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The Long-Term Consequences of Childbearing: Physical and Psychological Well-Being of Mothers in Later Life

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Abstract

Growing evidence points to relationships between patterns of childbearing and health outcomes for mothers; yet a need remains to clarify these relationships over the long-term and to understand the underlying mechanisms. Using data from the National Longitudinal Survey of Mature Women (N=1,608), I find that the long-term consequences of childbearing vary by health outcome. Early childbearing is associated with higher risk of ADL limitations at ages 65–83, though effects appear stronger among white than black mothers until SES is controlled. Early childbearing is also associated with greater levels of depressive symptomatology, though this association is mediated by SES and health. Late childbearing is associated with more depressive symptoms net of early life and current SES, child proximity and support, and physical health. Finally, I find no significant effects of high parity. These findings emphasize the need to better understand the mechanisms linking childbearing histories to later physical and psychological well-being.

Keywords

fertility; disability; depression; life course; weathering hypothesis

Despite a trend toward increasing childlessness in the US, most women become mothers at some point during their lives (Dye, 2005). For these women, factors such as when to have children and how many children to have become important questions that likely hold widespread implications over the life course. Indeed, timing of childbearing and family size have been linked to a broad range of temporally proximal outcomes, including socioeconomic attainment and health-related pregnancy outcomes (McElroy 1996; Ozalp, Tanir, Sener, Yazan, and Keskin 2003; Prysak, Lorenz, and Kisly 1995; Waite and Moore 1978). More recently, researchers have begun asking questions about the *long-term* health consequences of childbearing. Growing evidence points to a relationship between early childbearing and number of children, or parity, and health outcomes later in life (e.g., Grundy and Holt 2000; Mirowsky and Ross 2002). With more women delaying childbearing, it is also important to examine the impact of late childbearing. Moreover, multiple health outcomes should be explored to capture a wider range of health consequences linked to childbearing patterns. This study contributes to this growing body of research by examining the links between the timing of childbearing and parity and physical and mental health in later life by systematically investigating these relationships and the roles of various social, economic, and health characteristics as explanatory mechanisms across social statuses.

Available evidence provides mixed support for links between patterns of childbearing and physical health outcomes. Early childbearing has been linked to worse physical health

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relatively consistently across studies, generally indicated by disability (Grundy and Holt 2000; Mirowsky 2002). However, findings from studies investigating the relationship between number of children and physical health are less consistent. In some research, high parity is found to be detrimental to physical health (Grundy and Holt 2000; Grundy and Tomassini 2005). In other studies, no relationship is observed (Moen, Dempster-McClain, and Williams 1992; Kington, Lillard, and Rogoswsk 1997). While these studies represent important advancements to health research, further attention is warranted for the examination of the impact of childbearing patterns across both physical and emotional dimensions of health.

Research on the effects of parenthood on depression largely compares parents and childless adults, with less attention given to differences *among* parents (Evenson and Simon 2005). In one recent study addressing this gap in research, Evenson and Simon (2005) find that while parents are generally more depressed than those without children, parents of adult children are not significantly more depressed than the childless. This finding suggests the possibility that there may not be long-term mental health consequences of having children. This does not however provide information about how health differences may be evident in later life for mothers who differ in childbearing histories. Such differences among parents should be considered, as most women will become mothers. One important area of inquiry is age at first birth. Available evidence on how the characteristics of childbearing distinguish mothers in terms of psychological well-being suggests negative consequences associated with early first births (e.g., Koropeckyj-Cox, Pienta, and Brown 2007; Mirowsky and Ross 2002). Still, it is unclear if and how late completion of childbearing and parity influence health over the long-term. There are thus good reasons to investigate health differences among mothers with consideration of childbearing patterns, including early and late childbearing.

When a woman begins childbearing, how many children she has, and when she completes childbearing may influence her pursuit or maintenance of social and economic status (Hofferth 1984; Hofferth, Reid, and Mott 2001), availability of social support and sources of care (Knodel, Chayovan, and Siriboon 1992), and physical fitness (Williamson, Madans, Pamuk, Flegal, Kendrick, and Serdula 1994), to name only a few examples. Moreover, the timing of childbearing and parity are determined, at least in part, by the circumstances of early life and the cultural and social norms or scripts that shape the context in which fertility decision making occurs (Griffith 1973; Rindfuss and St. John 1983). Overall, fertility both *shapes* and *is shaped by* various factors, including social, economic, and health status—that is, both causal and selection mechanisms are implicated. These mechanisms likely differ by the health outcome examined. Thus, the complex pathways between childbearing and later well-being warrant systematic attention.

In this paper, I employ a life course perspective (Elder, Johnson, and Crosnoe 2004; Kuh and Ben-Schlomo 2004) and data from a nationally representative cohort of women aged 30–44 years in the United States in 1967 to investigate the relationship between childbearing histories and later life well-being (35 years later when the cohort is 65+ years old), with particular attention to influences of early life and adult social and economic circumstances. Specifically, I examine the timing of first birth, parity, and age at last birth as they relate to physical disability (indicated by impairments in activities of daily living) and depressive symptomatology among mothers in later life. I also explore race interactions with the timing of first birth in light of the weathering hypothesis (Geronimus 1994, 1996, 2003).

BACKGROUND

Research on the long-term health consequences of childbearing has largely focused on age at first birth and parity, and their effects on self-rated health status and mortality. The patterns that emerge suggest that early childbearing and high parity are detrimental for well-being over

the long-term. For example, childbearing during the teens or early 20s is associated with higher rates of mortality (Doblhammer 2000; Mirowsky 2005), and mothers with fewer than about five children have a mortality advantage over high parity mothers (Doblhammer and Oeppen 2003; Grundy and Tomassini 2005; Smith, Mineau, and Bean 2002). Late completion of childbearing may also have long-term consequences. Moreover, beyond mortality and self-rated health status, childbearing characteristics may have effects on other dimensions of physical health as well as mental health at older ages. Relatedly, the mechanisms linking childbearing patterns to later well-being likely vary by health outcome.

The mechanisms linking fertility to later life health are potentially numerous and varied. Fertility may relate to later life health outcomes through distinct etiologic pathways that may be physiological and/or social in nature. As examples, early childbearing and high parity may hinder socioeconomic status attainment (McElroy 1996; Furstenberg 1976; Waite and Moore 1978), while late childbearing may initiate physical health problems (e.g., hypertension; Seely 1999). Parity and the timing of childbearing may also be related to health in later life via social pathways of support and care (Smith et al. 2002). Additionally, geographic proximity of children to their parents is important for the receipt of support and care (Yi and Vaupel 2004), particularly among more contemporary populations among whom migration is relatively common. Although the mechanisms may be causal, selection processes are also possible.

Beyond the processes set into motion by childbearing, apparent relationships between fertility and later life health may be an artifact of lack of controls for earlier life conditions that may influence both reproduction and health (cf. Rich-Edwards 2002). In terms of health selection, frail or unhealthy women may have difficulty conceiving and giving birth and are also more apt to be ill. Some of the same social factors that may select young people into parenthood and/or result in large family size—such as low SES in childhood/adolescence and alternative (to two biological parent) family structures—are shown to have an effect on health, psychological morbidity, and mortality later in the life course (Gilman, Kawachi, Fitzmaurice, and Buka 2002; Hayward and Gorman 2004; Hertzman, Power, Matthews and Manor 2001; Preston, Hill, and Drevenstedt 1998). Several recent studies have recognized the potential of selection mechanisms driving this relationship (Doblhammer and Oeppen 2003; Grundy and Tomassini 2005), though most studies in this area have been unable to evaluate the role of early life circumstances. Although the present study is unable to speak to the issue of health selection, the analyses examine how the inclusion of pre-childbearing socioeconomic factors alters the relationship between childbearing histories and later life physical and/or mental health.

This paper is guided by questions that point to the need for understanding fertility and its consequences within a life course framework that recognizes childbearing characteristics—such as timing and parity—as a process of mutual influence of and on social, economic, and health statuses that may lead to observed health differentials beyond the reproductive period. A life course perspective highlights the intersection of individual and historical time. The women studied here were either born or coming of age during the Great Depression; some were mothers of the Baby Boom. This period encouraged the search for traditional homemaker roles (Elder 1974), and this group of women may be characterized as having relatively early and high fertility (Rindfuss, Morgan, and Swicegood 1988). Arguably, the culture of childbearing influences women's reproductive patterns and may also shape the consequences of childbearing patterns.

Early Childbearing

Previous research provides evidence of a link between early childbearing and later health outcomes. In general, studies suggest that early parenthood—having a first child around age 22 or 23—is detrimental to physical health in later life (Grundy and Holt 2000; Mirowsky

2002). Early childbearing has also been linked to greater psychiatric morbidity among British women (Maughan and Lindelow 1997) and rates of depression in the US (Deal and Holt 1998; Kalil and Kunz 2002; Koropeckyj-Cox et al. 2007; Mirowsky and Ross 2002). One study finds that between 28 and 48 percent of adolescent mothers are depressed (Deal and Holt 1998). This general relationship between early first birth and depression is corroborated by others, who find a detrimental effect of first births in the early to mid-20s (Koropeckyj-Cox et al. 2007; Mirowsky and Ross 2002) and with births at age 20 or younger (Kalil and Kunz 2002).

In terms of mechanisms, early childbearing is typically associated with negative social, rather than direct medical, costs to the mother (Makinson 1985; Menken 1972). For example, giving birth early in life may lead to the truncation of educational attainment (McElroy 1996; Waite and Moore 1978) and subsequent socioeconomic disadvantage. Although a portion of the association between early childbearing and physical health may be explained by lower educational attainment, more children, and prolonged unemployment and economic hardship (Mirowsky 2002), it is found to persist net of key social and economic controls (Grundy and Holt 2000). Observed differences in later life depression may be due, in part, to the fact that people who delay the transition into parenthood tend to have later first marriages, higher educational attainment, lower risk of economic hardship, and better current physical health (Koropeckyj-Cox et al. 2003; Mirowsky and Ross 2002). With regard to social selection factors, young people from disadvantaged backgrounds are at a greater risk for teenage childbearing (Singh, Darroch, Frost, and the Study Team 2001).

Racial differences in the relationship between age at first birth and later life health warrant additional investigation in light of the ‘weathering hypothesis’ (Geronimus, 1994, 1996, 2003). This framework emphasizes that health insults accumulate with age at a faster rate for black than white women due to their experience with racism and the consequences of disproportionate low socioeconomic status. From this process, it is expected that African American women beginning childbearing at younger ages will be in better health relative to older black women than is the case among whites (Geronimus, 1996). Indeed, tests of the weathering hypothesis suggest that “…over the reproductive age span, black women’s health may deteriorate more rapidly than white women’s” (Geronimus, 1994:84). Overall, the weathering hypothesis suggests younger optimal ages at childbearing among blacks.

Drawing on available theory and evidence, I hypothesize that:

H1: Early childbearing will be associated with negative physical and psychological health consequences.

H2: The negative effects of early childbearing will be stronger among white than black women.

H3: Social and economic circumstances across the life course should attenuate the relationship between early childbearing and later life health.

Late Childbearing

Existing studies on late childbearing and later life health present inconsistent findings. Alonzo (2002) finds that, among women in the US, having a child after the age of 35 is detrimental for the health of women in later life. More specifically, women who gave birth after age 35 had higher odds of a clinical assessment of less than good mobility at ages 50 and older, but self-reported limitations did not significantly differentiate late childbearers from those who completed childbearing earlier. However, the detection of a relationship may be importantly determined by the measurement of the health outcome under consideration. Mirowsky (2002) shows increases in self-reported physical impairments associated with first births at

ages 35 and older. There is some evidence that this may vary across race/ethnic groups or by cultural/social patterns. Older Chinese women with histories of late childbearing appear *less* likely to have limitations in activities of daily living (ADLs) (Yi and Vaupel 2004). Thus, while late childbearing may be associated with worse physical health, this pattern may be observed only for certain groups and its observation may be dependent upon the strategy used to garner health information. In terms of mental health, having children late may be associated with greater depression. An examination of the pivotal and optimal ages of first births for depression shows increases in levels of depression with first births after the late 30s (Mirowsky and Ross 2002).

Mechanisms that may be at work in the late childbearing and health relationship are less clear. On one hand, postponed childbearing may allow a woman to attain her desired level of education, marry and establish a stable relationship and home environment, and improve financial security. Moreover, mothers (particularly late childbearers among whom offspring are relatively young and able to provide assistance) may be more likely to receive care in old age from their children (Yi and Vaupel 2004). However, having children late (ages 35 and older), particularly first births, is associated with negative health during the time of pregnancy, such as pre-eclampsia, pregnancy-induced hypertension, and gestational diabetes (Jolly, Sebire, Harris, Robinson, Regan 2000; Ozalp, Tanir, Sener, Yazan, and Keskin 2003; Prysak, Lorenz, and Kisly 1995), with potential for long-term health consequences (Seely 1999). It has also been posited that more robust women may age at slower rates and are therefore able to have children late in the reproductive cycle (Yi and Vaupel 2004). Finally, as noted above, the weathering hypothesis suggests that having children later in life should be worse for black women than for white women due to black women's more rapid health decline across the reproductive years.

Although the evidence is somewhat ambiguous with regard to how late childbearing may relate to later life physical health, I hypothesize that:

H4: Late childbearing will be associated with worse physical and mental health in later life.

H5: Related to the weathering hypothesis, late childbearing is expected to interact with race such that black women completing childbearing later will be less healthy than white women with late births.

H6: Differences in social, economic, and health status, as well as the availability of support from children should account for some observed differences in health by late childbearing.

High Parity

There is also mixed evidence for a parity-later life health relationship. Looking at the long-term physical health effects of parity among British women, Grundy and colleagues (Grundy and Holt 2000; Grundy and Tomassini 2005) find a higher likelihood of reporting a physical limitation among women who had at least five children, even controlling for the timing of childbearing (Grundy and Holt 2000), suggesting independent effects of parity. Among women in the US, there is limited evidence for a parity-disability relationship. On one hand, Kington and colleagues (1997) find women with six or more children (compared to those with three to five children) to have significantly higher rates of having some physical role limitation. However, they find no differences by parity when measuring disability as having limitations in ADLs. Another study finds no association between number of children and limitations in activities such as walking up and down stairs or doing heavy work around the house (Moen et al. 1992). With regard to mental health, there is no evidence of a high parity-later life depression relationship, for either African American or white women (Sudha et al. 2006). More

specifically, there is no significant effect of high parity (measured as having six or more children) on depressive symptoms later in life for either group.

An inconsistency in findings is also present in considerations of potential risk and protective mechanisms associated high parity. It is reasonable to expect that a greater number of children may translate into greater economic costs (Bird 1997; Umberson and Gove 1989) as well as greater social support and sources of care (Yi and Vaupel 2004), leading to differing expectations about the parity-health relationship. The greater economic costs of having a large number of children may put women at a higher risk for negative health problems as they age. Therefore, we would expect socioeconomic status to account for some of the observed disadvantage in health. Also, it is possible that receiving social support from children buffers some of the negative effects of high parity, though some research is contradictory.

Contrary to what we would expect if high parity women were receiving more or better care from their children, analysis of contemporary European women finds that those with higher parities fare increasingly worse as they age (Doblhammer 2000), casting doubt on the notion that more children mean more and/or better care for the mother. One possibility is that the beneficial effect of care from children in older age cannot counterbalance any negative effects that high parities may have on health. Another possibility is that high parity women have high parity kids, who are thus less able to devote resources to the support/care of their parents (Smith et al. 2002). Koropeckyj-Cox and colleagues (Koropeckyj-Cox, et al. 2007) find current maternal demands to be independently associated with later well-being, suggesting negative effects associated with having children or grandchildren in the household, rather than positive effects of social support. Finally, high parity mothers who receive care from their children may be less healthy and therefore in need of care. Thus, several such factors may prevent the expected care arrangements from working to benefit high parity women in later life health, and it is unclear whether or how support from children may matter for the relationship between parity and later life well-being.

Based on this review, I hypothesize that:

> H7: High parity will be negatively associated with physical health but not associated with mental health.
>
> H8: Socioeconomic status should reduce the association between parity and physical health.

Despite limitations in the availability of research, differences in the populations studied, and the methods and measures employed, it appears that there are potentially deleterious health effects associated with the timing of childbearing and parity later in life for mothers. However, as described above, these findings are not definitively supported within and across health outcomes. There is also substantial variation in the extent to which proposed mechanisms are considered, and less is known about the effects of the timing of childbearing completion compared with age at first birth. Many studies examine the effects of timing or parity on later health without controlling for co-varying aspects of fertility. Moreover, failure to investigate key social correlates of poor physical and mental health may lead to an overestimation of the effect of childbearing histories on later well-being.

In this paper, I attempt to overcome many of these limitations using a rich source of data. These data allow for the examination of childbearing histories with several characteristics modeled concurrently, many of the proposed mechanisms, and both physical and psychological health well beyond the reproductive years. In doing so, I address questions about the long-term health consequences of early childbearing, late childbearing, and high parity and examine whether proposed mechanisms linking fertility to later life well-being vary by health measure.

DATA AND METHODS

Data

I use data from the National Longitudinal Survey of Mature Women (NLS-MW). Multistage probability sampling was used to draw a representative sample of civilian, non-institutionalized women aged 30–44 years in 1967, with an oversample of black women (see US Department of Labor 2005 for more detailed information). The initial survey interviewed 5,083 women. Since then, the cohort has been interviewed a total of 20 times through 2003 when 2,237 (44 percent) of the original respondents were surveyed. Most sample attrition is due to the death of the respondent (N = 1,485 of the original respondents), with refusals (N=1,036) and failure to locate (N=325) making up the rest. The NLS-MW is one of the most extensive, long-running data collection efforts carried out with a cohort of Americans, providing a unique opportunity to study women at various life course stages with a sizeable sample to sustain multivariate analyses.

The analysis sample is limited to black and white mothers who persist through the final wave of the study, when health outcomes are measured. Due in part to the race/ethnic composition of the U.S. population in 1967, there are too few respondents of other race/ethnic groups to analyze (87 of the 5,083 original respondents were coded as “Other”—non-white and non-black). The analysis sample also excludes 27 cases with invalid or unlikely ages at first birth (i.e., under age 13). Missing values of family income were imputed using multiple imputation hotdeck procedures in STATA version 9 (Mander and Clayton 2000), and missing values on variables where values could not be estimated with confidence, such as type of residence at age 15, were dealt with using casewise deletion. The final analysis sample is comprised of 1,608 mothers.

To the extent that certain childbearing histories are associated with greater risks of early mortality (i.e., during the reproductive years), results may be conservative estimates of the effects of fertility on women’s health[1]. None of the three childbearing characteristics predicts attrition from the sample by the end of the survey in 2003, although as may be expected, other factors such as race, cohort, and education are associated with attrition. Moreover, multinomial logistic regressions with attrition as an outcome category show no significant differences between attrition and having ADL limitation by childbearing characteristics.

Dependent Measures

I examine two health outcomes, limitations in ADLs and depressive symptomatology, drawing from the final, 2003, wave of the NLS-MW when the majority of respondents were between the ages of 65–83 years. Disability, an important component of health, indicates a disconnection between environmental and social demands and physical ability (Long and Pavalko 2004; Verbrugge and Jette 1994). Limitations in ADLs have been described as “the most extreme level of functional impairment” (Yang and George 2005, 265). Moreover, while different types of limitations have been used in measures of functional activity limitation (Long and Pavalko 2004a, 2004b), there is much more consistency in the measurement of ADL limitations as an indicator of disability. I measure disability using four of six commonly cited activities (Katz, Downs, Cash, and Grotz 1970; Verbrugge and Jette 1994): 1) transferring in and out of bed, 2) bathing or showering, 3) eating, and 4) dressing. The others, toileting and continence, are not available in the NLS-MW. These items are used to construct a dichotomous indicator of

[1]Research has demonstrated substantive relationships between fertility variables and mortality with these and other data (Doblhammer 2000; Doblhammer and Oeppen 2003; Mirowsky 2005; Smith et al. 2002; Spence and Eberstein 2006). An examination of the effects of childbearing characteristics on mortality is beyond the scope of this paper.

whether the respondent had difficulty carrying out any of four activities of daily living (ADLs) without help.

Depression is often the focus of mental health research due to its high prevalence and far reaching consequences for people's lives (Turner and Lloyd 1999). It has also recently been cited among the top five causes of the global burden of disease by the World Health Organization and the leading cause of disability (Hyman, Chisholm, Kessler, Patel, and Whiteford 2006). Increasingly, researchers recognize a somatic component of many scales used to measure depressive symptoms, including the CES-D, which may be confounded with physical disability (Meeks, Murrell, and Mehl 2000; Ormel, Kempen, Penninx, Brilman, Beekman, Van Sonderen 1997).

In order to consider mental health while limiting cross-contamination in measurement with physical health, I use a 12-item version of the Center for Epidemiological Studies' Depression Scale (CES-D; Radloff 1977) that excludes eight items previously identified as somatic complaints (Blazer et al. 1998)[2]. Responses to each item indicate the frequency with which respondents experienced a given feeling on a scale ranging from 0 to 3, where 0 is rarely or none of the time and 3 is most or all of the time. Responses are summed, producing a possible range of 0–36, though no one in the sample scores higher than 34. A higher score on the index denotes higher levels of depressive symptoms. The index is highly reliable in this sample (alpha=.79).

Independent Measures

The primary predictor variables, *childbearing characteristics*, come from fertility histories collected by 1982 when the sample was aged 45–59 years old. By these ages, almost all childbearing is complete. Therefore, estimates are not biased by the inclusion of mothers whose fertility may not be complete. Women were asked about up to 16 children born to them. This direct method for collecting data on biological children ever born is arguably superior to surveys in which age at birth is calculated from indirect measures, such as birthdates of household members where precise relationships are unclear. Data on adopted and stepchildren are not used in these analyses. Although parenthood generally may affect women's health over the life course, limiting the analyses to biological children may capture some biological effects of childbearing[3].

This research focuses on three childbearing characteristics: early childbearing, late childbearing and high parity. Existing studies provide mixed guidance in defining "early" childbearing, suggesting detrimental effects of childbearing from about age 18 to age 23 (Grundy and Holt 2000; Grundy and Tomassini 2005, Kington et al. 1997; Mirowsky 2002). Therefore, I combine theoretical argument for a contextually dependent "normative" standard for the timing of childbearing (Neugarten 1968; Neugarten, Moore, and Lowe 1965) with an empirical approach that uses sample averages (Mirowsky 2002). Twenty is the modal age at first birth, with 21 and 22 as the median and mean age at first birth, respectively. This modal age is one year younger than the average age at first birth found in another sample of women in the US that includes younger women (Mirowsky 2002). I therefore measure early

[2]Items included in scale address how often in the past week the respondent felt: unable to shake the blues, as good as other people, hopeful about the future, life has been a failure, fearful, happy, lonely, people were unfriendly, enjoyed life, crying spells, sad, and disliked by other people. Excluded items are: bothered, poor appetite, trouble keeping mind on tasks, depressed, everything took extra effort, restless sleep, talked less than usual, and could not get going. Others have also suggested omitting items from disability scales that might be confounded with depression (Meeks et al. 2000); however, this should not be relevant with disability in ADLs given the severity of these limitations.

[3]Also, it is beyond the scope of this paper to examine differences in the effect of biological vs. step or adopted children. Issues of timing are certainly complicated by the inclusion of step/adopted—for example, does it matter when the child was born or how old the mother was when the child came to live with her or how old the child was relative to how old the mother was when the child came to live her?

childbearing using a dichotomous indicator of whether the respondent had her first child before age 21, compared to the reference category of those who first gave birth at the age of 21 or older.

I also examine the effects of late childbearing, distinguishing between mothers who complete childbearing at ages 35 and older from those who have their last child before age 35. This age is what is often referred to in medical practice as "advanced maternal age" and is associated with negative health consequences during the time of pregnancy (Jolly, Sebire, Harris, Robinson, Regan 2000; Ozalp, Tanir, Sener, Yazan, and Keskin 2003; Prysak, Lorenz, and Kisly 1995), with potential for long-term health consequences (Seely 1999). Moreover, demographers have traditionally considered ages 15–45 as the reproductive years, particularly around the time that these women were having children, though age 50 has also been considered the average end of the reproductive period. The latest age at childbirth in this sample is 48, and three-fourths of the women have their last child before age 35. Thus, late childbearing, as defined here, refers to the last decade or so of the reproductive period.

Lastly, models include a dichotomous indicator of high parity, measured as five or more children, in reference to 1–4 children. Previous research suggests important distinctions at four + (Grundy and Holt 2000), five+ (Grundy and Tomassini 2005), and six+ (e.g., Kington et al. 1997; Sudha et al. 2006). Alternative specifications of parity were considered, but did not significantly improve predictive power. Therefore, I operationalize high parity as having five or more children and model it concurrently with early and late childbearing.

It is important to note that although early childbearing, late childbearing, and high parity are not mutually exclusive, the problem of small cell size does not preclude concurrent modeling[4]. Despite some overlap, there is a sufficient distribution of the sample to support the simultaneous analysis of these variables, and as discussed below, independent effects are evident.

Early life social and economic status measures are based on retrospective data collected in the baseline survey (1967) about the respondent's life when she was 15 years of age. The completed education of the respondent's mother is measured with a dichotomous indicator of 8th grade or less in reference to higher levels of educational attainment. Analyses also control for family structure (two-parent vs. other), type of residence (rural vs. other), and mother's employment status (employed vs. not). Dummy indicators for missing data on mother's education and employment are also included in the model.

Current social and economic status is measured at last interview. Educational attainment is measured as a continuous variable in number of years. Models also control for net family income (in logged dollars), employment status (working for pay=1, not=0), housing tenure (respondent owns home=1, does not own home=0), and marital status. Marital status is measured using a series of dummy variables representing never married, widowed, and divorced or separated, with married as the reference category.

Proximity to and support from children is measured at last interview from a series of questions about the respondent's children. Proximity is measured as whether the respondent co-resides with or has at least one child that lives within 10 miles, compared to those who do not. Instrumental support is measured as whether the respondent has a child that helps her with chores, errands, and/or personal care.

[4]Further examination of cell sizes shows that there are not any cells with exclusively poor or good health on the outcomes of interest, with regard to these 3 overlapping predictors (early childbearing, late life childbearing and high parity).

Lagged health status measures come from the 2001 wave of the NLS-MW and include disability, depressive symptoms, and body mass index (BMI). In recognition of the multidimensionality of health processes in older age (Kelley-Moore and Ferraro 2005), I also control for health status that may demonstrate the spuriousness of an observed relationship between childbearing characteristics and the specific health outcome under investigation. In particular, a substantial body of research demonstrates a relationship between physical disability and depression (Ormel, Rijsdijk, Sullivan, Sonderen, and Kempen 2002; Taylor and Lynch 2004; Turner and Noh 1988), particularly at older ages (Meeks et al. 2000; Yang 2007; Yang and George 2005). Thus, models are estimated net of these factors in the prediction of the other.

The measure of ADL limitations is as described above. In 2001, a shorter version (7-items) of the CES-D was administered to respondents. Lagged depressive symptoms are measured using the sum of three items from the CES-D[5]. In addition, I control for the effects of another well-known correlate of health—body mass index—distinguishing between four categories of current BMI: 1) underweight, or BMI of 18.5 or less, 2) normal or average BMI of 18.5–24.9 (reference group), 3) overweight, or BMI of 25–29.9, and 4) obese, or BMI 30 and greater (Centers for Disease Control and Prevention 2007).

Demographic controls include race to control for population composition and to investigate the weathering hypothesis (black=1, white=ref.), cohort to distinguish between those born before (1920s) and during the Great Depression (1930s), and age to account for the almost 20-year difference between the oldest and youngest women in the sample. Age in 2003, the last survey year, is a continuous variable based on year of birth. Based on tests of model fit for non-linearities in age, a quadratic term is included in models of depressive symptoms.

Analysis

Disability is modeled using binary logistic regression and depressive symptomatology is estimated with ordinary least squares regression. Sensitivity analyses considered different methods, including zero-inflated count models, for both dependent variables; however, conclusions about the main variables of interest were not substantively altered. All models control for demographic characteristics, beginning with the baseline model. I then investigate the utility of early life and current SES, child proximity and support, and covarying aspects of health status in accounting for observed disparities by childbearing characteristics. For ease of presentation, early life and current SES are entered together because, despite bivariate associations and theoretical reasons to consider early life independently, preliminary analyses showed little effect of early life characteristics. One exception is that the educational attainment of the respondent's mother during the early part of her life was independently associated with disability, and marginally related to depression, when current SES was excluded from the model.

In light of the weathering hypothesis, I test interactions between race and the two timing of childbearing variables—early and late childbearing. Results reveal one significant interaction between early childbearing and race for disability, which is included in the model. Multivariate analyses are weighted using a custom weight generated by the NLS to account for the sampling design, use of multiple waves of data, and attrition (National Longitudinal Survey Custom Weights, n.d.).

[5]In order to address issues of reverse causation, it is necessary to use lagged measures of health status. However, only a shortened (7-item) version of the CES-D was administered in 2001 (two years before the measurement of the dependent variable). Of these seven items, four have been identified as somatic and are therefore excluded (see Note 1 above). In supplemental analyses, I also tested the 7-item version and the 12-item version measured contemporaneous to the dependent variable. The main relationships of interest remained unmediated by depressive symptoms regardless of the measure used.

RESULTS

Table 1 displays weighted means or percentages for study variables for the full sample and across childbearing characteristics. Among early childbearers, a significantly greater proportion are black, 15 percent, compared to less than six percent of mothers who initiated childbearing at age 21 or older. Also, early childbearers tended to come from the cohort of women born in the 1930s (with only 44 percent born in the 1920s). In general, Table 1 suggests a profile of disadvantage for early childbearers. That is, these women tend to be less healthy, come from disadvantaged socioeconomic backgrounds, and appear worse off across various indicators of adult social and economic status than their counterparts who began having children later.

As with early childbearing, a significantly greater proportion of late childbearers are black and less healthy, on average, than those who completed childbearing before age 35. However, a rather different picture emerges from Table 1 in terms of their socioeconomic status across the life course. Mothers who had children into the last decade or so of their childbearing years do not appear to be socioeconomically disadvantaged in early or later life. One exception is that they contain a higher proportion of widows. Also, a greater proportion of late childbearers have at least one child who lives nearby and provides assistance with personal care, household chores, and/or errands, compared to mothers who completed childbearing earlier. Finally, women who gave birth at advanced maternal ages are more highly represented among those born in the 1920s, compared to mothers who completed childbearing before age 35. This may be related to the fact that this cohort came of age during the Great Depression, though preliminary analyses of multivariate models showed no significant cohort interactions with measures of childbearing history.

The last two columns of Table 1 show differences between high parity mothers and those with four or fewer children. More of these mothers are disabled and they demonstrate higher levels of depressive symptomatology. Black women are disproportionately represented among those with at least five children. High parity women appear worse off across some indicators of current SES, including educational attainment, family income, and proportion widowed. Although mothers of high parity tend to have a child residing nearby, they do not appear to receive more instrumental support from their children than women with fewer than four children.

Moving to multivariate results, Table 2 shows the results of logistic regression models of disability in ADLs. Model 1 is a baseline model of the effects of childbearing characteristics, net of demographic controls. There appear to be no significant associations between ADLs and late childbearing or high parity[6]. However, early childbearing is significantly associated with the likelihood of being disabled in later life. The effect of early childbearing is positive, indicating a higher likelihood of disability among those who had their first child before age 21 compared to those who began childbearing after this age. However, the effect is weaker for black mothers, as indicated by the significant race interaction in Model 1.

Models 2 through 5 suggest that the effect of early childbearing on later life disability is robust, being only slightly attenuated by socioeconomic characteristics (Model 2) and health status (Model 4). Similarly, controlling for child proximity and support (Model 3) has little influence. In the full model, Model 5, results indicate that women who are early childbearers have higher odds of ADL limitations than those who initiated childbearing at age 21 or older, net of all

[6]In analyses not shown, having five or more children is significantly associated with risk of disability, net of demographic characteristics, when the timing of childbearing is excluded from the model. However, this effect is accounted for by current SES and health status. Late childbearing is not associated with risk of disability when demographic characteristics are controlled.

other covariates in the model. Models 2 and 5 show that blacks and whites are similar in the effect of early childbearing when controlling for socioeconomic status across the life course.

Table 2 also shows net associations between several covariates and the likelihood of being disabled in later life. Higher educational attainment and home ownership are protective against risk of disability, while being overweight or obese and experiencing higher levels of depressive symptoms are associated with a greater likelihood of being disabled. Instrumental support from a child is positively associated with disability (Model 3), though this relationship is attenuated when socioeconomic and health considerations are entered into the model (Model 5).

Like physical disability, the results presented in Table 3 suggest that childbearing characteristics matter for women's psychological well-being over the long-run. This table shows unstandardized coefficients from models of depressive symptomatology. Model 1, controlling for race, age, and cohort, indicates late childbearing is associated with higher levels of depressive symptoms, while early childbearing has a marginally significant effect. The addition of controls for socioeconomic characteristics across the life course (Model 2) and health status (Model 4) substantially attenuate the relationship between early childbearing and depression, though the covariates considered in these analyses do not significantly account for differentials in depressed mood between late childbearers and mothers who completed childbearing before age 35.

In addition to the robust association between late childbearing and depressive symptoms in later life, Model 5 of Table 3 shows that women whose mother was employed during their adolescence and higher levels of educational attainment are protective for psychological well-being. Being unmarried, having instrumental support from a child/children, and experiencing limitations in activities of daily living are positively associated with depressive symptomatology. The full model accounts for 15 percent of the variation in depressive symptoms ($R^2 = .147$).

DISCUSSION

Using data collected from a sample of women in the United States, I have examined the relationship between key elements of mothers' childbearing histories and their later life well-being to answer questions about the long-term implications of fertility. I have done so by looking at both physical and mental health outcomes. The analyses presented here also address the extent to which early life social and economic status, as well as more proximal mechanisms, influence observed relationships between childbearing histories and poor health in later life. Overall, this study shows that women's fertility does matter for their well-being in later life though it does so differently across health outcomes. Unlike more proximal consequences of childbearing, which tend to be social for teenage childbearing (Makinson 1985; Menken 1972) and physiological for late childbearing (Ozalp, Tanir, Sener, Yazan, and Keskin 2003; Prysak, Lorenz, and Kisly 1995), the long-term effects of early childbearing outcomes are more likely to be physiological (i.e., affecting disability), while later childbearing mechanisms appear to be more social/psychological (i.e., affecting depressive symptoms).

Supporting the first hypothesis (H1), these analyses suggest that early childbearing has negative health consequences for both outcomes. However, the marginal association with depressive symptomatology is substantially attenuated by socioeconomic status, with current SES and health mediating this effect, providing partial support for H3. Moreover, the negative effects of early childbearing on disability are mostly stronger for white women, lending support to the weathering hypothesis (and H2) which suggests younger optimal ages at first birth among black mothers. If blacks and whites were equal on socioeconomic status, however, they would be similarly affected by early childbearing according to these data.

Although there are social and economic costs of having children early in life and young women from poor socioeconomic backgrounds may be selected into teenage childbearing, the relationship between early childbearing and disability among white women is robust, even against controls for early life and current SES, child proximity and support, depressive symptomatology, and BMI. Although the relationship may be direct (i.e., causal), it may also be due to differences in adapting to disablement. In this study, I was unable to control for early life health and/or pregnancy related health outcomes that might account for this relationship. Future research should address this limitation to determine whether early childbearers were less healthy at others stages of life and thus are more likely to be disabled as they age.

Childbearing at older ages appears more important for later psychological than physical well-being, lending limited support for H4 that predicted a negative association with both. Moreover, there were no significant race interactions, as expected from the weathering hypothesis (H5). The finding for mental health is consistent with a previous examination of the pivotal and optimal ages of first births for depression that shows increases in levels of depression with births after the late 30s (Mirowsky and Ross 2002). This is interesting because much concern over having children late in life has centered on the negative health risks faced by mothers. So while these women may be at greater risks of medical complications around the time of pregnancy, they are not significantly more likely to suffer from disability later on but rather, they experience more symptoms of depression.

Previous research suggests that people who delay parenthood tend to have later first marriages, higher educational attainment, lower risk of economic hardship, and better current physical health (Koropeckyj-Cox et al. 2003; Mirowsky and Ross 2002), and I predicted that these factors would account for some of the difference between late childbearers and those completing earlier (H6). Still, I find a relationship between late childbearing and depression controlling for many of these key factors and have been unable here to uncover the precise mechanisms driving this relationship. It may be that women who are late childbearers have less healthy children, a source of stress that may persist even as these children become adults. It may also be that late childbearers had less time to adapt to the depression found to prevail among parents. These and other factors need to be further examined to better understand the long-term mental health consequences of late childbearing.

Results provide partial support for H7, as high parity was not significantly associated with mental health. I also hypothesized (H8) that the relationship between high parity and physical health would be attenuated by socioeconomic status, however, no significant relationship between high parity and disability was observed. This lack of findings is consistent with past research that looks at ADL limitations (Kington et al. 1997) and depressive symptomatology (Sudha et al. 2006) among women in the US. Research on British women, however, finds higher risk of disability associated with high parity (Grundy and Holt 2000; Grundy and Tomassini 2005). This discrepancy between my findings and theirs may be attributable to differences in measurement of the dependent variable, or it may be indicative of social or cultural differences. Indeed, it has been posited that, “Large family size may itself cause stress in a society with generally low fertility…” (Grundy and Holt 2000, 1072). Although both Britain and the US have generally low fertility, this statement brings into view the potential of social circumstances in shaping the consequences of high parity.

There is greater racial and, perhaps, socioeconomic diversity in the US. African American and lower socioeconomic status women tend to have larger families, on average. Although these factors are controlled for in the models presented here, statistical techniques do not account for the potential influence of population composition on norms, or cultural scripts, within which women make decisions about childbearing. Childbearing decisions are influenced not only by structural factors (e.g., available resources), but also by schemas, or scripts, that shape the ways

in which women perceive the costs and benefits of having children throughout the life course (Hayford 2006). The influence of norms on the timing of life course transitions, such as the entry into motherhood, has been the topic of social scientific conversation for some decades. In a classic statement about this, Neugarten and Hagestad (1976, 51) wrote, "…the consequences of a role change that accompanies a major life event depends on whether or not the same change is prevalent among one's associates." Clearly the relative timing of events or general notions about fertility preferences and decisions based on one's peers varies historically and situationally.

A life course theoretical perspective highlights the dynamic interplay between personal biographies and the social and historical context in which people are born and develop throughout their lives (Elder 1998, 1994). Thus, it is important to consider these findings in historical context. The women of the NLS-MW did not delay childbearing or remain childless at the same rates as more recent cohorts. Moreover, these women were either children of the Great Depression or coming of age during that time, and their experiences may differ considerably from other cohorts, particularly their children who were born and raised during the post-war boom of the 1950s. Future research should examine more recent cohorts of American women to provide greater insight into the role of historical and social contexts and establish whether the relationships observed here are reproduced across generations.

The research presented here provides a relatively comprehensive assessment of the relationship between childbearing histories and later life well-being by examining theoretically important predictors of physical and psychological health. Nonetheless, a few limitations are important to keep in mind. First, I have focused here on differences among *mothers*, to the exclusion of childless women. Existing evidence suggests less depression (Sudha et al. 2006), no differences by ADL limitations (Kington et al. 1997), and higher odds of limiting long-term illness (Grundy and Tomassini 2005) among the childless relative to low parity mothers. Still, these studies fail to compare timing of childbearing categories to childlessness. Future research would benefit from further investigation into how childless women differ from early or late mothers in later life well-being.

Second, I approach this research from a cross-sectional perspective, using some lagged and retrospective measures. Still, the evidence presented here of differences in the association between childbearing characteristics and these health outcomes provides a basis for future research to examine each indicator of health status independently in a longitudinal framework. Finally, there is a notable absence of early life health, direct measures of the health impacts of pregnancy, health behaviors (e.g., exercise), and other social and economic correlates of health (e.g., religion).

This paper emphasizes the need to better understand the mechanisms linking childbearing histories to later well-being. As a central element of the life course for women, the timing of childbearing as well as parity/completed fertility are central in shaping women's opportunities, attitudes, decisions, and behaviors. From a public health perspective, it is crucial to know what may be done to overcome disadvantages in health through policies and interventions targeted at overcoming health disparities among women. The salience of questions about the relationship between childbearing characteristics and later well-being can be expected to persist as social and economic conditions encourage women to delay marriage, pursue higher education, and participate in the paid labor force more and with fewer periods of intermittency.

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REFERENCES

Alonzo, Angelo A. Long-Term Health Consequences of Delayed Childbirth: NHANES III. Women's Health Issues 2002;121:37–45. [PubMed: 11786291]

Bird, Chloe E. Gender Differences in the Social and Economic Burdens of Parenting and Psychological Distress. Journal of Marriage and the Family 1997;59(4):809–823.

Blazer, Dan G.; Landerman, LR.; Hays, Judith C.; Simonsick, Eleanor M.; Saunders, WB. Symptoms of Depression among Community-Dwelling Elderly African-American and White Older Adults. Psychological Medicine 1998;28:1311–1320. [PubMed: 9854272]

Centers for Disease Control and Prevention. Body mass index: About BMI for adults. Atlanta, GA: Centers for Disease Control and Prevention; 2007 [Retrieved May 30, 2007]. http://www.cdc.gov/nccdphp/dnpa/bmi/adult_BMI/about_adult_BMI.htm

Deal, Lisa W.; Holt, Victoria L. Young Maternal Age and Depressive Symptoms: Results from the 1988 National Maternal and Infant Health Survey. American Journal of Public Health 1998;88(2):266–270. [PubMed: 9491019]

Doblhammer, Gabriele. Reproductive History and Mortality Later In Life: A Comparative Study of England and Wales and Austria. Population Studies 2000;54(2):169–176. [PubMed: 11624633]

Doblhammer, Gabriele; Oeppen, Jim. Reproduction and Longevity among the British Peerage: The Effect of Frailty and Health Selection. Proceedings of the Royal Society of London, Series B, Biological Sciences 2003;270:1541–1547.

Dye, Jane Lawlor. Current Population Reports, P20-555. Washington, D.C: U.S. Census Bureau; 2005. Fertility of American Women: June 2004.

Elder, Glen H, Jr. Children of the Great Depression: Social Change in Life Experience. Chicago: University of Chicago Press; 1974.

Elder, Glen H, Jr. Time, Human Agency and Social Change: Perspectives on the Life Course. Social Psychology Quarterly 1994;57:4–15.

Elder, Glen H, Jr. The Life Course as Developmental Theory. Child Development 1998;69:1–12. [PubMed: 9499552]

Elder, Glen H., Jr; Johnson, Monica K.; Crosnoe, Robert. The Emergence and Development of Life Course Theory. In: Mortimer, JT.; Shanahan, MJ., editors. Handbook of the Life Course. New York: Springer; 2004. p. 3-22.

Evenson, Ranae J.; Simon, Robin W. Clarifying the Relationship between Parenthood and Depression. Journal of Health and Social Behavior 2005;46:341–358. [PubMed: 16433280]

Furstenberg, Frank F, Jr. The Social Consequences of Teenage Parenthood. Family Planning Perspectives 1976;8(4):148–164. [PubMed: 964349]

Geronimus, Arline. The Weathering Hypothesis and the Health of African American Women and Infants: Implications for Reproductive Strategies and Policy Analysis. In: Sen, G.; Snow, RC., editors. Power and Decision: The Social Control of Reproduction. Boston: Harvard University Press; 1994. p. 75-100.

Geronimus, Arline. Black/White Differences in the Relationship of Maternal Age to Birthweight: A Population-Based Test of the Weathering Hypothesis. Social Science & Medicine 1996;42(4):589–597. [PubMed: 8643983]

Geronimus, Arline. Damned if You Do: Culture, Identity, Privilege, and Teenage Childbearing in the United States. Social Science & Medicine 2003;57(5):881–893. [PubMed: 12850113]

Gilman, Stephen E.; Kawachi, Ichiro; Fitzmaurice, Garrett M.; Buka, Stephen L. Socioeconomic Status in Childhood and Lifetime Risk of Major Depression. International Journal of Epidemiology 2002;31 (2):359–367. [PubMed: 11980797]

Griffith, Janet. Social Pressure on Family Size Intentions. Family Planning Perspectives 1973;5(4):237–242. [PubMed: 4805743]

Grundy, Emily; Holt, Gemma. Adult Life Experiences and Health in Early Old Age in Great Britain. Social Science and Medicine 2000;51(7):1061–1074. [PubMed: 11005393]

Grundy, Emily; Tomassini, Cecilia. Fertility History and Health in Later Life: A Record Linkage Study in England and Wales. Social Science and Medicine 2005;61:217–228. [PubMed: 15847974]

Hayford, Sarah; Morgan, S Philip. Expect the Unexpected: Fertility Intentions and Behavior over the Life Course. Paper presented at Southern Demographic Association Annual Meetings; November 2–4, 2006; Durham, NC: 2006.

Hayward, Mark D.; Gorman, Bridget K. The Long Arm of Childhood: The Influence of Early-Life Social Conditions on Men's Mortality. Demography 2004;41(1):87–107. [PubMed: 15074126]

Hertzman, Clyde; Power, Chris; Matthews, Sharon; Manor, Orly. Using an Interactive Framework of Society and Lifecourse to Explain Self-Rated Health in Early Adulthood. Social Science and Medicine 2001;53:1575–1585. [PubMed: 11762884]

Hofferth, Sandra L. Long-Term Economic Consequences for Women of Delayed Childbearing and Reduced Family Size. Demography 1984;21(2):141–155. [PubMed: 6734854]

Hofferth, Sandra L.; Reid, Lori; Mott, Frank L. The Effects of Early Childbearing on Schooling over Time. Family Planning Perspectives 2001;33(6):259–267. [PubMed: 11804435]

Hyman, Steven; Chisholm, Dan; Kessler, Ronald; Patel, Wikram; Whiteford, Harvey. Disease Control Priorities in Developing Countries. New York: Oxford University Press; 2006. Mental Disorders; p. 605-626.

Jolly, Matthew; Sebire, Neil; Harris, John; Robinson, Stephen; Regan, Lesley. The Risks Associated with Pregnancy in Women Aged 35 Years or Older. Human Reproduction 2000;15(11):2433–2437. [PubMed: 11056148]

Kalil, Ariel; Kunz, James P. Teenage Childbearing, Marital Status, and Depressive Symptoms in Later Life. Child Development 2002;73:1748–1760. [PubMed: 12487491]

Katz, Sidney; Downs, Thomas D.; Cash, Helen R.; Grotz, Robert C. Progress in Development of the Index of ADL. The Gerontologist 1970;10(1):20–30. [PubMed: 5420677]

Kelley-Moore, Jessica A.; Ferraro, Kenneth F. A 3-D model of health decline: Disease, disability, and depression among black and white older adults. Journal of Health and Social Behavior 2005;46(4): 376–391. [PubMed: 16433282]

Kington, Raynard; Lillard, Lee; Rogoswsk, Jeannette. Reproductive History, Socioeconomic Status, and Self-Reported Health Status of Women Aged 50 Years or Older. American Journal of Public Health 1997;87(1):33–37. [PubMed: 9065223]

Knodel, John; Chayovan, Napaporn; Siriboon, Siriwan. The Impact of Fertility Decline on Familial Support for the Elderly: An Illustration from Thailand. Population and Development Review 1992;18 (1):79–103.

Koropeckyj-Cox, Tanya; Pienta, Amy M.; Brown, Tyson H. Women of the 1950s and the 'normative' life course: The implications of childlessness, fertility timing, and marital status for psychological well-being in late midlife. International Journal of Aging and Human Development 2007;64(4):299–330. [PubMed: 17703677]

Kuh, Diana; Ben-Shlomo, Yoav. Introduction. In: Kuh, D.; Ben-Shlomo, Y., editors. A Life Course Approach to Chronic Disease Epidemiology. New York: Oxford University Press; 2004. p. 3-14.

Long, Scott J.; Pavalko, Eliza. Comparing Alternative Measures of Functional Limitation. Medical Care 2004a;42(1):19–27. [PubMed: 14713736]

Long, Scott J.; Pavalko, Eliza. The Life Course of Activity Limitations: Exploring Indicators of Functional Limitations Over Time. Journal of Aging and Health 2004b;16(4):490–516. [PubMed: 15271267]

Makinson, Carolyn. The health consequences of teenage fertility. Family Planning Perspectives 1985;17 (3):132–139. [PubMed: 2431924]

Mander, Adrian; Clayton, David. Hotdeck Imputation. College Station, Texas: Stata Corp; 2000.

Maughan, Barbara; Lindelow, Malin. Secular change in psychosocial risks: The case of teenage motherhood. Psychological Medicine 1997;27(5):1129–1144. [PubMed: 9300517]

McElroy, Susan W. Early Childbearing, High School Completion, and College Enrollment: Evidence from 1980 High School Sophomores. Economics of Education Review 1996;15(3):303–324.

Meeks, Suzanne; Murrell, Stanley A.; Mehl, Rochelle C. Longitudinal Relationships between Depressive Symptoms and Health in Normal Older and Middle-Aged Adults. Psychology and Aging 2000;15 (1):100–109. [PubMed: 10755293]

Menken, Jane. The health and social consequences of teenage childbearing. Family Planning Perspectives 1972;4(3):45–53. [PubMed: 5040825]

Mirowsky, John. Parenthood and health: The pivotal and optimal age at first birth. Social Forces 2002;81 (1):315–349.

Mirowsky, John. Age at First Birth, Health, and Mortality. Journal of Health and Social Behavior 2005;46 (1):32–50. [PubMed: 15869119]

Mirowsky, John; Ross, Catherine E. Depression, Parenthood, and Age at First Birth. Social Science and Medicine 2002;54:1281–1298. [PubMed: 11989963]

Moen, Phyllis; Dempster-McClain, Donna; Williams, Robin W, Jr. Successful Aging: A Life-Course Perspective on Women's Multiple Roles and Health. American Journal of Sociology 1992;97(6): 1612–1638.

National Longitudinal Surveys. n.d. National Longitudinal Survey Custom Weights. [Retrieved December 6, 2006]. http://www.nlsinfo.org/web-investigator/custom_weights.php

Neugarten, Bernice L. Middle Age and Aging: A Reader in Social Psychology. Chicago: University of Chicago Press; 1968.

Nuegarten, Bernice L.; Hagestad, Gunhild O. Age and The Life Course. In: Binstock, Robert H.; Shanas, Ethel, editors. Handbook of Aging and the Social Sciences. New York: Van Nostrand Reinhold Company; 1976.

Neugarten, Bernice L.; Moore, Joan W.; Lowe, John C. Age Norms, Age Constraints, and Adult Socialization. American Journal of Sociology 1965;70:710–717.

Ormel, Johan; Kempen, Gertrudis IJM.; Penninx, Brenda WJH.; Brilman, Els I.; Beekman, ATF.; van Sonderen, Eric. Chronic Medical Conditions and Mental Health in Older People: Disability and Psychosocial Resources Mediate Specific Mental Health Effects. Psychological Medicine 1997;27 (5):1065–1077. [PubMed: 9300512]

Ormel, Johan; Rijsdijk, Fruhling V.; Sullivan, Mark; van Sonderen, Eric; Kempen, Gertrudis IJM. Temporal and Reciprocal Relationship Between IADL/ADL Disability and Depressive Symptoms in Late Life. Journal of Gerontology: Psychological Sciences 2002;57B(4):P338–P347.

Ozalp, Sinan; Tanir, H Mete; Sener, Turgay; Yazan, Sibel; Keskin, Ali E. Health Risks for Early (≤19) and Late (≥35) Childbearing. Archives of Gynecology and Obstetrics 2003;268(3):172–174. [PubMed: 12942245]

Preston, Samuel H.; Hill, Mark E.; Drevenstedt, Greg. Childhood Conditions that Predict Survival to Advanced Ages among African-Americans. Social Science and Medicine 1998;47(9):1231–1246. [PubMed: 9783866]

Prysak, Michael; Lorenz, Robert P.; Kisly, Anne. Pregnancy outcome in nulliparous women 35 years and older. Obstetrics and Gynecology 1995;85(1):65–70. [PubMed: 7800328]

Radloff, Lenore S. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. Applied Psychological Measurement 1977;1:385–401.

Rich-Edwards, Janet. A Life Course Approach To Women's Reproductive Health. In: Kuh, D.; Hardy, R., editors. A Life Course Approach to Women’s Health. Oxford: Oxford University Press; 2002. p. 23-43.

Rindfuss, Ronald R.; Morgan, S Phillip; Swicegood, Gray. First Births in America: Changes in the Timing of Parenthood. Berkeley: University of California Press; 1988.

Rindfuss, Ronald R.; St John, Craig. Social Determinants of Age at First Birth. Journal of Marriage and the Family 1983;45(3):553–565.

Seely, Ellen W. Hypertension in Pregnancy: A Potential Window Into Long-Term Cardiovascular Risk in Women. The Journal of Clinical Endocrinology and Metabolism 1999;84(6):1858–1861. [PubMed: 10372675]

Singh, Susheela; Darroch, Jacqueline E.; Frost, Jennifer J. the Study Team. Socioeconomic Disadvantage and Adolescent Women's Sexual and Reproductive Behavior: The Case of Five Developed Countries. Family Planning Perspectives 2001;33(6):251–258. 289. [PubMed: 11804434]

Smith, Ken R.; Mineau, Geraldine P.; Bean, Lee L. Fertility and Post-Reproductive Longevity. Social Biology 2002;49(3–4):185–205. [PubMed: 14652917]

Spence, Naomi J.; Eberstein, Isaac W. Age at First Birth, Parity, and Post-Reproductive Mortality among White and Black Women in the US, 1982–2001. Paper presented in the IUSSP Seminar on Longevity:

Early-life Conditions, Social Mobility, and Other Factors that Influence Survival to Old Age in Lund (Molle); Sweden. 2006. p. 8-10.

Sudha, Shreeniwas; Mutran, Elizabeth J.; Williams, Ishan C.; Suchindran, Chirayath. Childbearing History and Self-Reported Well-Being in Later Life: Contrasting Older African American and White Women. Research on Aging 2006;28(5):599–621.

Taylor, Miles G.; Lynch, Scott M. Trajectories of Impairment, Social Support, and Depression in Later Life. Journal of Gerontology: Social Sciences 2004;59B(4):S238–S246.

Turner, R Jay; Lloyd, Donald A. The Stress Process and the Social Distribution of Depression. Journal of Health and Social Behavior 1999;40(4):374–404. [PubMed: 10643162]

Turner, R Jay; Noh, Samuel. Physical Disability and Depression: A Longitudinal Analysis. Journal of Health and Social Behavior 1998;29:23–37. [PubMed: 2966841]

Umberson, Debra; Gove, Walter R. Parenthood and Psychological Well-Being: Theory, Measurement, and Stage in the Family Life Course. Journal of Family Issues 1989;10(4):440–462.

Verbrugge, Lois; Jette, Alan M. The Disablement Process. Social Science and Medicine 1994;38(1):1–14. [PubMed: 8146699]

Waite, Linda J.; Moore, Kristen A. The Impact of an Early First Birth on Young Women's Educational Attainment. Social Forces 1978;56(3):845–865.

Williamson, David F.; Madans, Jennifer; Pamuk, Elsie; Flegal, Katherine M.; Kendrick, Juliette S.; Serdula, Mary K. A Prospective Study of Childbearing and 10-Year Weight Gain in US White Women 25 to 45 Years of Age. International Journal of Obesity and Related Metabolic Disorders 1994;18(8):561–569. [PubMed: 7951478]

Yang, Yang. Is Old Age Depressing? Growth Trajectories and Cohort Variations in Late Life Depression. Journal of Health and Social Behavior 2007;48(1):16–32. [PubMed: 17476921]

Yang, Yang; George, Linda K. Functional Disability, Disability Transitions, and Depressive Symptoms in Late Life. Journal of Aging and Health 2005;17(3):263–292. [PubMed: 15857959]

Yi, Zeng; Vaupel, James. Association of Late Childbearing with Healthy Longevity among the Oldest-Old in China. Population Studies 2004;58(1):37–53. [PubMed: 15204261]

Biography

Naomi Spence is a postdoctoral fellow of the Carolina Population Center at the University of North Carolina, Chapel Hill. Her research focuses on social inequalities in health across the life course. She is examining the well being of both adolescents and older adults.

Table 1

Weighted Means/Percentages for Covariates by Childbearing Characteristics, Mothers Aged 65–83: NLS-MW

	Full Sample	Early Childbearer		Late Childbearer		High Parity	
		Yes[a]	No (ref.)	Yes[a]	No (ref.)	1–4 (ref.)	5+[a]
Health Outcomes							
Disability (Has ADL Limitations) %	19.77	28.29***	15.18	23.67†	18.55	17.64	26.92***
Depressive Symptoms (12 item CES-D)	4.38	4.85*	4.13	5.31***	4.09	4.13	5.20**
Demographic Characteristics							
Age (in years)	73.48	72.97***	74.77	73.08***	73.07	73.50	73.43
Black %	8.67	14.70***	5.42	10.61†	8.06	6.52	15.88***
1920s Cohort %	49.60	44.03**	52.60	64.19***	45.04	49.20	50.94
Early Life Social & Economic Status							
Mother's Education (<8grade) %	16.61	20.46**	14.53	17.40	16.36	15.56	20.12†
Mother's Education (missing) %	16.85	21.95***	14.10	19.23	16.11	15.57	21.15*
Family Structure (2-parent) %	79.93	70.23***	82.08	77.09	78.19	79.35	73.18*
Rural Resident %	29.97	39.03***	25.10	30.93	29.68	28.71	34.23†
Mother Employed (yes) %	31.98	35.67*	30.00	28.62	33.03	32.39	30.59
Mother Employed (missing) %	9.07	13.35***	6.76	10.49	8.62	7.56	14.11**
Current Social & Economic Status							
Educational Attainment (in yrs.)	12.17	11.17***	12.70	11.93†	12.24	12.43	11.27***
ln (Net Family Income)	9.99	9.86**	10.06	9.92	10.01	10.03	9.83**
Employed %	12.46	13.09	12.12	11.47	12.77	11.97	14.08
Home Owner %	81.33	78.00*	81.12	79.42	81.93	82.45	77.56†
Married %	50.50	44.87**	53.55	46.69	51.69	52.28	44.53*
Never Married %	.58	.98	.36	.28	.68	.47	.95
Divorced or Separated %	11.15	12.75	10.28	9.79	11.57	11.24	10.83
Widowed %	37.78	41.45*	35.80	43.24*	36.07	36.01	43.70*
Child Proximity & Support							
Has a Child Residing Nearby %	62.62	67.09*	60.22	71.84***	59.74	57.40	80.13***
Has Support from Child %	34.52	36.75	33.32	39.41*	32.99	33.14	39.16†
Lagged Health Status							
Underweight (BMI>18.5) %	1.64	1.83	1.53	1.60	1.65	1.50	2.10
Normal (BMI=18.5–24.9) %	35.60	31.36*	37.88	27.96***	37.99	37.29	29.92*
Overweight (BMI=25–29.9) %	36.22	34.27	37.27	38.24	35.59	36.56	35.08
Obese (BMI>=30) %	26.54	32.54***	23.31	32.21*	24.78	24.65	32.90**
Disability (Has ADL Limitations) %	16.57	21.60***	13.87	21.31*	15.10	14.76	22.65**
Depressive Symptoms (3 item CES-D)	1.14	1.36**	1.02	1.40*	1.06	1.05	1.44**

*** p < .001

** p< .01

* p<.05

† p<.10; (two-tailed t-test)

[a] Significantly different than childbearing reference group.

Table 2

Coefficients from Logistic Regressions of Disability in ADLs, N=1,608

	Model 1	Model 2	Model 3	Model 4	Model 5
Demographic Characteristics					
Age (in years)	.042	.010	.032	.043	.020
	(.032)	(.033)	(.032)	(.034)	(.035)
1920s Cohort (ref=1930s)	.443†	.485†	.460†	.521†	.537†
	(.268)	(.281)	(.270)	(.286)	(.296)
Race (black=1)	1.093**	.797**	1.042**	1.003**	.814**
	(.240)	(.261)	(.244)	(.269)	(.276)
Childbearing Characteristics					
Early Childbearer (ref= 21+)	.858**	.640**	.842**	.749**	.605**
	(.166)	(.176)	(.166)	(.173)	(.182)
Early Childbearer * Race	−.649*	−.538	−.630†	−.576†	−.494
	(.319)	(.328)	(.323)	(.343)	(.341)
Late Childbearer (ref= >35)	.148	.132	.128	−.0322	−.0420
	(.177)	(.182)	(.179)	(.188)	(.195)
High Parity (ref=1–4 children)	.276	.148	.256	.202	.124
	(.172)	(.181)	(.174)	(.184)	(.190)
Early Life SES (at age 15)					
Mother's Education, >8th Grade (ref=8th+)		.152			.145
		(.190)			(.197)
Mother's Education, missing		.087			.039
		(.218)			(.227)
Family Structure (2-Parent=1)		.285			.279
		(.226)			(.235)
Rural Resident (ref=no)		.116			.111
		(.159)			(.161)
Mother Employed (ref=no)		.221			.105
		(.166)			(.174)
Mother Employed, missing		.186			.175
		(.306)			(.311)
Current SES					
Educational Attainment (in years)		−.128**			−.090**
		(.032)			(.032)
ln(Net Family Income)		−.042			−.047
		(.056)			(.059)
Employed (ref=no)		−.260			−.056
		(.278)			(.285)
Home Owner (ref=no)		−.691**			−.652**
		(.179)			(.184)
Never Married (ref=Married)		−.901			−1.016†
		(.637)			(.606)
Widowed		.253			−.006
		(.166)			(.181)
Divorced or Separated		.234			.028
		(.261)			(.271)
Child Proximity & Support					
Has Support from Child (ref=no)			.484**		.311†
			(.147)		(.160)
Has Child Residing Nearby (ref=no)			.053		−.038
			(.160)		(.170)
Lagged Health Status					
Underweight (BMI <18.5; ref=Normal)				.473	.496
				(.622)	(.662)

	Model 1	Model 2	Model 3	Model 4	Model 5
Overweight (BMI 25–29.99)				.440*	.376†
				(.190)	(.194)
Obese (BMI 30+)				.894**	.784**
				(.198)	(.204)
Depressive Symptoms				.290**	.256**
				(.035)	(.037)
Constant	−5.247*	−.799	−4.782*	−6.177**	−2.674
	(2.230)	(2.507)	(2.249)	(2.366)	(2.601)
Log Pseudo Likelihood	−751.065	−712.766	−744.103	−692.741	−668.340
Pseudo R-squared	.061	.109	.069	.134	.164

Robust standard errors in parentheses

** p<.01

* p<.05

† p<.10; two-tailed test

Table 3

Unstandardized Coefficients from OLS Regressions of Depressive Symptoms, N=1,608

	Model 1	Model 2	Model 3	Model 4	Model 5
Demographic Characteristics					
Age (in years)	−2.981*	−2.908*	−2.951*	−2.960*	−2.782*
	(1.344)	(1.299)	(1.337)	(1.316)	(1.279)
Age^2	.020*	.019*	.020*	.020*	.018*
	(.009)	(.009)	(.009)	(.009)	(.009)
1920s Cohort (ref=1930s)	.474	.422	.493	.443	.378
	(.578)	(.566)	(.572)	(.564)	(.555)
Race (black=1)	1.120**	.029	1.005*	.804*	−.027
	(.406)	(.436)	(.400)	(.386)	(.420)
Childbearing Characteristics					
Early Childbearer (ref= 21+)	.633†	−.081	.589†	.347	−.176
	(.340)	(.338)	(.337)	(.325)	(.329)
Late Childbearer (ref= >35)	1.100**	1.075**	1.070**	.906*	.913*
	(.404)	(.384)	(.400)	(.388)	(.375)
High Parity (ref=1–4 children)	.461	.060	.436	.307	.040
	(.417)	(.397)	(.422)	(.400)	(.392)
Early Life SES (at age 15)					
Mother's Education, >8th Grade (ref=8th+)		.089			−.141
		(.418)			(.395)
Mother's Education, missing		.657			.504
		(.452)			(.451)
Family Structure (2-Parent=1)		−.369			−.434
		(.414)			(.394)
Rural Resident (ref=no)		−.187			−.156
		(.334)			(.327)
Mother Employed (ref=no)		−.458			−.625*
		(.300)			(.298)
Mother Employed, missing		.428			.254
		(.714)			(.696)
Current SES					
Educational Attainment (in years)		−.334**			−.266**
		(.065)			(.065)
ln(Net Family Income)		−.128			−.142
		(.110)			(.098)
Employed (ref=no)		−.557			−.184
		(.442)			(.440)
Home Owner (ref=no)		−.421			−.110
		(.455)			(.469)
Never Married (ref=Married)		4.059*			4.250*
		(1.870)			(1.968)
Widowed		1.835**			1.615**
		(.343)			(.337)
Divorced or Separated		1.993**			1.702**
		(.574)			(.546)
Child Proximity & Support					
Has Support from Child (ref=no)			1.428**		.705*
			(.331)		(.321)
Has Child Residing Nearby (ref=no)			−.145		−.322
			(.306)		(.290)
Lagged Health Status					
Underweight (BMI <18.5; ref=Normal)				−.547	−.451
				(1.179)	(1.082)

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	Model 1	Model 2	Model 3	Model 4	Model 5
Overweight (BMI 25–29.99)				.518	.441
				(.335)	(.329)
Obese (BMI 30+)				.606	.617†
				(.376)	(.373)
Disabled (Has ADL Limitations; ref=no)				3.430**	2.634**
				(.463)	(.465)
Constant	114.372*	120.525*	113.783*	113.857*	114.805*
	(49.879)	(48.200)	(49.640)	(48.950)	(47.579)
R-squared	.024	.108	.039	.083	.147

Robust standard errors in parentheses

** p<.01

* p<.05

† p<.10; two-tailed test