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Ethnic Differences in the Adjustment to Poverty and Disability among Unmarried Elderly Americans : An Analysis of Multi-State Transitions in Living Arrangements from 1984 - 1990

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Race and ethnicity are important factors which influence the elderly's residential adjustment behaviors, although it is unclear whether this reflects influences unrelated to race and ethnicity. Culturally, the norm of family support often observed among various minority ethnic groups is likely to provide flexible family support for the elderly. Economically, the life-long hardship of minority groups is likely to force them to maintain extended family living arrangements simply to reduce expenses via economies of scale. The controversy about the economic need versus the cultural prescription for extended living arrangements remains unresolved because it fails to articulate the meaning of family supports among many disadvantaged groups.

This study aims to test previous economic and cultural arguments, by examining ethnic differences in the elderly's responsiveness to their health and economic problems. Two hypotheses about cultural influences on the elderly's residential adjustment are examined. First, do elderly minorities receive family supports for longer periods when they are poor in economic and health status? Second, do elderly minorities receive family supports more often when their health status declines? Using the Longitudinal Survey on Aging from 1984

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to 1990, this study employs Markovian multi-state life tables, and discrete and continuous competing hazard analyses for the transition in living arrangements.

The main results provide substantial evidence against the "cultural resource" thesis. Elderly minorities experience more frequent transitions between living alone and living with relatives than white elderly persons when group differences in the extent of mortality and institutionalization are controlled. The shorter time of living alone among elderly minorities stems from their greater likelihood of joining relatives as well as greater mortality and attrition rates than elderly whites. Coresidence of elderly whites with their relatives is more likely to occur in response to their needs for health care than that of elderly minorities. Poverty also forces elderly minorities to move to live alone more than elderly whites. It implies that instability, not flexibility, characterizes elderly minorities' living arrangements.

Key-words : elderly's residential adjustment, race/ethnicity, double jeopardy, Markovian multi-step transition

Introduction

There are conflicting conclusions about racial/ethnic differences in living arrangements later in the life course. Some evidence shows that elderly minorities are likely to be located in a position of "double-jeopardy" because they bear additional economic and social disadvantages, in addition to coping with the devaluation of old age in most modern societies (Dowd and Bengtson, 1978). Other evidence suggests, however, that elderly minorities obtain cultural benefit from their minority race or ethnicity because their life-long extended family support network provides various informal support (Cool, 1981 ; Rosenthal and Marshall, 1986).

These studies on ethnic/racial differences in living arrangements of the elderly are limited in their ability to capture the dynamics between cultural and economic influences on residential adjustment late in life. Many previous studies misleadingly simplify the choices between independent and extended living arrangements by regarding them as a function of resources or need for family support. This approach fails to explain why many elderly persons remain living alone despite their low level of independent resources. Given that the later life course includes the weakening of economic and health resources, extensive research is needed to explain in what ways and to what extent the elderly adjust to insufficient or weakening economic and health status within and across ethnic/racial groups.

This study contributes to our understanding of ethnic/racial differences in residential adjustments later in the life course in two important ways. First, it will explore the dynamics of the residential adjustment of the elderly. Living arrangements of the elderly involve a significant risk of transition because many elderly persons in their post-retirement life undergo a diluting process of economic and health resources, which increases the cost of self-care and the need for family support. Using

the *Longitudinal Survey of Aging* from 1984 to 1990, we will examine the intensity and destination of transitions in living arrangements. We will focus on unmarried elderly persons' adjustment behaviors, since their particular vulnerability to changes in health and economic status increases their need to adjust their living arrangements.

Second, by examining ethnic/racial differences in the dynamics of residential adjustments, this study tests whether elderly whites and minorities differ in their normative prescriptions for family support. We assume that the norm of independence and familism sustains different rules for providing and receiving family support. The norm of independence and privacy among many elderly whites is likely to stress an aversion to dependency and to pressure them to continue to live alone even when their economic and health resources are inadequate or declining. By contrast, the norm of familism among elderly minorities is likely to alleviate the negative sense of receiving family support even when the elderly lack resources for the repayment.

Depending on this cultural prescription for family support, we expect that elderly minorities are more likely than elderly whites to obtain short-term and long-term family support. To test the validity of this hypothesis, we will answer the following two questions:

First, regarding short-term family support, are elderly minorities living alone at the origin more likely to join their relatives given economic and health problems?

Second, regarding long-term family support, do elderly minorities living with relatives at the origin remain in that living arrangement for a longer period than elderly whites given economic and health problems?

Theoretical Review

Aging is a problematic portion of the life course, since it normally involves a weakening of economic and health status (Dowd, 1975). Such declines increase elderly persons' need for familial assistance. Several studies have found that drops in the functional capacity of the elderly lead to a greater dependency on family members and to institutionalization (Worobey and Angel, 1990; Speare, Avery, and Lawton, 1991). Some elderly persons also adjust their living arrangements as their health and economic status decline by changing residence across relatively long distances. For instance, Speare, Avery, and Lawton (1991) found that disability and health declines increase the likelihood of co-residence with children by way of the elderly's residential mobility, or by children moving into elderly persons' houses. Litwak and Longino (1987) found that when elderly persons experience a moderate decline in health, they tend to move closer to children or to others who can provide assistance.

Given the variation in living arrangements related to differences in resources for independence and the need for dependency, the majority of elderly whites maintain independent living arrangements later in their life, but continue to keep various exchanges with family members across distances (Shanas, 1980). On the other hand, one feature common to black, Asian, and Hispanic minority elderly persons is the prevalence of their extended family living arrangements (Markides and Mindel, 1987; Wolf and Soldo, 1988).

Traditionally, two competing approaches explain the causes of prevalent extendedness of minority families in different ways. First, cultural approaches argue that the normative familism of ethnic minorities promotes various informal supports between family members. The persistent family solidarity provides elderly minorities with "cultural resources" for their

social, emotional, and economic security (Cool, 1981; Rosenthal and Marshall, 1986). Economic approaches, however, assert that the prevalence of extended living arrangements among elderly minorities does not result from their strong family relations. Shanas (1980) found that elderly minorities maintain less frequent contact with their children if they live far away from each other; however, they are more likely to live with their children compared to elderly whites. According to Litwak (1985), the higher incidence of extended living arrangements and the lesser extent of contacts between distant family members among minority groups are the result of their lack of resources for independent living arrangements and family contacts across geographic distances. Other research also asserts that the lack of socio-economic resources over the life course (Hayward et al., 1988; Gibson, 1991) and the ethnic bias in welfare programs (Binstock, 1992; Rodriguez, 1991) inhibit elderly minorities from maintaining their independent living arrangements. In conclusion, the economic approach asserts that generational coresidence among minority populations mainly stems from the lack of resources for the independence of younger and/or older generations rather than their cultural preferences for extended kinship (Angel and Tienda, 1982).

Previous economic and cultural approaches to ethnic differences in living arrangements of the elderly, however, often ignore the dynamic process of residential adjustments later in life. Some elderly persons living alone fail to receive family support even in a time of need and are often forced into an institution. While some elderly persons are more likely to live with their relatives than others, it does not necessarily imply that those living with relatives maintain more stable family support than those living alone. Also, the direction of family support in extended family living arrangements is complex. For example, evidence exists showing that elderly parents provide help for co-living members more often than they receive it (Speare, Avery, and Lawton, 1991).

Very few studies have assessed the possibility of ethnic variation in the elderly's responsiveness to declines in health (Worobey and Angel, 1990). Worobey and Angel employed the 1986 Longitudinal Survey of Aging (LSOA) and found that most unmarried elderly persons previously living alone continued to live alone, in spite of declines in their health status (Worobey and Angel, 1990). More importantly, they also found that elderly minorities were more likely than elderly whites to continue to live alone when their health status declined. The latter finding is intriguing, given the prevalence of extended households among elderly minorities. Unfortunately, Worobey and Angel analyzed only a dichotomous status of the transition— continuing to live alone or not— and did not consider various routes of transitions in living arrangements. Thus, we cannot tell whether elderly minorities are less likely to move into family households or less likely to be institutionalized in response to their declining health than elderly whites.

Previous studies about the relative importance of cultural and economic factors for residential adjustments are also problematic because of their ignorance of the mutually regulating relations between economic and cultural factors. This ignorance misleadingly implies that the effects of economic and health resources must be similar among culturally-different ethnic groups. Of importance, however, is that culture influences the way that individuals utilize resources for specific values and preferences. If ethnic groups differ in their normative prescriptions for family relations, the responsiveness to economic and health problems shows a distinctive pattern across ethnic groups. On the one hand, the norm of independence among most elderly whites is likely to stress a tension for dependency and to force elderly whites to delay their dependency until the time of extreme need. On the other hand, the value of family attachment among elderly minorities is likely to alleviate the negative connotations of dependency and to enable elderly minorities to maintain family support for a longer time than elderly whites. In conclusion, if majority whites and minorities differ significantly in

their normative prescriptions on family support, the elderly's responsiveness to their economic and health resources, and changes in those resources will vary between these two ethnic groups.

This study seeks to extend the ethnic literature on residential adjustment later in life by 1) comparing ethnic differences in the extent to which the elderly living alone or living with relatives at the origin experience changes in their living arrangements given health and income status; and 2) by examining the interplay of ethnicity and health/income status in shaping transitions in living arrangements. Two main hypotheses are examined to test the significance of cultural differences in the responsiveness to health and economic problems between elderly whites and minorities:

If elderly minorities are more likely to be family-attached and are more likely to tolerate their own or other family members' dependency than are elderly whites, then

- elderly minorities living alone will more often join their relatives than do elderly whites, when they have economic and health problems and declines in health *(short-term family support)*.
- elderly minorities will live in extended living arrangements for a longer period than elderly whites given health and economic problems *(long-term family support)*.

Data and Measurement

The data employed in this research is obtained from the two-year interval *Longitudinal Survey of Aging* (LSOA) from 1984 to 1990, which was designed to examine the dynamic process of health and family relations of non-institutionalized senior respondents aged 70 and over in 1984. LSOA also includes information about the outcome of the follow-up interviews,

which enables us to examine the characteristics of those who died, entered group housing, and were not re-interviewed due to other unknown reasons between interviews. More detailed information about the date and place of deaths for the entire sample was obtained from the National Death Index. The current study selected unmarried elderly persons from the total sample of 1984 and examined changes in living arrangements and other demographic characteristics by matching follow-up interviews. The sample size is 2,827 elderly persons.

As Table 1 shows, about 20 percent of the observations were interrupted for unknown reasons. Furthermore, elderly persons who were not re-interviewed have many characteristics that significantly differ from the total sample. Less-educated elderly persons and those who were under the poverty level in 1984 were more likely to become lost than well-educated persons and those who were economically advanced. Elderly persons living alone in 1984 were more likely to be lost than those living with relatives. Regarding time-varying characteristics, those living alone at the origin were more likely to be lost between the follow up interviews. Duration at the origin is shorter among respondents whose observations were interrupted during the follow up interviews. Those living in rented or other' s houses or having health problems at the origin, or those experiencing declines in health status between the interviews were more likely to be lost than their counterparts. Given that this study covers three spells from 1984 to 1990 and that there is a significant selectivity of persons not re-interviewed, dropping the cases of attrition may bias the analysis. To examine the risk of a selective observation, this study included attrition as an additional transition and examined whether the determinants of attrition significantly differ from those of the other transitions.

<Table 1> The Characteristics of Total Sample and Attrition Cases, LSOA 1984 - 1990

	Total Sample in 1984 Mean	Attrition from1984 to 1990 Mean	Z value of Mean Difference	
Time Fixed Variables				
Minority (Yes)	0.16	0.19	1.57	
Female (Yes)	0.82	0.82	0.36	
Age in 1984	79.61	79.55	0.23	
Years of education	9.58	9.17	2.38	**
Having daughter (Yes)	0.66	0.62	2.08	*
Under poverty in 1984 (Yes)	0.27	0.34	-2.99	**
Living alone in 1984 (Yes)	0.69	0.75	-3.18	**
Time Varying Variable				
Age at the origin [a)]	79.77	79.59	0.68	
Living alone at the origin (Yes)	0.68	0.76	-3.7	**
Time living alone at the origin (among those experiencing changes in living arrangement at the follow-up interviews)	3.73 (2.56)	2.72	11.42	***
Time living with relatives at the origin (among those experiencing changes in living arrangement at the follow-up interviews)	3.34 (2.38)	2.35	6.77	***
Home ownership at the origin (Yes)	0.52	0.46	2.40	**
Disability at the origin (0 to 13)	1.94	1.49	2.63	**
Decline in health between the origin and the nearest time before transition (Yes)	0.44	0.52	-3.53	**
Size of N	2,827	586		

*** $p < .001$, ** $p < .01$, * $p < .05$

a) The specification of the origin and destination is based on the observation with the longest spell. If the origin status is not living alone or living with relatives, the status at 1984 is considered to be the origin status.

Dependent Variable

Dependent variables were measured differently in the discrete- and continuous-time hazard models. The discrete-time hazard analysis examined origin-specific outcomes of transitions in living arrangements, whereas the continuous-time hazard analysis examined the survival time until a particular transition occurs. It must be addressed that the observation of transition outcomes or failure times does not meet the conventional BLUE assumption of an uniform random distribution of "independent" subjects (Altonji and Dunn, 1996; Baltagi and Griffin, 1984). This is because some elderly respondents experience several changes in living arrangements during the interviews and observations of these multiple transitions are likely to be correlated with one another.

Model I Discrete-time Hazard Analysis

$$P\{ y(t) = k \mid X, t, y(0)=j \} = e^{(XB + t\gamma)} / (1 + \Sigma e^{(XB+t\gamma)})$$

where, y(0) is the living arrangement at the origin, and y(t) is the living arrangement at the time, t.

Model II Continuous-time Hazard Analysis

$$T_k = e^{x_k B + c(\log(t_k))}$$

The failure time equation below assumes that the hazard rate changes with survival time depending on the shape parameter σ, where c is $1/\sigma - 1$. If $\sigma = 1$, the hazard is flat; and if $\sigma < 1$, the hazard increases with survival time.

Another issue with regard to survival data analysis derives from the amount of censored cases and the relationship between censored cases and failure time. In this study, about 35 percent of respondents did not experience change in living arrangements between the interviews. In addition to this standard censoring case, multiple paths to transitions technically increased censored cases when only a particular path of transition was considered. Furthermore, it is likely the case that the risk of censoring is dependent upon the length of spell. If this is the case, multi-state failure time analysis with large numbers of censored cases has the risk of under-observing longer spells and hence producing misleading estimates.

To handle the problems resulting from multi-spell observations within unit subjects and the association between censored cases and the length of spell, this study chose the longest spell among all observed spells as the unit of analysis. Spells from 1984 though were measured regardless of their duration if, at the origin with the longest spell, those respondents were not living alone or living with relatives. Regarding survival times until transitions, LSOA does not provide the information on the exact time of the transition in living arrangements and the previous history of living arrangements before 1984. Thus, the following measurements were used to estimate survival times until transitions: 1 for those who changed living arrangements at every interview ; 3 for those who stayed in the same living arrangements between two following interviews (either between 1984 to 1986, between 1986 to 1988, or between 1988 to 1990); and 5 for those who stayed in the same living arrangements between three following interviews (such as between 1984 through 1986 to 1988, or 1986 through 1988 to 1990). No transitions or other transitions than that of interest were regarded as censored. There are five possible outcomes of a transition in living arrangement : death, institutionalization, living alone, living with relatives, and other attrition.

Independent Variables

The central independent factor is ethnicity. This study focuses on differences between majority whites and minorities. Elderly minorities were measured as those who are Hispanic or non-whites.[1] While minorities are composed of various ethnic origins with different immigration and acculturation history, they share similar characteristics in terms of their lower SES and more frequent extended family living arrangements, both of which significantly differ from the characteristics of the majority of whites.

Other main independent factors are health, change in health, and economic status. Health status was measured using the summed scale of Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). ADLs included seven items of self perception about difficulty with bathing, dressing, eating, getting in and out of bed or chair, walking, getting outside, and using the toilet. IADLs included six items: preparing one's own meals, shopping for personal items, managing one's own money, using the telephone, doing heavy housework, and doing light housework. Each item was coded 1 if a respondent reported no difficulty and 0 if any difficulty was reported. Concerning non-responses, the average score of both ADL and IADL was weighted by the total number of items. The total scale ranges from 0 to 13. Finally, the analysis model included a dichotomous status of health problems, distinguishing whether elderly respondents had any problems with ADLs or IADLs at the origins. Another health index is changes in health status, specifying whether or not respondents experienced any declines in health status between the time at origin and the nearest time before the transition or censoring occurs.

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1) The ethnic composition of minority groups in the LSOA is American Indian (4.1 %), Asian (4.1 %), blacks (84.7 %) and others (7.2%).

While LSOA includes a rich set of information on elderly individuals' health status, it has very few items about their economic status. Two items of income status, total family income and family poverty level, do not really indicate elderly individuals' income level. Substantial non-response rates of these two items also bring in suspicion of the selective observation. This analysis chose poverty level as the best proxy variable for elderly persons' income status. Poverty level was coded dichotomously, distinguishing between economic status below and above poverty levels. In addition, the analysis included several income-related items. Education level was measured categorically : elementary school (less than 8 years' schooling, reference), high school (8 to 12 years' schooling), and more than high school (13 years or more years of schooling). Home ownership was categorically coded: living in their own house with living in a relative's house, or in a rented house as reference.

Additionally, this analysis controlled the effects of age, gender, and presence of daughters, which may affect the transition in living arrangements. As Findley (1988) addressed, it is difficult to examine a causal relationship between covarying variables. Thus, this study used time-lagged variables once these were available.

Results

Ethnic Differences in the Transition in Living Arrangements among Unmarried Elderly Persons

To what extent do elderly whites and minorities experience transitions in living arrangements later in their life? We employed multi-state Markovian life tables to examine the stability of living arrangements and the relative strength of competing outcomes for transitions in living

arrangements between the two elderly groups.

The transition pattern of the elderly living alone at the origin was observed first. Table 2.1 summarizes age-and destination-specific transition rates and expected durations of living alone.[2] The first part of the table presents the biennial transition rate for each two-year age group in 1984. The biennial transition rate is the geometric mean of transition rates between 1984 and 1990. The second part of the table presents expected durations of living alone under various assumptions on transition outcomes.

The first column of the second part shows the expected duration of living alone when death is considered as the sole outcome of the transition. The values through the second and forth columns represent the amount of drops in year duration when the additional transition outcome is taken into account. The last column presents the expected duration of the origin when all the transition outcomes are considered.

Overall, elderly minorities living alone have a greater transition rate than elderly whites. The total age-specific transition rate shows that elderly minorities in most age groups have much greater transition rates than elderly whites of the same age groups. This higher transition rate among elderly minorities is consistent with their shorter duration of living alone. For example, the total expected time of living alone among elderly whites aged 70 and 71 is 1.5 years longer than that of elderly minorities of the same ages.

Regarding the amount of drops in year duration due to each transition outcome, the expected duration is slightly longer for elderly whites than minorities when death is considered as the only transition outcome. When institutionalization is added to the transition outcome, the expected duration

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2) Because no satisfactory information about the duration surviving in the final age group was available, the expected duration was estimated using the partial life expectancy to age 86 as follows ;

$$_{86-x}e_x = \Sigma {}_2L_a \,/\, l_x = (T_x - T_{86}) \,/\, l_x$$

<Table 2.1> The Biennial Transition Rate and the Expected Duration of Living Alone

Elderly Non-Hispanic Whites Living Alone at the Origin

Age at 1984	Mean of two year transition rate from 1984 to 1990 $_2\hat{q}_x$ [a] Outcome of Transition: Death	Institutionalization	Attrition	Living with relatives	Total	Expected duration in competing multi-state life tables $\hat{e}_x$ Additional Effect of Other Transition Outcome (drop in year) [b]: Death included only, $\hat{e}_x$	Institutionalization	Attrition	Living with relatives	Total expected duration of living alone, e_x
70-71	0.06	0.02	0.06	0.08	0.21	13.74	0.56	1.77	1.30	10.11
72-73	0.06	0.01	0.08	0.09	0.23	12.12	0.43	1.51	0.99	9.19
74-75	0.07	0.02	0.11	0.04	0.24	10.45	0.39	1.16	0.64	8.26
76-77	0.08	0.03	0.01	0.06	0.17	8.79	0.31	0.70	0.52	7.26
78-79	0.10	0.02	0.08	0.05	0.24	7.10	0.22	0.69	0.34	5.85
80-81	0.12	0.02	0.11	0.06	0.32	5.42	0.18	0.49	0.23	4.52
82-83	0.16	0.07	0.13	0.06	0.43	3.70	0.13	0.26	0.12	3.19
84-85	0.13	0.07	0.17	0.08	0.45	1.94	0.04	0.08	0.04	1.78
86+	0.20	0.07	0.14	0.07	0.48	–	–	–	–	–

Elderly Minorities Living Alone at the Origin

Age at 1984	Mean of two year transition rate from 1984 to 1990 $_2\hat{q}_x$ [a] Outcome of Transition: Death	Institutionalization	Attrition	Living with relatives	Total	Expected duration in competing multi-state life tables $\hat{e}_x$ Additional Effect of Other Transition Outcome (drop in year) [b]: Death included only, $\hat{e}_x$	Institutionalization	Attrition	Living with relatives	Total expected duration of living alone, e_x
70-71	0.04	0.01	0.12	0.09	0.26	13.53	0.39	2.83	1.68	8.63
72-73	0.02	0.04	0.07	0.12	0.26	11.77	0.36	2.26	1.38	7.77
74-75	0.11	0.01	0.11	0.10	0.33	9.90	0.17	1.99	0.97	6.77
76-77	0.09	0.00	0.18	0.10	0.36	8.45	0.14	1.68	0.72	5.91
78-79	0.15	0.00	0.14	0.06	0.35	6.78	0.14	1.16	0.49	4.99
80-81	0.23	0.00	0.29	0.14	0.66	5.26	0.15	0.87	0.40	3.84
82-83	0.11	0.11	0.12	0.08	0.42	3.81	0.17	0.27	0.14	3.23
84-85	0.05	0.03	0.22	0.05	0.35	1.97	0.01	0.11	0.03	1.82
86+	0.02	0.19	0.13	0.10	0.44	–	–	–	–	–

of living alone declines slightly more for elderly whites than minorities, indicating that overall elderly whites living alone have a higher risk of institutionalization than elderly minorities. This figure requires a cautious interpretation because the greater attrition rate among elderly minorities may cause us to underestimate their risks of death and institutionalization. Finally, when the incidence of joining relatives is accounted for, the year duration declines more greatly among elderly minorities than among elderly whites, indicating a greater tendency for elderly minorities to join their relatives than their white counterparts.

Table 2.2 summarizes transition rates and expected durations at living with relatives. In contrast to living alone, elderly whites and minorities are not likely to differ significantly in their extent of transition experience when they live with relatives at the origin.

Looking at total expected duration, elderly minorities aged 70 to 77 live with relatives for a slightly longer period than elderly whites of the same ages, whereas elderly minorities aged 78 or older live with relatives for a slightly shorter period than elderly whites of the same ages.

Despite little difference in total transition rates and expected durations, the extent to which elderly respondents experience each component of transition outcomes maintains significant contrast between elderly whites and minorities. Elderly minorities in most age groups are more likely than their white counterparts to experience transition to living alone. Due to this greater incidence of elderly minorities living alone, the year duration declines more greatly among elderly minorities when transition to living alone is added to the transition outcomes than for elderly whites.

The risk of death among those living with relatives is greater among elderly whites than minorities. When death is considered as the only transition outcome, the expected duration for which elderly minorities live with relatives is longer than that for elderly whites across every age group. In most age groups, elderly whites are more likely to experience

<Table 2.2> The Biennial Transition Rate and the Expected Duration of Living with Relatives

Elderly Non-Hispanic Whites Living with Relatives at the Origin

Age at 1984	Mean of two year transition rate from 1984 to 1990 ${}_2q_x$ [a] Outcome of Transition: Death	Institutionalization	Attrition	Living Alone	Total	Expected duration in competing multi-state life tables $\hat{e}_x$ Additional Effect of Other Transition Outcome (drop in year) [b]: Death included only, $\hat{e}_x$	Institutionalization	Attrition	Living with relatives	Total expected duration of living with relatives e_x
70-71	0.06	0.04	0.05	0.16	0.31	12.78	1.08	1.43	2.09	8.18
72-73	0.11	0.06	0.04	0.16	0.37	11.15	0.89	1.24	1.50	7.52
74-75	0.11	0.04	0.09	0.13	0.37	9.73	0.62	1.16	0.98	6.97
76-77	0.12	0.03	0.08	0.13	0.37	8.26	0.47	0.88	0.56	6.35
78-79	0.16	0.06	0.11	0.01	0.33	6.74	0.37	0.66	0.15	5.56
80-81	0.17	0.06	0.11	0.05	0.39	5.23	0.20	0.40	0.16	4.47
82-83	0.18	0.03	0.11	0.03	0.35	3.63	0.07	0.19	0.06	3.31
84-85	0.20	0.07	0.08	0.04	0.39	1.90	0.03	0.04	0.02	1.81
86+	0.33	0.08	0.08	0.05	0.54	—	—	—	—	—

Elderly Minorities Living with Relatives at the Origin

Age at 1984	Mean of two year transition rate from 1984 to 1990 ${}_2q_x$ [a] Outcome of Transition: Death	Institutionalization	Attrition	Living Alone	Total	Expected duration in competing multi-state life tables $\hat{e}_x$ Additional Effect of Other Transition Outcome (drop in year) [b]: Death included only, $\hat{e}_x$	Institutionalization	Attrition	Living with relatives	Total expected duration of living with relatives e_x
70-71	0.07	0.03	0.14	0.16	0.40	13.49	0.42	2.22	2.59	8.26
72-73	0.09	0.00	0.07	0.15	0.31	11.98	0.24	1.51	2.13	8.10
74-75	0.09	0.00	0.12	0.15	0.35	10.49	0.22	1.20	1.65	7.42
76-77	0.02	0.00	0.04	0.15	0.21	8.92	0.22	0.68	1.22	6.80
78-79	0.08	0.00	0.06	0.15	0.28	7.00	0.22	0.55	0.75	5.48
80-81	0.21	0.00	0.10	0.08	0.39	5.25	0.23	0.40	0.39	4.23
82-83	0.16	0.06	0.13	0.18	0.54	3.76	0.26	0.21	0.27	3.02
84-85	0.00	0.37	0.07	0.03	0.47	2.00	0.18	0.04	0.02	1.76
86+	0.16	0.06	0.02	0.08	0.32	—	—	—	—	—

institutionalization than elderly minorities. This greater risk of death and institutionalization among elderly whites living with relatives implies that elderly whites living with relatives are more likely to be composed of those with a high risk of morbidity and mortality than is the case for elderly minorities. To put it differently, coresidence of elderly whites with their relatives is more likely to occur in response to their needs for health care than that of elderly minorities.

In summary, there is a contrast between the stability of independent living arrangements of elderly whites and minorities. Elderly minorities live alone for a shorter period than elderly whites. This shorter time of living alone among elderly minorities stems from their greater likelihood of joining relatives as well as greater mortality and attrition rates than elderly whites.

The stability of extended living arrangements does not differ significantly between the two groups. Despite this similar extent of net transition rates and expected durations of living with relatives, the likelihoods of transition to living alone, death, and institutionalization substantially differ between the two elderly groups. Particularly, elderly minorities living with relatives at the origin have a greater risk of transition to living alone than their white counterparts, which cancels off the gain in year duration due to their lower rates of mortality and institutionalization than elderly whites.

Determinants of Competing Transitions in Living Arrangements among Unmarried Elderly Persons

Why do elderly minorities live alone more often and at the same time join their relatives more often than do elderly whites? Previous cultural approaches provide a theoretical answer to this question: elderly minorities' living arrangements are "flexible" because the strong family solidarity among

minority groups is more likely to promote the residential adjustment of elderly minorities. The following section evaluates this argument by examining the significance of net effects of ethnicity and its interaction with economic and health status. In addition to economic and health status, the analysis controls for the effect of gender, age, education, and the presence of daughters.

Table 3.1 presents the net effects of ethnicity and other covariates on transition rates (A) and failure times (B) for those living alone at the origin. Coefficients denote odds of a particular transition relative to remaining at the origin in the discrete-time hazard model (A) and odds of the duration relative to the base-line duration in the continuous-time hazard model (B). The table also includes coefficients of interaction between ethnicity and health/economic status, each of which is examined in a separate analysis.

The discrete-time and continuous-time hazard models both elucidate a significant association between hazard of transition and failure time. The estimates of survival time in the discrete-time hazard model imply that the time remaining at living alone significantly reduces the likelihood that elderly respondents would experience any transition. In contrast, the estimates of sigma, which denotes the shape of the base-line hazard distribution, imply that the hazard of any transition increases with the failure time, although the effect of failure time is not likely to be dramatic. It must be noted that the survival time in the discrete-time hazard analysis was measured differently from the failure time in the continuous-time hazard model. In the continuous-time hazard analysis, the observation was regarded to be censored if no transitions or those other than the transition of interest occurred during the total spell of interviews. Basically, the discrete-time hazard analysis fails to account for censored cases. The current discrete-time model has approximated the survival time for censored observations, such as 6 years when respondents remain at the origin through 1984 and 1990, 4 years when remaining at the origin between 1986 and 1990, and 2 years when staying at the origin between 1988 and 1990.

Turning to the detailed effects of covariates, ethnicity has no significant effect on the likelihood of joining relatives. This finding suggests that a higher rate of joining relatives among elderly minorities found in the multi-state life tables is due largely to their more vulnerable health and economic status.

In contrast to the insignificant effects on joining relatives, however, ethnicity significantly influences the risk of death and institutionalization. Elderly minorities living alone at the origin sustain lower rates of death than elderly whites, which contrasts with the findings from the multi-state life tables. This implies that the overall greater mortality rate of elderly minorities living alone at the origin than their white counterparts results from confounding ethnic differences in economic and health status. Once controlling for group differences in health and economic status, elderly minorities living alone at the origin sustain a significantly lower death rate than their white counterparts.

Health problems significantly suppress the ability of the elderly to maintain their independent living and reduces the failure times until they experience any type of transition. In addition, decline in health significantly increases the likelihood of any type of transition and reduces the failure time of living alone until this transition.

Poverty has significant effects on the likelihood of death and institutionalization. The failure time of living alone until the transition to death among elderly respondents below the poverty line is .83 times that of those above poverty. This indicates that the independent living arrangement is significantly volatile among those in economic disadvantage due to their higher risk of death. Those below the poverty level are also 78 percent more likely to experience institutionalization.

Home ownership significantly influences the likelihood of death and institutionalization. The risk of death and institutionalization, respectively, is 37 and 42 percent lower among those living in their own house than

Table 3.1 Determinants of Transition Rate and Survival Time of Living Alone at the Origin, LSOA 1984-1990

\ transition outcome		Living with Relatives		Death		Institution		Attrition	
		Transition Rate (A)	Failure Time (B)	Transition Rate (A)	Failure Time (B)	Transition Rate (A)	Failure time (B)	Transition Rate (A)	Failure time (B)
Survival time		0.16 ***	–	0.15***	–	0.15 ***	–	0.15 ***	–
Sigma			0.44 ***		0.53 ***		0.61 ***		0.49 ***
Ethnicity	minority (ref: non−Hispanic whites)	0.60	0.88	0.34***	1.04	0.27 **	1.24	0.41 **	0.99
Health	disability at the origin (ref: no health problem)	1.24	0.79 *	2.19*	0.79 ***	1.96 ^	0.57 ***	1.18	0.78 **
Change in Health	decline in Health (ref: others)	1.89 *	1.00	2.94***	0.50 ***	7.87 ***	0.75^	2.11 ***	0.51 ***
Income Level	poverty (ref: above the poverty line)	1.05	0.89	1.09	0.83 **	1.78 *	1.02	1.29	1.00
Home Ownership	own house (ref: other s own house)	0.82	1.07	0.63*	0.98	0.58 *	1.07	0.53 ***	1.03
Gender	female (ref: male)	1.23	1.17	0.62^	1.12 **	1.44	1.26	0.75	1.15 *
Kin availability	having daughter (ref: no daughter)	1.46	0.97	0.61*	1.00	0.73	1.21	0.69 ^	1.23 ***
Education	9 to 12 years (ref: 〈= 8 years)	0.95	0.96	0.96	0.99	1.10	0.90	0.83	1.02
	〉 12 years (ref: 〈= 8 years)	0.59	0.87	0.57^	0.91	0.65	0.95	0.49 *	1.07
Age		0.99	0.99	1.02	1.00	1.08 ***	0.98	1.00	1.01 *
Interaction between Ethnicity and Health/Economic Status									
	minority*disability	2.98	–	4.00^	–	9.48 *	–	2.59	–
	minority*decline in health	1.84	–	6.72**	–	1.34	–	3.10 ^	–
	minority*poverty	0.29 ^	–	1.03	–	0.82	–	0.79	–
	minority*home ownership	0.37	–	0.44	–	0.24 ^	–	0.57	–
R^2		0.31	0.06	0.31	0.13	0.31	0.08	0.31	0.10
N		1,595	160	1,595	328	1,595	133	1,595	352

*** p 〈0.001, ** p 〈0.01, * p 〈0.05, ^ p 〈0.10

among those living in other's house.

Taken together, the effect of ethnicity on transition outcomes among those living alone at the origin indicates the importance of health and economic resources in accounting for the difference in residential adjustment of elderly whites and minorities. Although elderly minorities living alone at the origin are more likely to join their relatives than elderly whites of the same living arrangement, this group difference becomes insignificant when their health and economic status are controlled.

Significant group differences in the effects of poverty also provides evidence against the hypothesis that elderly minorities living alone at the origin are more likely than elderly whites to obtain family support in response to their economic disadvantages. Contrary to the hypothesis, odds difference of joining relatives versus staying living alone according to income level is smaller among elderly minorities than elderly whites.

Table 4.2 summarizes the results for elderly living with relatives. Elderly minorities living with relatives are more likely than elderly whites to experience transition to living alone. This is consistent with the unadjusted finding from the multi-state life tables, suggesting that elderly minorities' greater tendency of the transition to living alone is not likely the result of their more advantaged economic and health status than elderly whites at the same origin. Although a speculative explanation, this is likely because characteristics of relatives with whom the elderly live might differ between the two groups, perhaps because children of elderly minorities are more economically vulnerable than children of elderly whites.

The risk of death and institutionalization does not differ significantly between the two elderly groups when health and other covariates are controlled. This finding suggests that the higher risk of death and institutionalization among elderly whites living with relatives than elderly minorities found in multi-state life tables pertains to the fact that elderly whites living with relatives are more likely to be composed of subgroups with

health problems than is the case for elderly minorities.

Health problems have a significant effect on any type of transition. Elderly respondents with health problems are less likely to experience transition to living alone. It is interesting to note that the failure time of living with relatives until the transition to living alone is significantly shorter among those with health problems. Although speculative, this is likely to be because those with health problems are more likely to enter institution before they experience another transition to living alone. Health problems and declines in health also significantly increase the risk of death and institutionalization. It is important to note that the failure time until institutionalization is longer among those with health problems or decline in health. This indicates that living with relatives plays a supplementary role with formal care utilities in providing health care for the elderly.

Income level has no significant effect on the transition. However, home ownership significantly reduces the likelihood that the elderly will be institutionalized, indicative of their strong resistance toward institutionalization as far as the elderly maintain their own housing.

The result shows significant interaction between ethnicity and home ownership. Odds difference of transition to living alone according to home ownership status is much greater among elderly minorities than whites. This suggests that home ownership more clearly stratifies elderly minorities in their choice of independent versus extended living arrangements than is the case for elderly whites.

Taken together, as opposed to our hypothesis, elderly minorities living with relatives at the origin are more likely than their white counterparts of the same health and economic status to experience the transition to living alone. This finding requires inquiry into the extent to which characteristics of family members with whom elderly respondents live influence the stability of the extended living arrangements. In addition to this net effect in an opposite pattern to the hypothesis, the evidence exists that home ownership

Table 3.2 Determinants of Transition Rate and Survival Time of Living with Relatives at the Origin, LSOA 1984-1990

\ transition outcome		Living Alone		Death		Institution		Attrition	
		Transition Rate (A)	Failure Time (B)	Transition Rate (A)	Failure Time (B)	Transition Rate (A)	Failure time (B)	Transition Rate (A)	Failure time (B)
Survival time		0.24 ***	–	0.33 ***	–	0.34 ***	–	0.29 ***	–
Sigma			0.46 ***		0.54 ***		0.53 ***		0.41 ***
Ethnicity	minority (ref: non–Hispanic whites)	2.43 *	1.39 *	0.73	1.15	0.93	1.10	1.88 ^	1.21 ^
Health	disability at the origin (ref: no health problem)	0.40 ^	0.45 **	2.72 ***	0.80 **	2.99 **	1.13 ***	0.84	0.65 ***
Change in Health	decline in Health (ref: others)	0.26 **	0.81	3.15 ***	0.54 ***	3.47 ***	1.46 *	1.38	0.34 ***
Income Level	poverty (ref: above the poverty line)	1.53	1.26	.67	1.00	0.79	0.80	0.81	1.08
Home Ownership	own house (ref: other's own house)	1.78	0.88	0.69	1.18 ^	0.47 *	0.25	0.65	1.28 *
Gender	female (ref: male)	1.58	0.88	1.32	1.16	1.63	1.18	2.05 ^	1.29 ^
Kin availability	having daughter (ref: no daughter)	0.53	1.13	0.97	1.08	0.78	1.30	0.50 *	1.21
Education	9 to 12 years (ref: 〈= 8 years)	1.06	1.20	1.04	0.79 *	1.05	0.92	0.98	0.96
	〉12 years (ref: 〈= 8 years)	0.78	1.87 *	0.80	0.71 **	0.55	0.54 **	0.72	0.91
Age		1.01	1.01	1.01	1.00	1.04	0.98	0.97	1.03 ***
Interaction between Ethnicity and Health/Economic Status									
	minority*disability	0.55	–	0.91	–	0.61	–	0.71	–
	minority*decline in health	1.76	–	1.22	–	4.03	–	1.29	–
	minority*poverty	0.64	–	0.68	–	0.14 ^	–	1.17	–
	minority*home ownership	7.44	–	1.03	–	8.93 *	–	0.69	–
R^2		0.30	0.17	0.30	0.09	0.30	0.11	0.30	0.32
N		684	53	684	226	684	76	684	93

*** p 〈0.001, ** p 〈0.01, * p 〈0.05, ^ p 〈0.10

more greatly increases the incidence of living alone among elderly minorities than elderly whites.

Discussion: The Flexibility or the Instability of Extended Living Arrangements?

The main research question which has guided various analyses is whether elderly minorities obtain family support more often and for longer periods than elderly whites when their economic and health status is poor or their health status declines. Contrary to our expectations, the hypothesis that elderly minorities join relatives more often and for longer fenods than elderly whites in a time of economic and health problems is not supported. For those living alone at the origin, the net effect of ethnicity is insignificant when group differences in health and economic status are adjusted. For those living with relatives at the origin, elderly minorities are more likely than elderly whites of the same health and economic status to experience the transition to living alone.

In conclusion, we draw two important remarks from these findings. First, residential adjustment later in the life course remains distinct between elderly whites and minorities, mainly because their differences in vulnerability to weakening health and economic status. Second, the results elucidate the importance of an "un-measured" dimension of ethnicity; characteristics of kin members regarding their resources, need for family support, and felt-obligation to provide care for the elderly, which may have a primary effect on the life course adjustment of the elderly.

The present research builds an important step toward advancing our understanding of cultural and economic influences on residential adjustments later in life. We encourage more extensive studies of the family life course, resources, constraints, and needs of both elderly parents and their children to elaborate several of significant findings about residential adjustments addressed here.

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국문요약

무배우자 노인의 빈곤과 질병에 대한 적응양식에서 인종간 차이: 1984년에서 1990년 거주지 변화에 대한 다중 변천 모형

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미국사회에서 노인의 거주지 적응양식은 인종간에 차이가 크다. 일반적으로 소수인종노인은 백인노인에 비하여 자녀와 함께 사는 경향이 강하다. 이에 대하여 문화적 입장에서는 소수인종은 백인에 비하여 가족부양규범이 강하다고 주장한다. 다른 한편 경제적 입장에서는 소수인종은 그들의 생애를 지배하는 빈곤때문에 규모의 경제를 통하여 가계비용을 줄이기 위하여 확대가족을 유지할 수밖에 없다고 주장한다.

본 연구는 노인이 질병과 빈곤에 적응하는 방식에 있어 인종간 차이를 검토함으로써 기존의 경제학적 논의와 문화적 논의의 적합성을 검정하는데 목적을 두고 있다. 이를 위하여 노인의 거주지 적응에 대한 문화적 영향과 관련하여 두가지 가설을 검정하고 있다. 첫째, 소수인종 노인은 백인노인에 비하여 빈곤과 질병상황에서 가족으로부터 더 오랜기간 보호를 받는지를 검토한다. 둘째, 소수인종 노인은 백인노인에 비하여 건강이 악화될 때 더욱 신속하게 가족으로부터 보호를 받을 수 있는지를 검토한다.

분석을 위해서 1984년에서 1990년기간 동안 실시된 "고령화에 대한 종단적 조사(Longitudinal Survey on Aging)"를 이용하여 마르코비안 다중생명표 모형과 사건사분석을 수행하였다.

본 연구결과에 따르면 소수인종 노인은 가족부양규범의 문화적 이점을 그다지 크게 가지고 있지 않다. 인종간 사망력과 시설입소의 차이를 통제할 때, 소수인종 노인은 백인노인에 비하여 보다 흔하게 자녀동거에서 단독거주형태로 혹은 그 반대방향으로 거주지 변화를 경험하고 있다. 백인노인은 소수인종노인에 비하여 질병상태와 관련하여 자녀와 동거하는 경향이 더 강하다. 사망력과 시설입소의 인종간 차이를 통제할 때 소수인종노인이 백인노인보다 쉽게 자녀동거에서 단독거주로 이행하는데 이는 소수인종에서 가족부양체계가 불안정함을 의미한다. 또한 빈곤시에 소수인종 노인은 백인노인에 비하여 보다 쉽게 자녀와 떨어져 살게 된다. 이러한 결과는 소수인종 노인에 대한 가족의 지원은 그 가족의 경제적 제약속에서 매우 안정적이지 못함을 시사한다.

주요단어 : 노인의 거주지 적응양식, 소수인종 노인의 이중고, 마르코비안 다중생명표