	-0.0233	-0.0328	-0.0391
60	0.0379	0.0448	0.0505	0.0038	-0.0055
61	0.1048	0.2292	-0.0825	-0.0767	-0.0683
62	0.1199	0.0665	0.1254	0.064	0.0452
63	6E-05	0.0243	-0.0157	-0.0408	-0.0159
64	-0.0229	-0.0227	0.0074	-0.0202	-0.0383
65	0.0293	0.0388	0.0461	0.074	0.0528
66	-0.1202	-0.2055	-0.1921	-0.1505	-0.1345
67	-0.3326	-0.4568	-0.4139	-0.2711	-0.2444
68	-0.0296	-0.0213	-0.0305	-0.0805	-0.0773
69	-0.2424	-0.2072	-0.2559	-0.2029	-0.1561
70	0.0187	-0.0055	0.0077	-0.0272	0.1271
71	0.004	0.0828	0.0853	0.0712	0.1284
72	-0.0999	-0.0591	-0.0275	-0.0218	-0.0168
73	-0.015	0.0225	-0.0153	-0.0438	-0.0095
74	-0.0788	-0.0049	-0.0054	-0.0467	-0.0591
75	-0.0248	-0.0111	-0.0095	-0.0196	-0.0435
76	-0.0345	-0.0171	-0.0318	-0.0818	-0.0002
77	-0.0526	-0.043	-0.0447	-0.0857	-0.0729
78	0.0624	0.0761	0.0834	0.0642	0.0215
79	-0.1168	-0.0294	-0.0329	-0.0691	-0.0682
80	-0.014	-0.0082	-0.0042	-0.0693	-0.0716
81	-0.0318	-0.0221	-0.0109	-0.0441	-0.0318
82	0.1094	0.1114	0.1196	0.002	0.02
83	-0.0217	0.0766	0.0454	0.0168	0.0373
84	-0.0492	-0.0089	-0.0327	-0.0634	-0.0235
85	-0.0657	-0.0494	-0.0597	-0.0614	-0.0482
86	0.0673	-0.0423	-0.1322	-0.0933	-0.0879
87	0.1524	0.059	0.0432	0.0885	0.098
88	-0.0122	-0.0029	-0.0441	-0.1201	-0.1623
89	0.1463	0.0744	-4E-06	-0.0296	-0.0197
90	0.0179	-0.0036	-0.1648	-0.2274	-0.1995
91	0.1011	0.1398	0.1337	0.1781	0.0727
92	0.0054	-0.0115	-0.0057	0.0285	0.0191

93	0.2871	0.213	0.1522	0.0371	-0.0088
94	0.0314	-0.0135	-0.0466	0.0284	0.0139
95	-0.1347	-0.1289	-0.1986	-0.2227	-0.1739
96	-0.2141	-0.1406	-0.1266	-0.1263	-0.086
97	-0.0387	0.0067	-0.0134	-0.0381	-0.0414
98	-0.0495	-0.0898	-0.0757	-0.1053	-0.1036
99	0.0504	0.0493	0.0356	0.1155	0.1169
100	-0.0823	-0.0543	-0.0642	-0.0552	-0.0291
101	-0.0859	-0.0849	-0.1553	-0.1463	-0.1116

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