

**The Wisconsin Longitudinal Study: As We Age
R01 Proposal**

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A. Specific Aims

We propose to continue the Wisconsin Longitudinal Study (WLS) with a 5th major round of data collection, 45 years after the high school graduation of the original 10,317 participants. We are more than 50 research colleagues at the University of Wisconsin and across the nation. We want to exploit the unique scientific value of the WLS to pursue a broad agenda of research on social and economic factors in health and aging.

We represent diverse scientific fields – sociology, demography, epidemiology, economics, social and cognitive psychology, industrial engineering, neuroscience, social work, psychiatry, nursing, and medicine. Our plan for data collection – of which these proposed surveys are only the first phase – spans many modes: telephone and mail surveys, brain imaging, personal interview, bio-indicators, content analysis of recorded interviews, and linked administrative records.

We intend and expect that these new data, along with the rich data presently available from the WLS, will resolve old questions and open new areas of interdisciplinary inquiry about health, aging, and the life course. All WLS data will be released to the research community, either directly or through a secure data enclave, to the maximum extent consistent with high standards of protection for the privacy and confidentiality of research participants, as soon as they have been collected, cleaned, and documented. To these ends, we request that the National Institute of Aging (NIA) establish a Data Monitoring Board to oversee the conduct of the WLS.

We describe our specific aims first in terms of *contacts with the study populations* and then in terms of the *content of the study*.

A.1. *Contacts with the study populations*

(a) We propose one-hour telephone and 48 page mail surveys in 2002 of more than 9600 American men and women. They were first surveyed as graduating seniors in high school in 1957 and were followed up in 1964, 1975, and 1992. They will be 63-64 years old when they are surveyed. (b) We propose parallel telephone and mail surveys of 7150 randomly selected siblings of the graduates. Most were first surveyed in 1994; about 2100 were first interviewed in 1977. (c) We propose shorter (30 minute) telephone interviews with spouses (N = 10,150) and widows (N = 850) of

graduates and their siblings. These interviews will provide invaluable data about spousal characteristics, health, and family relations and cross-validating data about the siblings and graduates.

A.2. *Content of the study*

Soon to cover almost half a century, the WLS is unique as a large scale longitudinal study of adults and their families. It is a valuable public resource for studies of aging and the life course, intergenerational transfers and relationships, family functioning, long-term effects of education and cognitive ability, occupational careers, physical and psychological well-being, and morbidity and mortality. Our goal is to extend and enrich our observations of the WLS cohort in ways that will answer important research questions in aging for decades to come. (a) We will update histories of education, employment and retirement, work activities and conditions, earnings, income, wealth, and economic transfers. (b) We will update measures of family structure, family relations, and stressful life events, while adding new measures of coping behavior. (c) We will repeat and enrich previous measurements of health, illness, psychological well-being, and mental disorder. We will obtain more extensive data on health-related behaviors—both beneficial behaviors, like exercise and weight control, and risky behaviors, like smoking. (d) We will obtain extensive measures of cognitive functioning to complement those obtained from WLS graduates and siblings in adolescence. (e) We will collect more data on the circumstances of participants' birth and upbringing. (f) We will repeat past measurements of social and civic participation and of exchange relationships, but we will obtain more intensive measures of intellectual and social engagement and of social isolation. (g) We will measure child outcomes that may greatly alter the life course of their parents, including child disability, severe mental illness, and early death. (h) We will obtain data on health insurance, access to health care, and pension coverage. (i) We will measure medical, legal, religious, and psychological preparation for the end of life.

B. Background and Significance

In several major reports, expert panels of the National Research Council (NRC) have offered new, but convergent recommendations for future research on

health and aging (National Research Council 1997; 2000a; 2000b; 2000c; 2000d; 2001a; 2001b). These reports emphasize the importance of (1) social context for behavior; (2) interdisciplinary approaches to scientific and policy issues; (3) developmental or life-course perspectives; (4) recognition of multiple levels of influence; (5) identification of mechanisms or pathways to health and illness; (6) development and use of new methodologies; and (7) development of new institutional and training infrastructure to support the new research agenda (Berkman 2001). These admirable goals require continued development of major, public longitudinal data resources on population health and aging. We believe that a broad, interdisciplinary program of research built around continuing, intensive observation of participants in the WLS will contribute to each of these salutary goals. Thus, we have assembled a large cadre of able and productive colleagues at Madison and elsewhere across the nation to work together on the design and analysis of the next round of the WLS.

B.1. A Description of the WLS

The WLS began with a 1/3 random sample (N = 10,317) of women and men who graduated from Wisconsin high schools in 1957.¹ The original purpose of the study was to assess the demand for higher education in Wisconsin. The next two waves of survey data were collected from the graduates or their parents in 1964 and 1975.² Those data provide a full record of social background, high school curriculum, youthful aspirations and social influences, schooling, military service, family formation, labor market experiences, and social participation. Early survey data were supplemented by earnings of parents from state tax records, mental ability test scores and rank in high school class, and characteristics of high schools and colleges, employers, industries, and communities of residence. Recently, we added state archival data on high school district resources from 1954 to 1957 (Olson and Ackerman 2000a; 2000b). WLS records for graduates are also linked to those of

three best same-sex high school friends; about half the graduates have a named peer in the sample. Data on the occupational careers of male graduates are supplemented by Social Security earnings histories from 1957 to 1971, and we are currently seeking permission from the Social Security Administration to obtain full earnings histories for both male and female graduates and siblings.

In 1975, we obtained a roster of living siblings and chose a focal sibling at random for each graduate (except we included all twins). We located adolescent cognitive ability test scores for 6619 of the focal siblings of graduates (75%). In 1977 we obtained parallel interview data for a highly stratified sample of 2100 of these randomly selected siblings.

In 1992-94, we conducted four major surveys with NIA support: telephone and mail surveys of WLS graduates and nearly identical telephone and mail surveys of an expanded random sample of focal siblings (See Appendix A). We updated our measurements of marital status, child-rearing, education, labor force participation, jobs and occupations, social participation, and future aspirations and plans among graduates and siblings. In addition, we expanded the content of earlier follow-ups to include psychological well-being, mental and physical health, wealth, household economic transfers, and social comparison and exchange relationships with parents, siblings, and children.

In 1975, our measurement procedures resembled those of the Current Population Survey (CPS) and the 1973 Occupational Changes in a Generation Survey (OCG). In 1992, we balanced continuity of these procedures with comparability to other well-designed surveys, e.g., Health and Retirement Survey (HRS), National Survey of Families and Households (NSFH), NIH surveys of work and psychological functioning, and the NORC General Social Survey (GSS). We also coordinated our design with members of the MacArthur Foundation Research Network on Successful Midlife Development, with the Whitehall II study (Marmot et al. 1991), and with Wadsworth's (1991) longitudinal cohort study of births in Great Britain in 1946.

In 1992, the 1-hour telephone interview covered life history data, family rosters, and job histories, which have many skips or branches. For example, we

¹ The WLS cohort thus includes Milwaukee's "Class of '57," made famous by the TV comedy, *Happy Days*. In 2002, Richie, Potsie, and Ralph would be 63 years old.

² See the data collection summary in Appendix A.

developed a job history protocol for CATI (Computer-Assisted Telephone Interview), which covers 94% of jobs held since 1975 that lasted 6 months or longer. Because we anticipated lower response rates in the mail survey, the CATI instrument contains selected items from key inventories of personality (The Big Five, John 1990; 1991), health (depression and alcohol use), and well-being (Ryff 1989; Ryff and Keyes 1995), of which there are more detailed measures in the mail instrument. The mail instrument also adds measures of well-being, social contact, exchanges, and health, including an extensive account of menopausal experience. The sibling mail survey was modified to obtain additional measures of physical health and health-related behaviors, richer accounts of menopausal experiences, and more information about relationships between the focal sibling and other family members—including indicators of childhood abuse.

Recently, we have matched WLS graduates and siblings to the National Death Index-Plus (NDI-Plus)—using SSNs, names, and birthdates as identifiers—in order to obtain cause(s) of death and confirm date and place of death. We are currently doing the same for parents of the graduates and siblings.³

The WLS sample design has become increasingly complex over time, but a fair summary is that, in 1992, we completed telephone interviews with 8493 WLS graduates out of 9741 survivors, and we interviewed 4804 siblings out of 6260.⁴ (The flow chart in Appendix A summarizes sample design and attrition.) In 2002, as in previous waves, we will attempt to interview all surviving graduates or siblings, regardless of previous response status.

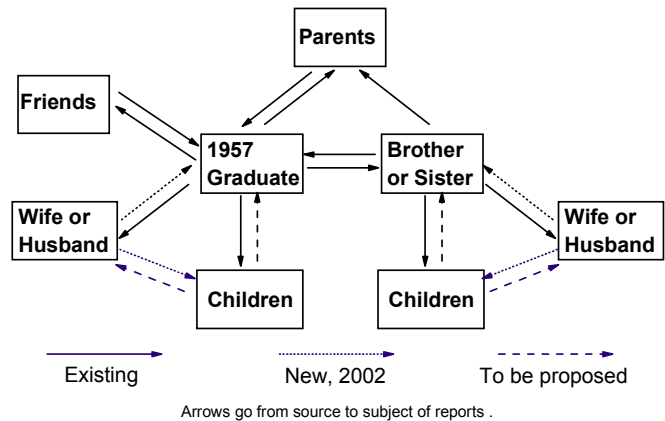
B.2. Is the WLS Worth the Investment?

The strengths of the WLS as a resource for studies of midlife and aging lie in its *longitudinal scope*, its

exceptional *sample retention*, the *content and quality* of survey and administrative data, and its *relational design*: It has followed a large and diverse sample from high school graduation to the cusp of retirement, and it has followed a number of social and economic relationships between the graduates and their significant others.

We are not alone in believing that the WLS is a uniquely valuable resource for studies of aging in America. For example, *New Horizons* extols the value of the classic British birth cohort surveys but then adds that, “In the United States, the Wisconsin Longitudinal Study ... is the closest to the British birth cohorts in richness of psychosocial information, but goes well beyond the British studies with its in-depth assessments of educational attainment and occupational experience as well as accompanying data from siblings, spouses, and parents” (National Research Council 2001b:105).

Figure 1. Relational Links in the Wisconsin Longitudinal Study



While the WLS data center on the 1957 graduates, we now find it useful to think of them as focal points in sets of relationships with aging parents, spouses, adult children, and siblings, as shown in Figure 1, as well as relationships with the localities and social institutions through which they have passed—high schools, colleges, and employers. WLS files include full survey and administrative data records for graduates, linked with those of friends and siblings. Parents were the initial post-high school informants about graduates, but a great deal of our information about parents has come from administrative records or from siblings. Data have not previously been obtained from spouses or children—except sometimes to help locate sample members—but we propose to

³ However, we estimate that about 500 fathers and 2000 mothers of graduates or siblings will still be alive in 2002.

⁴ An additional randomly selected 20% of the siblings who had not been interviewed in 1977 were not interviewed by telephone because we ran out of money; 55% of these siblings responded to a modified mail survey.

interview spouses (and widows) in this wave of the study and to add children soon thereafter.

The parallel data for siblings are a special strength of the WLS. Siblings provide unique data—self-reporting variables that cannot be obtained from proxies, cross-validating information about graduates and their families, and complementary accounts of inter-household (and intergenerational) exchanges. Analytically, the sibling data permit construction of multi-level models of family and individual effects on life course outcomes (Hauser and Sewell 1986; Hauser, Sheridan, and Warren 1999).

Among Americans aged 60 to 64 in March 2000, 66.7% are non-Hispanic white women and men who completed at least 12 years of schooling (U.S. Bureau of the Census 2000: Table 1a) and thus resemble the WLS cohort. The WLS is unusually valuable in its representation of women as well as men. Also, because the WLS is the first of the large, longitudinal studies of American adolescents, it provides the first large-scale opportunity to study the life course from late adolescence through the mid-60s in the context of a full record of ability, aspiration, and achievement.⁵ The WLS graduates and their siblings have lived through major social changes: rising affluence, suburban growth, the decline of old ethnic cleavages, the cold war, and changing gender roles. Moreover, the WLS cohort, born mainly in 1939, precedes by a few years the baby boom generation that has taxed social institutions and resources at each stage of life, and thus the study can provide early indications of trends and problems that will become important as the larger group passes through its early 60s. The WLS overlaps the youngest cohorts that entered HRS in 1992, and this has provided opportunities to check the scope of our findings. Unlike the WLS, HRS is nationally representative, but it does not cover the lives of respondents from adolescence to old age.

The WLS data also have obvious limitations. Some strata of American society are not represented. Everyone in the graduate sample completed high school. Sewell and Hauser (1975) estimated that

about 75% of Wisconsin youth graduated from high schools in the late 1950s; about 7% of siblings in the WLS did not graduate.⁶ There are only a handful of African American, Hispanic, or Asian persons in the WLS. Given the minuscule share of minorities in Wisconsin when the WLS began, there is no way to remedy this omission. About 19% of the WLS sample is of farm origin; this is consistent with national estimates for cohorts of the late 1930s. In 1964, 1975, and 1992, 70% of the sample lived in Wisconsin, but 30% lived elsewhere in the U.S. or abroad. WLS graduates are homogeneous in age, but the ages of selected siblings vary widely, mainly from 8 to 10 years older to 8 to 10 years younger than the graduates.

B.3. The WLS as a National Resource

In a recent symposium at the National Academy of Sciences, Hauser (2001) outlined several potential strengths of longitudinal population surveys: (1) Giving us “the big picture,” global descriptions of variations in the life course in populations; (2) Making it possible to model dynamic processes over long periods of time; (3) Providing data across time about role-relationships, e.g., parent-child, sister-brother, wife-husband; (4) Providing data at multiple levels of analysis, e.g., the biological, neurological, psychological, and social, as well as at varying levels of aggregation; (5) Providing representative data about rare as well as common events and processes; (6) Facilitating serendipitous findings; and, taken together with other studies, (7) Permitting piecemeal construction of synthetic models of life-course processes.

We think that the WLS will make contributions in each of these ways, but the strengths and limitations of the WLS should be considered in the context of other major studies of aging. We have assembled a tabular comparison among several major studies (For detailed comparisons of study design and content, see Appendix B.2, Kuo, Marks, Park, Hauser, and Hauser 2001). We compare five major studies:

1. Wisconsin Longitudinal Study (WLS)
2. Health and Retirement Survey (HRS)

⁵ There have, of course, been exceptionally important and influential longer-term studies of the life-course in the U.S. These reflect careful and insightful work, but they are based on small, local, or highly selected samples (Oden 1968; Elder 1974; Clausen 1993).

⁶ Even so, because of its high response rates, we think that the WLS may be less positively selected than most other large epidemiological studies of aging populations.

3. National Survey of Families and Households (NSFH)

4. Americans' Changing Lives (ACL)

5. Midlife in the United States (MIDUS)

The last of these is not (yet) a longitudinal study, but a second wave has been proposed.⁷

In our judgment, each of the five focal studies has made important contributions to our knowledge of midlife development, health, and aging, and each is likely to make important contributions in the future. Moreover, we believe that partial overlaps in content among multiple surveys are valuable features of the nation's repertoire of longitudinal studies (Hauser 2001). Thus, we would not propose that the WLS is a substitute for any of these other data resources.

The other four studies differ from the WLS in similar ways: All attempt to cover the entire U.S. population; all are presently of relatively short duration and, except HRS, they cover adults of all ages. Only NSFH provides rich (retrospective) data on early life circumstances, but it lacks the psychological measures in the WLS. Beyond these features, each study is unique in content and design, reflecting the interests of its leaders and research community.

Now that HRS has been combined with two older (AHEAD and CODA) cohorts, it provides continuing, biennial coverage of the U.S. population over the age of 50 in a sample of about 20,000 individuals. It is surely the flagship among large, long-term studies of aging. It covers spouses of married couples, and over-samples minorities and Floridians. HRS has also established links with data from the SSA, NDI, HCFA (Medicare), and employers. Coverage was excellent in the initial wave, and sample retention has been good across the first 8 years. Data cover cognition,

self-reported health, and a variety of attitudes and preferences, but there is far more emphasis on detailed economic data than in the WLS. Unlike the WLS, HRS data on upbringing and on events before age 50 are retrospective or thin. Spousal reports provide important relational content, but there are no data from siblings. As with the WLS, bio-indicators have been obtained only on a pilot basis.

NSFH began with 13,017 persons aged 19 or more in 1987-88.⁸ Wave 2 took place in 1992-93, and wave 3 is in the field. The response rate was 74% in the first wave, and 83% of survivors responded in wave 2. The total sample is quite large, and the data provide rich, self-reported accounts of relationships among spouses, children, and parents. NSFH covers work experience, health, and well-being in less detail than the WLS. It provides similar data on family histories, social support, inter-household exchanges, and current labor force involvement, income sources, assets, and debt. However, there are few elderly participants in NSFH—by comparison either to HRS or WLS—and the NSFH does not provide cognitive measures or relational data for adult siblings. The temporal window of observation in NSFH is wider than that of HRS—15 years vs. 9, and there are no plans to obtain bio-indicators.

ACL, like NSFH and MIDUS, is a sample of the adult household population. The first (1986) wave achieved a response rate of 68% (N = 3,617). Responses were obtained for 83% of first wave participants in the second wave (1989) and for 83% of second wave participants in the third wave (1994).⁹ A fourth wave has been funded. ACL focuses on “productive” social relationships—on and off the job—and on cross-cultural variation in them. It has strong coverage of stressful events, chronic strains, and their effects on health, personal functioning, and productive activity. It also has excellent data on neighborhood contexts, spousal relationships, social support, and friendship. However, unlike what we propose for the WLS, ACL contains relatively little

⁷ We also tried to include the Panel Study of Income Dynamics (PSID) in this review, but because of its varied content, complex sample design, and varied coverage across time, we were unable to do so. We have also excluded other important studies of the elderly, either because of short duration (the two Longitudinal Studies of Aging, LSOA), focus on institutional populations (National Long-Term Care Survey, NLTCS)—or because they are no longer active—the older cohorts of the National Longitudinal Survey of Labor Market Experience (NLS).

⁸ N = 9600, plus large over-samples of minorities and persons in households with one parent, step-children, cohabitators, and the recently married.

⁹ ACL over-samples Blacks, persons aged 60+, and spouses of married men aged 65+.

information about early life circumstances, schooling, occupational histories, pensions, health, health insurance, or retirement.

MIDUS is a household-based, cross-sectional study of about 3500 adults in 1995 (over-sampling those 45 and older), supplemented by (a) 951 siblings (of 529 primary respondents), (b) an independent sample of 1000 twin-pairs, and (c) small oversamples in several metropolitan areas. The relational design is a great strength, but the first round response rate was unfortunately low (60.8% in the main sample), and persons with low levels of schooling were substantially under-represented. MIDUS has a very rich base of psychosocial assessments, focusing on midlife development and health, but, relative to WLS, it is weak in measures of adolescent development, educational history, work history, marital history, intergenerational relationships, and financial status. A second round has been proposed to add a large array of bio-indicators and create a supplementary African-American sample from Milwaukee.

To summarize, the WLS has unique and valuable features. No other study combines its historical location, length of coverage, breadth of content, sample size, sample retention, and coverage of siblings (Jencks et al. 1979; Center for Human Resource Research 1992). The graduates are similar in education and race-ethnicity to about 2/3 of their birth cohort nationwide. Measurements are of high and often of known quality. The WLS has fared well in comparisons of findings with those from national studies of comparable populations (Jencks, Crouse, and Mueser 1983; Sewell and Hauser 1975; Corcoran, Gordon, Laren, and Solon 1992). HRS, NSFH, PSID, ACL, and MIDUS were not designed to obtain comparable long-term or public-record data on social and psychological background—nor do they have comparable socioeconomic histories or job characteristics. Other major longitudinal studies—the national studies of youth and of high school graduates that began in adolescence—cover much more recent cohorts, and several of them are inactive. We think that the WLS is worth the investment that we propose to make, as it provides a unique and important resource for continuing analyses of aging and the life course.

C. Preliminary Studies/Progress Report

We proposed three distinct, but complementary,

activities for the current renewal period (3/1/98-2/28/02). (1) *Research Activities*: Continue studies of the antecedents and patterns of life trajectories in socioeconomic attainment, family circumstances, and health from adolescence to midlife; (2) *User Contact and Support Activities*: Maintain, enhance, document, and disseminate the WLS as a public data resource; (3) *Planning Activities*: Anticipate and design a new follow-up of the WLS samples.

Within these three areas, the WLS project had eight specific objectives to build on and extend work during the previous project period: (a) studying sibling resemblance in health, well-being, and social and economic status; (b) studying the evolution and consequences of cognitive ability from youth to midlife; (c) studying socioeconomic measurement and model specification in relation to careers and to health, well-being, morbidity, and mortality; (d) maintaining and enhancing WLS data and documentation and the on-line dissemination of public-use files; (e) outreach to WLS users through professional meetings and workshops, individual consultations, and preparation of special-purpose restricted data files; (f) organizing a research and planning conference in order to bring WLS researchers together with a complementary group of leading social and biomedical aging researchers; (g) updating and enhancing information on respondent location and mortality; (h) designing and developing instruments and methods for the post-2000 follow-up of the WLS. We have made substantial progress in meeting these objectives.

C.1. Research Activities

Since our last competing renewal proposal was submitted (in mid-1997), the WLS has yielded 37 articles or chapters in books, 6 completed dissertations (and 3 more in progress), 3 Master's theses, and more than two dozen presentations and/or manuscripts in progress. Of the published works, about half are by the PI (Hauser) or his advisees, and the remainder have been prepared by other scholars associated with the project. The dispersion of authorship represents both the efforts of project staff to encourage public use of WLS data and the products of the Life Histories and Health in Midlife Study (LHMS, PI, Carol Ryff), which carried out intensive interviews and collected bio-indicators from a highly selected subsample of WLS graduates. (A full

bibliography of recent WLS work follows this section.)

Beginning in the 1960s, analyses of WLS data focused on college entrance and the early career (Sewell 1971; Sewell and Hauser 1975; Sewell and Hauser 1980; Sewell and Hauser 1992). Since the early 1990s, the WLS has focused on later stages of the life course, and its content has encompassed a wider range of familial, socioeconomic, psychological, and health outcomes (Hauser et al. 1992). However, the project will continue to build on key findings from the early life course.

In the first two decades of the project, we developed a widely known and tested theory of the social psychological processes in late adolescence that give direction to the socioeconomic life course (Sewell 1971; Sewell, Hauser, and Wolf 1980; Hauser, Tsai, and Sewell 1983). These ideas have provided a flexible framework for our ongoing investigations of a broader range of outcomes. Briefly, our initial theory was that social background and mental ability, along with school performance during adolescence, are reflected in social support for achievement among significant others, e.g., parents, teachers, and peers. These social influences affected levels of educational and occupational aspiration, which strongly affect post-high school education and labor market success. There are many ways to test and elaborate these ideas and to explore how the effects of adolescent experiences vary by gender and are modified by later events in the family and the labor market.

The WLS data and research based on them are well-known. As of June 2001, there had been more than 1600 citations in the Social Science Citation Index to just eight key project publications.¹⁰ WLS data had also been used before the 1992-94 round of data collection in studies of geographic constraints on college access; recruitment into teaching, nursing, and other occupations; choice of marital partner; differential family formation and fertility; gender differences in market participation and success;

religious and ethnic differences in achievement processes; birth order effects on ability and achievement; effects of high schools and colleges on aspirations and achievements; and inter-firm and inter-industry differences in compensation (See Appendix B.1.).

In the current renewal, the key questions have been whether or not we have been correct about the significance of adolescent experiences throughout the adult life course, whether (and how) their effects may fade with the passage of decades (Warren and Hauser 1997; Hauser et al. 1999; Hauser, Warren, Huang, and Carter 2000), and what is the scope of outcomes that are affected by these processes (Hauser and Sweeney 1997; Miech and Hauser 2001). The short answer is that, for the most part, social and psychological characteristics of childhood and adolescence affect adult outcomes primarily through educational attainment. But there are also fascinating exceptions to this generalization. For example, cognitive ability has small, but statistically significant, long-term effects on occupational success and the timing of menopause, and occupational aspirations have a persistent effect on occupational standing. In the forthcoming renewal, we plan to focus on the strengths of the WLS design in new studies of long-term outcomes, such as cognitive functioning, emotional functioning, psychological well-being, physical health, mental health, access to medical care, disability and mortality, alcohol use, family relations, problematic child outcomes, wealth and retirement, and preparation for the end of life.

Recent publications from the WLS include studies of schooling in full sibships (Kuo and Hauser 1996; Kuo and Hauser 1997; Hauser and Kuo 1998); sibling resemblance in socioeconomic achievement (Hauser et al. 1999; Hauser et al. 2000; Warren, Hauser, and Sheridan 2001); measuring occupational status and social class in studies of health (Hauser and Warren 1997; Warren, Sheridan, and Hauser 1998; Miech and Hauser 2001; Warren and Kuo 2000); long-term effects of childhood poverty and three-generation mobility (Warren and Hauser 1997; Hauser and Sweeney 1997); new mathematical models of labor market choice (Logan 1996a; Logan 1996c; Logan 1996b; Logan 1998); life course profiles and mental health (Singer, Ryff, Carr, and Magee 1998); life pathways to physiological risk (Singer and Ryff

¹⁰ These are Sewell and Shah (1967), Sewell, Haller, and Portes (1969), Sewell, Haller, and Ohlendorf (1970), Sewell and Hauser (1972; 1975), Sewell, Hauser, and Wolf (1980), Hauser, Tsai, and Sewell (1983), and Hauser and Sewell (1986).

1999); socioeconomic status, gender, and health at midlife (Marks and Shinberg 1997; Marks and Shinberg 1998; Shinberg 2001); entry of women into male-dominated occupations (Sheridan 1997); the effects of family role changes on midlife career changes (Carr and Sheridan 2001); long-term effects of cognitive ability (Hauser and Sweeney 1997; Hauser et al. 1999; Hauser et al. 2000; Shinberg 1998; Warren 1998; Hauser 1998; Olson and Ackerman 2000b); timing and differentials in menopause and hormone therapy (Shinberg 1998); effects of social mobility on psychological well-being (Carr 1997); effects of child-disability on the life-course of parents (Seltzer, Greenberg, Floyd, Pettee, and Hong 2001); and sibling resemblance in depression (MacLean and Hauser 2000; MacLean and Hauser 2001).¹¹

In addition to analytic work, we have augmented the WLS data in several significant ways. We have already mentioned the NDI-Plus matches to multiple cause(s) of death and the match of high schools to archival resource data in the state archives. We have also added new measures of cognitive ability in adolescence, obtaining freshman year scores for most of the graduates and increasing the coverage of siblings. Finally, we completely updated the coding of some 60,000 occupation-industry entries from the 1992-94 surveys to the 1990 Census classification system.

C.2. User Contact and Support Activities

WLS data are secure, well-maintained, and available to external users to the maximum possible extent. Original paper records are securely stored in the Wisconsin State Archives and kept under lock and key when in use. Three sets of electronic records are maintained: public data files, which have been stripped of potentially identifying information; private data files, which contain geographic identifiers and other data stripped from the public files—but no personal identifiers; and files of identifying information, but with minimal survey data, which are

accessible only to the project programmer and individuals under her direct supervision. All files have been updated regularly as data have been added, variables have been recoded, or errors have been corrected. Public data, documentation (bibliography, codebooks, flowcharts, and other memoranda), and extraction tools are available on the web at <http://dpls.dacc.wisc.edu/WLS/wlsarch.htm>. The WLS data are now in their 4th edition since 1994. Archival WLS data are at the Interuniversity Consortium for Political and Social Research, but the ICPSR website directs potential users to the WLS website for more convenient data access. We have recorded at least 290 different users downloading WLS data since 1995 with e-mail addresses from all over the world.

Project staff regularly promote the WLS at meetings of the American Sociological Association, the Population Association of America, and the Gerontological Association of America. Data updates are announced through the CAAR (Current Awareness of Aging Research) service of the Center for Demography of Health and Aging at the UW-Madison and other aging-related listservs. Project staff have also presented public seminars about the project at, e.g., the University of Michigan and the RAND-NIA Summer Institute. Project staff are available by e-mail or telephone to answer user queries, and they have often provided hands-on assistance to new student or faculty users in Madison.

¹¹ The WLS project has yielded since its inception 4 research monographs, 31 doctoral dissertations, 19 masters theses, more than 160 research articles or chapters in books – and more than two dozen works in progress. See Appendix B.1., “As We Age: The Wisconsin Longitudinal Study, 1957-2001.”

In 1999, we joined investigators from the MIDUS project in a workshop that explored possibilities for future data collection and analysis in that project and the WLS. This meeting raised a number of very interesting research ideas. However, we concluded that both projects were quite large, and the most promising designs for the immediate future were quite different. Thus, while we remain in regular communication, we pursue independent, but complementary, lines of proposal development.

C.3. Planning Activities

Early in 2000, we began a new and fruitful method of outreach and planning. After identifying researchers or research groups with potential interest in the WLS, Robert and Taissa Hauser contacted investigators—at Madison and elsewhere and, then, met personally with individuals or small groups. We invited participants to prepare a brief prospectus that described their potential scientific interests in the WLS and the resources, including new data, needed to pursue them. In mid-February, 2001, we convened a general meeting of more than 40 faculty and research staff who had prepared research prospectuses. That meeting provided an overview of the history and design of the WLS, suggested potential research groups that might prepare proposals, and laid out a timetable for preparation of the first round of proposals. During the past months, we developed a plan for a series of small and large proposals designed to develop and exploit the WLS over the next five to ten years. The investigators listed on this proposal,¹² along with our collaborators and consultants, have developed, shared, criticized, and rewritten multiple sets of specific aims and full proposal drafts.

This proposal is the keystone of the entire project—a plan to collect repeated measures and new baseline data from WLS graduates, siblings, spouses,

and widows. In the paragraphs below, we present a description of our overall plan, both as tangible evidence of our planning effort and as an introduction to our research design and methods.

Our long-term plan has four major phases, of which this proposal is the first. (Phase 1) *Surveys of graduates, siblings, spouses, and widows;* (Phase 2) *A program of projects that will include analytic proposals and augment data through administrative record-matches and neurophysiological measurement;* (Phase 3) *Personal interviews with a large and highly stratified subset of graduates and their siblings;* (Phase 4) *Other research proposals to be submitted either independently or as additions to the program of projects.* The design of the Phase 1 surveys is described in Section D, Research Design and Methods. The paragraphs below describe Phases 2, 3, and 4.

Phase 2: *A program of projects that will include analytic proposals and augment data through administrative record-matches and neurophysiological measurement.* Our current plan is to propose 3 cores and 8 complementary research projects:

Core A: Administrative. This core will be responsible for coordination, grant management, oversight, and support services for all components of the research program.

Core B: Data dissemination (documentation, outreach, and security). Non-identifiable WLS data have been in the public domain since 1983. We have a firm commitment to placing data in the public domain as soon as they have been cleaned and documented. No project participants will claim any proprietary rights in the data.

Core C: Complementary and pilot data collection and management. Other data collection activities will be essential for research projects in the program or related projects that will be proposed independently. These will expand the range of research that investigators may undertake using the WLS and related data resources. We think it sensible to centralize these activities in a single project core in order to share staff and other resources, coordinate sampling designs across complementary activities, and assure quality data matching, management, and documentation.

[Main text continues at p. 258]

¹² *Investigators* are core WLS staff and faculty at the UW-Madison and elsewhere who will play lead roles in the analytic proposals to be submitted independently or as components of a forthcoming program of projects. *Collaborators* are other UW faculty who are serving as advisors on this proposal; several of these plan later proposals. *Consultants* are not at the UW; some consultants may later join the project as investigators either through the P01 mechanism or independently.

Principal Investigator – Hauser, Robert M.

**Publications: Wisconsin Longitudinal Study¹³
1997-2001**

[Items marked by an (*) are Citation Classics.]

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¹³ Main text of proposal continues at page 258.

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Here are the eleven complementary data-collection activities that we now envision.

1. Matching WLS records for graduates and siblings born in Wisconsin to official birth records. For graduates and their older siblings, these are likely to include an indication of length of gestation and prematurity. For most younger siblings, they will include birth weight.¹⁴ At all ages we can obtain indicators of prematurity or length of gestation, place of birth, presence of medical professionals, and parental occupations at time of birth. This match will also confirm information, like mother's maiden name, which will be useful in NDI searches.
2. Linking records of WLS graduates, siblings, and parents to additional years (post-1998) of the National Death Index (NDI-Plus). We already have an approved NDI project and substantial experience in reviewing and cleaning NDI data. We hope later to add searches for death records of spouses and children of both graduates and siblings.
3. Collecting bio-medical data and bio-markers from subsamples of graduates and siblings. We expect to initiate these measurements through personal interviews (see below) and to learn from the experience of the LHHMS, which carried out intensive interviews and obtained biomedical data from a subsample of 200 WLS graduates.
4. Linking WLS records to the Wisconsin state tumor registry. We have already ascertained the feasibility of this match by carrying out a blind statistical match of birth dates within the sample.
5. Conducting a follow-back survey of Wisconsin health insurance plans. We will draw on lessons learned in the Community Tracking Study (CTS), which conducted a similar survey of private insurance policies for a sample of 38,310 people in the United States (Kemper et al. 1996).
6. Linking respondent locations to local health resources using the Area Resource File. The ARF includes over 6000 variables representing information on health facilities, health professions, managed care enrollment, services resources and utilization, and socioeconomic and environmental characteristics at the county level (Bureau of Health Professions 1999).
7. Linking older sibling's records to Medicare enrollment and claim data. (Graduates will not be eligible for Medicare until 2004.)
8. Collecting and linking data on elementary schools attended by the graduates (from Wisconsin state historical archives). This will follow the model of our successful collection of resource data for high schools.
9. Linking WLS records to Wisconsin Worker's Compensation records. (We have obtained informal agreement from the State and are now preparing a formal contract.)
10. Linking WLS records to SSA earnings and disability benefit records. (We have contacted the Social Security Administration and believe that our chances of an earnings match are good. We can definitely match to disability records through the Disability Research Center at the University of Illinois.)
11. Completing the geocoding of addresses of WLS participants throughout the course of the study and linking them to local area data. (We have carried out a successful pilot match to addresses of graduates in 1992.)

Affiliated Research Projects. Eight research projects will complement one another and use the core resources:

1. Social and Behavioral Contexts of the Aging Mind - PI: Robert M. Hauser (with Jeremy Freese, Deborah Carr, Dean Dennis Krahn, Mary L. Carnes, Kristen Lawton Barry, Fred Blow, Brian Goodman)
2. Psychological, Legal, and Economic Preparation for Own and Spouse's End of Life - PI: Deborah Carr (with Karin Kirchhoff, Karen Holden, Howard Erlanger, June Weisberger, Mark Suchman)
3. Life Course Effects of Child Disability and Death - PI: Marsha Seltzer (with Jan Greenberg, Frank Floyd)
4. Access to Care and Health in the Near Elderly - PI: Maureen Smith (with John Mullahy, Roberta Riportella-Muller, Stephanie Robert, Mary L. Carnes, Karen Holden, Robert M. Hauser, Richard Campbell)

¹⁴ We plan a pilot study to validate self-reports of birth weight. NHANES provides one model for such questions (see Appendix C).

5. Family Relations Across the Life Course - PI: James Raymo (with Carolyn Liebler, Gary Sandefur, John Karl Scholz, Kara Levine, Megan Sweeney)
6. Work, Health, and Well-Being - PI: John Robert Warren (with Pascale Carayon, Marla C. Haims, Peter Hoonakker)
7. Education in Careers, Health, and Retirement - PI: Robert M. Hauser (with Craig Olson, Charles N. Halaby)
8. Biological Measures and Emotions - PI: Richard Davidson

We briefly describe each of these projects in Section D, Research Design and Methods. Proposals for each of these projects have been drafted.

Phase 3: *Personal, household interviews* with a large and highly stratified subset of graduates and focal siblings. We believe that it is essential to renew our contact with graduates and siblings before attempting new and more invasive modes of data collection. After the telephone and mail surveys proposed here, however, our plan is to interview both members of each of approximately 1500 sibling pairs, chosen to maximize completeness of the existing data, i.e., participation in all previous waves. We will supplement these cases with a highly stratified set of other sibling pairs and of graduates who were only children.

The personal interviews will cover sensitive material that cannot be ascertained by telephone, e.g., measurements of sexual behavior and attitudes, biological data, and more intensive assessments of cognitive and physical functioning. (Depending on our success in obtaining informed consent for administrative record matches by mail, we will either obtain these permissions in the course of personal interviews or use the interviews to follow up initial mail requests.)

Phase 4: *Other research proposals* to be submitted either independently or as additions to the program of projects. These thirteen projects are either smaller in scope than those previously listed or require access to data from personal interviews or other data sources that have not yet been proposed.

1. Doing Well by Doing Good: Volunteer Work and Health–Jane Piliavin
2. Cognition and Interaction in Interviews of Older Adults–Nora Cate Schaeffer, Douglas W. May-

- nard, and Jennifer L. Dykema
3. Sexual Behaviors and Relationships of Older Adults–John DeLamater and Janet Hyde
4. The Relationship Between Physical Attractiveness, Human Capital Investment, Socioeconomic Attainment, and Spousal Quality Over the Life Course–Nora Cate Schaeffer, Sheri Meland, Aimee Dechter, and Megan Sweeney
5. Affect in the Life-Course–Daniel Kahneman and Norbert Schwarz
6. Gender, Care-work, and Income: Outcomes of Family Attitudes and Work Experiences–Myra Marx Ferree
7. Childhood Abuse and Adult Outcomes–Mary L. Carnes, Daphne Kuo, and Kristen W. Springer
8. The Long-Term Impact of Early Family Environment and Personal Characteristics on Obesity and Smoking–Daphne Kuo
9. Early Parental Loss, Risk Taking and Health–Karen Swallen
10. Dimensions of Health and Mortality Differentials: Survival Models Using Sibling and Spouse Data–Alberto Palloni, Aimee Dechter, and Daphne Kuo (Consultants: Elizabeth Arias, Dennis Fryback, John Mullahy, Diane Shinberg)
11. WLS and Matching with Wisconsin Tumor Registry–Patrick Remington
12. Civic Engagement over the Life Course–Cheryl Bowdre
13. Spirituality, and Mental and Physical Health–Diane Lauver

At present, we have specific aims statements, but not full drafts of these proposals. However, preliminary work on projects 4, 5, 7, 9, and 10 is now underway with pilot support from the Center for Demography of Health and Aging, UW-Madison.

C.4. Other Preliminary Studies

In our opinion, the entire corpus of research that has been based on or inspired by the Wisconsin Longitudinal Study is the key to preliminary studies addressing the feasibility and value of our proposal. There is not sufficient space here to describe and assess that work (but see Appendix B.1, “As We Age: The Wisconsin Longitudinal Study, 1957-2001,” for a comprehensive review and bibliography.) Rather, we have chosen a few examples of preliminary work, which highlight promising new directions for the WLS.

(a) *Laboratory and survey measures of emotional response and affect.* An exciting component of the Life History and Health at Midlife Study (LHHMS) is the laboratory measurement of emotional response by Richard Davidson and colleagues.¹⁵ In this preliminary work, Davidson has found a coherent network of associations among prefrontal activation, startle, immune function and self-report measures of well-being, distress, depression and perceived stress. These included systematic relations between left prefrontal activation and various well-being subscales including Self-Acceptance, Purpose in Life, and Positive Relations with others. One such relationship, between pre-frontal asymmetry and self-acceptance is illustrated in Figure 2.

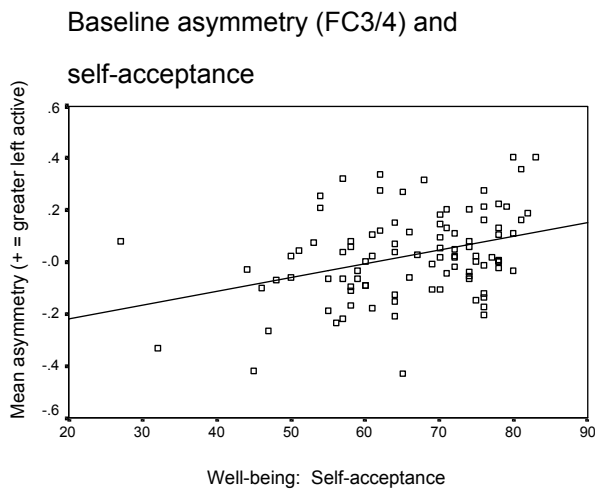


Figure 2: Relations between baseline prefrontal asymmetry and Self-Acceptance. Higher numbers on the ordinate denote greater relative left-sided prefrontal activation

We will recruit a moderately large, representative, and highly stratified subsample of WLS participants ($N = \sim 500$) to participate in assessments at the new Keck Laboratory in Madison, where brain structure and function will be assessed using fMRI. We expect to find relationships between brain structure and function and demographic characteristics, life-histories, and survey-based psychological measures, as well as proximate emotional stimulation. The first assessments, to begin in the summer of 2001, will include fMRIs of individuals who were earlier assessed in 1997 in the LHHMS.

¹⁵ For more background, see Davidson (2000; Davidson and Irwin 1999).

We have also begun a collaboration with Daniel Kahneman and his associates to attempt large-scale survey-based assessments of affect (See, for example, Kahneman 2000a; 1999; 2000b). As a first stage in this work, we will administer a pilot version of his affect protocol, the Daily Retrospective Questionnaire (DRQ, see Appendix C) to WLS participants shortly after they arrive in Madison for fMRI assessments. The DRQ is designed to measure affect retrospectively, but continuously, in a way comparable to instantaneous measures based on experience sampling. We plan to look at relationships between the affect measures and relevant features of brain structure and activation.

(b) *Effects of child outcomes on parents.* The WLS project has focused mainly on the effects of parents on children. Marsha Seltzer and Jan Greenberg have begun to use the WLS to look at effects of non-normative child outcomes on the life course of parents. Most such studies are based on clinical or volunteer “samples,” so the WLS presents a unique opportunity for prospective study. With support from NIA (R03-AG15549), Seltzer and Greenberg began by reviewing detailed interview protocols and identifying more than 200 parents (graduates or siblings) whose children had developmental disabilities or severe mental illness. We did not ask specifically about children with disabilities in the 1992 or 1994 interviews, but many parents volunteered such information in response to questions about caregiving.

Parents who had a child with a developmental disability or a serious mental health problem were compared to other parents with respect to their characteristics at age 18 and their occupational attainment, marriage and childbearing, and physical, social, and psychological well-being at midlife. Whereas the three groups were similar at age 18, parents who had a child with a developmental disability later had lower rates of employment, more children, and lower rates of social participation. However, they had similar marital histories, physical health, and psychological well-being. Parents who had a child with a serious mental health problem had normative patterns of educational and occupational attainment and marriage, but elevated levels of physical symptoms, depression, and alcohol symptoms (Seltzer et al. 2001).

Based on these promising findings, we plan a specific effort to identify parents of children with disabilities (DD) or severe mental illness (SMI) in the next WLS surveys. The timing of child-bearing in the sample leads us to expect that many SMI cases will have occurred between 1992 and 2002, thus giving us additional analytic leverage on the effects of SMI children. Also, we already have identified more than 700 graduates or siblings who had experienced the death of a child by the early 1990s. Because child deaths tend to occur either at very young ages or during late adolescence and early adulthood, we will be able to compare effects of child disability and child death at different stages of the life course of parents. With direct questions about disability and death, we expect to identify several hundred more such cases, for a total of about 900 child deaths, 400 children with DD, and 400 with SMI.

(c) Intergenerational financial transfers. Inconclusive theoretical and empirical findings about motives for intergenerational transfers suggest another line of work with the WLS. Karl Scholz and Kara Levine have carried out preliminary analyses of the WLS data that include a descriptive examination of financial transfers from parents to graduates and their focal siblings. A subset of the WLS data includes 4,240 sibling pairs in which there are data in both the 1975/77 and 1992/94 surveys, including valid data on transfers from parents. In these pairs, there appears to be considerable inequality in parent-child transfers.

Scholz and Levine have conducted preliminary analyses of the relationship between the likelihood of transfer receipt and characteristics of the recipients. Their conditional fixed-effect logit models for the likelihood of transfer receipt suggest that children with higher IQ are less likely to receive a transfer. This is consistent with some altruism models predicting that parents should compensate their less able children with higher transfers. Meanwhile, frequency of contact appears unrelated to the likelihood of receiving a transfer, which may call into question the prevalence of an exchange motive. The likelihood of transfer receipt does appear to be positively related to the recipient's educational attainment and income, which might be consistent with either altruism or exchange. The new data will allow more thorough interrogation of the motives for

these transfers.

(d) Computer and internet use. Another WLS sub-project seeks to understand the causes and consequences of computer and Internet use with data from the new surveys. Between the December 1998 and August 2000 Computer Use supplements to the Current Population Survey (CPS), the share of American households with Internet access increased by 58% (to 41.5%), and home computer ownership increased by 21% (to 51.0%) (NTIA 2000). Yet, while Internet penetration into American homes has grown at a rate unprecedented for communication technologies (DiMaggio, Hargittai, Neuman, and Robinson 2001), no one knows how this will proceed into even as short-run a future as the next round of the WLS. However, Jeremy Freese has used the CPS to estimate variation in computer ownership, Internet use, and e-mail use in August 2000 among those with the modal characteristics of WLS respondents.

While the age of WLS participants decreases their likelihood of adopting new technologies, relative to the rest of the US population, this is counterbalanced by their modal race-ethnicity and educational attainment. White high-school graduates aged 59-63 (a five-year span around the modal age of WLS graduates in 2000) are about as likely to have a computer and Internet access in their homes as are all adults over age 25. Wisconsin is typical among states in Internet use; it is tied for 28th in the share of households with Internet access (NTIA 2000).

Educational differentials in technology diffusion are likely to be large in the WLS. Among whites aged 59-63 years, 68.5% of college graduates lived in households with Internet access, compared to only 33.8% of high school graduates. College graduates were more than 2.5 times as likely to use e-mail as high school graduates. The rich psychosocial data in the WLS will clarify the sources of this educational difference in adoption, and we can also examine the psychological changes from 1992 to 2000 that are associated with frequent use vs. non-use. Data collected in 2002 will also provide a baseline for future analyses of the effects of computer use in the aging process.

(e) Life-histories and bio-medical measurement. In the LHHMS, Carol Ryff, Burton Singer, Richard Davidson and colleagues chose a small and highly

selected subsample of WLS graduates,¹⁶ obtained detailed life histories from them in 1997, and conducted biomedical and neurophysiological examinations. Much of their work has focused on the relationship between life pathways and allostatic load, a ten-item index of symptoms of “physiological wear and tear” (McEwen 2000b; McEwen 2000a; McEwen 1998). There is suggestive evidence that allostatic load may mediate between cumulative life stresses and physical and cognitive decline (Seeman, Singer, Rowe, Horwitz, and McEwen 1997; Singer and Ryff 1999; Seeman, McEwen, Rowe, and Singer 2001).

Some findings of these studies are weak or puzzling. In the most recent report from the MacArthur Studies of Successful Aging, Seeman, et al. (2001) report that the components of allostatic load do not act in unitary fashion on several outcomes (across a 7-year period) and that they may be linked in a causal chain—a “cascade” of effects. They call for the development of additional, leading indicators of physiological stress. Consequently, as much as we would like to contribute to the integration of psychosocial and bio-medical research, we do not think that the allostatic load construct is yet ready for application on the full scale of the WLS. We hope that there will be a more clearly defined construct and set of indicators of allostatic load when we undertake large-scale biomedical measurements in the WLS.

The LHHMS also provides cautionary evidence about the difficulty of obtaining intensive biomedical data from research participants. Of 354 selected WLS graduates, 202 completed the survey components (home interview and questionnaire), but only 106 individuals agreed to come to Madison for a physical examination, provided blood and urine samples, and participated in the laboratory study of emotions. Considering the sensitivity and expense of these procedures, some lessons we draw are that we must (1) motivate the participation of WLS respondents in the later bio-medical phase of the study, (2) be deliberate and limited in the design of that phase of the study, and (3) pretest field procedures to maximize participation.

(f) The structure of psychological well-being (PWB).

¹⁶ Participants were selected on the basis of psychological profiles, life histories, and proximity to Madison.

In a current methodological project, Robert Hauser and Kristen W. Springer are examining the factorial structure of widely-used scales of PWB, both in the WLS and other samples (NSFH and MIDUS). This work is important because PWB is not merely the absence of ill-health, and because other existing measures are limited in scope. Briefly, Ryff (1989) has proposed a theoretically-based, multi-dimensional construct of well-being, with factors of self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth (See also Ryff and Keyes 1995). Subscales of varying length (3 to 7 items) have been administered in the NSFH, MIDUS, and the WLS, and they have been analyzed in several studies (e.g., Maier and Lachman 2000; Marks 1998; Ryff and Singer 1996).

In most studies, the six PWB subscales are moderately correlated, but in the WLS, the data are best fitted by a confirmatory factor model (for ordered categorical data) in which three of the six first-order factors (environmental mastery, purpose in life, and self-acceptance) are almost indistinguishable. The correlations among these factors are all 0.96 or higher, and all three have correlations of at least 0.90 with a fourth factor, personal growth. These puzzling findings could be a function of age-homogeneity among the WLS graduates, but we find a similar pattern among the WLS siblings, who vary widely in age. The findings persist when we correct for order of presentation and positive or negative wording. We plan to investigate this further using new WLS data alongside data from other surveys.

D. Research Design and Methods

In 1992, to extend our research to ages 53-54, we interviewed 8500 of the 9750 surviving women and men in the WLS. The surveys obtained detailed job histories and characteristics; incomes, assets, and inter-household transfers; social and economic characteristics of parents, siblings, and children; descriptions of respondents' relationships and exchanges with them; and data on mental and physical health and well-being (see Appendix A). Immediately after data collection in the graduate sample was complete, we carried out parallel surveys of more than 5300 randomly chosen brothers and sisters of the WLS graduates, of whom 2100 had

previously been interviewed in 1977.¹⁷

This highly successful survey operation serves as the model for the next WLS surveys. Although our new plans are even more ambitious, we are committed to continuing high response rates and quality data collection. The plans outlined below are preliminary, especially in regard to specific scales and measures and decisions about their placement in telephone vs. mail surveys. There is a great deal of new content to be accommodated, but we believe that it will be possible to achieve our full analytic aims by increasing the length of the mail instrument, administering subsets of longer scales, choosing random subsamples of participants in some content areas, and—if necessary—shifting some content to the later phase of personal interviews.

This section of the proposal is presented in 6 parts: (1) outline of survey plans; (2) data to use and to share; (3) selected analytic objectives; (4) preliminary overview of survey content; (5) survey management and operations; and (6) timeline.

D.1. Outline of Survey Plans

We propose the following major phases of data collection in this application.

- a. As in the 1992-94 round of the WLS, we will first carry out telephone surveys of the WLS graduates and a sample of their brothers and sisters. As in the past, we plan to contact all surviving members of the sample, whether or not they participated in the last round of the survey. This should give us approximately 8300 complete 1-hour telephone interviews with graduates and 6000 with siblings¹⁸. These will be followed by mail-out, mail-back surveys. These will be longer than in the 1992-94 round of the study – as many as 48 pages.
- b. The telephone interview schedules will build in

¹⁷ We have not appended telephone instruments or sample documentation from the 1994 sibling surveys because they are so similar to those for WLS graduates. However, we have included the mail instrument for sisters, which provides more information about the menopausal experience than was obtained in the graduate survey.

¹⁸ We believe that we can interview more siblings now because funding cuts forced us to drop the last two sample replicates in 1994.

supplementary sections for (a) graduates or siblings who have been widowed and (b) who have had a physically or mentally disabled child or have experienced the death of a child.

- c. We will obtain permission from WLS participants to tape-record randomly selected telephone interviews in full in anticipation of an R01 to support subsequent behavior coding of respondent cognition and interaction with interviewers.¹⁹
- d. In this round, because of our interest in joint survivorship and (eventual) widowhood, we will carry out shorter (30 minute) interviews with the spouses of graduates and siblings, which will focus mainly on health and family relations. We will also carry out shorter telephone interviews with approximately 900 widows or widowers of graduates and siblings.

D.2. Data to Use and to Share

Our research design will support and encourage the multi- and interdisciplinary research agendas of more than 50 researchers at the University of Wisconsin, the University of Michigan, the University of Washington, the University of Illinois, the University of California-Los Angeles and other institutions who have committed to invest their time and effort in the project. Our interests range broadly – from the effects of childhood circumstances on late adult health and well-being, to the effects of children's prospects on the life course of their parents, to relationships between life-course trajectories and brain activation, to differential access to health care services, to the precursors of cognitive decline. Our analytic proposals are being submitted either as components of a program of projects or as independent applications.

As in the last round of the WLS, the new WLS data will be made public as soon as we have left the field and cleaned the data. We will also make specific provision for public use of private or confidential data in the secure data enclave that we are developing in the P30 Center for Demography of Health and Aging at the UW-Madison. No one will have proprietary rights to the data.

The project will create a wide array of data for analyses of the aging process. In framing our work,

¹⁹ Short segments of all interviews will be recorded for accurate coding of cognition items.

we have attempted to draw on recent programmatic statements about research needs in aging – such as the NRC reports, *The Aging Mind*, *New Horizons*, *Cells and Surveys*, *Health and Behavior*, and *Approaching Death*. While our coverage of research areas is broad, we have not attempted comprehensive coverage of areas that are exceptionally well-treated in other, existing studies like the HRS. Rather, we have looked for areas where the WLS has a comparative advantage, where the investigators have well-developed interests and expertise, and where we believe that our work will complement other studies or anticipate future research needs. In short, while the costs of this proposal are almost entirely for support of survey development, data collection, and data management, we are not proposing data collection for its own sake. Rather, we focus on areas where the WLS design is already strong and where there are well-defined plans for analysis.

The entire team has considered existing features of the WLS design, along with areas in which new or improved forms of data collection are feasible and will improve the scientific value of WLS data. Existing strengths include the baseline data on social and economic standing, cognitive test scores, and ambitions in adolescence; links to existing data about high schools and employers; data on job characteristics, careers, and families across the life course; the baseline self-report data on health and well-being; the relational structure of the data (including parents, siblings, and offspring); the match to cause of death data from the National Death Index (NDI-Plus) for parents, siblings, and graduates who died in 1979 or later; the possibility of direct collection of biomedical markers for some or all of the sample; and the possibility of interviewing children of graduates or of their siblings. The WLS also has high overall response rates and likely future high levels of participation of graduates and focal siblings.

We will initiate a number of new data collection activities in this round of the WLS. (Only the costs of survey based collection of data and permissions are covered by this application.) Some new data – like repeated measures of health and cognitive functioning – complement existing data. Others – like proposed links to data from Social Security, collection of brain images, and detailed analyses of interviewer-

respondent interaction – will extend the previous scope of the study. Still others, such as inventories of social networks and leisure activities, will be investments based on our best guesses about valuable future scientific directions.

D.3. Selected Analytic Objectives

In this section, we summarize the analytic objectives of the first several plans for analysis of the cumulative 2002-4 WLS data. These by no means exhaust our current plans (see section C.3, Phase 4), nor do they indicate the array of analyses that may be undertaken by other researchers. We think these several vignettes describe a viable and broad—though incomplete—array of uses for the next round of the WLS that fully justify investment in the project.

a. Contexts of the Aging Mind

These analyses will focus on reciprocal relationships between four specific social and behavioral contexts and psychological functioning in an aging population. Specific aims:

1. To determine the relationship between psychological functioning and the conditions of social and intellectual engagement over the life course, especially lifetime job conditions, networks of social support, and social participation and leisure activities.
2. To determine (a) how stressful life events and chronic strains affect psychological health; (b) what coping strategies older individuals enact in response to specific stressors; (c) whether specific coping strategies lead to superior mental health outcomes; and (d) the extent to which cognitive ability, personality, and socioeconomic characteristics may mediate the effects of stressors.
3. To determine (a) trajectories of change in alcohol consumption from age 53 to 63; (b) the psychosocial predictors of these trajectories; (c) the consequences of alcohol consumption for cognition, psychological functioning, and overall quality of life; and (d) the factors that intervene in determining these consequences.
4. To determine (a) the role of cognitive and socioeconomic factors in the diffusion of computer/Internet technologies to older adults; (b) the barriers and promoters of this diffusion; (c) the place of computer/Internet technology in this cohort's lives; and (d) the psychosocial

consequences of frequent Internet use.

b. Life-Course Effects of Non-Normative Child Outcomes

This research will investigate how non-normative child outcomes—having a child with a developmental disability (DD), severe mental illness (SMI), or who has died influences parents' life course trajectories and well-being. Specific aims:

1. To investigate how parents of children with DD or SMI and parents with deceased children differ from other parents in midlife and the transition to retirement.
2. To investigate the effect of the timing of these non-normative outcomes on parental life course trajectories and well-being.
3. To compare the impact of these non-normative outcomes on mothers and fathers.

c. Access to Care and Health in the Near Elderly

As the baby boom generation ages, the number of near-elderly Americans (55-64 years old) will rise dramatically. This age group faces increasing barriers to obtaining health care during a time of significant life transitions and deteriorating health. Health insurance increases access to and utilization of health services. Even for insured individuals there are financial and non-financial barriers to care. These barriers may be exacerbated by the overlapping *life transitions* that distinguish the near-elderly, including changes in health insurance, health, work, and income. For these reasons, we will investigate access to health care among WLS graduates and siblings. Specific aims:

1. To examine how recent life transitions affect access to care, use of services, and health outcomes, and determine important features of these transitions (e.g. type, timing, or number).
2. To identify which financial and non-financial incentives in a current health insurance plan are most important in determining access to care, use of services, and health outcomes.
3. To determine how the healthcare environment (e.g., managed care market share, physician availability, rural/urban) influences access to care, use of services, and health outcomes.
4. To examine how socioeconomic factors in early life affect access to care, use of services, and health outcomes.
5. To examine how each of these factors affect

disparities in access for persons in vulnerable subgroups, e.g., persons with low income, those in poor health, and women.

d. Family Relations across the Life Course

This research seeks to extend existing knowledge about family relations at older ages and their relationship with key experiences later in the life course. We focus on six dimensions of family relations: frequency of contact, perceived closeness, provision and receipt of financial resources, provision and receipt of physical care, provision and receipt of instrumental support, and provision and receipt of emotional support. Specific aims:

1. To examine how family relations at middle and later life are influenced by family history, such as earlier divorce and widowhood.
2. To explore the motivations for family exchanges of goods and services by characterizing conditions under which these transfers are made.
3. To examine how family relations influence, and are influenced by, labor supply transitions at typical retirement ages.
4. To examine how family relations influence, and are influenced by, health status transitions at middle and later life.

e. Work, Health, and Well-Being

This research will examine features of work that may be implicated in the relationship between socioeconomic status and health. We will link the WLS data to Wisconsin Workers' Compensation data, allowing us to assess health outcomes beyond respondents' own self-reported health symptoms and medical conditions. Specific aims:

1. To determine how the physical and psychosocial characteristics of jobs influence cardiovascular, musculoskeletal, and stress-related health problems and medical conditions, general/overall health, and depression.
2. To determine how Quality of Working Life (QWL) factors—job satisfaction, psychological well being, and the relationships between work and family life and work and emotional conditions—mediate the relationships between job characteristics and health outcomes.
3. To investigate how the cumulation of job characteristics and experiences across the career is related to health.

f. Education in Careers, Health, and Retirement

This research will exploit some of the unique opportunities the WLS provides to study education, careers, and their consequences across the life course. The WLS contains key baseline measurements—of adolescent cognitive functioning, educational performance, and ambition—for a representative cohort of high school seniors. It has accumulated detailed information about education, family life, and socioeconomic careers. Because similar data have been obtained for randomly chosen brothers or sisters of the Wisconsin graduates of 1957, we can trace individual and familial patterns of resemblance or divergence in education, career lines, and their consequences. Specific aims:

1. To extend our social-psychological model of socioeconomic achievement from youth through maturity, modifying it to add new explanatory variables and a richer set of outcomes.
2. To extend the preceding analyses to comprehend similarities and differences between women and men and among brothers and sisters in selected outcomes.
3. To extend our analyses of career outcomes to encompass retirement, conceived not as a discrete event, but as a process of changing commitment to the labor market and to other activities.
4. To study the causes and effects of disability, especially in relation to labor market activity and earnings. These analyses will be based in the recently funded (by the Social Security Administration) Disability Research Institute at the University of Illinois.
5. To assess the changing impacts of schooling and of early cognitive ability on the earnings of older workers.
6. To study the very long-term effects of primary and secondary school resources on career outcomes.
7. To use new statistical methodologies—more powerful statistical tools for dealing with endogeneity in cross-sectional and longitudinal relationships—to assess the consequences of exposure to military service and college.

g. Life Histories, Biological Measures, and Emotions

Key parts of the brain are implicated in different aspects of emotion and emotion regulation; they are part of the central circuitry that is likely crucial for understanding how cumulative psychosocial burden

can have deleterious effects upon health. This research will use magnetic resonance imaging (MRI) to obtain high resolution information about the morphometry and functional activation of particular brain regions implicated in emotion and emotion regulation in a highly stratified subsample of WLS respondents. Respondents will undergo functional and structural MR imaging, along with brain electrical activity measures. The circuitry that will be featured will include the amygdala, hippocampus and different territories of the prefrontal cortex. Specific aims:

1. To assess with structural MRI the volume of the hippocampus, amygdala and orbital prefrontal cortex. We predict that the volume of the amygdala and hippocampus will be positively correlated with anxiety symptoms and other indices of negative affect.
2. To assess with functional MRI and a specific emotion regulation task designed to probe the circuitry described above the functional status of the amygdala, hippocampus and orbital prefrontal cortex. We predict that greater cumulative exposure to adversity will be associated (a) with prolonged activation of the amygdala following the offset of a negative stimulus and (b) with inability to voluntarily suppress amygdala activation through controlled efforts to attenuate negative emotion.
3. To relate morphometric and functional data.
4. To examine relations between electrophysiological measures of prefrontal activation asymmetry and morphometric and functional brain imaging measures as well as measures of dispositional affect, well being, and exposure to adversity.

h. Psychological, Legal and Economic Preparation for Own and Spouse's End of Life

This research will provide an assessment of preparation for the end of life as WLS members approach the retirement years. As older adults prepare psychologically and practically for their own and their spouse's deaths, they face a host of new decisions and circumstances not encountered by previous birth cohorts. Legal, demographic, and technological shifts over the past five decades have created a unique new context of living and dying. The preparations and plans that older adults make for their deaths may have critical ramifications for the quality of their dying experience, as well as the psychological and

economic well-being of their survivors. Specific aims:

1. To examine end-of-life planning and preparation among the WLS respondents and their spouses. We will explore whether the use of four planning strategies—advance directives (AD), durable powers of attorney for health care, in-depth discussions with families of professionals, and financial planning—are affected by economic, psychological, and family factors.
2. To evaluate the degree to which family members accurately characterize one another’s end-of-life preferences.
3. To determine whether and how preparation for spouse and parent death affects the survivor’s psychological adjustment to it.
4. To evaluate whether planning and preparation for death (such as informing others of one’s end-of-life preferences) affects the “quality of death” experienced by deceased spouses and parents.
5. To identify the information, financial strategies and resources (e.g., wills, insurance trusts) used by married couples as they prepare for the death of one spouse. Of particular interest is how spouses decide to allocate their economic resources to the couple (in the present) versus the survivor (in the future).
6. To identify how couples’ financial planning and preparation for end of life affect the economic and psychological well-being of the surviving spouse.

D.4. Overview of Survey Content

We plan to combine segments of the 1992-94 instruments (Appendix A) with well-validated items from other surveys that will serve our immediate analytic interests and anticipate the longer-term uses of the WLS. We have not yet developed complete survey instruments. Extracts from several potential sources of survey items are reproduced in Appendix C; however, we will likely select from many instruments and their components to make effective use of the time of WLS participants. We have requested support for several key investigators during the first summer of this project—but at no other times—in order to focus intensively on instrument development during that period.

The following text provides an overview of our current plans for survey content, focusing mainly on additions to the 1992-94 protocols. We expect to add content to the telephone interviews because

employment histories, person rosters, and inter-transfers should take less time now than in 1992-94. We have also budgeted additional content and response incentives in the mail surveys.²⁰ We have not attempted to order items as they might appear in a survey instrument. As noted above, we are requesting the appointment of a Data Monitoring Board by NIA to advise us about these key design choices.

a. Graduate and sibling telephone interviews ***Repeats and updates from 1992-94***

Education and employment histories; job characteristics; marriage; household, parent, in-law, child, and sibling rosters and characteristics; religion; depression (DIS, Robinson 1991; Robins, Marcus, Reich et al. 1996; Robins, Helzer, Croughan, and Ratliff 1981); alcohol use; income, assets, and inter-household transfers;²¹ caregiving; selected measures of personality (BFI-54, John 1990; John 1991) and well-being (Ryff 1989) (see Appendix A).

New measures for this round

1. Cognitive functioning. Accumulating evidence indicates that cognitive functioning can be measured reliably by telephone (Brandt, Spencer, and Folstein 1988; Herzog and Rodgers 1999; Nesselrode, Pedersen, McClearn, Plomin, and Bergeman 1988; Herzog and Wallace 1997). In 1992-94, participants were asked items from the WAIS-R similarities subtest (Wechsler 1981). In addition to repeating this measure of abstract reasoning, we plan a more extensive assessment of cognitive functioning in the next round.

(a) Verbal fluency. As a test of letter fluency, respondents will be given thirty seconds to name as many words as they can that begin with either the letter F, A, or S, counterbalanced across respondents (Borkowski, Benton, and Spreen 1967; Monsch et al. 1994). As a test of category fluency, respondents will be given thirty seconds to name as many kinds of either furniture or animals as they can, again,

²⁰ Our current plan is to obtain bio-indicators, to measure sexuality and sexual behavior, and to obtain *intensive* measures of affect in personal household interviews, to be proposed later.

²¹ As in HRS, amounts were "bracketed" in the 1992-94 WLS surveys, and bracketing will again be used here.

counterbalanced (Drachman and Leavitt 1972; Kozora and Cullum 1995; Schooler, Mulatu, and Oates 1999). This portion of the interview will be tape-recorded and scored by coders later.

(b) Verbal memory, immediate and delayed. Participants will be read a list of ten high-frequency words at a rate of one word per two seconds. They will be asked immediately afterward to recall as many of these words as they can. Five minutes later, after answering intervening questions unrelated to testing cognition, they will be asked to recall these words again. Three different counterbalanced word lists will be used so that these may be used again in subsequent rounds of the WLS (Herzog and Rodgers 1999).

(c) Working memory. We will *pretest* a modified version of the WAIS-III (1997) digits backward subtest. We are not sure whether this test can be adapted for telephone administration.

(d) Metamemory. Participants will be asked to assess their own memory as compared both to other people their age and to what it was ten years earlier (Cavanaugh 1999; Flavell 1971; Levy and Langer 1994; Turvey, Schultz, Arndt, Wallace, and Herzog 2000; O'Rourke, Sudman, Johnson, and Burris 1999).

2. *Suicidal ideation* will be measured with a subset of items from the Beck Scale for Suicidal Ideation (Beck, Rial, and Rickels 1974). While rarely measured in sample surveys of community populations, this is a critically important component of mental health among older adults, especially older white men (Brant and Osgood 1990; Moscicki 1995).

3. *Job conditions.* We will measure interpersonal dynamics in the workplace by asking questions about (1) social support on the job and (2) the extent to which the job involves teamwork; these are derived from measures used by the GSS and the National Institute for Occupational Safety and Health (NIOSH).

4. *Access to health care.* We propose to add items on health insurance, access to care, use of services, and outcomes. The large majority of these items are from the 1996-1997 Community Tracking Study (CTS) Household Survey, a nationally representative telephone survey of 60,446 persons (Reschovsky, Kemper, and Tu 2000). Measures of access to care will include unmet and delayed care needs, financial barriers to care, restricted provider access, waiting time, travel time, and administrative burden.

Measures of use will include ambulatory care, hospital care, and preventive care. Other outcomes will include patient trust in physicians and overall satisfaction with health care.

5. *Preparation for death and reactions to death.* *(a) End-of-life preparation* will be evaluated in terms of the planning strategies used (section D.3.h.1). We will also ascertain end-of-life preferences and economic planning for death. *(b) Attitudes towards death* will be evaluated using the Death Attitude Profile-Revised (Wong, Reker, and Gesser 1994), a widely used scale which measures fear, avoidance and acceptance of death. *(c) Attitudes towards life quality* will be measured using the Quality of Life Values Inventory (Cohen-Mansfield, Droge, and Billig 1992), which evaluates beliefs about the components of a life worth living. *(d) Quality of death* for the decedent will also be evaluated, e.g., physical pain, cognitive functioning, whether they were with loved ones at the moment of death, whether they had come to peace with the idea of dying, disagreement about end-of-life care; and whether their preferences for end-of-life medical care and interventions were honored by health care workers (Carr, House, Kessler, and Nesse 2000). *(e) Grief* will be measured for participants who have lost parents, spouses, siblings, or children using a subset of items adapted from widely used grief scales (Jacobs et al. 1986; Singh and Raphael 1981; Zisook, Devaul, and Click 1982).

b. Supplementary material for graduate and sibling parents of children who died or who have had developmental disabilities or severe mental illness. Screening items for non-normative outcomes, plus several additional scales, listed below.

1. *Amount of care* will be measured by a count of the number of everyday living tasks for which the parent provides help to his/her adult child with disabilities, from a list of 11 personal and instrumental activities of daily living (Greenberg, Seltzer, and Greenley 1993).

2. *Behavior problems* will be measured by the Inventory for Client and Agency Planning (ICAP, Bruininks, Hill, Weatherman, and Woodcock 1986).

3. Other measures of *social support* will be supplemented by a shortened version of Antonucci's (1986) Social Networks in Adult Life.

4. *Quality of the relationship* between the target child and his/her parent is measured by the Positive Affect

Index (Bengtson and Black 1973), a 10-item scale assessing the quality of the relationship, indicated by ratings of trust, intimacy, understanding, fairness, and mutual respect.

5. *Amount of informal caregiving support* is measured by the number of daily living tasks for which other family members and friends help the adult child with disabilities from the same list of 11 activities of daily living used to measure the parent's involvement in providing care.

6. Parents' current participation in a *disability-related support group* is measured by items developed by Tessler, et al. (1992).

7. *Service utilization and unmet service needs* will be recorded (including respite services), as well as a measure of parental satisfaction with services.

8. *Medications* prescribed to treat disability-related symptoms will be recorded.

9. We will administer *role-specific well-being measures* to parents of adult children with disabilities, including the Zarit Burden Scale (Zarit, Reever, and Bach-Peterson 1980), caregiving gain (Pearlin, Mullan, Semple, and Skaff 1990), and pessimism about the future (Friedrich, Greenberg, and Crnic 1983).

10. Finally, we will ask about *future care plans* when the parent is no longer able to remain in the caregiving role. These questions focus on residential and financial plans for the adult child as well as who will assume primary caregiving responsibility when the parent dies (Greenberg, Seltzer, Orsmond, and Krauss 1999).

c. Graduate and sibling mail surveys

Repeats and updates from 1992-94

General health, symptoms, diagnosed medical conditions (OARS, Fillenbaum 1988) smoking, exercise, menopause, personality, depression, work/family interaction, job importance, social support, caregiving-receiving, social participation. Update and amend from 1992-94 sibling survey (Appendix A). We will add items as necessary to cover material in the SF-36 (Ware and Sherbourne 1992) (Ware et al. 1995).

New measures for this round

1. *Sleep*. New items will be drawn from the Wisconsin Sleep Cohort Study and will ask about snoring, sleep apnea, difficulty falling asleep, and excessive daytime sleepiness.

2. *Functional limitations*, including both activities of daily living (ADLs) and instrumental activities of daily living (IADLs), will be assessed using standard measures, such as the items from the Duke OARS instrument (Katz, Ford, Moskowitz, and et al. 1963; Fillenbaum 1988; McDowell and Newell 1996).

3. *Dispositional optimism* will be measured with a shortened version of the Life Orientation Test (Scheier and Carver 1985).

4. *Perceived control* will be measured using Pearlin and Schooler's (1978) Mastery Scale, a global measure of the sense of control over the world and the ability to bring about desired outcomes. Control is a direct and indirect predictor of physical and mental health and an important factor in healthy aging (Rodin 1986; Lachman and Weaver 1998).

5. *Anxiety* will be measured using seven items from the SCL-90 (Derogatis and Cleary 1977) which inquire about experiences of nervousness, fear, panic, and restlessness in the two weeks prior to the interview.

6. *Stressful life events*. In a 1997 pilot interview with 200 original WLS participants, Ryff, Singer, and colleagues developed a checklist of stressful life events, drawing on Holmes and Rahe (1967; Borkowski et al. 1967; Turner and Lloyd 1995). This scale inventories life events occurring within the past five years and lifetime experience with selected stressful life events.

7. *Persistent life stressors*. To our existing measures of work-related strains, and economic status, we will add measures of *subjective economic strains*, e.g., satisfaction with one's present financial situation, and perceived difficulty in paying monthly bills.

8. *Coping strategies and style*. We will use a theoretically derived measure of coping (COPE, Carver, Scheier, and Weintraub 1989) that includes multiple coping subscales which can be combined to measure problem-focused and emotion-focused coping (Kling, Seltzer, and Ryff 1997; Seltzer, Greenberg, and Krauss 1995).

9. *Relationship quality*. We will add more measures of quality of relationship with spouses, parents, siblings, and (all) children. One possibility for marital relationships is the 20-item Marital Satisfaction Questionnaire for Older Persons (Haynes et al. 1992).

10. *Social support*. In addition to repeated and extensive measures of personal resources, economic

resources, and social support, we will measure individuals' beliefs that they have social and emotional support from others (Wethington and Kessler 1986)

11. *Conflict and abuse* in the family of orientation will be asked about self and focal sibling, using the Conflict-Tactics Scale (Straus 1979; Straus et al. 1998) and one of the standard scales of sexual abuse (e.g., MacMillan et al. 1997; Finkelhor, Hotaling, Lewis, and Smith 1990).

12. *Problem drinking*. The Short Michigan Alcoholism Screening Test-Geriatric version (Blow, Gillespie, Barry, Mudd, and Hill 1998) will be used to assess alcohol-related problems. The alcohol section of the version IV of the DIS (Robins et al. 1996) will be used to assess lifetime and current DSM-IV diagnoses of alcohol and drug abuse/dependence.

13. *Leisure-time activities*. We will add extensive measures modeled after the inventories of the diversity and intensity of passive, intellectual, and physical activities in Friedland, et al. (2001) and Hultsch, et al. (1999), and we will measure volunteer work and motivations for it (Callero 1985; Callero, Howard, and Piliavin 1987; Clary et al. 1998).

14. *Computer ownership and Internet access*. Measures of information technology ownership and use have been selected to maximize the potential for cross-survey comparisons between the WLS and the 2000/2002 Internet modules of the General Social Survey and the regular Computer Ownership supplements to the Current Population Survey. We will measure access to computers at home and work; barriers and pathways to internet use, E-mail use, and modes and frequency of computer use.

15. *Religious attitudes* will be evaluated using a subset of questions from the Religions Coping Scale (Pargament and Hathaway 1990), a widely used set of indicators designed to tap religiosity.

d. Telephone interviews with spouses and widows

1. *Reports about self*: Social background, education, limited military and occupational history, health, personality, psychological well-being, depression, alcohol use, religion, cognition, preparation for death and reactions to death (modified from 1992-94 telephone and mail surveys and new graduate and sibling surveys).

2. *Reports about spouse* (graduate or sibling): (a) *Memory, Spouse Report*. We will use a shortened

version of the Informant Questionnaire on Cognitive Decline in the Elderly (IQOCDE) scale to gather information from spouses on changes in the Primary Respondent's cognition functioning (Jorm 1994; Jorm and Jacomb 1989). The IQCODE asks for general assessments of memory and judgment and for perceptions of changes in the performance in specific everyday tasks (e.g., remembering conversations a few days later). (b) *Health and personality of graduate or sibling*. We will also obtain cross-validating reports on the graduate or sibling's health, personality, and relationships with others. (c) *Close-out information from widows*. Widows will be asked the last occupation of the graduate or sibling, the date, location, and cause of death, other circumstances of death, and economic provision for the surviving spouse.

D.5. Survey Management and Operations

As in the 1992-94 WLS surveys, we have chosen the University of Wisconsin Survey Center (UWSC) to carry out respondent tracing, survey operations, and coding (See Resources and Environment for a description of the facilities and staff of the UWSC.) UWSC leaders have experience working with us, they are close at hand, and they did a superb job in the 1992-94 round of the WLS.

Before submitting each of our previous proposals for large scale survey operations in the WLS (in 1974 and in 1989), we made pilot efforts to trace the graduates in order to demonstrate the feasibility of the project and were highly successful. Our search methods of the mid-1970s were codified by Clarridge, et al. (1977). Today, it is even easier to find the participants, primarily because of the availability of name-address libraries on CD-ROM, which may be searched along block-faces as well as by name, address, or telephone number.

In the 1992 round of the WLS, we failed to locate only 270 of the 10,317 graduates, dead or alive. Because we have (a) the names and addresses of graduates, siblings, and focal children, (b) links through those addresses to current or former neighbors, and (c) rich data on schools, school-mates, and employers, we anticipate few problems in locating research participants.

We will begin to trace respondents as soon as this proposal is approved and funded, in order to create a large backlog of located participants at the time the

surveys begin. Each phase of survey operations—from tracing through coding—will be carried out in a series of 10 replicate subsamples within each major component of the design (graduates, siblings, and spouses). For example, in 1992-94 we created highly stratified sample replicates of graduates, siblings who had been interviewed in 1977, and siblings who had not been interviewed in 1977, and these were entered into the field sequentially. We followed the same procedure in the mail survey operations. This had three advantages. First, it smoothed the flow of easy and of difficult cases, thus evening out the workload and accommodating the inevitable entry of inexperienced interviewers. Second, it permitted us to estimate final response rates and costs early in the survey operation. Third, it gave us the capacity to terminate survey operations at any of several thresholds without lowering the response rate among cases that had been entered into the field. In fact, because the University interrupted field operations with a building renovation project that increased fixed costs, we eliminated telephone surveys with the last two replicates of siblings not interviewed in 1977—without affecting the response rate in other replicates.

We can conduct all but the final pretests of survey instruments and operations with individuals who are part of the population from which the WLS was drawn, but not part of the WLS graduate sample. We have the names of all 1957 Wisconsin high school graduates, not merely those in the WLS sample. In each previous wave of the study, using information from high school reunion booklets, we have found it possible to locate a sufficient number of non-sample individuals for early pretest activities. However, final pretests, e.g., those testing the design of bounded queries and waiver procedures, will necessarily have to be carried out with actual sample members.

Items will be divided between telephone and mail surveys; as in 1992-94, a few items will appear in both instruments to check reliability. The division of content between the two instruments will be based on the complexity of branching structures, the need to bound queries with prior information, and various aspects of item format. Because the telephone interview should not be too long, many of the social psychological and health measures will be obtained by mail. (See Section D.4 for a preliminary overview

of survey content.)

Interviewers will use computer-assisted (CATI) techniques, with which the UWSC has long experience. Information essential to bounded segments of the telephone interview, such as name of the employer at the last interview and rosters of children's names, will be transferred from files of the 1992-94 interviews and entered in the interview schedule database. Time and support for this data-development activity have been allocated in the first project year. We have requested a level of support for repeated call-backs that should be sufficient for us to achieve a targeted response rate of 90% in the telephone interviews.

Based on our experience with the mail surveys in 1992-94, we believe that the new mail instrument will require about 1 hour and 20 minutes to complete. UWSC will provide three mailings and one, final telephone contact to encourage respondents to mail back their questionnaires.²² In the early sample replicates, we plan to experiment with telephone administration of a full or truncated mail instrument to individuals who have not responded by mail. We want to try this because there is evidence of a gradient in response to the 1992-94 mail surveys by adolescent cognitive ability. We want both to maximize response and to reduce or eliminate that gradient, and we suspect that it is largely due to difficulty in reading the mail instrument. In addition, a subset of the items in the psychological scales will be administered in the initial telephone interview, to avoid a total loss of information from those not returning the mail questionnaire.

To carry out planned administrative data matches, we will need to obtain written waivers for WLS participants. Social security numbers have been obtained from almost all participants, either from state tax files early in the study or from participants during the 1992-94 surveys. Depending on our success in obtaining administrative approval for administrative data matches, the required waivers may include Social Security earnings records and disability records, Wisconsin State Worker's Compensation records (of workplace injuries), birth certificates, the Wisconsin state tumor registry, and Medicare

²² We will enclose a \$5 bill in the first mailing and pay \$20 on return of the completed questionnaire.

enrollment and claim data. (For data that are matters of public record, it may be sufficient to inform the research participants of our plans.)

Our tentative plan for obtaining waivers is as follows: At the conclusion of the telephone interview, we will describe the set of waivers that we wish to obtain, and we will ask the participant if he or she will consider giving us permission to use each type of information. If the response to this request is negative, the matter will be dropped; if it is positive, the respondent will be asked to return signed waivers, which will be mailed by UWSC. The mailed waivers will be accompanied by a note inviting the respondent to call the principal investigator directly with any questions and giving him or her the opportunity to withdraw verbal consent gracefully. We will pretest this procedure with a small number of WLS participants, and if we do not achieve high coverage, we will postpone collection of waivers until the planned phase of personal, in-household interviews.

The self-administered questionnaire will be mailed to primary respondents and siblings some time after the waiver request, since the reverse ordering might reduce waiver return rates. The converse problem, of lowering response to the mail questionnaire by sending the waiver first, should be minimized by only asking for the waiver from respondents who agree to the waivers during the telephone interview. We have not yet decided how long to wait between our request for the waiver and the first mailing of the self-administered questionnaire, nor whether that questionnaire should include an additional effort to obtain the waiver. Since waivers must be delivered to the Social Security Administration within 90 days of signing, we will have to link to these data as we go.

Part of the pretest activities in the first year will be to develop the waiver procedure. Every effort will be made to begin our survey operations with well-grounded expectations about likely waiver success rates and possible negative respondent reactions which may result from the request for waivers. We know that, a decade ago, a pretest of a much more extensive waiver procedure was reasonably successful in the sample of mature women in the National Longitudinal Survey of Labor Market Experience, and HRS has had a good experience in obtaining informed consent for matches of earnings data. Costs for

pretests of both the questionnaires and the SSA waiver have been included in the budget line items for UWSC.

We will use well-developed local procedures and resources for recording, cleaning, merging, recoding, and analyzing data. As described more fully in the section on Resources and Environment, the Center for Demography and Ecology provides a large network of UNIX workstations and PCs that are well-equipped with standard software and on- and off-line storage devices. An experienced staff provides support for data processing operations, using both commercial software and locally-created, specialized utilities.

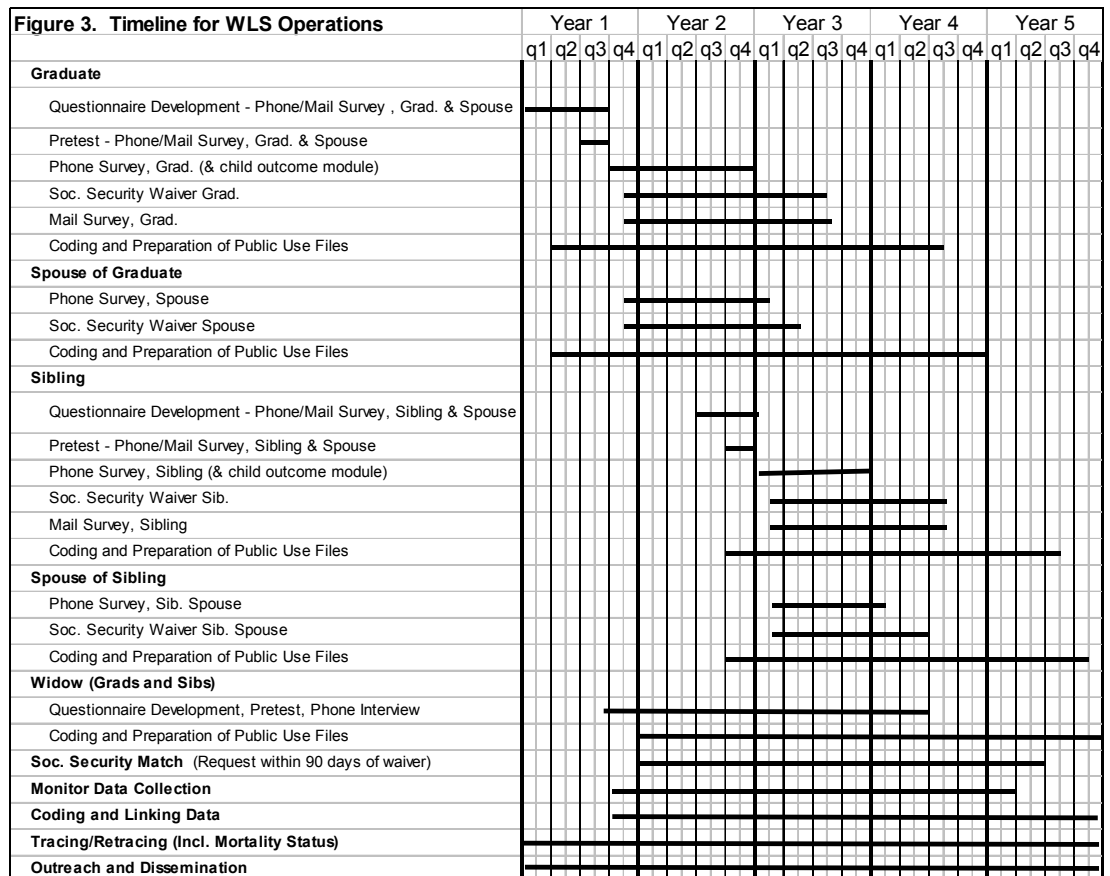
Based on long experience, project staff will apply a variety of standard techniques, both simple and complex, to assure the quality and consistency of our data and of its documentation. Members of the project staff have advanced knowledge of social statistical techniques, which may lead to methodological investigations and innovations where these will help us understand the data. Methodological work, however, will be secondary to the substantive concerns of the project.

D.6. Timeline

Based on our experience in 1992-94, we believe that a five-year award is essential to the WLS project. This proposal is more ambitious and demanding than the 1992-94 surveys, and we have a long-term commitment to producing data and documentation of the highest quality. We have added a great deal of new content, along with interviews with spouses and widows. The increased age of participants—especially older siblings—may require extra effort and special accommodation. We will also undertake additional measures to protect the privacy and confidentiality of participants, including limits on disclosure in public data and the creating of semi-public data to which access will be licensed and controlled through CDHA’s secure data enclave. Thus, we propose several phases of survey operations over five-years, each to end with initial release of public data as soon as possible

Figure 3 shows our planned timeline—developed in close consultation with staff of the UWSC—for instrument development, survey operations, and post-field processing. Briefly, graduate survey operations will precede sibling data collection. Within those two major field operations, interviews with spouses and widows will take place concurrently. However, data preparation and release for

graduates and siblings will have higher priority than that for spouses or widows. Social Security waivers (and perhaps others) must also be processed on a flow basis. We plan to continue outreach activities throughout the project in order to support continuing analyses, help develop new analytic research proposals, and recruit new users of WLS data.



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