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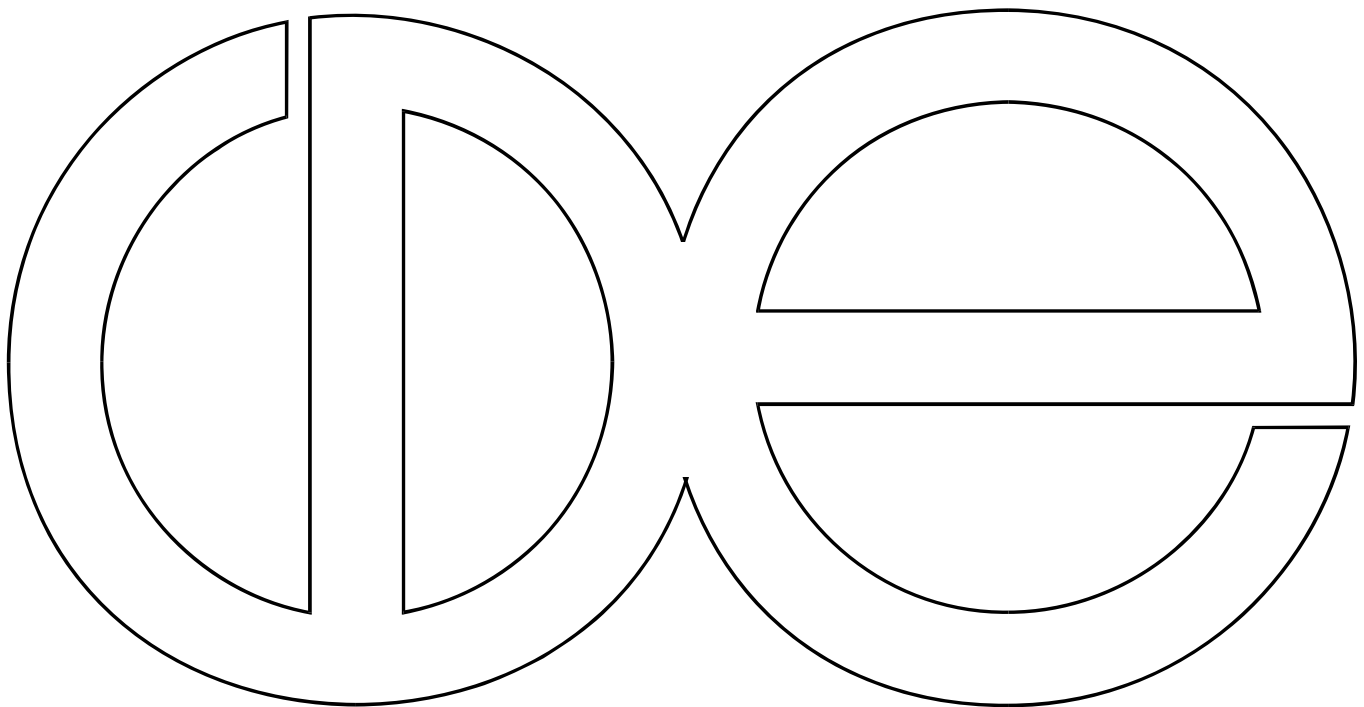
**Death of Parents and Adult Psychological and Physical  
Health: A Prospective National Study**

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A Prospective U.S. National Study

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Abstract

Guided by a life course perspective and attachment theory this study aimed to examine the impact of the death of a mother or father, or both, on multiple dimensions of psychological and physical health, as well as to examine gender differences in these effects. Analyses of longitudinal data from 8,933 U.S. adults revealed that the death of one or both parents over a period of 5 years was associated with several negative effects on mental and physical health. Gender differences were inconsistent. Death of a father led to more negative effects for sons; death of a mother led to more negative effects for daughters. Negative effects of parent loss were more apparent for men in terms of physical health. Overall, these results suggest that scholars and practitioners working with families should not ignore or underestimate the impact of filial bereavement on adult well-being.

Key words: Bereavement, Grief, Health, Parent death, Psychological well-being, Depression, Personal mastery

## Death of Parents and Adult Psychological and Physical Health:

### A Prospective U.S. National Study

With increased contemporary life expectancy in most developed countries, it is most typical now for individuals to experience the death of parents during adulthood rather than childhood (Watkins, Menken, & Bongaarts, 1987; Winsborough, Bumpass, & Aquilino, 1991). Therefore, most adults also have longstanding life course ties and a longstanding history of attachment and affectional bonds with their parents both as children and adults before the death of first one parent, and then the second parent, occurs. While the death of parents is a typical experience for adults, surprisingly little research has examined the impact of parent loss during adulthood on mental and physical health.

Given that we know that parent loss in childhood is associated with significant problematic consequences (Bowlby, 1980; Harris, 1995), and given that we know that loss of other significant family members during adulthood, such as a spouse or child, is associated with significant negative effects on well-being (Genevro, Marshall, & Miller, 2004), it is surprising that filial bereavement and its potential consequences for adult well-being has not received even more systematic research attention. The overall aim of this study was to contribute to a population perspective on the mental and physical health impact of death of a mother, a father, or both, on adults' mental and physical health by examining this issue with a prospective design, using data from a U.S. national sample.

### Theoretical Background

Guiding theoretical paradigms have a considerable impact on which issues and factors are given scholarly attention and which are not. In American family studies, the dominance of Talcott Parsons' theory of kinship in modern societies (Parsons, 1942), which was part of his overall structural-functionalist model, may have contributed to the relative scarcity of attention to parental loss and its impact on adults. Parsons posited that at the time of marriage, it is most functional for adults in modern societies to largely disconnect from their parents and to focus on

their own relatively autonomous nuclear households (Parsons, 1942). Parsons' theory about adult autonomy from parents also was congruent with the dominant developmental theory of his period--Freudianism--which also emphasized the importance of autonomy from parents for healthy adults (Freud, 1920/1965). However, contrary to supporting what Parsonsian theory might predict, research in the U.S. over the last forty years has refuted the idea that Americans radically disconnect from or abandon their parents, married or not (Bengtson, Rosenthal, & Burton, 1990; Cooney & Uhlenberg, 1992; Shanas et al., 1968; Rossi & Rossi, 1990; Eggebeen & Hogan, 1990; Spitz & Logan, 1992).

Indeed, although coresidence with older parents is not very prevalent at any point in time in the U.S., research guided by a life course approach to intergenerational relationships has demonstrated that continued significant contact and exchange with living parents continues for the vast majority of American adults throughout the life course (Rossi & Rossi, 1990). Indeed, as families become more vertical (i.e., more typically comprised of persons from three or more generations) and less horizontal (i.e., more typically comprised of fewer persons from the same generation, such as siblings and cousins) in structure, continuing relations across generations, and interdependency across generations becomes even more common and important to adults (Bengtson et al., 1990; Eggebeen & Hogan, 1990; Cooney & Uhlenberg, 1992; Rossi & Rossi, 1990).

Mothers continue to provide a range of financial, emotional, and instrumental support to daughters and sons across the adult years (Cooney & Uhlenberg, 1992; Eggebeen & Hogan, 1990; Rossi & Rossi, 1990). Beginning in early adulthood, there is also a considerable amount of reciprocity in the relationship--especially in emotional and instrumental support. It is only after mothers become relatively older--typically in their 60s or 70s--that daughters are more likely to provide more support to mothers than they continue to receive (Rossi & Rossi, 1990). Thus, mothers often remain a critical social resource to daughters and sons, through early adulthood and into middle age.

Fathers, too, have an important influence on women's and men's lives and through their multifaceted roles as care providers, companions, spouses to mothers, protectors, models, moral guides, teachers, and breadwinners in families (Lamb, 1997a). While there is controversy whether biology predisposes women to be more optimally equipped for nurturant parenting than men (Rossi, 1984), considerable research has suggested there is nothing about the biological makeup of fathers that prevents them from becoming a critical secondary (or even primary) attachment figure for infants (Lamb, 1997b). Research has confirmed that most infants do become attached to their fathers (Lamb, 1997b).

In recent years, the literature on caregiving for older parents has suggested that concepts from attachment theory may continue to be relevant for adults in relationship to their aging parents. Bowlby's (1969, 1973, 1979, 1980) theory of lifespan attachment emphasizes humans' intrinsic biosocial propensity to seek security through connection with others in the face of a challenging outside world environment. Attachment theory posits that in the early months of life, infants seek a feeling of security (which is also the basis for courage to explore the world) through a responsive, dependable affectional bond that is established with one primary person--the "primary attachment figure," who in most cultures has been the mother. Because of the importance of the attachment figure to the child, there is a considerable motivation by the child to "protect" the attachment figure.

Empirical work guided by attachment theory has confirmed that mothers tend to be the primary attachment figure for children, but that, as noted above, significant attachments have been found to also develop with fathers (Lamb, 1997b). Further, considerable empirical research has now confirmed that different mental models regarding attachment exist in adults as well as children (Feeney & Noller, 1990; Hazan & Shaver, 1987; Simpson, 1990), and that they are associated with retrospective accounts of childhood relationships with mothers and fathers (Hazan & Shaver, 1987).

Cicirreli (1983, 1991, 1993) has suggested that continued adult attachment may help to

motivate caregiving for parents—as adult daughters and sons seek to protect their primary attachment figures, in part, to help them maintain the sense of emotional security that comes from having attachment figures alive and available for support. Attachment theory might also lead us to hypothesize that continued adult attachment to parents would also lead to a decline in well-being upon loss of a parent to death in adulthood. Adults who have two parents alive, and therefore who have two primary affectional/attachment bond figures alive in their lives, might be expected to have a well-being advantage in adulthood that has been previously underestimated.

A family life course perspective (Bengtson et al., 1993) guides us to consider the importance of “linked lives” for influencing well-being across the life course (Elder, 1998; Elder & Johnson, 2003). It also guides us pay attention to important life transitions and the quality of lifelong histories with relational partners when considering the well-being impact of a life transition (George, 1993). Given the attachment bonds with mothers and fathers typically date from birth, and considering the evidence that adult daughters and sons typically continue to have ongoing contact and emotional and support exchange into adulthood, a life course perspective would also lead us to expect that the transition to loss of a mother and/or father to death would be experienced as a very serious loss, and would have negative impact on mental and physical well-being for adults as well as children.

#### Empirical Background

A few scholars have examined parent loss and adult well-being and their work does suggest that parent loss in adulthood is associated with some negative effects. Most of this literature is clinically-based, utilizing small nonrepresentative samples of persons who are recruited for study only after a parent loss has occurred. The clinical literature that has examined this issue has suggested that grief reactions after a parent’s death can lead to depression, thoughts of suicide, and other psychiatric problems (Birchnell, 1975; Horowitz et al., 1981; McHorney & Mor, 1988, Sanders, 1979-80).

Scharlach (1991) examined initial and residual grief reactions among a convenience

sample of 220 adults, aged 36-60, recruited through a notice in the *Los Angeles Times*, who experienced the death of a parent within the last five years. His results suggested that bereaved adult children report a wide range of initial symptoms related to parent death including difficulties sleeping and working, and getting along with certain people; residual reactions included becoming upset when thinking about the parent, finding it painful to recall the parent's memory, inability to avoid thinking about the parent, and crying when thinking about the parent. Sharlach did not find differences in initial or residual grief reactions to mothers in contrast to fathers.

Moss et al. (1993) evaluated responses from 102 40-65 year-old daughters who had recently experienced the death of a mother. They found substantial evidence of depression, grief, and somatic reactions, but they also found a considerable heterogeneity in responses that was associated with differential characteristics of the daughter, mother, and quality of their relationship. In additional research Moss et al. (1997) examined gender differences in response to death of a last surviving parent and found that overall, daughters reported more upset and somatic response than sons.

The only previous prospective, population study of psychological and physical health outcomes associated with parental death we were able to find, which was undertaken by Umberson and Chen (1994), used a U.S. national sample study (Americans' Changing Lives) to examine parent loss over a three-year survey interval. These researchers found that loss of a mother (in contrast to no such loss) was associated with a greater increase in psychological distress over time for daughters and sons, although additional moderator analyses suggested this effect was not actually global across all subgroups: sons who lost functionally impaired mothers to death experienced more distress than sons who lost unimpaired mothers, while daughters whose unimpaired mothers died experienced more increase in distress than daughters who lost impaired mothers to death. Sons who recalled mental health problems of fathers in childhood also reported a greater increase in psychological distress upon the death of a father than did other

sons or daughters.

In terms of alcohol consumption (measured as number of drinks), Umberson and Chen (1994) found that father's death was associated with a greater increase in alcohol consumption over three years than not experiencing a father's death—particularly among daughters who recalled family violence or who continued frequent contact with fathers, and sons who recalled a father's drinking problem in childhood. These scholars also found evidence that the death of either a father or mother (in contrast to not experiencing a parent death) contributed to a greater decline in ratings of health over time across the entire sample of men and women.

Umberson (2003) also followed up this quantitative research with qualitative interviews of persons who had experienced the loss of a parent. These interviews are even more striking in providing evidence of the major life change that a parental loss can provoke. Most of the people she interviewed spoke about how dramatic this change was, and how those who had not experienced this yet just did not understand what they were going through. Respondents remarked on how little place has been made for filial bereavement in contemporary American society. And themes from the qualitative analyses of these interviews also revealed how the general societal underestimation of the impact of filial bereavement may also lead to marital misunderstanding and marital problems, which has been confirmed by other quantitative analyses on this topic by Umberson (1995).

In this study, we aimed to build upon previous clinical work, and particularly extend the suggestive population study work of Umberson and Chen (1994; Umberson, 1995; Umberson, 2003) and further examine the issue of parent death and adult well-being. We expanded upon their work in a number of ways: First, by examining a larger range of psychological well-being outcomes, including measures of additional dimensions of psychological well-being—self-esteem, personal mastery, and psychological wellness--as well as psychological distress, alcohol use, and self-assessed physical health. Next, by examining differences in the well-being profiles of adults who had one or both parents dead but did not experience additional parent loss during a

five-year period in contrast to adults who continued to have both parents alive during this period of time. And additionally, by examining the well-being impact of losing both parents during a five-year period.

In brief, our research objectives for this study were to address gaps in the aging and bereavement literatures on parent loss in adulthood and its effects on adult mental and physical health by: 1) Examining the impact of the loss of either a mother or father, or both, on multiple dimensions of psychological dysfunction, psychological well-being, and self-assessed health, and

2) Examining gender differences in the effects of parent loss on well-being.

### *Hypotheses*

Given what we know from the prior empirical literature on this topic, and guided by attachment theory, life course theory, and theories of gender (e.g., Chodorow, 1978) that suggest that women are socialized to rely upon close relationship interaction even more for their identities and well-being than men are, we investigated the following hypotheses:

Hypothesis 1: Having one or both parents deceased, or losing either a father or mother, or both, to death over a five-year period will be associated with greater decline in (or lower levels of) psychological and physical well-being than having both parents continue to be alive during the same period.

Hypothesis 2: Continuously living with one or both parents deceased, or experiencing bereavement for one or both parents during a five year period will be associated with larger negative effects on well-being for women than for men.

### *Method*

#### *Data*

The data for these analyses came from the first and second waves of the National Survey of Families and Households (NSFH), which includes information from personal interviews conducted in 1987-1988 (Time 1, T1) and in 1992-1993 (Time 2, T2; 5 years later), with a

nationally representative sample of 13,007 noninstitutionalized American adults, 19 years old and older (note: due to random sampling in households, a very few persons age 16 became primary respondents). This survey included a main sample of 9,643 respondents, with an additional oversample of 3,374 African Americans, Mexican Americans, Puerto Ricans, single parents, stepparents, cohabitators, and recently married persons. The response rate at T1 (1987-1988) was 75%. At T2 (1992-93), the reinterview response rate was 82% of first wave respondents. This yielded national population coverage at a rate of about 62% ( $.74 \times .82$ ) for data from both waves. Sampling weights correcting for selection probabilities and nonresponse allow this sample to match the composition of the U.S. population on age, sex, and race. (See <ftp://elaine.ssc.wisc.edu/pub/nsfh/c1intro.002> and <ftp://elaine.ssc.wisc.edu/pub/nsfh/README>, for more NSFH design details.)

The analytic sample for this study consisted of NSFH primary respondents of all ages in 1987-1988, who also responded in 1992-1993, and who had complete and consistent information about whether their biological or adoptive mothers and fathers were alive or not at both T1 and T2 (N=8,933; 5,506 women, 3,427 men).

### *Measures*

*Death of parent.* *Death of parent contrasts* were classified into 5 mutually exclusive and exhaustive categories based on respondent reports at both T1 and T2 about whether their mother and father were alive or deceased (see Table 1). Respondents who reported both parents alive at both T1 and T2 were classified as *both alive T1-T2* and used as the reference category in all analyses; respondents who reported either one parent dead or both parents dead at both T1 and T2 (but no change in death status between waves) were classified as *one or both parents dead T1-T2*; respondents who reported their father was alive at T1, but dead at T2 were classified as *father died T2*; respondents who reported their mother was alive at T1, but dead at T2 were

classified *mother died T2*; respondents who reported both parents alive at T1, but reported both parents dead at T2 were classified as *loss of both parents T2*.

*Well-being outcomes.* Psychological well-being has been theoretically posited and empirically established to be a multidimensional construct, including distinct dimensions of positive and negative affect, as well as self-evaluation (Bryant & Veroff, 1982), and psychological wellness stemming from experiences of purpose, growth, and meaningful engagement with life and other people (Ryff, 1989; Ryff & Keyes, 1995; Keyes, Shmotkin, & Ryff, 2002). This study examined six distinct dimensions of psychological well-being.

For an assessment of negative affect, we used a 12-item modified version of the Center for Epidemiological Studies Depression (CES-D) index (Radloff, 1977) included at both waves ( $\alpha = .93$  both waves) to assess *depressive symptoms*. The logged score of the mean symptom score plus 1 was used for this measure to help correct for skew to the left. (See Table 2 for descriptives for all analytic measures; see Appendix for all scale items.).

In some previous work, alcohol consumption has been used as a “functional equivalent” assessment of psychological distress or psychological dysfunction (e.g., Umberson & Chen, 1994), with the rationale that psychological distress can be expressed in different forms across some subgroups—and use overuse of alcohol is sometimes viewed as one way adults (particularly men) might “self-medicate” to deal with feelings of psychological distress. Given the somewhat J-shaped curve of optimal alcohol use (that is, zero consumption is considered potentially somewhat less beneficial than 1-2 drinks per day; however, binge drinking on any given occasion is always considered problematic) we employed a measure of *binge drinking* as an additional assessment of psychological dysfunction in this study. Respondents at T2 of the NSFH were asked, “Have you had any alcoholic drinks during the past 30 days?” If they

answered, “yes,” they were also queried, “On about how many days did you have five or more drinks on the same occasion during the past 30 days?” If respondents answer 1 or more to this question they were coded 1 on binge drinking; respondents answering 0 were coded 0.

Positive affect was assessed with a one-item standard assessment of *global happiness* asked at both T1 and T2: “Taking things all together, how would you say things are these days?” (1=very unhappy to 7=very happy).

Two assessments of self-evaluation were included. *Self-esteem* was assessed with a 3-item version of Rosenberg’s (1965) self-esteem index (T1 alpha = .65; T2 alpha = .64). We also evaluated a 5-item personal mastery index consisting of 4 items from the Pearlin Mastery Scale (Pearlin, Lieberman, Menaghan, & Mullan, 1981) along with a single item of control-mastery also at T1 of the NSFH (T2 alpha = .65).

To evaluate psychological wellness, we used an 18-item version of Ryff’s psychological wellness assessment (Ryff 1989; Ryff & Keyes, 1995), which includes 3 items from each of Ryff’s 6 scales assessing autonomy, purpose in life, self-acceptance, environmental mastery, positive relations with others, and personal growth (alpha = .81).

Global *self-assessed health* was assessed with a standard 1-item measure of health: “Compared to other people your age, how would you describe your health?” (1 = very poor to 5 = excellent). This one item measure has been found to be a robust predictor mortality in a wide range of studies across numerous countries (Idler & Benjamini, 1997).

For four measures—the CES-D, global happiness, self-esteem, global health—T1 assessment of the measures were available and were controlled in the respective analyses. For the Personal Mastery Scale, responses to the one item measuring personal mastery that was included at T1 of the NSFH was included as a T1 control (the correlation of this one item at T2

with the other four items of the scale at T2 is .57). The binge drinking assessment and the Ryff measure were not included at T1, so the CES-D assessment from T1 was entered to help control for T1 well-being in all analyses of these measures to better estimate the likely longitudinal change in well-being over time due to loss of parents.

Several demographic statuses—race-ethnicity, education, household income, parental status, and employment status—were controlled in all analyses because they are associated with psychological and physical health (Ross, Mirowsky, & Goldsteen, 1990) and might have confounded our results. The following variable coding was used: race-ethnicity (coded 1=African American vs. 0 = all others), education (T1, in years), household income (continuous measure totaled across all types of earned and unearned income for all household members at T1; missing coded -1), missing on household income at T1 (dichotomous flag variable to include all respondents missing on income in the regression analyses, missing = 1), having a child age 18 or younger in the household at T2 (1 = has child vs. 0 = no child), and employment status at T2 (1 = employed vs. 0 = not employed).

Multivariate OLS or logit regression models were estimated for all analyses using SPSS. Preliminary analyses included both men and women in models that included gender interaction variables. For six of the seven outcomes, at least one significant gender interaction was found. Therefore final models were estimated separately for men and women. Models were estimated both with weighted data and unweighted data. Estimates were relatively similar across both sets of models, therefore, we report results from unweighted data where standard errors are expected to be more reliable (Winship & Radbill, 1994).

## Results

### *Gender differences in effects of parent death on adults*

To test our gender difference hypothesis, we estimated models with gender interactions as noted above (full results not shown; significant gender interactions noted in Table 3). We found gender differences (at least at a trend level) for six out of seven outcomes. However, only

three of the total of seven differences found were consistent with our hypothesis that parental loss would be more problematic for the mental and physical health of daughters in contrast to sons. Loss of both parents was associated with a greater decrease in positive affect (happiness) for women in contrast to men (Female X Loss of both,  $b = -.61, p \leq .05$ ). Having one or both parents dead across this five year period, in contrast to having both parents alive, was associated with a trend toward a greater decline in global happiness (Female X One or both dead,  $b = -.11, p < .06$ ), and lower reported levels of personal mastery for women (Female X One or both dead,  $b = -.32, p \leq .05$ ).

Contrary to our hypothesis, however, these models revealed that loss of a father led to a significantly greater increase in depressive symptoms for men in contrast to women (Female X Loss of father,  $b = .20, p \leq .01$ ). Also contrary to hypothesis, we found that loss of both parents over a period of five years was associated with significantly greater odds of binge drinking for men than for women (Female X Loss of both,  $b = -1.77, p \leq .01$ ). Loss of father was associated with a trend toward lower levels of psychological wellness for men in contrast to women (Female X Loss of father,  $b = 1.34, p \leq .10$ ). Also, loss of both parents was associated with a trend toward a greater decrease in self-assessed health for men in contrast to women (Female X Loss of both,  $b = .24, p \leq .10$ ).

Overall, this inconsistency in results suggests that there are, indeed, some gender differences in the degree to which parental loss impacts adult well-being. However, it is important to look across multiple dimensions of mental and physical health to get the full picture. But parent loss is definitely not consistently more problematic for daughters in contrast to sons.

*Effects of parent loss on mental and physical health for daughters and sons considered separately*

Table 3 provides estimates from regression models estimated separately for women and men. These results provide us with a more detailed within-gender account of the effects of

parent loss on mental and physical health. Overall, these results provide us with considerable, although not absolutely consistent, support for our hypothesis that parent loss is associated with poorer mental and physical health in comparison to continuing to have both parents alive.

Among women, loss of a father over a five year period (in contrast to continuing to having both parents remain alive) was associated with a lower level of personal mastery and a lower level of psychological wellness. Among men, loss of father was associated with even more problematic effects on mental health: a greater increase in depression symptoms, a lower level of personal mastery, a lower level of self-esteem, and a lower level of psychological wellness.

Loss of a mother among women was associated with greater odds of binge drinking, a trend toward a greater decline in global happiness, a greater decline in self-esteem, a lower level of personal mastery, and a lower level of psychological wellness. Men who reported loss of their mother also reported a greater decline in global happiness, a lower level of psychological wellness, and a greater decline in self-rated health than men who continued to have both parents alive.

Loss of both parents among women was associated with several significant negative effects: a greater increase in depressive symptoms, a greater decline in happiness, a greater decline in self-esteem, a lower level of personal mastery, and a lower level of psychological wellness. Among men, loss of both parents led to greater odds of binge drinking, a greater decline in self-esteem, a lower level of personal mastery, a lower level of psychological wellness, and a greater decline in self-rated health.

Interestingly, our additional contrast of persons who did not have a *new* loss over the five-year interval, but who continued life with one or both parents dead in contrast to having both parents alive over a period of five adult years provided additional support for the hypothesis that having both parents alive is a well-being advantage for adults. Both women and men who had one or both parents dead reported a greater increase in depressive symptoms (trend level

effect for men), and a greater decline in self-rated health (trend level effect for women) during this five-year period. Women in this parent loss status also reported a greater decline in global happiness, a lower level of personal mastery, and a lower level of psychological wellness. Intriguingly, however, contrary to hypothesis, women who lived with one or both parents dead during the five year study interval reported a greater increase in self-esteem than women who lived with both parents alive during this period.

### Discussion

Guided by a life course perspective and attachment theory this study aimed to examine the impact of the death of either a mother or father, or both, on multiple dimensions of psychological dysfunction, psychological well-being, and self-assessed health among adults, and to examine gender differences in the effects of parent loss on well-being. We hypothesized that loss of a mother or father or both, as well as living with one or both parents dead, in contrast to having both parents alive over a five year period, would be associated with greater declines or lower levels of mental and physical well-being. We also hypothesized that due to socialization to put greater primacy on close relationships, particularly family relationships, women would suffer more negatively from loss of parents than men.

Overall, we found considerable evidence supporting the idea that due to long-term linked lives across time and due to the typically strong affectional bonds and attachment experienced with mothers and fathers, the death of a mother or father or both in adulthood is associated with a number of negative effects on mental and physical well-being. However, our gender hypothesis was not supported. Effects were not consistent for sons and daughters. Within gender analyses across multiple dimensions of well-being allowed us to see that the effects of loss came through in somewhat different ways for women and men.

Death of a father led to less personal mastery for both daughters and sons. But loss of a father was also associated with a greater increase in depressive symptoms and lower psychological wellness for sons. Overall, it appeared from our results that death of a father may have a somewhat more negative effect on sons in contrast to daughters.

Death of a mother was associated with lower levels of psychological wellness for both daughters and sons. But loss of a mother for daughters was also associated with greater odds of binge drinking, a greater decline in self-esteem, and a lower level of personal mastery. Loss of a mother was also associated with a greater decline in happiness for sons. Overall, our results suggest that death of a mother may have somewhat more negative effects on daughters in contrast to sons.

Death of both parents within a five year period is not exceptionally common, but it is still occurs frequently enough to take seriously (about one out of every 100 of our national sample of respondents experienced this sequence of events during a five-year period). Loss of both parents within five years was associated with relatively consistent negative effects across our multiple dimensions of well-being. Both daughters and sons experiencing the death of both parents reported greater declines in self-esteem, lower levels of mastery, and lower levels of psychological wellness. Daughters additionally reported a greater increase in depressive symptoms and a greater decline in positive affect (happiness). Sons additionally reported significantly higher odds of binge drinking and a greater decline in health. Overall, death of both parents appeared to have severe negative effects for both daughters and sons relatively equally.

We also note that we found some general evidence of the well-being value of having both parents alive in contrast to having one or both parents dead during adulthood. Even without

having experienced a recent parent loss, women with one or both parents dead reported a greater increase in depressive symptoms, a greater decline in global happiness, a lower level of personal mastery, and a lower level of psychological wellness when contrasted with their women peers who continued to have both parents alive during the five-year period studied.

There was one inconsistent indication concurrently of a greater increase in self-esteem for this group of women. We can only speculate that perhaps this effect is some evidence of renewed ego strength from having worked through the loss of a parent/parents for a longer period, and perhaps having successfully reconfigured the self-identity that Umberson (2003) found to be so shaken up by more recent parent loss.

For men, the most robust evidence of the well-being impact of having one or both parents dead in contrast to both alive came through their reports of a greater decline in self-assessed physical health over five years (in contrast to their men peers who had both parents alive). Overall, we might conclude that, for adults, having one or both parents dead in contrast to having both parents alive is associated with generally poorer psychological well-being over time for women and poorer physical health over time for men.

Our results are partly congruent with those of Umberson and Chen (1994) who did a somewhat similar analysis across a three-year time frame. Similar to their results, we also found that loss of a mother led to a greater decline in sons' health over time. However, we did not find the same association between loss of father and greater increase in alcohol consumption as measured by number of drinks. By contrast, we used a measure of binge drinking and found that it was loss of mother that led to more binge drinking among women, as well as loss of both parents leading to more binge drinking among men. In subgroup analyses Umberson and Chen

found that it was mainly certain subgroups of men that experienced a greater increase in psychological distress over time due to a loss of mother. We found that living with one or both parents dead (in contrast to both alive), or having both die led to a greater increase in psychological distress for women, and that loss of father led to a greater increase in psychological distress for men.

The inconsistency in our results may be due to the fact that we had a slightly different time frame for analysis—three vs. five years. And we set up our contrast groups somewhat differently (we included a both parents died group, and used both parents alive as the reference group). Our measure of alcohol consumption was also different—emphasizing binge drinking in contrast to a linear number of drinks. Umberson and Chen also looked at various two-way and three-way interactions across subgroups. We emphasized particularly an examination of gender differences, and within-group differences within gender. But both of our analyses lead to similar conclusions overall—that there are negative mental and physical effects over time for adults due to parent loss.

Both of these national studies also give credence to what smaller studies with more limited samples have indicated—parent loss is associated with problematic outcomes, some short-term, and sometimes long-term, and should not be underestimated (Birchnell, 1975; Horowitz et al., 1981; McHorney & Mor, 1988, Moss et al., 1993; Sanders, 1979-80, Scharlach, 1991).

Our study is limited in not taking into account the numerous life course relationship quality factors and sociodemographic factors that we might expect may further modify effects of parent loss on well-being. We note that Umberson and Chen examined fourteen such factors, in

addition to gender--both for two-way interactions, and three-way interactions with gender--and found only three factors modifying effects on psychological distress (mother's functional health for mother's death, father's drinking problem and father's mental health in childhood for father's death). Only mother's violent behavior modified effects of mother's death on alcohol consumption; age, marital status, emotional support from father, father's drinking, and frequency of contact with father modified effects of father death on alcohol consumption. None of the factors studied by Umberson and Chen modified the effects of mother's or father's death on physical health. Therefore, although it is important to further consider these subgroup differences, there is also evidence to suggest that the story of negative effects on mental and physical well-being is not limited to a few specific groups.

We also acknowledge that due to a five-year gap in time, we may be missing some of the shorter-term negative effects for persons who lost a parent two to five years prior to their second reports. But the fact that we still find the negative effects we do in this population-level analysis, even when we may be underestimating shorter-term negative effects (e.g., within two years of a loss), further suggests the significance of the negative effects on psychological and physical health we did find here.

### Implications

The results from this study have several implications for health care professionals, family life educators, clinical psychologists, marriage and family therapists, and other practitioners working with adults. First, it appears time to recognize the importance of addressing the significance of parent loss for adults in family life education and practitioner education and training. Family life educators should include attention to preparing adults to anticipate that the

loss of a parent or parents may not be an easy transition. It would be helpful if adults were allowed to understand that they are not abnormal if they experience a challenging time with these losses. Just because it is relatively expectable to lose parents to death during adulthood, due to the long-term ties, life history, and linked lives and attachments associated with the mother-adult child bond and the father-adult child bond, it is not uncommon for the death of a parent to be a psychologically and physically challenging, as well as a potentially transformative event (Umberson, 2003). Umberson's (2003) qualitative work suggests that adults experiencing filial bereavement are ashamed to talk about their troubling thoughts, feelings, and symptoms, because there is no expectation that filial bereavement should be a big "problem," or that there is a need for very much support for or very much time to process these losses. This state of affairs in family life education and clinical support for aging families needs to be addressed and improved.

Given the evidence that parent loss can also impact marital interactions and marital quality (Umberson, 1995, 2003), it is also important that those doing counseling with couples be cognizant of the potential issues between couples that may emerge when one member of the couple loses a parent to death. Once again, due to a societal minimizing of this loss, a marital partner may inappropriately feel their bereaved partner should "just get over it," and may deride or misunderstand the grieved partner, unless there is better overall understanding of the depth of this loss.

Filial bereavement may also spill over into how an adult may continue to care for his or her own children, particularly if these children are still young. The death of an adult's parent means that the children of that adult have also lost a grandparent. Therefore, it may be advisable

that such a death be considered and supported by family life educators and practitioners in a holistic family systems fashion (Abeles, Victor, & Delano-Wood, 2004).

### Conclusions

In summary, our prospective longitudinal study of parent loss has led us to the following tentative conclusions: 1) Death of mothers and/or fathers can lead to significant negative effects on both psychological well-being and self-reported physical health for both daughters and sons. 2) Death of a father leads to more negative effects for sons than for daughters. 3) Death of a mother leads to more negative effects for daughters than for sons. 4) Negative effects of parent loss are reflected more in men's physical health reports than women's. 5) Overall, there are not consistent gender differences in the effects of parent loss.

Future research should continue to further explore the long-term as well as short-term mental and physical well-being consequences of parent loss for adults. Future research should also further examine additional factors, such as differences in past and recent relationship quality, differences in culture, and differences in other sociodemographic factors, which may moderate the relationships between parent loss and well-being. Beyond preloss factors that may moderate the associations between loss and well-being, it is also important for future research to consider postloss factors that can help attenuate the impact of parent loss on well-being.

Family life educators and clinicians should help bring the problems that may accompany parent death "out of the closet," and work to develop educational preparation and resources and strategies to optimally support the well-being of individuals, couples, and families where an adult child is experiencing filial bereavement. Additional research attention to this topic is important to help further illuminate the many ways in which parent-child relationships continue to be an important factor in determining well-being for both parents and adult children across the adult life course. Additional practitioner attention is important to help adult children, their partners, and their families as positively as possible traverse the life course experience of death of parents.



### References

- Abeles, N., Victor, T. L., & Delano-Wood, L. (2004). The impact of an older adult's death on the family. *Professional Psychology: Research and Practice*, 35(3), 234-239.
- Bengtson, V. L., & Allen, K. R. (1993). The life course perspective applied to families over time. In P. G. Boss, W. J. Doherty, R. LaRossa, W. R. Schumm, & S. K. Steinmetz (Eds.), *Sourcebook of family theories and methods: A contextual approach* (pp. 469-504). New York: Plenum.
- Bengtson, V. L., Rosenthal, C. J., & Burton, L. M. (1990). Families and aging: Diversity and heterogeneity. In R. Binstock & L. George (Eds.), *Handbook of aging and the social sciences* (3<sup>rd</sup> ed., pp. 263-287). San Diego, CA: Academic Press.
- Birtchnell, J. (1975). Psychiatric breakdown following recent parental death. *British Journal of Medical Psychology*, 48, 379-390.
- Bowlby, J. (1969). *Attachment and loss. Vol. 1: Attachment*. London: Hogarth Press.
- Bowlby, J. (1973). *Attachment and loss. Vol. 2: Separation, anxiety, and anger*. London: Hogarth Press.
- Bowlby, J. (1979). *The making and breaking of affectional bonds*. London: Tavistock.
- Bowlby, J. (1980). *Loss, sadness, and depression*. New York: Basic Books.
- Bryant, F. B., & Veroff, J. (1982). The structure of psychological well-being: A sociohistorical analysis. *Journal of Personality and Social Psychology*, 43(4), 653-673.
- Chodorow, N. (1978). *The reproduction of mothering: Psychoanalysis and the sociology of gender*. Berkeley, CA: University of California.
- Cicerelli, V.G. (1983). Adult children's attachment and helping behavior to elderly parents. *Journal of Marriage and the Family*, 45, 815-822.
- Cicerelli, V. G. (1991). Attachment theory in old age: Protection of the attached figure. In K. Pillemer & K. McCartney (Eds.), *Parent-child relations across the life span* (pp. 25-42).

Hillsdale, NJ: Ehlbaum.

Cicerelli, V. G. (1993). Attachment and obligation as daughters' motives for caregiving behavior and subsequent effect on subjective burden. *Psychology and Aging*, 8, 144-155.

Cooney, T., & Uhlenberg, P. (1992). Support from parents over the life course: The adult child's perspective. *Social Forces*, 71, 63-84.

Eggebeen, D., & Hogan, D. (1990). Giving between the generations in American families. *Human Nature*, 1, 211-232.

Elder, G. H., Jr. (1998). The life course of human development. In W. Damon & R. M. Lerner (Eds.) *Handbook of child psychology: Vol. 1: Theoretical models of human development* (pp. 939-991). New York: Wiley.

Elder, G. H., Jr., & Johnson, M. K. (2003). The life course and aging: Challenges, lessons, and new directions. In R. A. Settersten, Jr. (Ed.), *Invitation to the life course: Toward new understandings of later life* (pp. 49-81). New York: Baywood.

Feeney J. A., Noller, P. (1990). Attachment style as a predictor of adult romantic relationships. *Journal of Personality and Social Psychology*, 58, 281-91.

Freud, S. (1920/1965). *A general introduction to psychoanalysis* (J. Rivere, trans.). New York: Washington Square Press.

Genevro, J. L., Marshall, R., & Miller, T. (2004). Report on bereavement and grief research. *Death Studies*, 28, 491-575.

George, L. K. (1993). Sociological perspectives on life transitions. *Annual Review of Sociology*, 19, 353-373.

Harris, M. (1995). *The loss that is forever*. New York: Dutton.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, 52, 511-24.

Horowitz, M., Krupnick, J., Kaltreider, N., Wilner, N., Leong, A., & Marmar, R. C. (1981).

- Initial psychological response to parental death. *Archives of General Psychiatry*, 38, 316-323.
- Idler, E. L., & Benyamini, Y. (1997) Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38, 21-37.
- Keyes, C. L. M., Shmotkin, D., & Ryff, C. R. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology*, 82, 1007-1022.
- Lamb, M. E. (1997a). Fathers and child development: An introductory overview and guide. In M.E. Lamb (Ed.), *The role of the father in child development* (3<sup>rd</sup> Ed.)(pp. 1-18). New York: Wiley and Sons.
- Lamb, M. E. (1997b). The development of father-infant relationships. In M.E. Lamb (Ed.), *The Role of the father in child development* (3<sup>rd</sup> Ed.)(pp. 1-18). New York: Wiley and Sons.
- McHorney, C. A., & Mor, V. (1988). Predictors of bereavement depression and its health services consequences. *Medical Care*, 26(9), 882-893.
- Moss, M. S., Moss, S. Z., Rubinstein, R., & Resch, N. (1993). Impact of elderly mother's death on middle age daughters. *International Journal of Aging and Human Development*, 37(1), 1-22.
- Moss, M. S., Resch, N., & Moss, S. Z. (1997). The role of gender in middle-age children's responses to parent death. *Omega: Journal of Death and Dying*, 35(1), 43-65.
- Parsons, Talcott. (1942). Age and Sex in the Social Structure of the United States. *American Sociological Review*, 7(5), 604-616.
- Pearlin, L., Lieberman, M., Menaghan, E., & Mullan, J. (1981). The stress process. *Journal of Health and Social Behavior*, 22, 337-356.
- Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton

University Press.

- Ross, C. E., Mirowsky, J., & Goldsteen, K. (1990). The impact of the family on health: The decade in review. *Journal of Marriage and the Family*, 52(4), 1059-1078.
- Rossi, A. (1984). Gender and parenthood. *American Sociological Review*, 49(1), 1-18.
- Rossi, A. S., & Rossi, P. H. (1990). *Of human bonding: Parent-child relations across the life course*. New York: Aldine de Gruyter.
- Ryff, C. (1989). Happiness is everything, or is it? *Journal of Personality and Social Psychology*, 6, 1069-1081.
- Ryff, C.D., & Keyes, C.L.M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69, 719-727.
- Sanders, C. M. (1979-80). A comparison of adult bereavement in the death of a spouse, child, and parent. *Omega*, 10(4), 303-322.
- Schlarlach, A. E. (1991). Factors associated with filial grief following the death of an elderly parent. *American Journal of Orthopsychiatry*, 61, 307-313.
- Shanas, E., Townsend, P., Wedderburn, D., Friis, H., Milhoj, P., & Stehouwer, J. (1968). *Old age in three industrial societies*. New York: Atherton Press.
- Simpson, J. A. (1990). Influence of attachment styles on romantic relationships. *Journal of Personality and Social Psychology*, 59, 971-80.
- Spitz, G., & Logan, J. (1992). Helping as a component of parent-adult child relations. *Research on Aging*, 14(3), 291-312.
- Umberson, D. (1995). Marriage as support or strain? *Journal of Marriage and the Family*, 57, 709-723.
- Umberson, D. (2003). *Death of a parent: Transition to a new adult identity*. Cambridge: Cambridge University Press.
- Umberson, D. & Chen, M. D. (1994). Effects of a parent's death on adult children: Relationship salience and reaction to loss. *American Sociological Review*, 59, 152-168.

- Watkins, Susan Cotts, Janet A. Menken and John Bongaarts. (1987). Demographic Foundations of Family Change. *American Sociological Review*, 53, 346-358.
- Winsborough, H. H., Bumpass, L. L., & Aquilino, W. S. (1991). *The death of parents and the transition to old age*. Working Paper NSFH-39. Madison, WI: University of Wisconsin Center for Demography & Ecology.
- Winship, C., & Radbill, L. (1994). Sampling weights and regression analysis. *Sociological Methods and Research*, 24, 230-263.

Death of Parents--28

Table 1

*Weighted Percentage Distribution (Unweighted N) for Death of Parents over Five Years*

Parent Status	Total Sample		Women		Men	
	Unweighted N	Weighted Percent	Unweighted N	Weighted Percent	Unweighted N	Weighted Percent
Both alive T1-T2 (omitted)	3340	36.5	1990	34.9	1350	38.3
One or both dead T1-T2	4218	48.5	2649	49.7	1569	47.1
Father died T2	698	7.2	438	7.2	260	7.3
Mother died T2	592	6.9	376	7.4	216	6.4
Loss of both parents T2	85	.9	53	.9	32	.9
Valid cases	8933		5506		3427	

Source: National Survey of Families and Households, 1987-1993, primary respondents.

Table 2

*Descriptive Statistics for Analytic Variables*

Variables	M	SD	Range	Cronbach's alpha
<b>Mental and Physical Health Outcomes</b>				
Depressive symptoms (T1)	2.08	1.18	0 - 4.44	.93
Depressive symptoms (T2)	2.06	1.14	0 - 4.44	.93
Binge drinking (T2)	.16	.36	0 - 1	
Global happiness (T1)	5.45	1.35	1 - 7	
Global happiness (T2)	5.41	1.32	1 - 7	
Self-esteem (T1)	4.14	.59	1 - 5	.65
Self-esteem (T2)	4.09	.64	1 - 5	.64
Personal mastery (T1, 1-item)		3.63	.96	1 - 5
Personal mastery (T2)	18.13	3.36	5 - 25	.65
Psychological wellness (Ryff) (T2)	84.71	11.59	19 - 108	.81
Self-assessed health (T1)	4.07	.81	1 - 5	
Self-assessed health (T2)	3.95	.84	1 - 5	
<b>Demographic Characteristics</b>				
Gender (female = 1)	.53	.50	0 - 1	
Age (T1)	43.04	16.47	16 - 95	
Race/ethnicity (African-American=1)	.18	.38	0 - 1	
Employed (T2)	.63	.48	0 - 1	
Years of education	12.89	3.05	0 - 20	
Household income (in thousands \$)	45.24	41.43	0 - 853.60	
Missing on income data	.03	.17	0 - 1	
Child $\leq$ 18 in Household (T2)	.38	.49	0 - 1	

Source: National Survey of Families and Households 1987-93, primary respondents (N=8933).

Note: Descriptive statistics calculated using weighted data.

# Death of Parents--30

Table 3  
Estimates for the Effects of Parent Death on Mental and Physical Health by Gender

Variable	Depressive symptoms <sup>d</sup>		Binge drinking <sup>c</sup>		Global happiness <sup>d</sup>		Self-esteem <sup>d</sup>		Personal mastery <sup>d</sup>		Psychological wellness <sup>d</sup>		Self-assessed physical health <sup>d</sup>	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Both alive T1-T2 (omitted)	—	—	1.00	1.00	—	—	—	—	—	—	—	—	—	--
One or both dead T1-T2	.07* (.04)	.07+ (.05)	1.12 (.14)	.93 (.11)	-.13** <sup>c</sup> (.06)	-.02 <sup>c</sup> (.07)	.04* (.02)	-.04+ (.03)	-.34** <sup>b</sup> (.13)	-.07 <sup>b</sup> (.15)	-1.11** (.44)	-.44 (.53)	-.05+ (.03)	-.10** (.03)
Father died T2	-.01 <sup>a</sup> (.06)	.18** <sup>a</sup> (.07)	1.11 (.20)	.92 (.17)	-.04 (.08)	.03 (.10)	-.01 (.03)	-.05+ (.04)	-.45** (.18)	-.38* (.22)	-.93+ <sup>c</sup> (.61)	-1.88** <sup>c</sup> (.77)	-.04 (.04)	-.06 (.05)
Mother died T2	.07 (.06)	.07 (.08)	1.43* (.21)	1.26 (.19)	-.12+ (.09)	-.21* (.11)	-.09** (.04)	-.03 (.04)	-.49** (.19)	-.22 (.24)	-1.23* (.67)	-1.72* (.88)	-.05 (.05)	-.15** (.06)
Both parents died T2	.31* (.15)	.11 (.20)	1.41 (.49)	2.68** (.45)	-.48** <sup>b</sup> (.17)	.12 <sup>b</sup> (.25)	-.21** (.09)	-.34*** (.11)	-1.28** (.47)	-1.36** (.60)	-3.78** (1.56)	-4.66* (2.15)	-.10 <sup>c</sup> (.11)	-.42*** <sup>c</sup> (.14)
<u>Time 1 Variables</u>														
Depressive symptoms	.38*** (.01)	.35*** (.02)	1.04 (.05)	1.08* (.04)							-2.18*** (.14)	-2.10*** (.17)		
Global happiness					.24*** (.01)	.23*** (.02)								
Self-esteem							.35*** (.01)	.33*** (.02)						
Personal mastery (1-item)									.74*** (.05)	.76*** (.06)				
Self-assessed health													.49*** (.01)	.41*** (.02)
R <sup>2</sup>	.19	.17			.09	.09	.15	.16	.12	.11	.27	.24	.14	.11
-2 Log Likelihood			2627.69	3208.46										
df			14	14										

Source: National Survey of Families and Households, 1987-1993, primary respondents (N=8933).

## Death of Parents--31

+  $p \leq .10$ . \*  $p \leq .05$ . \*\*  $p \leq .01$ . \*\*\*  $p \leq .001$ . (one-tailed test)

<sup>a</sup> =  $p \leq .01$ . <sup>b</sup> =  $p \leq .05$ . <sup>c</sup> =  $p \leq .10$ . (one-tailed test); significant gender differences found in combined gender analysis

Note: All models also included controls for race/ethnicity, employment status, years of education, household income, missing on income, marital status, and presence of a child  $\leq$  age 18 in household. Analyses used unweighted data. F tests for all models were significant at  $p < .0001$ .

<sup>d</sup> = Unstandardized regression coefficients from OLS models; standard errors in parentheses.

<sup>e</sup> = Odds ratios (exponentiated B logit coefficients) from logistic regression models; standard errors of logit coefficients in parentheses.

## Appendix

### Scale Items

#### I. Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977)

On how many days during the past week (0-7) did you....

- Feel you could not shake of the blues even with help from your family and friends?
- Feel bothered by things that usually don't bother you?
- Feel lonely?
- Feel sad?
- Feel depressed?
- Have trouble keeping your mind on what you were doing?
- Not feel like eating, your appetite was poor?
- Feel everything you did was an effort?
- Feel fearful?
- Sleep restlessly?
- Talk less than usual?
- Feel you could not "get going"?

#### II. Self-esteem (Rosenberg, 1965)

Please indicate how much you agree or disagree with the following statements (1=strongly disagree, 5 = strongly agree):

- On the whole I am satisfied with myself.
- I am able to do things as well as other people.
- I feel that I'm a person of worth, at least on an equal plane with others.

#### III. Personal mastery (Pearlin et al., 1981, NSFH 2 first four items)

Please indicate how much you agree or disagree with the following statements (1= strongly disagree, 5=strongly agree):

- I can do just about anything I really set my mind to.
- Sometimes I feel that I'm being pushed around in life.\*
- There is really no way I can solve some of the problems I have.\*
- I have little control over things that happen to me.\*
- I have always felt pretty sure my life would work out the way I wanted it to.<sup>a</sup>

IV. Psychological wellness (18 items; 3 items for each of 6 subscales; Ryff, 1989)

Please indicate how much you agree or disagree with the following statements (1 = strongly disagree, 5 = strongly agree).

Autonomy

- I tend to be influenced by people with strong opinions.\*
- I have confidence in my opinions, even if they are different from the way most other people think.
- I judge myself by what I think is important, not by the values of what others think is important.

Positive Relations with Others

- Maintaining close relationships has been difficult and frustrating for me.\*
- I have not experienced many warm and trusting relationships with others.\*
- People would describe me as a giving person, willing to share my time with others.

Purpose in Life

- I live life one day at a time and don't really think about the future.\*
- Some people wander aimlessly through life, but I am not one of them.
- I sometimes feel as if I've done all there is to do in life.\*

Self-Acceptance

- I like most parts of my personality.
- When I look at the story of my life, I am pleased how things have turned out.
- In many ways, I feel disappointed about my achievements in life.\*

Environmental Mastery

- The demands of everyday life often get me down.\*
- In general, I feel I am in charge of the situation in which I live.
- I am quite good at managing the many responsibilities of my daily life.

Personal Growth

- I gave up trying to make big improvements or changes in my life a long time ago.\*
- I think it is important to have new experiences that challenge how I think about yourself and the world.
- For me, life has been a continuous process of learning, changing, and growth.

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\* Item reverse-coded.

<sup>a</sup> This item included both at NSFH1 and NSFH2.

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