# Household Context and Subjective Well-being among the Oldest-Old in China

Feinian Chen
Department of Sociology
Texas A&M University
Email: feinian_chen@tamu.edu

Susan E. Short
Department of Sociology
Brown University
Email: susan_short@brown.edu

March 1, 2004

Paper prepared for the 2004 Annual Meetings of the Population Association of America in Boston. Data used for this research was provided by the longitudinal study entitled "Determinants of Healthy Longevity in China" (DHLC) managed by the Center for Healthy Aging and Family Studies, Peking University. DHLC is supported in part by funds from Duke University under an award from the U.S. National Institutes of Aging (NIA), and by the matching support of Chinese institutions.

Introduction

The linkage between the social relations of older adults and their well-being has been studied extensively in the aging literature (Grundy, Bowling, Farquhar 1996; Hanson et al. 1989; House, Landis and Umberson 1988). Among a network of social ties, the household provides a crucial context where household members enjoy varied levels of social integration as well as emotional and instrumental support, promoting good health outcomes (Antonucci 1990; Hughes and Waite 2002). At the same time, relations between household members can create tensions and may involve unpleasant interactions, and therefore can be damaging to individuals' well-being (Rook 1984; Rook and Pietromonaco 1987). Parallel to the conceptual uncertainty of the relationship between living arrangements and health outcomes is a mixed range of results from empirical studies. For example, some studies suggest that co-residence with children is beneficial while others find it detrimental to elderly well-being (Sarwari et al. 1998; Zunzunegui, Beland and Otero 2001); some find living alone disadvantages individuals on a range of health measures whereas others indicate that it does not pose any risk to an elders' mental or physical well-being (Lawton, Moss and Kleban 1984; Wang, Snyder and Kaas 2001).

Aside from the conceptual and methodological challenges of sorting out the relationship between living arrangements and elderly well being, additional complexity is added by the strong social and cultural norms that prescribe distinctive roles for each family member. Associated with these roles are expectations and obligations regarding appropriate behavior toward each other. Thus, the same type of living arrangement may have entirely different implications in different cultural contexts. In some societies, such as the U.S., many older adults prefer to live independently. In other settings where a strong emphasis is placed on parent-adult

child relationships and co-residence with adult children is normative, living alone can be highly undesirable for the elderly. As a consequence, it is plausible that the same living arrangements have different health implications across societies.

In this paper, we focus our research lens on contemporary China, a country with a strong tradition of extended family. In addition, patrilinearity and patrilocality characterize the family system in China. Typically, parents expect to live with at least one of their sons and to depend on them for old age support. However, as a country experiencing dramatic socioeconomic restructuring, China's cultural norms may be changing. Results from the 2000 census indicate that the majority of the households (56%) are nuclear households and that average family household size declined to a historical low of 3.5 (Zeng and Wang 2003). At the same time, the traditional extended family household remains an important family form. In fact, sixty percent of the elderly population aged 65 and over share residence with their children (Zeng and Wang 2003), considerably higher than the level in most Western countries. While the Census does not distinguish between co-residence with daughters or sons, results from large-scale surveys done in the 1990s indicate that living with daughters may have become more acceptable and more common in urban China, although living with sons was still much more prevalent (Chen, Short and Entwisle 2000; Chen Forthcoming; Whyte 2003).

While there exists an extensive literature documenting trends in living arrangements, determinants of living arrangements, as well as their implications for patterns of intergenerational support in East Asian countries (Freedman, Thornton and Yang 1994; Natividad and Cruz 1997; Weinstein et al. 1994; Whyte 2003), little has been done on the consequences of living arrangements for elderly health. How do living arrangements affect old

age well-being in a context of rapidly changing social and cultural norms? This general question motivates this research paper. We focus on a specific dimension of well-being: subjective well-being, or emotional health, as measured by indices of positive and negative well-being. Significantly, we focus on a particular group of elderly in China: the oldest old, defined as those aged 80 and older. We argue that the household context is crucial for this age group, as they are mentally and physically more vulnerable and more likely to need help in daily living than the younger elderly (Zeng et al. 2002).

Specifically, our research addresses the following questions. First, is it better to live independently or to live with children? Does a strong tradition of extended family marginalize elders who live by themselves? Second, is living with sons, the traditionally preferred type of living arrangements, beneficial to one's emotional health? Third, how does living with daughters affect one's subjective well-being? Distinctions between living with daughters and sons are rarely made in studies that investigate the effect of living arrangements on elderly health. Yet, we expect that co-residence with a son and daughter-in-law is qualitatively different from co-residence with a daughter and son-in-law. Although living with sons is considered normative, and co-residence with sons may well enhance subjective well-being, women in China, as elsewhere, do more caregiving than men. Such gendered caregiving patterns may be particularly critical to late life experience in the context of a patrilineal and patrilocal family system. Tensions with daughters-in-law, particularly for women, are well-reported in the research literature. In late life, elders may be happier when living with daughters compared to daughters-in-law. Finally, we explore whether the influence of the household context on subjective well-being differs in urban and rural areas, where cultural norms vary and two

different old age support systems are in operation.

Using two waves of data from the Determinants of Healthy Longevity Survey in China (DHLC, 1998, 2000), we document patterns of living arrangements among the oldest old in urban and rural China. Then, in crosssectional analysis, we investigate how variations in living arrangements are related to measures of subjective well-being. Finally, we use fixed-effect models to explore whether *changes* in living arrangements in a two year interval may lead to *changes* in subjective well-being. The use of longitudinal data allows us to answer our research questions dynamically and to more effectively control for confounding characteristics of the elderly that may be unmeasured in the survey.

## Background

Improvement in life expectancies and a drastic decline in fertility has contributed to the rapid "aging" of the Chinese population. In 1964, 3.6% of the population was 65 or older (Liang, Tu and Chen 1986). By 2000, this percentage had increased to 6.9%, and by 2050, it is projected to be 22.7% (Zeng et al. 2002). Among those 65 and older, the share of oldest old (age 80+) is expected to increase particularly fast, with a growth rate of 4.4% as compared to 2.7% for the elderly population aged 65 and older from 2000 to 2050 (Zeng et al. 2002).

The rapid aging of the population in China has led to concern about caregiving support for the elderly. Currently, support from children is the major source of old age security in China (Gu et al. 1995; Zeng et al. 2002). Using the 1982, 1990 and 2000 censuses, Zeng and Wang (2003) show that the majority of elderly live with their children. From 1982 to 1990, the

proportion of elderly and the oldest old living with children remains unchanged; from 1990 to 2000, the proportion of younger elders living with children declined by 10% and the proportion of the oldest old who lived with children remained stable. All of these statistics point to the continued prevalence of extended family in China, particularly for the oldest old.

A traditionally Confucian society, the extended family was the ideal family type in China. Family and kinship ties were guided by a strong patriarchal and patrilocal tradition. It was common for older parents to live together with at least one of their adult sons. Living with a daughter was generally considered undesirable. Men who married into their wives' families were often stigmatized. The Confucian doctrines put a strong emphasis on children's filial obligation to their parents, particularly that of the sons. The daughter's obligations to her parents ended after she married and left her natal family. Except for maintaining emotional closeness with her parents, her filial responsibilities were transferred to her husband's parents.

Although dramatic changes in the Chinese society have occurred in recent decades, researchers have found that traditional family forms have been remarkably resilient (Guo 2000; Lavely and Ren 1992; Zeng and Wang 2003). The majority of the elderly in China still live with their adult children, usually one of their sons. In addition to the argument of cultural continuity, one of the many reasons offered is that sons are critical to old-age support in China, where pension schemes are virtually non-existent for most elders, particularly those who live in rural areas. In contrast, elderly in urban areas fare better in that the majority of the urban workers receive retirement income. However, men are more advantaged in this regard than women. Great disparities between urban and rural areas also exist in terms of health insurance programs and health care facilities (Gu et al., 1995).

Given urban-rural differences in old age support, it is not surprising that signs of change in family organization are observed first in urban China. For example, a study in the 1990s based on major cities in China found that many parents would prefer not to live with a married son if situations allow (Logan and Bian 1999). Further, co-residence with daughters is reported to have become more culturally acceptable in big cities (Davis-Friedman 1991). Results from a large-scale survey in China suggest that living with daughters is much more common in urban than rural areas (Chen *Forthcoming*). A recent study by the authors established that coresiding maternal grandmothers were as likely as paternal grandmothers to help with childcare (Chen, Short and Entwisle 2000). A recent city-based study also documented that grown daughters were just as likely to provide support and provision as grown sons (Whyte and Xu 2003).

Previous studies on the effect of living arrangements on elderly well-being

In studies of the relationship between household structure and elderly health, researchers consider a range of health outcomes, including subjective well-being, functional status, disability and mortality. Regardless of the measures used, the overall picture of the effect of living arrangements on elderly well-being is less than clear. The only exception is the consistently positive effect of the presence of a spouse on physical health (Lilliard and Waite 1995; Waite and Hughes 1999). Marriage is said to benefit health because it increases household economic resources, promotes healthy behaviors, and provides emotional and instrumental support that are necessary for a successful aging process (Waite and Gallagher 2000).

Outside of marriage, empirical results are largely mixed, particularly in regard to the relative benefits of co-residence with children versus living alone. Theoretically, it is often

expected that older adults who live alone may be vulnerable to social isolation to the detriment of their health. Studies in the U.S. provide limited support for this hypothesis. For example, Waite and Hughes (1999) found that living alone led to lower levels of physical, cognitive and emotional functioning for a cohort of individuals aged 51-61, who were experiencing a transition from mid to old age. Similarly, Dean et al. (1992) found that individuals above age fifty who lived alone were more susceptible to depression than those who did not live alone. A salient negative effect of independent living on elderly health was also found in other countries (or regions) where co-residence with children was the norm. For example, a study of rural Taiwanese elders found that living alone was associated with much higher levels of stress, compared with other types of living arrangement (Wang, Snyder and Kaas 2001). In a study based in Henan province in China, Cui (2002) found that elderly living alone were disadvantaged in all measures of physical, mental and social well-being. Further, more than 80 percent of the elderly who live alone reported that they would like to live together with other family members, suggesting that independent living was "forced" rather than "chosen."

However, other studies suggest the opposite, that is, elders who live alone are reportedly healthier than those who live with others (Lawton, Moss and Kleban 1984; Magaziner, Yuhas and Day 1986; Magaziner et al. 1988). Many of these studies received methodological criticism on the basis that it was impossible to eliminate possible selection effects with crosssectional data, i.e., elderly who live alone may be a healthier group to begin with. Nonetheless, some longitudinal studies in the U.S. confirmed the positive findings. For example, a study based on the Longitudinal Study on Aging found that living alone did not increase mortality risks among either men or women (Davis et al. 1997). Using data from a prospective survey of a group of

elderly white women from Baltimore from 1984 to 1989, Sarwari et al. (1998) suggested that living alone was protective against functional status deterioration. Furthermore, a prospective study of four year change for women aged 60-72 years in the Nurses' Health Study documented that women living alone had lower risk of decline in mental health, and were neither socially isolated nor at any increased risks for decline in functional status (Michael et al. 2001).

Similarly, the effect of co-residence with children on elderly health seems to be uncertain and conditional upon other factors. A longitudinal study of three generation families 1985-1988 in the U.S. found that co-residence with children can be detrimental to the psychological well-being of elders except at times of crisis (Silverstein and Bengtson 1994). Lillard and Waite (1995) found that unmarried women living with children experienced higher mortality than comparable married women. On the other hand, Waite and Hughes (1999) and Hughes and Waite (2002) found no difference between married couples living alone or living with children in a number of health outcomes, including self-rated health, functional status and depressive symptoms, using data from the Health and Retirement Survey. However, they found that single women living with children appeared disadvantaged in all outcomes.

In cultural contexts where intergenerational ties are traditionally strong and coresidence with children is common, living with children seems to be beneficial to elderly health. A 1993 study of elderly over 65 in Spain reported a co-residence rate as high as 45 percent and found that it was associated with good self- rated health and low prevalence of depressive symptoms (Zunzunegui, Beland and Otero 2001). Similarly, in East Asian countries, where extended family is culturally dominant, a positive effect of coresidence with children on health has also been reported. In rural Taiwan, it was found that living with children is associated much lower stress

level than living alone and that there was no difference in stress level between those living with children and those living with spouse only (Wang, Snyder and Kaas 2001). Cui (2002) documented the positive effect of living with children on mental and physical well-being in Henan province in China.

In the aging literature on living arrangements and health, the distinction between living with a daughter or a son is rarely made  One reason may be that co-residence itself is gendered. In the U.S., living with a daughter is much more common for elderly; in East Asian countries, coresidence with sons is more prevalent.  However, given that caregiving is more often done by women across most settings, we should expect that such a distinction might matter.  Living with a daughter may be different that living with a daughter-in-law.  In the U.S., both men and women report higher levels of closeness to their parents than parents-in-law (Rossi and Rossi 1990). In terms of caregiving for the elderly, however, it is not clear that such differences matter (Peters-Davis, Moss and Pruchno 1999).  In this paper we distinguish between co-residence with a son and co-residence with a daughter to explore whether in an East Asian context this distinction matters to subjective well-being.  We expect that if it is relevant, it should be most relevant to the oldest old, those more likely to be affected by caregiving relationships

This paper makes several contributions to the literature on living arrangements and elderly health.  First, we distinguish between patrilocal versus matrilocal residence.  As discussed above, because caregiving responsibilities usually fall upon women in the household, care by a daughter and a daughter-in-law may be qualitatively different from each other.  We hypothesize that the close emotional bonding between a daughter and her parents may be more beneficial to the elderly.  However, it is also likely that it does not make a difference because the

patrilineal culture in China defines that a daughter-in-law has primary obligations to the parents of her husband, which may guide her activities accordingly. Second, we focus on subjective well-being. More studies have been done on the effect of living arrangements on functional status and mortality while the effect of living arrangements on subjective well-being has been explored considerably less. Endogeneity should be less of a problem when using subjective well-being as the dependent variable. It is plausible that physically weaker elders may be more likely to live with children than by themselves out of necessity. It is less likely that life satisfaction or happiness leads to differences in living arrangements. Living arrangements are more likely to be consequence than cause, although the possibility of reverse causation cannot be ruled out completely. Third, we make use of a longitudinal dataset, which helps us to deal with the problem of selectivity and allows us investigate the relationship between living arrangements and subjective well-being dynamically. Finally, we target a specific group of elderly, the oldest old (aged 85+). Living arrangements may have a stronger influence on their well-being than that on younger elders, because they are most in need of help.

Data: Deteriminants of Healthy Longevity in China (DHLC)

We use data from the Determinants of Healthy Longevity in China (DHLC) Survey, "the first large survey of the oldest old conducted in a developing country" (Zeng et al. 2002: 252). The data was collected by Peking University's Center for Healthy Aging and Family Studies (CHAFS) and the China National Research Center on Aging (CNRCA), with support from the U.S. National Institute on Aging. The DHLC was undertaken in 631 randomly selected counties and cities of the 22 provinces in China (Liaoning, Jilin, Heilongjiang, Hebei, Beijing, Tianjin,

Shanxi, Shaanxi, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Sichuan, and Chongqing). It covers roughly half of the counties and cities of those provinces, and the sample areas represent 85 percent of the total population of China. In the 1998 baseline survey, 9,073 oldest-old persons (aged 80+) were interviewed. In 2000, 4,844 of those elders re-interviewed; and 6,372 elders were newly added interviewees. For more detailed description of the data, see Zeng et al. (2002).

Living Arrangements of Elderly in DHLC

The DHLC data collects information on every person living in the household as well as their relationship to the elderly respondent. Based those questions, we created a six-category variable of living arrangements: 1) those who live with a son; 2) those who live with a daughter; 3) those who live with a spouse; 4) those who live with others; 5) those who live alone; and 6) those who live in nursing home. These categories are mutually exclusive, that is, each excludes cases that fall into the lower categories. For example, category 3 only includes those who live with a spouse but do not live with a son or a daughter (excluding category 1 and 2); category 4 includes those who live with people who are other than their daughters, sons or spouse (excluding category 1, 2, and 3).

Figure 1 shows living arrangements of the elderly in the DHLC sample in 1998, based on our six-category typology. Not surprisingly, the majority of the elders (51.8%) live with their sons. This clearly reflects the legacy of the patriarchal and patrilocal tradition in China: care of parents is typically considered sons' responsibility. Only about 10.3% of the sample live with their daughters, very different from patterns observed in the Western countries, where

coresidence with daughters is much more common than coresidence with sons. Living in a nursing home is uncommon in China, with only 5.1% of the sample in this category. This reflects both a shortage of facilities and cultural reluctance. Indeed, living in a nursing home is still largely stigmatized in China; when their parents do so, children are often regarded as "unfilial.".

-Figure 1 about here-

We observe a clear urban-rural difference in elderly living arrangements among the oldest old in China. Although living with sons is generally more common than living with daughters, elderly in rural areas are more likely to live with sons than those in urban areas (58.5% vs. 41.5%), while elderly in urban areas are more likely to live with daughters than those in rural areas (16.0% vs. 6.7%). This is consistent with earlier studies, reflecting changes to the patrilocal norm in urban China (Whyte and Xu 2003). Overall, the likelihood of coresidence with children is higher in rural than urban areas (65% vs. 57%). This is expected, as rural elders are more dependent on their children for support in absence of a pension system. Living in a nursing home is unusual in rural areas (1.5%), as facilities are in extreme short supply.

Figure 2 shows changes in living arrangements from 1998 to 2000 for those who survived. It shows a great deal of stability. For example, 83% of the elderly who lived with their son in 1998 continued to do so in 2000; 95% of those who lived in a nursing home in 1998 were in a home soin 2000.

-Figure 2 about here-

Subjective Well-being for Elderly in DHLC

The DHLC includes a series of questions on the elder person's life evaluation. They are: 1) "How do you rate your life at present?" 2) "Do you always look on the bright side of things?"3) "Do you like to keep your? belongings neat and clean?" 4) "Can you make your own decisions concerning your personal affairs? 5) "Are you as happy now as when you were younger?" 6) "Do you often feel fearful or anxious?" 7)"Do you often feel lonely and isolated?" 8) "Do you feel the older you get the more useless you are?" The responses range from 1 (always or very good) to 5 (never or bad). We rearrange the order of the responses so that for all the items, 1 suggests the weakest feeling and 5 suggests the strongest feeling. An exploratory factor analysis was performed on these eight items, which generated two factors, with the first five items loading on one and the latter three loading on the other (results not shown). Because the data are not collected specifically to study the psychological well-being of elderly, these items are certainly not perfect indicators. A review of literature on subject well-being of elderly shows sophisticated instruments have been developed and cross-validated to assess perceptions of well-being among the elderly. Examples include a 20-item scale of Life Satisfaction Index (LSI), a 21-item (short version) Philadelphia Geriatric Center (PGC) Morale Scale, a 20-item Center for Epidemiologic Studies Depression Scale (CES-D) and a 10-item Affect Balance Scale. Although the items in the DHLC survey are not associated with one of these established indices, they represent important dimensions of subjective well-being, such as life satisfaction, happiness, and loneliness

Research has shown that negative and positive affect are independent phenomena and are both relevant to subjective well-being (Bradburn 1969; Diener and Emmons 1994). Based on the factor analysis described above and the literature review, we create two indices, one for positive

well-being and the other for negative well-being. We add items 1-5 to create an index of positive well-being. The index ranges from 7 to 25, with higher numbers indicating better well-being. The index of negative well-being is an aggregation of items 6-8, with values ranging from 3 to 15, with higher values indicating worse well-being. The internal consistency coefficients for the two indeces are $\alpha$=0.64 and $\alpha$=0.60 respectively. Although indices on subjective well-being used in the psychology and epidemiology literature typically have higher coefficients, such indices tend to be constructed from at least ten to twenty items. Because $\alpha$ is known to positively correlated to number of items used (Cortina 1993), our indices are indeed reasonable, given we only have five and three available items respectively to construct them.

Descriptive statistics on the indices of positive and negative well-being as well as the items used to construct them are presented in Table 1. On average, it seems that elderly in urban areas have a higher level of positive well-being (19.5 vs. 18.3) and a slightly lower level of negative well-being (7.6 vs. 7.9) than rural elderly. What could account for such differences? Could it be differences in living arrangements? Financial status? Our multivariate analyses will help to address these questions.

-Table 1 about here-

Analytic Strategy

Our analysis consists of two parts. In the first part, we make use of a cross-sectional design. We first regress indicators of positive and negative well-being on living arrangements in 1998 (Model 1) and then add a series of control variables (Model 2). We control for socio-

demographic characteristics, such as age, gender, and marital status (currently married or not). Previous studies show married people consistently have better health than those who are not currently married. We also control for whether the spouse has been dead for less than two years. We hypothesize that elderly who have recently begun grieving the loss of a spouse will have lower subjective well-being. We also control for human capital, including education and financial status (whether one supports oneself and one's spouse). Elderly who are economically independent are more likely to have better assessment of their lives than those who have to depend on their children for support. We control for self-reported health, as better physical health is associated with better emotional health. After recoding, the variable is measured on a scale of 1 to 5, with 1 indicating very bad health and 5 indicating very good health. We also include three measures of family relationship, indicated by number of children, whether other children (other than any with whom they live) visit frequently, and whether siblings visit frequently or not. We hypothesize that those who have a closer connection with other children or siblings would have better emotional health.

Descriptive statistics of the independent variables in 1998 are shown in Table 2. The urban sample is on average younger, more educated and more likely to be married than the rural counterpart. In addition, urban elderly are almost seven times more likely to be economically independent than those in the rural areas. Because of ample differences in urban and rural samples, we separate the urban and rural samples in the multivariate analysis.

-Table 2 about here-

In the second part of the analyses, we make use of a longitudinal design by exploring dynamically whether any *change* in living arrangements from 1998 to 2000 leads to *change* in

subjective well-being. First, it is important to note that a significant part of the sample (41%) died during the two year interval. Our longitudinal analysis thus is restricted to those who survived and were followed up in 2002. A logistic regression with mortality risk as the dependent variable shows mortality is not selective on living arrangements in urban areas. In rural areas, those who live with others are more likely to die during the two year interval and those who live alone are less likely to die (See Table A1 in Appendix).

The fixed effect models (equation 3) can be described by a subtraction of equation 2 from equation 1 (see below)[1]. Variables that do not change over time (such as age and education) drop out of the model, as does the time invariant error term ($\nu_i$). Thus, the model implicitly controls for any unmeasured characteristics that do not change over time. For example, emotional health could be related to personality, which is not measured in the survey. If we can assume personality is time-invariant, the fixed effect model effectively controls for this potentially "omitted" variable. The interpretation of coefficients in the fixed effect models is slightly different from the cross-sectional model in that they reflect *within-individual* differences rather than *between- individual* differences.

$$Y_{it} = \alpha + X_{it}\beta + \nu_i + \varepsilon_{it} \quad (1)$$

$$Y_{it-1} = \alpha + X_{it-1}\beta + \nu_i + \varepsilon_{it-1} \quad (2)$$

$$Y_{it} - Y_{it-1} = (X_{it} - X_{it-1})\beta + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (3)$$

[1]We use STATA 7.0 to estimate to the fixed effect model. The actual model that is estimated by STATA is a little different from Equation 3 in that it estimates $\alpha$. The equation that STATA estimates subtracts the grand mean of Y's, X's and the error terms' from either side of the equation, which should not affect estimates of $\beta$'s. It is better than estimating the deviation equation directly (Equation 3), because the latter produces correct estimates of coefficients but incorrect standard errors because of loss of degrees of freedom when means were already estimated. See STATA (2001) and Gould (2001).

Results from the Cross-sectional Models

Results from the OLS regression models on positive and negative well-being are presented in Tables 3 and 4 respectively. Model 1 is the reduced model, including only variables on living arrangements. Living with a son is the reference category. In Model 2 we add the control variables. First, living arrangements clearly have an impact on positive well-being. While living with son is the modal residential type for the oldest old in the DHLC sample, it is certainly not the best for positive well-being. As shown in Model 1, in urban areas, living with son is better than living with others, alone, or in a nursing home, but it is inferior to living with spouse only and living with a daughter. After the control variables are introduced, effects of living arrangements remain relatively stable, although some shifts are expected, because some of the key confounding variables, such as age, health, and marital status, are not included in Model 1. In the full model (Model 2), living with a daughter emerges as the optimal living arrangement for one's positive well-being while living alone seems to be the worst type of living arrangement in urban China. In rural China, similar effects are observed. Living alone is most detrimental to one's positive well-being while living with a daughter seems more beneficial than living with a son, although the effect is only marginally significant ($p=0.056$). Living in a nursing home seems to the best type of living arrangement in rural China, which is not what we expected. We hesitate to put too much meaning into this result, because nursing homes are extremely rare in rural China and only 1.5 percent of the sample live in them.

-Table 3 about here-

The effect of control variables are as expected, and are similar across urban and rural areas. Self-reported health is positively associated with positive well-being; education promotes

emotional health; financial independence enhances positive well-being; females have better positive well-being than males. In rural areas, having other children and sibling visit frequently also enhances positive well-being. These two variables do not have any effect in urban areas. It could be that urban elders enjoy a wider range of social support from a variety of sources and have larger social networks beyond family. Therefore interaction with other children and siblings maybe less important .

Table 4 presents results of the OLS regressions on negative well-being. Model 1 shows that elders living with a spouse (without a son or daughter) seem to fare best; those living with others or living alone tend to have higher negative well-being, and there is no difference between living with a son or a daughter in either urban and rural areas. After control variables are introduced, however, we observe some major shifts in the effect of living arrangements. According to Model 1, urban elderly who live with a spouse have a score of negative well-being that is 0.544 lower than those who live with a son. The coefficient becomes non-significant and positive (0.237) in Model 2. At the same time, we observe that those who are currently married have a score of negative well-being that is 0.711 lower than those who are not, a strong negative effect. This illustrates that the effect of living with a spouse that we observe in Model 1 is a spurious effect. What it truly reflects is the effect of marital status. Indeed, none of the living arrangement variables are statistically significant in urban areas in Model 2. In terms of the direction of the effect, those living with a daughter have lower negative well-being than those living with a son, or living in any other type of arrangement. The effects of living arrangements in rural areas are similar. The only difference is that living alone has a statistically significant effect on negative well-being: living alone appears detrimental to emotional health for rural

elderly.

-Table 4 about here-

Other control variables behave in expected ways. The older one is, the higher the level of negative well-being. Males have lower negative well-being than females. Better health leads to a lower level of negative well being. Education has a protective effect in urban areas. Interestingly, financial independence does not seem to affect negative well-being. Recent death of a spouse worsens one's negative well-being in urban areas. In rural areas, social interaction with other children matters.

Results from the Fixed Effect Models

Results from the cross-sectional models clearly suggest that living arrangement matters for subjective well-being. A particularly interesting result is that co-residence with a daughter may be more beneficial for positive subjective well-being than co-residence with a son. One interpretation might be living with a daughter brings greater satisfaction late in life than living with a daughter-in-law, even in a society with a strong patrilineal and tradition. Can we explain away this effect? It is possible that unmeasured factors related to both co-residence patterns and subjective well-being yield this result. To explore this possibility further, we turn to the fixed effects models. Results from the fixed effect models are presented in Tables 5 and 6 respectively. Because of strong stability in some of the living arrangement categories, for this part of the analysis we combine living with others, living alone or in a nursing home into one category to create cells with adequate numbers of cases.

-Tables 5 and 6 about here-

As it turns out, none of the living arrangements variables are significant in the model of positive well-being or negative well-being in either urban or rural areas. Only two effects are consistent with the cross-sectional models. Better self-reported health leads to higher positive well-being and lower negative well-being. Death of spouse increases one's negative well-being.

Do the results from the fixed effect models invalidate results from our cross-sectional models? Possibly, but we think a more cautious interpretation would be more judicious. We do not wish to overinterpret the lack of an effect in these models. First, living arrangements were relatively stable over this short two year interval. Because the fixed effect model is driven by within individual changes, maybe we simply do not have enough change in the independent variables, and specifically the living arrangements variables, to allow us to observe any meaningful effects. Second, about forty percent of the baseline sample died during the two year interval. Those who died during the two year interval had a higher negative well-being and a lower positive well-being than those who survived in 1998 (results not shown). Thus, the respondents who are included in the fixed effect model on average have better emotional health than those who are included in the cross-sectional model, which may contribute to the discrepancy between the fixed-effect and the cross-sectional models. Third, fixed effect models are dynamic in nature. The coefficients reflect more of within-individual changes than between-individual changes. In other words, they can be interpreted as effects of *changes* in living arrangements on *changes* in subjective well-being. Results from the cross-sectional models tell a different story, which is not necessarily contradictory to our longitudinal analysis. We learn from the cross-sectional model that living with a daughter is better than living with a son in

terms of positive well-being. It simply means that an elder who lives with a daughter has better emotional health than one who live with a son. However, that does not necessarily mean that moving from a son's house to a daughter's house will improve one's emotional health. In fact, it could be that changes in residence at that late stage in life could be harmful or at least have no benefit for health. Indeed, qualitative evidence suggests that elderly who move from one child's house to another child's house may feel stigmatized because such change can be interpreted as not being wanted (Fong 2003). In future empirical analysis, we will explore the importance of change further.

## Discussions and Conclusions

The family household is the traditional social institution where elderly are cared for in East Asian countries. As a result, declining trends in coresidence with children has raised alarms among researchers and policymakers alike. Many believe that it is in the government's and elderly's best interests to preserve the familial system. While governments may promote such a system for economic reasons, the multi-faceted implications of such promotion have not been systematically considered by researchers. In particular, are elderly better off living with their children? If coresidence does not promote elderly well-being, efforts to uphold the "tradition" may be short-sighted. Looking at other settings around the world, where privacy and independence are more highly valued in the aging process, there are indications that co-residence with children is not necessarily the optimal living arrangement and that independent living may indeed be more beneficial. Likewise, in transitional societies where cultural norms are shifting, a traditional type of living arrangement may not always be the most desirable.

Despite the dramatic societal changes that have occurred in China in recent decades, e.g., the Communist Revolution, the Cultural Revolution, the One-child Policy, and the Economic Reforms, the patrilineal extended family tradition remains strong. As evidenced in the DHLC sample and other studies, the majority of the oldest old in China live with their sons. At the same time, there arenumerous signs of change. Nuclear family is now the dominant family form in China. Our study has shown that a sizable number of the oldest old, particularly those in urban areas, live with a daughter. Hence, in a society where old customs meet rapid economic change, will the traditional preferred living arrangement still benefit elderly well being (assuming that it once did)?

The answer to the above question is not a simple yes or no. If we define a traditional living arrangement as an extended family household, the answer is a yes. Our analysis clearly indicates that living with children is a better living arrangement than living alone in both dimensions of subjective well-being, with the disadvantage of living alone being more pronounced in rural China. This is quite different from results in U.S. based research, where living alone can be beneficial for elderly health. We believe this finding denotes cultural continuity. The family household in China remains an important context where caregiving of the elderly takes place. Consistent with the literature on intergenerational exchanges, children in China still assume primary responsibility for elderly care and provide essential economic, emotional and instrumental support to aging parents. In contrast, living alone is not a desirable living arrangement and culturally stigmatized. In rural areas, where social network and social relations for elderly are more limited and access to health care is more difficult, lack of family members in the house may pose serious risks to health.

Nonetheless, if we define a traditional living arrangement as coresidence with a son, then our answer to the same question is a no. The dominance of patrilocal residence stands in sharp contrast to the results of our multivariate analysis on subjective well-being. Strikingly, the culturally preferred living arrangement, i.e., living with a son, is indeed not the most beneficial type of residence for elderly's emotional health. Instead, we find that living with a daughter is superior to living with a son in that it improves positive well-being for the oldest old in China, net of control variables. The effect is most salient in urban China, where ten percent of the oldest old share residence with their daughter. This represents a significant departure from the patrilineal tradition, according to which daughters were not expected to support aging parents. The finding confirms results from previous studies, which documented the erosion of patrialineal norms in China. In a previous study by the authors, we found that coresiding maternal grandparents play as important a role in providing alternative childcare as paternal grandparents (Chen, Short and Entwisle 2000). A recent study by Whyte and Xu (2003) showed that the traditional pattern of relying on sons for old age support has disappeared in Baoding and that married daughters felt as responsible for their parents as married sons.

What contributes to this "daughter paradox"? We believe the answer lies in caregiving patterns and household dynamics. As in most places around the world, women in the family are primary caregivers. A daughter may be more nurturing, caring, and attentive to the needs of the parents than a daughter-in-law, which may in turn help promote the well-being of the elderly. Historically, although a daughter is not obligated to take care of her parents, the emotional tie between a daughter and her natal family remains throughout life. Stories and heroic deeds of filial daughters are recorded and have been preached to generations of women as parts of the

Confucian doctrines. Thus, although living with a daughter is a relatively new phenomenon, the emotional bonding daughters and parents and the sense of obligation daughters hold towards their natal parents is far from a modern invention.

In contrast, household dynamics in a patrilineal extended family today are quite different from their historical counterpart. Historically, the patriarch had absolute authority in the family. The mother-in-law, often referred to as "deputy patriarch" had tremendous power over the daughter-in-law. Nowadays, the power dynamics in the same type of family are completely different. A son may still live with an aging parent out of a sense of obligation, but a daughter-in-law's emotional distance from the in-laws may make her caregiving less satisfactory compared with that of a daughter. For those aging parents (particularly those who are not educated and those who live in the rural areas and who depend solely on their children for support), their position in the family may be particularly vulnerable. Many complain that they are living at the mercy of their children. There are plenty of anecdotal stories documenting the conflicts between the parents and coresiding sons and daughters-in-law. Indeed, the household is like a double edged sword, while it can promote elderly well-being by providing intimacy and support, it can be detrimental to health when tensions are high. Rapid socioeconomic change in China today creates large intergenerational differences in education and lifestyle, differences that may exacerbate traditional tensions, including those with daughters-in-law.

Finally, the longitudinal component of our analysis deserves mention. First, the longitudinal component establishes that living arrangements are relatively stable over a recent two year interval. Second, the fixed-effects models call into question the importance of living arrangements for subjective well-being. These results merit further empirical exploration. At

the same time, we hesitate to dismiss too easily the intriguing patterns suggested by the cross-sectional models. At the very least, they indicate that further exploration of the importance of living arrangements to quality of life among the oldest old, including the implications of gendered caregiving patterns, is warranted.

REFERENCES

Antonucci, T. C. 1990. "Social Supports and Social Relationships," Pp205-206 in *Handbook of Aging and the Social Sciences*, edited by R. H. Binstock and L. K. George. New York: Academic Press.

Bradburn, N. M. 1969. *The Structure of Psychological Well-being*. Chicago: Aldine.

Chen, F, Short, S. E. , and Entwisle, B. 2000. "The Impact of Grandparental Proximity on Maternal Childcare in China." *Population Research and Policy Review* 19: 571-590.

Cortina, J. M. 1993. "What is Coefficient Alpha? An Examination of Theory and Applications." *Journal of Applied Psychology* 78: 98-104.

Cui, Z. J. 2002. *Living Arrangements and the Health Status of the Elderly in Rural China. Working Paper.* International Institute for Population Sciences, Mumbai.

Davis, M. A., Moritz, D. J., Newhaus J. M. (?). 1997. *American Journal of Public Health* 87: 371-377.

Davis-Friedmann, D. 1991 . *Long Lives: Chinese Elderly and the Communist Revolution.* Stanford, CA: Stanford University Press.

Dean, A., Kolody B., Wood, P, and Matt, G. E. 1992. "The Influence of Living Alone on Depression in Elderly Persons." *Journal of Aging and Health* 4: 3-18.

Diener, E. and Emmons, R. A. 1994. "The Independence of Positive and Negative Affect." *Journal of Personality and Social Psychology* 47: 1105-1117.

Fong, V. 2003. Paper presented at the "Daughters' Worth Re-evaluated: Changing Intergenerational Relations and Expectations in Contemporary China. Fairbank Center Workshop, Harvard University, Cambridge, MA.

Freedman, R., Thornton, A. and Yang, L.S.. 1994. "Determinants of Coresidence in Extended

Households." Pp335-358 in *Social Change and the Family in Taiwan*, Edited by Arland Thornton and Hui-Sheng Lin. Chicago: The University of Chicago Press.

Grundy, E., A. Bowling, and M. Farquhar. 1996. "Social Support, Life Satisfaction and Survival at Older Ages." Pp135-156 in *Health and Mortality among Elderly Populations*. New York: Oxford University Press.

Gu, S., Zhu, N, Chen, X., and Liang, J. 1995. "Old-Age Support System and Policy Reform in China." *Korea Journal of Population and Development* 24: 245-273.

Guo, Z. 2000. "Family Patterns." Pp98-111 in *The Changing Population of China*, Edited by Peng Xizhe and Zhigang Guo. Oxford: Blackwell.

Hanson, B. S., Isaacsson, J. T., Janzon, L., and Lindell, S. E. 1989. "Social Network and Social Support Influence Mortality in Elderly Men: The Prospective Population Study of 'Men Born in 1914,' Malmo, Sweden." *American Journal of Epidemiology* 130:100-111.

House, J. S., Landis, K. L., and Umberson, D.. 1988. "Social Relationships and Health." *Science* 241: 540-545.

Hughes, M. E. and Waite, L. J. 2002. "Health in Household Context: Living Arrangements and Health in Late Middle Age." *Journal of Health and Social Behavior* 43: 1-21.

Lavely, W. and Ren, X. 1992. "Patrilocality and Early Marital Co-residence in Rural China, 1955-85." *China Quarterly* 130: 378-391.

Lawton, M. P., Moss, M.., and Kleban, M. 1984. "Marital Status, Living Arrangements and the Well-being of Older People." *Research on Aging* 6: 323-345.

Liang J., Tu, E., and Chen, X. 1986. "Population Aging in the People's Republic of China." *Social Science Medicine* 23: 1353-1362.

Lilliard, L. A. and Waite, L. J. 1995. "'Til Death Do Us Part:' Marital Disruption and Mortality." *American Journal of Sociology* 100: 1131-1156.

Logan, R. J., and Bian, F. 1999. "Family Values and Coresidence with Married Children in

Urban China." *Social Forces* 77: 1253-1283.

Magaziner, J., Yuhas, M. K., and Day, N. L. 1986. "Health and Resources of Community Resident Aged Living Alone. *Medical Medicine Journal* 35: 905-909.

Magaziner, J., Cadigan D. A., and Hebel R. J. (?). 1988. "Health and Living Arrangements among Older Women: Does Living Alone Increase the Risk of Illness?" *Journal of Gerontology* 43: M127-133.

Michael, Y. L., Berkman, L. F., Colditz, G. A., and Kawachi, I. 2001. "Living Arrangements, Social Integration, and Change in Functional Health Status." *American Journal of Epidemiology* 153: 123-131.

Natividad, J. N. and Cruz, G. T. 1997. "Patterns in Living Arrangements and Familial Support for the Elderly in the Philippines." *Asia-pacific Population Journal* 12(4): 17-34.

Peters-Davis N. D., Moss, M. S., and Pruchno R. A. 1999. "Children-in-law in Caregiving Families." *The Gerontologist* 39: 66-75.

Rook, K. S. 1984. "The Negative Side of Social Interaction: Impact on Psychological Well-being." *Journal of Personality and Social Psychology* 46: 1097-1108.

Rook, K. S. and Pietromonaco, P. 1987. "Close Relationships: Ties That Heal or Ties That Bind?" *Advances in Personal Relationships* 1: 1-35.

Rossi, A. S., and Rossi, P. H. 1990. *Of Human Bonding: Parent-child Relations across the Life Course.* New York: Aldine de Gruyter.

Sarwari, A. R., Fredman, L., Langenberg, P., and Magaziner, J. 1998. "Prospective Study on the Relation between Living Arrangement and Change in Functional Health Status of Elderly Women." *American Journal of Epidemiology* 147: 370-378

Silverstein, M, and Bengston, V. L. 1994. "Does Intergenerational Social Support Influence the Psychological Well-being of Older Parents? The Contingencies of Declining Health and Widowhood." *Social Science Medicine* 38: 943-957.

Waite, L. J. and Hughes, M. E. 1999. "At Risk on the Cusp of Old Age: Living Arrangements and Functional Status Among Black, White and Hispanic Adults." *Journal of Gerontology* 54: S134-144.

Waite, L. J., and Gallagher, M. 2000. *The Case for Marriage*. New York: Doubleday.

Wang, J., Snyder, M., and Kaas, M. 2001. "Stress, Loneliness, and Depression in Taiwanese Rural Community-dwelling Elders." *International Journal of Nursing Studies* 38: 339-347.

Weinstein, M.,. Sun, T.H , Chang, M.C. and Freedman, R. 1994. "Coresidence and Other Ties Linking Couples and Their Parents." Pp305-334 in *Social Change and the Family in Taiwan*, Edited by Arland Thornton and Hui-Sheng Lin. Chicago: The University of Chicago Press.

Whyte, M. K. 2003. *China's Revolutions and Intergenerational Relations*. Ann Arbor, Michigan: Center for Chinese Studies, The University of Michigan.

Chen, F. "The Division of Labor between Generations of Women in Rural China." *Social Science Research*. *Forthcoming*.

Whyte, M. K. and Xu, Q. 2003. "Support for Aging Parents from Daughters Versus Sons." Pp167-196 in *China's Revolutions and Intergenerational Relations*, Edited by Martin K. Whyte. Ann Arbor, Michigan: Center for Chinese Studies, The University of Michigan.

Zeng, Y. and Wang, Z. 2003. "Dynamics of Family and Elderly Living Arrangements in China: New Lessons Learned from the 2000 Census." *The China Review* 3: 95-119.

Zeng, Y., Vaupel, J. W., Xiao, Z., Zhang, C., and Liu, Y. 2002. "Sociodemographic and Health Profiles of the Oldest Old in China." *Population and Development Review* 28: 251-273.

Zunzunegui, M. V., Beland, F., and Otero, A. 2001. "Support from Children, Living arrangements, Self-rated Health and Depressive Symptoms of Older People in Spain." *International Journal of Epidemiology* 30: 1090-1099.

**Figure 1. Living Arrangments of the Oldest Old in China, DLHC, 1998**

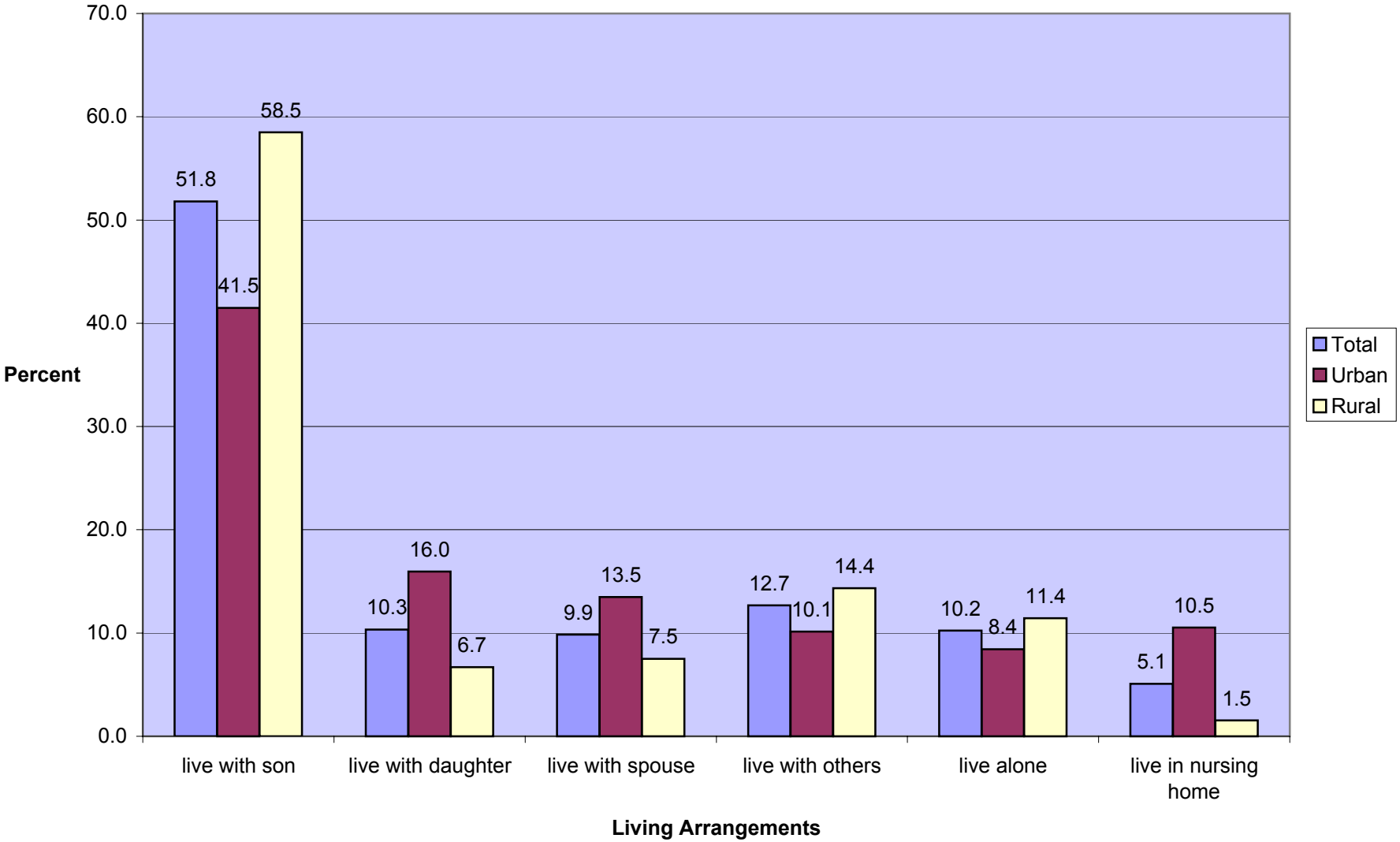

**Figure 2: Changes in Living Arrangements from 1998 to 2000**

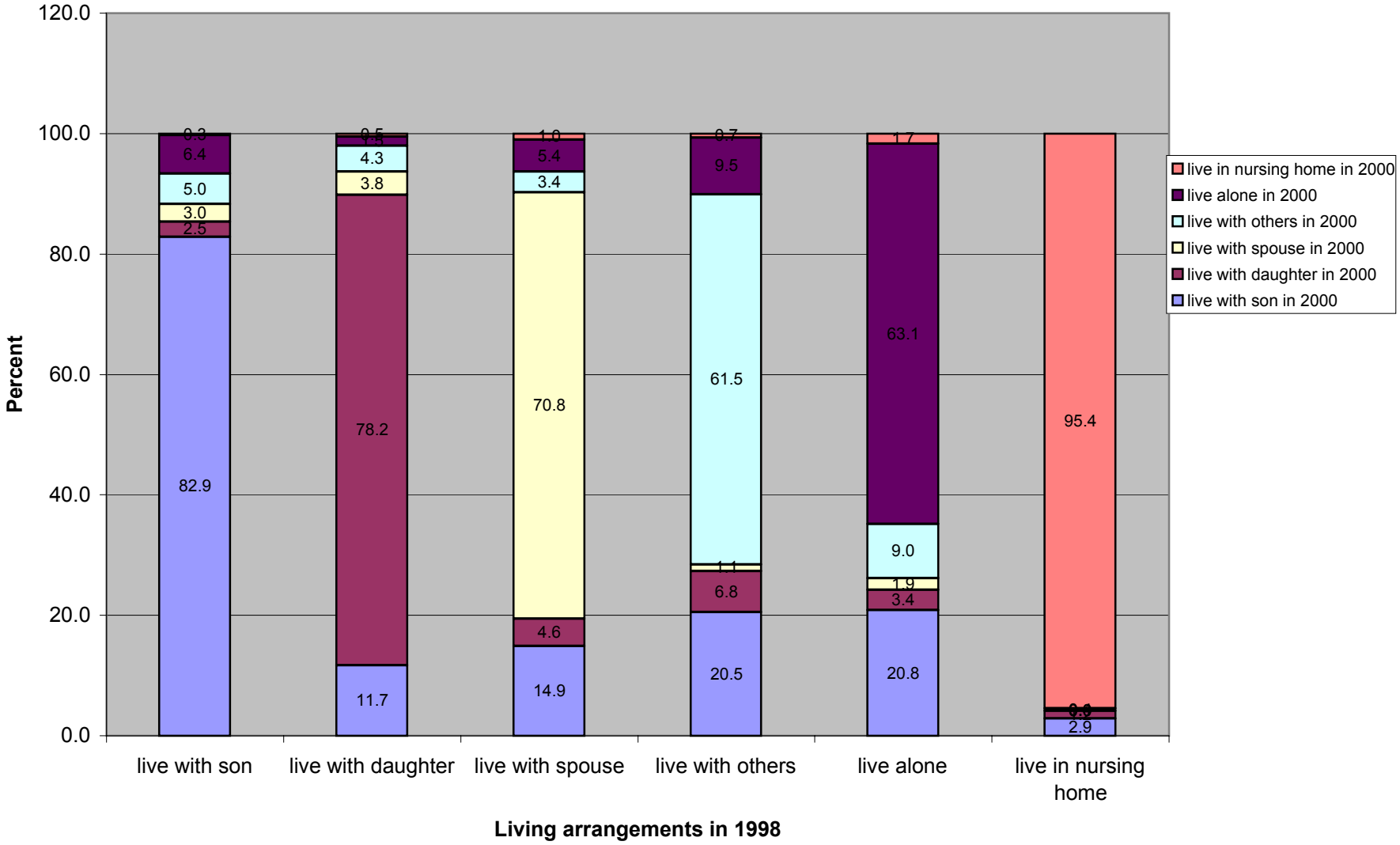

Table 1. Items Used to Construct the Index of Positive and Negative Well-being, DHLC, 1998.

| | Total | | | | Urban | | | | Rural | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max |
| *Index of Positive Well-being* | 18.766 | 2.811 | 7 | 25 | 19.465 | 2.723 | 10 | 25 | 18.313 | 2.775 | 7 | 25 |
| Quality of Life | 3.910 | 0.720 | 1 | 5 | 4.010 | 0.723 | 1 | 5 | 3.846 | 0.711 | 1 | 5 |
| Looking on the Bright Side of Thing | 3.931 | 0.803 | 1 | 5 | 4.056 | 0.791 | 1 | 5 | 3.851 | 0.801 | 1 | 5 |
| Happy as Younger | 4.050 | 0.724 | 1 | 5 | 4.182 | 0.701 | 1 | 5 | 3.965 | 0.725 | 1 | 5 |
| Keep Things Neat and Clean | 3.545 | 1.018 | 1 | 5 | 3.725 | 1.000 | 1 | 5 | 3.429 | 1.014 | 1 | 5 |
| Able to Make Own Decisions | 3.329 | 1.056 | 1 | 5 | 3.493 | 1.065 | 1 | 5 | 3.223 | 1.037 | 1 | 5 |
| | | | | | | | | | | | | |
| *Index of Negative Well-being* | 7.787 | 2.043 | 3 | 15 | 7.603 | 2.095 | 3 | 15 | 7.906 | 2.000 | 3 | 15 |
| Feel Fearful | 2.343 | 0.850 | 1 | 5 | 2.275 | 0.842 | 1 | 5 | 2.387 | 0.853 | 1 | 5 |
| Feel Lonely | 2.422 | 0.881 | 1 | 5 | 2.388 | 0.904 | 1 | 5 | 2.444 | 0.865 | 1 | 5 |
| Feel Useless | 3.023 | 0.997 | 1 | 5 | 2.940 | 1.012 | 1 | 5 | 3.076 | 0.983 | 1 | 5 |

Table 2. Descriptive Statistics of Independent Variables, DHLC, 1998.

| Variables | Total (N=7594) | | Urban (N=2982) | | Rural (N=4612) | |
|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| age | 91.247 | 7.605 | 89.759 | 7.483 | 92.209 | 7.528 |
| male | 0.425 | 0.494 | 0.449 | 0.497 | 0.409 | 0.492 |
| currently married | 0.185 | 0.388 | 0.235 | 0.424 | 0.152 | 0.359 |
| spouse dead <=2 years | 0.297 | 0.457 | 0.360 | 0.480 | 0.256 | 0.436 |
| self reported health (1-5) | 3.638 | 0.825 | 3.671 | 0.839 | 3.617 | 0.815 |
| years of schooling | 1.956 | 3.720 | 3.138 | 4.805 | 1.191 | 2.525 |
| whether supports oneself & spouse | 0.193 | 0.395 | 0.391 | 0.488 | 0.066 | 0.248 |
| number of children | 4.722 | 2.801 | 4.472 | 2.882 | 4.883 | 2.735 |
| whether other children visit frequentl | 0.728 | 0.445 | 0.679 | 0.467 | 0.759 | 0.428 |
| whether siblings visit frequently | 0.172 | 0.377 | 0.159 | 0.366 | 0.180 | 0.384 |

Table 3. OLS Regression Models on Positive Well-being, Urban and Rural China, DHLC, 1998

| | Urban | | | | Rural | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| live with daughter | 0.356 | * | 0.434 | *** | 0.328 | | 0.295 | |
| | (0.148) | | (0.135) | | (0.169) | | (0.154) | |
| live with spouse | 0.452 | ** | 0.148 | | 0.554 | *** | 0.274 | |
| | (0.156) | | (0.191) | | (0.160) | | (0.191) | |
| live with others | -0.170 | | -0.054 | | -0.371 | ** | -0.187 | |
| | (0.177) | | (0.165) | | (0.121) | | (0.115) | |
| live alone | -0.449 | * | -0.483 | ** | -0.432 | *** | -0.267 | * |
| | (0.189) | | (0.176) | | (0.133) | | (0.122) | |
| live in nursing home | -0.064 | *** | 0.180 | | 1.047 | ** | 1.097 | *** |
| *(reference: live with son)* | (0.172) | | (0.167) | | (0.335) | | (0.309) | |
| age | | | -0.016 | * | | | 0.005 | |
| | | | (0.007) | | | | (0.006) | |
| male | | | -0.276 | * | | | -0.181 | * |
| | | | (0.109) | | | | (0.089) | |
| currently married | | | -0.192 | | | | -0.034 | |
| | | | (0.200) | | | | (0.181) | |
| spouse dead <=2 years | | | -0.103 | | | | 0.085 | |
| | | | (0.142) | | | | (0.125) | |
| self reported health (1-5) | | | 1.273 | *** | | | 1.421 | *** |
| | | | (0.054) | | | | (0.046) | |
| years of schooling | | | 0.064 | *** | | | 0.052 | ** |
| | | | (0.011) | | | | (0.017) | |
| whether supports oneself & spouse | | | 0.582 | *** | | | 0.660 | *** |
| | | | (0.116) | | | | (0.160) | |
| number of children | | | 0.026 | | | | 0.001 | |
| | | | (0.019) | | | | (0.015) | |
| whether other children visit frequently | | | 0.134 | | | | 0.328 | *** |
| | | | (0.114) | | | | (0.098) | |
| whether siblings visit frequently | | | 0.114 | | | | 0.212 | * |
| | | | (0.127) | | | | (0.101) | |
| constant | 19.397 | *** | 15.649 | *** | 18.325 | *** | 12.327 | *** |
| | (0.078) | | (0.692) | | (0.054) | | (0.563) | |
| F statistics | 5.23 | | 47.85 | | 10.31 | | 73.56 | |
| Degrees of Freedom | 5 | | 15 | | 5 | | 15 | |
| R square | 0.01 | | 0.20 | | 0.01 | | 0.20 | |
| N | | | 2923 | | | | 4529 | |

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

Table 4. OLS Regression Models on Negative Well-being, Urban and Rural China, DHLC, 1998

| | Urban | | Rural | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| live with daughter | -0.006 | -0.105 | 0.012 | -0.038 |
| | (0.113) | (0.109) | (0.120) | (0.117) |
| live with spouse | -0.544 *** | 0.237 | -0.254 * | 0.234 |
| | (0.120) | (0.156) | (0.114) | (0.146) |
| live with others | 0.408 ** | 0.179 | 0.103 | -0.088 |
| | (0.134) | (0.132) | (0.087) | (0.087) |
| live alone | 0.198 | 0.149 | 0.340 *** | 0.246 * |
| | (0.144) | (0.142) | (0.095) | (0.093) |
| live in nursing home | 0.110 | -0.035 | -0.440 | -0.412 |
| *(reference: live with son)* | (0.132) | (0.136) | (0.241) | (0.236) |
| age | | 0.021 *** | | 0.010 * |
| | | (0.006) | | (0.004) |
| male | | -0.240 ** | | -0.319 *** |
| | | (0.089) | | (0.068) |
| currently married | | -0.711 *** | | -0.235 |
| | | (0.163) | | (0.139) |
| spouse dead <=2 years | | 0.377 *** | | 0.077 |
| | | (0.114) | | (0.095) |
| self reported health (1-5) | | -0.522 *** | | -0.600 *** |
| | | (0.044) | | (0.035) |
| years of schooling | | -0.041 *** | | -0.022 |
| | | (0.009) | | (0.013) |
| whether supports oneself & spouse | | -0.125 | | -0.160 |
| | | (0.094) | | (0.122) |
| number of children | | 0.002 | | -0.009 |
| | | (0.015) | | (0.012) |
| whether other children visit frequently | | -0.132 | | -0.148 * |
| | | (0.092) | | (0.075) |
| whether siblings visit frequently | | -0.149 | | -0.127 |
| | | (0.103) | | (0.077) |
| constant | 7.639 *** | 8.042 *** | 7.904 *** | 9.514 *** |
| | (0.059) | (0.557) | | (0.429) |
| F statistics | 8.39 | 23.00 | 5.00 | 29.63 |
| Degrees of Freedom | 5 | 15 | 5 | 15 |
| R square | 0.01 | 0.10 | 0.01 | 0.09 |
| N | | 2982 | | 4612 |

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

Table 5. Fixed- Effect Models on Positive Well-being, Urban and Rural China, DHLC, 1998

| | Urban | | Rural | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| live with daughter | -0.426 | -0.345 | 0.238 | 0.079 |
| | (0.420) | (0.396) | (0.357) | (0.336) |
| live with spouse | -0.451 | -0.498 | 0.310 | 0.177 |
| | (0.383) | (0.384) | (0.309) | (0.312) |
| live with others, alone or in a nursin | -0.228 | -0.242 | 0.043 | 0.109 |
| | (0.298) | (0.285) | (0.186) | (0.177) |
| currently married | | 0.191 | | 0.008 |
| | | (0.391) | | (0.313) |
| spouse dead <=2 years | | -0.223 | | 0.302 * |
| | | (0.144) | | (0.135) |
| self reported health (1-5) | | 1.055 *** | | 1.066 *** |
| | | (0.079) | | (0.064) |
| whether supports oneself & spouse | | 0.407 | | 0.482 |
| | | (0.279) | | (0.320) |
| constant | 19.701 *** | 15.661 *** | 18.212 *** | 14.241 *** |
| | (0.159) | (0.349) | (0.078) | (0.249) |
| R square | 0.005 | 0.194 | 0.004 | 0.190 |
| N | | 3214 | | 4938 |

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

Table 6. Fixed- Effect Models on Negative Well-being, Urban and Rural China, DHLC, 1998

| | Urban | | Rural | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| live with daughter | -0.218 | -0.357 | -0.423 | -0.305 |
| | (0.388) | (0.363) | (0.316) | (0.305) |
| live with spouse | -0.214 | -0.043 | -0.352 | -0.302 |
| | (0.353) | (0.352) | (0.274) | (0.284) |
| live with others, alone or in a nursing hor | 0.214 | 0.187 | -0.006 | 0.015 |
| | (0.275) | (0.261) | (0.165) | (0.160) |
| currently married | | -0.161 | | 0.141 |
| | | (0.358) | | (0.285) |
| spouse dead <=2 years | | 1.803 *** | | 1.282 *** |
| | | (0.132) | | (0.123) |
| self reported health (1-5) | | -0.395 *** | | -0.478 *** |
| | | (0.072) | | (0.058) |
| whether supports oneself & spouse | | -0.217 | | 0.014 |
| | | (0.256) | | (0.290) |
| constant | 6.787 *** | 7.961 *** | 7.392 *** | 8.868 *** |
| | (0.147) | (0.320) | (0.069) | (0.226) |
| R square | 0.009 | 0.002 | 0.002 | 0.045 |
| N | | 3214 | | 4938 |

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

Table A1. Logistic Models on Mortality Risks in 2000.

| | Urban | | Rural | |
|---|---|---|---|---|
| live with daughter | 0.183 | | -0.001 | |
| | (0.127) | | (0.132) | |
| live with spouse | -0.233 | | -0.156 | |
| | (0.218) | | (0.182) | |
| live with others | 0.150 | | 0.185 | * |
| | (0.151) | | (0.093) | |
| live alone | -0.104 | | -0.230 | * |
| | (0.177) | | (0.107) | |
| live in nursing home | -0.161 | | -0.486 | |
| *(reference: live with son)* | (0.165) | | (0.318) | |
| age | 0.085 | *** | 0.087 | *** |
| | (0.007) | | (0.005) | |
| male | 0.484 | *** | 0.469 | *** |
| | (0.110) | | (0.078) | |
| currently married | -0.440 | * | -0.298 | |
| | (0.203) | | (0.162) | |
| spouse dead <=2 years | 0.187 | | 0.041 | |
| | (0.131) | | (0.105) | |
| self reported health (1-5) | -0.360 | *** | -0.362 | *** |
| | (0.053) | | (0.039) | |
| years of schooling | -0.026 | * | -0.018 | |
| | (0.013) | | (0.016) | |
| whether supports oneself & spouse | -0.150 | | -0.165 | |
| | (0.118) | | (0.155) | |
| number of children | 0.006 | | -0.007 | |
| | (0.018) | | (0.013) | |
| whether other children visit frequer | -0.123 | | 0.015 | |
| | (0.108) | | (0.082) | |
| whether siblings visit frequently | -0.262 | | 0.004 | |
| | (0.139) | | (0.091) | |
| constant | -7.117 | *** | -7.288 | *** |
| | (0.673) | | (0.497) | |
| | | | | |
| LR Chi-square | 376.3 | | 602.2 | |
| DF | 15 | | 15 | |
| N | 2648 | | 4700 | |