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Depressive Symptoms, Transitions to Widowhood, and Informal Support From Adult Children Among Older Women and Men in Japan

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Abstract

This study examines the relationships among depressive symptoms, transitions to widowhood, worsening health, and family support in Japan over 10 years. The analyses focus on availability and receipt as the two primary dimensions of intergenerational support relationships. We used growth curve models to analyze data from the Nihon University Japanese Longitudinal Study of Aging, finding that (1) becoming widowed correlated with increased depressive symptoms and this relationship was weaker among women than men, (2) continuous widowhood was associated with fewer depressive symptoms over time, (3) transitions to coresidence with sons and daughters among the widowed was correlated with reduced depressive symptoms, (4) self-reported health and difficulty with activities of daily living were predictors of depressive symptoms over time. The findings suggest the importance of new research on household transitions, availability and proximity of family caregivers, and social embeddedness as protections against depressive symptoms.

Keywords

depressive symptoms; widowhood; intergenerational support; health; cross-national research

Widowhood is a distressing event that is associated with elevated mortality risk, increased depressive symptoms, and changes in social relationships (Lillard & Waite, 1995; Sasson & Umberson, 2014). In Japan, the effect of transitions to widowhood on depressive symptoms has been documented (Sugihara, Sugisawa, Shibata, & Harada, 2008; Tiedt, 2013). However, only a handful of studies focusing on Japan have examined the relationship between family support and depressive symptoms in a longitudinal manner and even fewer

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have considered how shifting expectations for care from children may impact those trajectories. In light of increasing longevity and declining fertility, family caregivers may not be available and are likely to operate under greater strain. Given recent shifts in preferences toward independent living versus multigenerational coresidence (Traphagan, 2003), longitudinal studies focusing on widowhood, household arrangements, and depressive symptoms in Japan can advance discussions of expectations and burden on informal support providers as well as care recipients within families (Tiedt, 2010, 2013). This study sought evidence for the protective effect of social support from adult children on depressive symptoms, as elders transition to widowhood and worsening physical health. A primary objective of the analyses was to evaluate the dimensions of informal support, examining care relationships from the perspectives of availability and receipt. This study defines availability of support as coresidence with children and participation in community groups, while receipt of support refers to having received instrumental support or companionship from children.

The analyses drew from past and contemporary research that highlights “pragmatic altruism” in intergenerational support relationships (Grundy & Henretta, 2006; Logan & Spitz, 1996; Takagi & Silverstein, 2006). Pragmatic altruism refers to a tendency for older and younger generations to adjust altruistic support intentions given family context. Family tradition, widowhood, available caregivers, health stressors, property, and economic incentives play unique roles in shaping contemporary household and support relationships. For example, although many older parents and their children express preferences to live independently in contemporary Japan, households often reunify to meet the care needs of elders and the property needs of younger generations (Takagi, Silverstein, & Crimmins, 2007). This study used a mixed modeling approach to examine how the changing contexts of individual lives influenced the direction of depressive symptoms reported and how this associated with support flows.

Declining fertility, increased longevity, and the greater labor force participation of women carry implications that all family members will be expected to assume responsibility for providing the informal support that will replace direct financial assistance and care previously received from national, prefectural, and local governments (Ogawa & Retherford, 1993; Traphagan, 2003). Contemporary studies have argued that many Japanese households no longer follow traditional arrangements, where caregiving is clearly stratified by gender and marital status (Tanaka & Johnson, 2010; Tiedt, 2010, 2013). In light of past research, this study emphasizes that widowhood and worsening health trigger coresident and readily available support networks that may or may not coincide with traditional expectations concerning the person who provides care.

Background

Multigenerational Coresidence, Informal Support Availability, and Depressive Symptoms

In Japan, obligations to support elder parents are rooted in traditional Confucian ideals. Under what is typically referred to as the *ie* (household) system, eldest sons inherit financial responsibility for parents' homes and property, often coresiding within the same household, while the *yome* (daughter-in-law) is expected to assume caretaking responsibilities (Nonoyama, 2000; Therborn, 2004). This relationship may be viewed as an exchange of

financial support from the elder generation for instrumental support and companionship in later life.

However, declining rates of coresidence over past decades have led scholars to believe that filial piety may be less pervasive in contemporary Japan (Izuhara, 2002; Traphagan, 2003). The norm may have shifted to accommodate mutually beneficial arrangements. Adult children coreside with their parents when there is a common need, since children tend to move out of their parents' homes in young adulthood and parents prefer to remain independent as long as possible (Smits, van Gaalen, & Mulder, 2010). Adult children, and in particular daughters-in-law, may regard caretaking responsibilities as a burden (Izuhara, 2000, 2002; Traphagan, 2003). Older parents are also increasingly reluctant to rely upon their children, not wishing to hinder the younger generation and hoping to maintain their independence (Takagi & Saito, 2013). Expectations for support from children and coresidence often go hand in hand within traditional households, while less traditional families may reinterpret the generational contract, given caregiver availability, the health of the elder generation, and socioeconomic status of both generations (Takagi & Silverstein 2006; Takagi et al., 2007). For example, more advantaged parents may assume responsibility for less independent children, while widowhood, financial strains, and poor health may determine when parents coreside with children. In these scenarios, children may "boomerang" back into parents' homes or parents may transition to coreside in children's households (Takagi et al., 2007; Takagi & Silverstein, 2011).

Given the changing interpretations of filial piety in contemporary Japan, researchers can better understand how living arrangements affect elders' quality of life by studying self-reported depressive symptoms. Coresidence with adult children implies the availability of one or more caregivers and the potential for mutually beneficial relationships that improve elder well-being. This research hypothesizes the following concerning coresidence, support availability, and satisfaction with support on depressive symptoms:

Hypothesis 1: Support Availability

Coresiding with sons and daughters reflects traditional support expectations and is correlated with fewer depressive symptoms.

Widowhood and Support Availability

Numerous international studies have reported widowhood and marital dissolution as a risk factor for physical and mental health decline, including elevated depressive symptoms (Hughes & Waite, 2009; Lee & DeMaris, 2007; Sugihara et al., 2008). Gender differences in depressive symptoms due to widowhood, in particular, have been the focus of past research. For example, some North American studies document sharper increases in depressive symptoms among men prior to and following the deaths of spouses (Lee, DeMaris, Bavin, & Sullivan, 2001), while others state that recovery from bereavement is determined by the extent of dependence on spouses rather than gender (Carr, 2004).

Marriage is associated with fewer depressive symptoms for women and men in Japan (Sugisawa, Shibata, Hougham, & Sugihara, 2002). However, widowhood may be uniquely harmful to men, despite female longevity, since men tend to benefit from wives' social

networks and support (Okabayashi, Liang, Krause, Akiyama, & Sugisawa, 2004). Men may experience difficulty in maintaining relationships with friends and colleagues postretirement and are more likely than women to suffer from alcoholism, a condition that can exacerbate depressive symptoms (Arai et al., 2007; Sugihara et al., 2008). Given varying contexts of dependence, marital status is an important correlate of depressive symptoms for both genders but may be inconsequential in terms of health and mortality (Nagata, Takatsuka, & Shimizu, 2003; Sugihara et al., 2008). At the same time, marital dissolution restructures social relationships and may trigger latent support networks, beginning with adult children. Past studies have documented the gender gap in depressive symptoms, with women reporting more symptoms than men (Mirowsky, 1996; Mirowsky & Ross, 1992; Tiedt, 2013). Given female longevity and the likelihood of marriage at younger ages, women are more at risk for widowhood and depression than men but also have increased opportunities to take advantage of family supports as well as experience positive life events, such as the birth of grandchildren (Tiedt, 2013). For most individuals, depression increases post widowhood, but may lessen through time, particularly for those who are widowed sufficiently young to recover (Sasson & Umberson, 2014). The past literature guides these analyses in seeking evidence for the following assertion on widowhood:

Hypothesis 2: Widowhood

Becoming widowed correlates with heightened depressive symptoms among men and women, but the effect is weaker among women. Being continuously widowed from baseline does not exhibit an effect on depressive symptoms.

Receipt of Informal Support, Physical Health, and Depressive Symptoms

Past research has found that depressive symptoms predict functional declines and future disabilities (Barry, Allore, Bruce, & Gill, 2009; Barry, Murphy, & Gill, 2011). Depressive symptoms are also correlated with transitions in social roles such as marital dissolution that weaken the ability of elders to cope with the deterioration of physical health and may accelerate morbidity (Lee & DeMaris, 2007). Therefore, having a family member or close friend on hand to provide instrumental support and companionship can protect elders from depressive symptoms and ease discomforts associated with functional declines (activities of daily living [ADLs] and instrumental activities of daily living; Cohen & Wills, 1985; Silverstein, Chen, & Heller, 1996). Both receiving support and the perception that one has somebody to count on for support have been linked to reduced depression over time among hospitalized elders and individuals with comorbid health conditions (Barefoot et al., 2003; Brummett, Barefoot, Siegler, & Steffens, 2000).

Previous studies in the United States have found that depressive symptoms are correlated with loss of mobility, disability, and general functional decline (Barry et al., 2011). Research conducted in Japan has confirmed this relationship as well as the fact that functional decline may exacerbate preexisting depressive symptoms or induce their onset (Wada et al., 2004). Conversely, daily exercise, balanced diets, and hobbies are correlated with reduced depressive symptoms (Aihara, Minai, Aoyama, & Shimanouchi, 2011). By extension, participating in community organizations may protect against depressive symptoms, and engagement in informal and formal groups may also indicate better mental health (Ahern &

Hendryx, 2008). However, the protective effects of group participation have been found to be more important in the United States than in Japan in respect to depressive symptoms (Kikuzawa, 2006; Sugisawa et al., 2002). Maintaining an active lifestyle also implies greater social connectedness. Therefore, elders with health-related mobility problems face challenges in calling upon social networks for advice and companionship.

Spouses provide the primary buffer against depressive symptoms, in assisting with all manner of daily living activities and providing emotional outlets. However, in a vertically organized society such as Japan, children may play a more significant role than in Western societies in alleviating aging-related stressors. Contact with children is an important buffer against depressive symptoms among widowed, divorced elders (Sugisawa et al., 2002). In Japan, social support from children is generally associated with positive well-being, improved cognitive function, and fewer depressive symptoms (Okabayashi et al., 2004). Positive and distressing aspects of adult/child caregiving relationships tend to develop when the spouse, or primary caretaker, is no longer present. Transitioning to both coresidence and support at later ages may be driven by widowhood and declining health. These shifts can signify compromise among nontraditional family members, who had not previously considered coresiding and were not active or intimate supporters (Takagi et al., 2007). In particular, the presence of an emotional confidant can be crucial in protecting elders from depressive symptoms since they provide reassurance beyond instrumental assistance with ADLs difficulties (Okamoto & Harasawa, 2011). In light of findings from the literature on receiving informal social support and depressive symptoms, this study posits:

Hypothesis 3: Companionship and Availability of Support

Receiving companionship from children reduces depressive symptoms.
Participation in community groups indicates better health and increased support availability and is associated with reduced symptoms.

Hypothesis 4: Health and Receipt of Instrumental Support

Worsening health exacerbates depressive symptoms. Receiving instrumental support from children indicates increasing ADL difficulties and chronic health conditions and is associated with increased depressive symptoms.

Data and Method

We used data from the Nihon University Japanese Longitudinal Study of Aging (NUJLSOA), a five-wave, nationally representative panel study conducted in the years 1999, 2001, 2003, 2006, and 2009 (Nihon University Center for Information Networking, 2015). Although only two waves are available for public use, this study received permission to employ all five waves. Data were gathered from face-to-face interviews with respondents aged 65 years and over. The response rate was approximately 74.6% at baseline. Responses were solicited via proxy when individuals were unable to participate. However, for this study, proxy respondents and individuals with dementia were eliminated from all analyses.

The NUJLSOA employed a two-stage, stratified cluster design. The population was selected from voting and housing registers and stratified by prefectures into regional sampling units.

Smaller municipal units corresponded to these regions. The baseline sample size had 4,997 respondents. The total incorporated into this analysis was reduced to 2,636 respondents who answered at least 8 of the 11 depressive symptoms items at baseline and at least two subsequent waves, including respondents who were lost to attrition. Imputing values for these individuals helped retain between 96% and 98% of the sample across survey waves. Tests comparing the analytic sample ($n = 2,636$) to respondents who died and were otherwise lost to follow-up ($n = 2,361$) revealed significant differences in the means of a few primary study variables (See Table 1). These included depressive symptoms, physical health measures, and widowhood, confirming that the survivors were healthier than respondents who were lost for various reasons.

Measures

Depressive symptoms—The dependent variable for this study is a summary scale of responses to 11 survey questions capturing the presence of depressive symptoms over the previous week. These items are comparable to those making up the short form of the Center for Epidemiologic Studies Depression Scale (CES-D) as described by Kohout, Berkman, Evans, and Cornoni-Huntley (1993), which was in turn based on Radloff's (1977) 20-item scale. Items were coded 0, indicating *rarely*, 1 marking *sometimes*, and 2 referring to *often*. Both forms of the CES-D have been used in Japan-based research for approximately three decades and found to be valid and reliable (Shima, Shikano, Kitamura, & Asai, 1985; Yokoyama, et al., 2008). Cronbach's α tests indicated that the indices achieved moderate to high reliability across the five survey waves used in this study (1999: $\alpha = .73$, 2001: $\alpha = .74$, 2003: $\alpha = .72$, 2006: $\alpha = .72$, and 2009: $\alpha = .71$).

Health—Health was captured by three measures. First, a comorbidity index was generated based on positive responses to 15 items describing the presence of health conditions. These included tachycardia from myocardial infarction and angina, other heart diseases, cancers, cerebrovascular ailments, high blood pressure, respiratory illnesses, digestive illnesses, diabetes, renal/urinary tract ailments, ailments of the liver/gall bladder, arthritis, chronic back pain, fractures/fissures, other fractures, and osteoporosis (summary scale = 0–15). A variable describing difficulties with ADLs was also added to the model. These functional limitations included problems with bathing, dressing, eating, standing up from bed, walking around the house, going outside, and using the toilet. The variable was dichotomized (0 = *no ADLs* and 1 = *at least one ADL*) in order to capture transitions to having these difficulties, since the mean number of ADLs was less than 1 (0.52). Finally, a Likert-type scale described self-reported health (1 = *very unhealthy* and 5 = *very healthy*).

Demographic factors and the passage of time—The models also controlled for the demographic factors age at baseline and change in widowhood (0 = *married/ separated/ divorced/never married* and 1 = *widowed*). The analyses focused on spousal death rather than marital dissolution, since changes in marital status across survey waves were overwhelmingly due to widowhood. Between 1999 and 2009, the total percentage of widowed respondents increased from 34% to 46%, while the percentage of all other nonmarried statuses decreased from about 3.5% to just over 3%. A continuous widowhood variable (0 = *married/separated/divorced/never married/not continuously widowed* and 1 =

widowed continuously from baseline for the duration of the study) was also generated to account for differences between respondents who experienced transitions to widowhood and those who did not. Finally, the variables time and quadratic time measured years since the baseline survey wave.

Social support—Social support characteristics were included in the analyses indicating the dimensions of availability and receipt. This article was primarily concerned with outlining “informal” support relationships, such as those found within families, among friends, and acquaintances. The models did not control for support and long-term care provided by national, prefectural, or municipal social welfare nets or private organizations.

Support availability—Coresidence with adult children and affiliation with community groups and organizations represented support availability. Coresidence was measured separately for sons (0 = *not coresiding with son* and 1 = *coresiding with son*) and for daughters (0 = *not coresiding with daughter* and 1 = *coresiding with daughter*). Two variables also captured continuous coresidence (0 = *not continuously coresiding with children* and 1 = *coresid-ing with children from baseline for the duration of the study*), permitting comparisons between static statuses and transitions in the analyses.

Social participation, or support availability from nonfamily members, was represented by a variable describing membership in community groups and organizations. Respondents to the NUJLSOA could indicate affiliation with up to 11 groups, which were summed in a scale (range = 0–11). A few examples of these groups included senior citizen groups, religious organizations, women’s groups, and sports clubs.

Receipt of support—Having adult children as helpers with functional difficulties and as companions captured receipt of support. Several indices illustrated the total instrumental support and companionship received from daughters, sons, and daughters-in-law. The instrumental support and companionship indices were constructed according to typologies discussed by Cohen and Wills (1985).

Instrumental support measures were generated from answers to 7 items describing help from children and their spouses with finances, preparing meals, housework, shopping, transportation, receiving advice, and a category marked “other.” The positive responses were summed for up to 10 child caregivers before generating a grand total that measured the amount of support received from daughters, sons, and daughters-in-law, respectively (range = 0–70).

One item that focused on having companionship was used to capture emotional support. This item was totaled for up to 10 possible child caregivers, for daughters, sons, and daughters-in-law separately (range = 0–10). Both support indices represent exact counts of children who provided support and in this way proxy caregiver network size.

Analytic strategy—First, a series of baseline analyses were run to test for collinearity among the variables (not shown in this article) and to test for differences between the analytic sample and attrition sample. Collinearity was low and within acceptable ranges

among the independent variables. Tests also revealed that respondents who were lost to the survey in subsequent years due to death or other forms of attrition reported higher CES-D scores, more ADL difficulties, and comorbidity (See Table 1). These results provided a justification for controlling for survey attrition due to death and other causes as a way of accounting for health-related differences between the analytic sample and original baseline sample. The linear, mixed modeling approach used in this study is capable of handling incomplete and unbalanced data (Fitzmaurice & Ravichandran, 2008; Muramatsu, Yin, & Hedeker, 2010; Vinkers, Gussekloo, Stek, Westendorp, & van der Mast, 2004).

Depressive symptom trajectories from 1999 to 2009 were examined by fitting two linear multilevel models: a random intercept model and a random coefficient model with a random slope for time since baseline. The main focus of discussion is the random coefficient model, hereafter referred to as the “growth curve model,” a type of mixed modeling that nests multiple repeated measures (time) within individuals, making it possible to study between-individual differences in within-individual change over time (Curran, Obeidat, & Losardo, 2010; Rabe-Hesketh & Skrondal, 2012).

The growth curve models are estimated at two levels. Level 1, the fixed effects portion, provides estimates of within-individual changes in depressive symptoms as a linear function of time. Level 2 demonstrates between-individual differences of the intercept and slope of depressive symptoms (McCoach & Kaniskan, 2010; Sasson & Umberson, 2014). A variable capturing quadratic time was also added to the models to adjust for nonlinearity. The models were fit as follows:

$$Y_{ij} = \gamma_{0i} + \gamma_{1i}T_{ij} + \gamma_{1i}T_{ij}^2 + \sum_f \gamma_{fi}Z_{fij} + \varepsilon_{ij}.$$

$$\gamma_{0i} = \beta_0 + \sum_k \beta_{0k}X_{ki} + u_{0i} + \varepsilon_{ij}, \quad (\text{A})$$

$$\gamma_{1i} = \beta_{10} + \sum_l \beta_{1l}X_{li} + u_{1i}, \quad (\text{B})$$

whereas Y_{ij} represents depressive symptoms for individual i at occasion j . γ_{0i} is the intercept and γ_{1i} is the linear growth slope. At Level 1, T_{ij} and T_{ij}^2 represent time and quadratic time since baseline for individual i at occasion j . γ_{fi} is the fixed effects of Z_{fij} covariates. ε_{ij} is the occasion-specific error term. At Level 2, u_{0i} and u_{1i} are person-level residuals representing individual i 's mean depressive symptoms' deviation from the overall intercept and slope.

Cross-level interactions with time were included in the growth curve model to directly test the hypothesized, linear relationships between widowhood, coresidence, and support on depressive symptoms across survey waves. Then, we generated best linearized unbiased predictors of the random effects from the growth curve model to depict these depressive

symptoms trajectories. The fitted values of the intercept γ_{0j} and slope γ_{1j} of depressive symptoms were plotted on a graph.

Results

Table 2 presents the characteristics of the baseline sample. About 38% of respondents did not answer the CES-D at some point following baseline, died, or were lost to follow-up by the fifth wave. The average respondent was female and about 73 years old. These statistics also reveal key risk factors for depression. For example, most respondents had more than one chronic health condition and about 7% reported ADL difficulties. In addition, 32% of the sample was widowed at baseline. In terms of social support, most respondents belonged to a community group or organization, and as expected, more respondents coresided with sons than daughters. Concomitantly, a greater percentage of respondents reported receiving instrumental support and companionship from sons than daughters and daughters-in-law.

Table 3 presents the fixed and random effects of depressive symptoms from 1999 to 2009 from a random intercept and growth curve model. Results from a likelihood ratio test indicated that the growth curve model was a better fit than the random intercept model ($p < .001$). Since the significance levels of depressive symptoms predictors did not vary dramatically between the two models, the results and discussion focus on the growth curve models. Underscoring the findings from Table 1, there was a significant relationship between attrition ($p < .001$) and increasing depressive symptoms trajectories.

Examining overall trajectories, the CES-D intercept was higher than the baseline mean (Table 2) as would be expected ($b = 4.88$, $SE = 0.15$). In addition, the random intercept variance term revealed considerable difference in depressive symptoms between individuals ($b = 1.57$, $SE = 0.12$). Comparably, the mean change in depressive symptoms since baseline as expressed by the random slope for time demonstrated a lesser increase ($b = 0.02$, $SE = 0.004$). The slope for time was significant ($p < .001$), but quadratic time was not.

The top portion of the model, aside from baseline predictors and gender, reflect time-varying effects on depressive symptoms. All dichotomous variables that do not represent a continuous state can be interpreted as change scores. As hypothesized, transitions to ADL difficulties and additional comorbid health conditions correlated with increasing depressive symptoms, while better self-rated health had the opposite effect. Supporting Hypothesis 2, transitions to widowhood exhibited a strong, positive correlation with depressive symptoms ($b = 1.08$, $SE = 0.17$). However, the static predictor, continuous widowhood, displayed the opposite effect ($b = -0.31$, $SE = 0.12$). Among the availability of support indicators, community contact predicted reduced depressive symptoms ($b = -0.13$, $SE = 0.02$). Surprisingly, none of the coresidence variables were significant at Level 1. At the same time, receiving instrumental support from daughters was correlated with increased symptoms, while receiving companionship from daughters-in-law correlated with reduced symptoms. However, as expected, coresidence with children and the gender of respondents took an increased significance in light of widowhood status. Although women generally reported more depressive symptoms than men ($b = 0.23$, $SE = 0.08$), and transitions to widowhood were associated with increased symptoms for both genders, the interaction term between

widowhood and female demonstrates that widowhood was not as detrimental to women than to men ($b = -0.39$, $SE = 0.15$). In addition, among those transitioning to widowhood, coresiding with sons ($b = -0.31$, $SE = 0.13$) and daughters ($b = -0.43$, $SE = 0.19$) was associated with fewer depressive symptoms.

The cross-level interactions among widowhood, social support, health, and time in the growth curve models tested the impact of these predictors on the growth curve. Among the previously significant time-variant predictors, widowhood ($b = -0.04$, $SE = 0.02$), ADLs ($b = 0.04$, $SE = 0.02$), and subjective health ($b = -0.03$, $SE = 0.01$) had an effect on the growth curve.

Figure 1 plotted the fitted values from the growth curve model by widowhood. The graph on the left demonstrates that the slope for the fitted values of depressive symptoms is sharper among men who become widowed than women who become widowed. The slope for continuous widowhood since baseline is slight when compared to those who were not widowed and those who became widowed. The graph of the right depicts the effect of coresident relationships for those who have become widowed on depressive symptoms. The CES-D trajectories demonstrate that widowed elders who coresided with sons and daughters derived clear benefits over those who did not coreside with children.

Discussion

This article asked whether social support from adult children and their spouses, as captured through availability and receipt, protected Japanese elders from depressive symptoms. The analyses focused on relationships that involved widowhood, since becoming widowed was associated with depressive symptoms (Sasson & Umberson, 2014) and elders who are not married are more likely to rely on their children for support.

Supporting Hypothesis 2, becoming widowed correlated with increased depressive symptoms at Level 1. However, continuous widowhood from baseline demonstrated the opposite effect. Furthermore, the cross-level interaction between widowhood and time displayed a slightly negative relationship. This finding reflects past studies that have found widowhood to have a strong initial effect on depressive symptoms that lessens over time (Sasson & Umberson, 2014). Previous international literature has documented differences between men and women in the effects of widowhood on mortality as well as mental and physical health outcomes (Lee et al., 2001; Lillard & Waite, 1995; Tiedt, 2013). This study also demonstrated that gender was a significant predictor of depressive symptoms. However, the full effect was only revealed through the relationship with widowhood. Although women may be more at risk for depression than men, and both men and women experienced depression after losing their spouses, the effect of losing one's spouse was less severe among women than men.

This study further posited that coresident relationships would correlate with fewer depressive symptoms over time and that companionship and instrumental support from children would offer further protections. However, with the exception of companionship from daughters-in-law, the direct relationships among support availability, receipt of support,

and depressive symptoms did not support this hypothesis. Furthermore, the fact that receiving instrumental support from daughters was correlated at Level 1 with increased depressive symptoms may imply worsening health and provide some support for Hypothesis 4. But these two results are inconclusive in light of the fact that none of the support relationships were significant over time as captured by the cross-level interaction terms. At the same time, widowhood moderated the relationship between coresidence and depression. Among respondents who became widowed, transitions in coresidence with daughters and sons accounted for reduced depressive symptoms, offering partial support for Hypothesis 1. Given the large number of individuals who became widowed since baseline and in light of significant relationships demonstrated by increasing chronic conditions and the onset of ADLs, these may have been boomerang households (Takagi et al., 2007), in which children who had previously left home moved in with their aging parents. In a smaller number of cases, parents may have moved into children's households. Overall, the findings support this study's assertions that contemporary Japanese families act according to pragmatic altruism in respect to intergenerational relationships. Depending on contexts related to spousal loss, available children, and economic circumstances, coresident and supportive relationships are activated that work to improve elder well-being.

Confirming Hypothesis 3, respondents benefited from increased participation in community groups and organizations, underscoring the importance of physical activity and wide social networks in combating depressive symptoms post widowhood (Aihara et al., 2011). However, only the healthiest individuals would have reported involvement in multiple organizations or increased their memberships, raising questions concerning the intensity and quality of community contact, information that cannot be gleaned from the survey.

Partially supporting Hypothesis 4 and reflecting previous literature (Barry et al., 2009; Wada et al., 2004), comorbid health conditions, ADL difficulties, and self-reported health accounted for changes in depressive symptoms trajectories over survey years. Changes in self-reported health and transitions to ADLs also directly impacted the growth curve. Although worsening health may have been a motivation for transitions to coresidence and receiving support, this cannot be inferred from the models. The results do underscore the importance of intergenerational support relationships, as many parents became widowed and transitioned to coresidence with sons and daughters.

Conclusions

This study fills an important gap in the literature on aging in Japan by examining marital status, social support relationships, and their impact on depressive symptoms across a decadelong period. The results provide evidence that continuous support availability protects elders who become widowed from depressive symptoms. The findings suggest the importance of research on household transitions, proximity of family caregivers, and social embeddedness. For example, the availability of family caregivers played a crucial role in reducing depressive symptoms among elders who became widowed and experienced transitions in coresident relationships with sons and daughters. These are examples of intergenerational support relationships that are pragmatically altruistic in adapting caregiver and recipient needs to shifting demographic, economic, and social realities.

Furthermore, becoming widowed predicted sharp increases in depressive symptoms, while having been widowed for some time demonstrated the opposite effect on depressive symptoms. One can infer that respondents who survived widowhood may have had time to transition into additional support relationships, join community groups, and experience positive events in their lives, such as the birth of grandchildren. At the same time, self-reported health and physical health at Level 1 demonstrated strong, direct impacts on depressive symptoms trajectories. These results imply that further research should examine the role of family and community support, post widowhood, in activating opportunities for education, exercise, and networking that improve health and reduce depressive symptoms over time.

This study was limited by the fact that it did not use a weighted sample with equal periods of observations per individual. However, controlling for survey attrition partially accounted for the loss of representativeness. This allowed for a more sizable analytic sample. Attrition's positive relationship with increased depressive symptoms also underscores the fact that this article underestimates the prevalence of depressive symptoms. Imputing missing responses for individuals who were missing up to 3 items of the CES-D was another method for reducing the effects of attrition and retaining the baseline sample. Further, controlling for multiple cross-level interactions between the random slope for time and depressive symptoms predictors results in considerable multicollinearity. To reduce the impact of these adjustments, the models tested a reduced number of predictors.

Next, there was some ambiguity in interpreting change scores over multiple survey waves. The measures that captured becoming widowed and transitioning to coresidence could in a few cases indicate multiple transitions to marriage and independent living. Controlling for continuous states of widowhood and coresidence provided a partial solution by providing a static condition to compare to the change scores, but this could not account for the few individuals who transitioned more than once.

Furthermore, this study did not shed light on one of the central support relationships in traditional Japan, the wife of the eldest son as caregiver. Although the models control for measures of support from daughters-in-law, it proved difficult to disentangle the wives of eldest sons from this subgroup of caregivers. We recommend that future studies control for this relationship when possible.

Overall, the support relationships indicate that the presence of a caregiver may be more important for elder mental health than actually receiving help. However, it is also important to keep in mind that the nonsignificant effects of receipt of instrumental support and companionship on depressive symptoms over time may have been masked by collinearity among the coresidence and support variables as well as a probable mediating relationship between physical health, support, and depressive symptoms (Tiedt, 2010, 2013). Prior to running the final models, additional cross-level interaction terms tested these relationships but were found to be insignificant.

This study focused on the position of elders with children, since the primary research questions centered on whether informal support availability and receipt of support correlated

with depressive symptoms. The results imply clear benefits from continuous social support and contact, including affiliation with community groups and organizations. Federal, prefectural, and local governments could ease some of the long-term costs associated with mental health care by subsidizing community groups and events aimed at seniors. Directing new aging policy initiatives at family members and caregivers, in addition to their aging care recipients, would increase understanding of the crucial nature of family and community ties in regard to elder health and bolster preventative measures.

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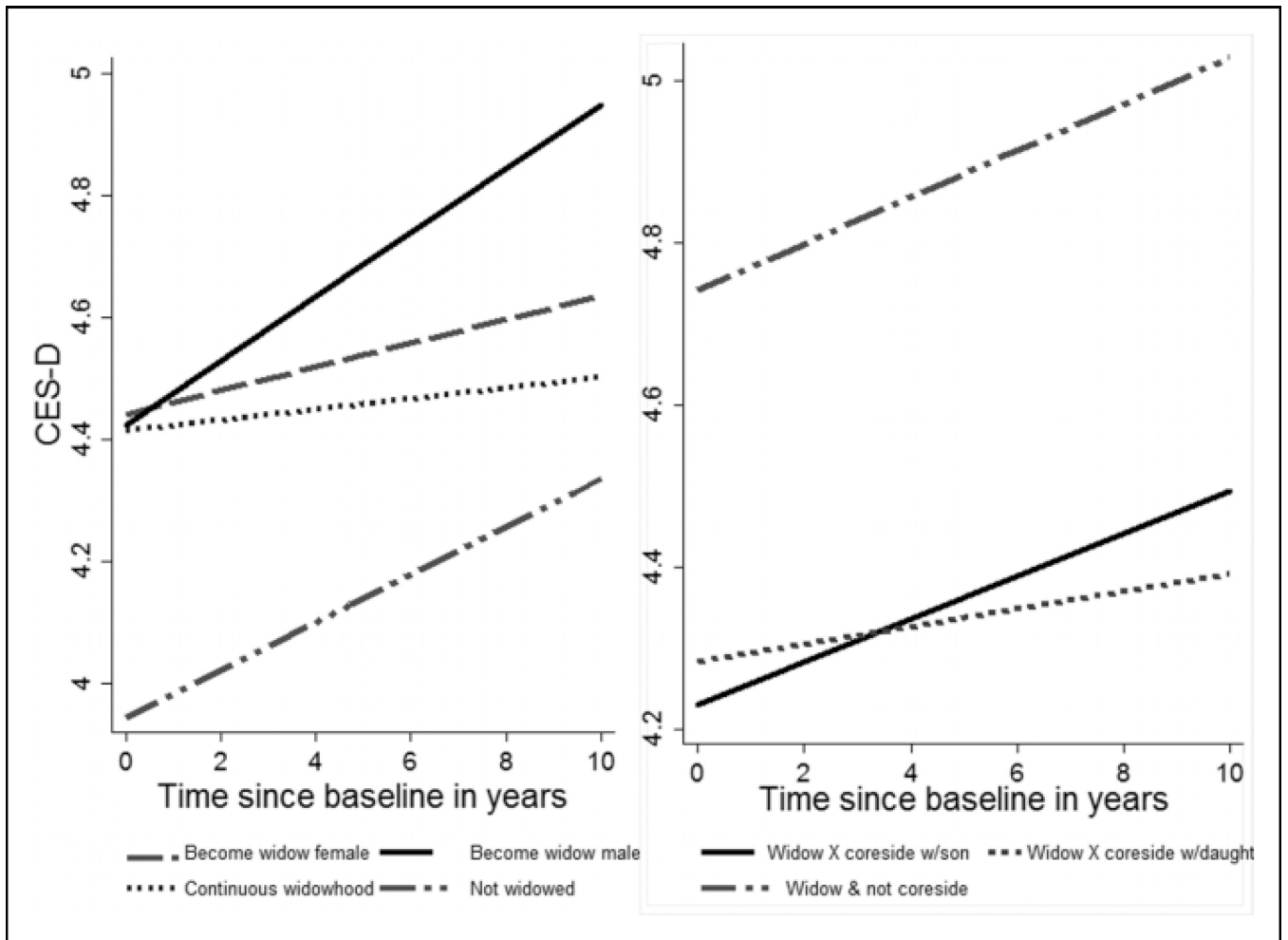


Figure 1.
Fitted values of depressive symptoms trajectories by widowhood, gender, and coresidence.

Table 1

Baseline Means for Analytic Sample Versus Nonanalytic sample.

	Analytic Sample ^a (<i>n</i> = 2,636)		Nonanalytic Sample ^b (<i>n</i> = 2,361)	
	Mean	<i>SD</i>	Mean	<i>SD</i>
CES-D (0–22) ^c	4.12 ^{***}	2.44	4.80	2.85
Widowed ^d	0.32 ^{***}	0.47	0.44	0.50
Comorbidity (0–15) ^c	1.57 ^{***}	1.36	1.82	1.53
ADLs (dichotomous) ^d	0.07 ^{***}	0.25	0.27	0.45
Self-reported health ^c	3.26 ^{***}	1.05	2.78	1.13

Note. CES-D = Center for Epidemiologic Studies Depression Scale; ADL = activities of daily living.

^a Answered CES-D items at baseline and in at least two additional waves.

^b Missing more than 3 CES-D items at baseline and/or lost to follow-up.

^c Two sample t-test.

^d χ^2 test.

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Table 2

Baseline Sample Characteristics.

	Mean	SD
CES-D (0–22)	4.12	2.44
Age	73.42	5.54
Female	0.57	0.50
Comorbidity (0–15)	1.56	1.36
ADLs (dichotomous)	0.07	0.25
Self-reported health ^a	3.26	1.05
Widowed ^b (dichotomous)	0.32	0.47
Coreside with son (dichotomous)	0.38	0.49
Coreside with daughter (dichotomous)	0.12	0.32
Community contact (0–11) ^c	1.31	1.34
Instrum support from son (0–70)	0.48	1.10
Companionship from son (0–10)	0.16	0.45
Instrum support from daughter-in-law (0–70)	0.38	0.97
Companionship from daughter-in-law (0–10)	0.13	0.39
Instrum support from daughter (0–70)	0.36	1.22
Companionship from daughter (0–10)	0.14	0.47
Attrition (dichotomous)	0.38	0.49

Note. $N = 2,636$. CES-D = Center for Epidemiologic Studies Depression Scale; ADL = activities of daily living.

^aSelf-reported health (1 = *very unhealthy* and 5 = *healthy*).

^bWidowed (0 = *married/divorced/separated/never married* and 1 = *widowed*).

^cCommunity contact (0–11 group memberships).

Table 3

CES-D Trajectories, 1999–2009.

	Model 1^a		Model 2^a	
	Random Intercept		Growth Curve	
	b	SE	b	SE
Age at baseline ^b	-1.31 ^{e-3}	0.01	2.33 ^{e-4}	0.01
Female	0.22 ^{**}	0.08	0.23 ^{**}	0.08
Comorbidity (0–15)	0.18 ^{***}	0.02	0.17 ^{***}	0.02
ADLs	0.88 ^{***}	0.08	0.64 ^{***}	0.14
Self-reported health (1–5)	-0.47 ^{***}	0.03	-0.34 ^{***}	0.04
Widowed continuously	-0.25 [*]	0.12	-0.31 [*]	0.12
Widowed	0.93 ^{***}	0.15	1.08 ^{***}	0.17
Coreside with son continuously	-0.16	0.11	-0.17	0.11
Coreside with son	-0.04	0.1	-0.05	0.12
Coreside with daughter continuously	-0.02	0.18	-0.04	0.18
Coreside with daughter	-0.20	0.15	-0.13	0.17
Community contact	-0.14 ^{***}	0.02	-0.13 ^{***}	0.02
Instrum support from son ^b	-0.02	0.05	0.04	0.07
Instrum support from daughter-in-law ^b	0.08	0.06	0.01	0.08
Instrum support from daughter ^b	0.05 [*]	0.03	0.07 [*]	0.04
Companionship from son ^b	0.18	0.16	0.16	0.16
Companionship from daughter-in-law ^b	-0.42 [*]	0.18	-0.37 [*]	0.18
Companionship from daughter ^b	0.04	0.07	0.03	0.07
Attrition	0.27 ^{***}	0.07	0.28 ^{***}	0.07
Widowed × Female	-0.44 ^{**}	0.14	-0.39 ^{**}	0.15
Widowed × Coreside With Son	-0.32 [*]	0.13	-0.31 [*]	0.13
Widowed × Coreside With Daughter	-0.49 ^{**}	0.19	-0.43 [*]	0.19
Widowed × Time			-0.04 ^{**}	0.02
ADLs × Time			0.04 [*]	0.02
Subjective Health × Time			-0.03 ^{***}	0.01
Coreside With Son × Time			0.01	0.02
Coreside With Daughter × Time			-0.02	0.03
Instrum Support From Son ^b × Time			-0.01	0.01
Instrum Support From Daughter-in-Law ^b × Time			0.01	0.01
Instrum Support From Daughter ^b × Time			-1.95 ^{e-3}	0.01
Time	0.02	0.02	0.14 ^{***}	0.03

	Model 1^a		Model 2^a	
	Random Intercept		Growth Curve	
	b	SE	b	SE
Quadratic time	-1.76 ^{e-3}	2.05 ^{e-3}	228e-3	2.02 ^{e-3}
Constant	5.29 ^{***}	0.13	4.88 ^{***}	0.15
Random effects parameters				
Random intercept variance	1.69	0.08	1.57	0.12
Slope variance (time)			0.02	3.58 ^{e-3}
Covariance (time, ID)			-0.02	0.02
Residual variance	4.51	0.07	4.17	0.08
Log likelihood	-25,060.08		-24,982.13	
<i>N</i>	2,636		2,636	

Note. CES-D = Center for Epidemiologic Studies Depression Scale; ADLs = activities of daily living; ID = person identifier.

^aRandom coefficient models have significantly better fit than random intercept models ($p < .001$).

^bMean centered.

* $p < .05$;

** $p < .01$;

*** $p < .001$.