

Associations Between Generativity and Social Asymmetry Among Older Adults in Japan

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Abstract

Objectives: Loneliness and social isolation are major public health concerns among older adults in Japan. Generativity, the concern for and commitment to future generations, may buffer older adults from loneliness. This study examined the cross-sectional and longitudinal associations between generativity and social asymmetry (the discrepancy between social isolation and loneliness) among older adults in Japan.

Methods: Data were from 2 waves (2008 and 2012) of the Midlife in Japan survey, a nationally representative longitudinal study of 645 adults aged 30–79 residing in the Tokyo metropolitan area. Generativity was measured using the 6-item Loyola Generativity Scale. Social asymmetry was computed as the residual score from regressing loneliness onto social isolation.

Results: Higher generativity levels were associated with lower social asymmetry scores ($B = -0.21$, $SE = 0.04$), but generativity change across waves did not predict social asymmetry 4 years later ($B = -0.04$, $SE = 0.06$).

Discussion: Generativity may play a protective role in buffering older adults from the adverse effects of social isolation on loneliness. Promoting generativity among older adults may be a potential intervention strategy to reduce loneliness and improve well-being in aging populations in Japan.

Keywords: Generativity, Japan, Loneliness, Older adults, Social asymmetry, Social isolation

Loneliness and social isolation in older adults are significant public health concerns due to their associations with increased morbidity, mortality, and diminished well-being (Holt-Lunstad et al., 2015, 2017; Steptoe et al., 2013). Social isolation is characterized by an objective lack of social contacts and interactions, while loneliness refers to the subjective perception of being alone or disconnected (Perlman & Peplau, 1981). Prior theoretical work has delineated important distinctions in the phenomenology of loneliness, namely emotional versus social loneliness (Weiss, 1973). Emotional loneliness stems from the absence of a close intimate attachment figure, while social loneliness arises from the lack of a wider social network or group belongingness. This distinction suggests that deficits in intimate versus collective ties may engender different forms of loneliness. Despite the adverse health impacts of loneliness and social isolation, not all

socially isolated older adults experience loneliness, and vice versa, suggesting a discrepancy between the objective and subjective aspects of social relationships that may be indicative of individual differences in unmet social connection needs (Ong et al., 2016; Tomova et al., 2021).

Social asymmetry, a concept that captures this discrepancy, examines the concordance or discordance between loneliness and social isolation levels (McHugh et al., 2017; Ward et al., 2019). Individuals may be concordant, displaying matching levels of loneliness and social isolation, or discordant, experiencing either greater loneliness than expected given their social isolation (*social vulnerability*) or less loneliness than expected (*social resilience*). Social asymmetry may indicate how well individuals adapt to their social environment and how resilient they are to the adverse effects of social isolation. Existing research has revealed associations between social asymmetry

and cognitive outcomes in older adults, with socially resilient individuals (highly isolated but not lonely) outperforming less resilient counterparts (highly isolated and lonely) in memory, executive function, and global cognition (McHugh et al., 2017; McHugh Power et al., 2019). Social asymmetry may have implications for understanding the health consequences of loneliness and social isolation among older adults, with vulnerable individuals potentially facing higher mental and physical health risks than resilient individuals, even at similar social isolation levels. Conversely, individuals who are resilient to loneliness may be less prone to the adverse effects of social isolation on health by maintaining positive relationships despite having limited social connections.

One factor that may influence social asymmetry is generativity, the concern for and commitment to fostering the well-being of future generations. As a central developmental task in midlife and older adulthood, generativity reflects one's internal beliefs, motivations, and life goals oriented toward leaving a lasting legacy and contributing to future generations. This is distinguished from outward behavioral expressions of generativity, which represent the enactment of generative commitment through actions (Erikson et al., 1994; McAdams et al., 1993). Research shows generativity benefits older adults' psychological well-being (An & Cooney, 2006; McAdams et al., 1993) and physical health (Gruenewald et al., 2012; Moieni et al., 2020). Generativity may also alleviate loneliness and social isolation in older adults by fostering meaningful relationships, facilitating social engagement and support, and promoting belonging and connectedness (Grossman & Gruenewald, 2017; Gruenewald et al., 2012; Hart et al., 2001).

However, the relationship between generativity and susceptibility or resilience to social isolation remains unclear. Moreover, most generativity research has focused on static levels rather than dynamic changes over time, despite generativity being a process that varies across life stages and contexts (Erikson et al., 1994; McAdams et al., 1993). Consequently, it is crucial to investigate how changes in generativity over time may affect one's social asymmetry levels.

Japan's rapidly aging population provides a compelling context to examine generativity's role in social asymmetry. Japan has the highest proportion of adults aged 65 and older globally, comprising 28% of the population in 2019 and projected to reach 40% by 2060 (United Nations Department of Economic and Social Affairs, 2019). This major demographic shift is coupled with high rates of isolation and loneliness among older Japanese adults. Approximately 20% report feeling lonely, and 15% have no regular contact with family or friends (Cabinet Office Japanese Government, 2022; Kino et al., 2023; Raymo et al., 2008). These converging factors have significant implications for the health and well-being of older adults in Japan.

Additionally, Japan has a rich cultural tradition of generativity encompassing familial and societal aspects. Filial piety, reflecting respect and care for elders alongside duty to repay kindness, is a core value (Karasawa et al., 2011; Palmore, 1975). Another cultural emphasis is social responsibility, signifying contribution to society and future generations, especially during times of hardship (Imada, 2004). These tenets underscore generativity's salience in Japanese culture and shape how older adults express and perceive generativity. For instance, supporting children and grandchildren can fulfill filial piety, while volunteering embodies social responsibility.

Exploring generativity's role in Japan thus offers valuable insight into how cultural factors influence the lived experience of loneliness and isolation. Elucidating this cultural variation in generativity's significance can enrich understanding of resilience versus vulnerability to social disconnection in aging populations.

The current study presents findings from preregistered analyses using two waves of longitudinal data from the Midlife in Japan (MIDJA) survey. Our overarching aim was to elucidate the role of generativity in shaping social asymmetry, defined as the mismatch between loneliness and social isolation. We focused on generativity based on prior evidence linking it to enhanced social connection and well-being in later life. Our analyses were twofold: First, we examined cross-sectional associations between generativity levels and social asymmetry, testing if this orientation confers resilience or vulnerability to isolation. Second, we analyzed longitudinal changes in generativity to evaluate whether generativity gains over time may strengthen social resilience. We hypothesized higher generativity levels and increases would predict greater resilience, reflected in lower social asymmetry. Overall, this approach enabled delineating how generativity intersects with subjective and objective social disconnection in aging Japanese adults.

Method

Study Design and Sample

Data are from the MIDJA survey, a nationally representative longitudinal study of adults aged 30–79 in the Tokyo area. The initial wave of the MIDJA survey was conducted in 2008 and included a probability sample of 1,027 participants. A subsequent wave of data collection occurred in 2012 that included 657 respondents. Our analyses focused on the subset of 645 participants who completed the initial and subsequent MIDJA surveys. This sample had an average age of 59.47 ($SD = 1.36$) years at baseline and was 53% female. Overall, 73% were married and 89% had attained a high school education or higher. The majority (77%) reported a monthly income of 420,000 JPY or greater (see Table 1 for descriptive statistics).

Measurement of Key Variables

Generativity

Generativity was measured at two time points using the six-item Loyola Generativity Scale (McAdams & de St Aubin, 1992). Participants rated items on a scale from 1 (*not at all*) to 4 (*a lot*), reflecting the extent to which they perceived themselves as contributing to society, passing along skills, influencing others' lives, and teaching others. Adapted versions of this generativity scale have demonstrated validity in prior research with Japanese samples (Morita & Fujiwara, 2021). These items were percent of maximum possible (POMP) scored on a 0–10 scale and averaged to yield a single generativity score with good reliability at both Time 1 ($\alpha = 0.88$) and Time 2 ($\alpha = 0.88$). For the analyses testing the associations of generativity *change* and social asymmetry, we used the Reliable Change Index (RCI). This was calculated by subtracting the Time 1 generativity score from the Time 2 score, and then dividing it by the standard error of the difference between the two scores. Conversion to POMP scores enabled standardized comparisons and interpretation of constructs on a

Table 1. Descriptive Statistics

Variable	N	Mean	SD	Min	Max	Range	SE
Age	645	54.72	13.60	30.00	79.00	49.00	0.54
Income	595	0.00	1.00	-2.48	1.56	4.04	0.04
Generativity (T ₂)	641	3.20	2.04	0.00	10.00	10.00	0.08
Generativity (T ₁)	643	3.33	2.14	0.00	10.00	10.00	0.08
Loneliness	645	3.15	1.91	0.00	10.00	10.00	0.08
Social isolation	645	4.16	2.13	0.00	10.00	10.00	0.08
Social asymmetry	398	0.00	1.00	-2.64	2.74	5.39	0.05
Social anxiety	638	0.01	0.99	-1.48	3.76	5.24	0.04
Functional status	641	-0.11	0.88	-0.52	3.53	4.06	0.03

Notes: POMP = percent of maximum possible; SD = standard deviation; SE = standard error; T₂ = Time 2; T₁ = Time 1. Items for loneliness for social isolation measures were reverse-coded, averaged to create composites, and POMP scored to create compatible 0–10 scales.

common metric (Cohen et al., 1999), while the RCI provided a conservative index of reliable generativity change to minimize overinterpreting unreliable change estimates (Blampied, 2022).

Loneliness and social isolation

Loneliness was measured with an adapted version of the UCLA Loneliness Scale (Russell et al., 1980). Participants rated seven items from 1 (*never*) to 4 (*often*) according to their experiences of loneliness and social connection. Items included statements such as “there was no one I can turn to” and “people are around me but not with me” ($\alpha = 0.79$). Social isolation was measured using six items. Participants rated the frequency of contact with neighbors, friends, and family members on a scale ranging from 1 (*almost every day*) to 8 (*never or hardly ever*; $\alpha = 0.61$). Comparable adapted versions of the UCLA Loneliness Scale and social isolation measures have demonstrated validity in prior research with Japanese samples (Igarashi, 2019; Murayama et al., 2023; Tsuji et al., 2020). For the current study, relevant items from both scales were reverse-coded, averaged to create composites, and POMP scored to create compatible 0–10 scales.

Calculation of social asymmetry

We calculated social asymmetry by regressing loneliness onto social isolation. The residual score provided an estimate of the variance in loneliness that was unexplained by social isolation. These residuals served as our primary outcome reflecting social asymmetry. A zero residual indicated that an individual’s loneliness was fully accounted for by their isolation. Positive residuals suggested being more lonely than expected given isolation levels (i.e., social vulnerability). Negative residuals indicated being less lonely than expected given isolation (i.e., social resilience).

Covariates

Potential confounders such as income, education, functional limitations, social anxiety, marital status, sex, and age were controlled for in our analyses. Income was reported categorically in Japanese Yen and z -scored. Education was assessed on a continuum, ranging from 1 (eighth grade/junior high graduate) to 8 (graduate school). Functional limitations were assessed with 10 items rated from 1 (*not at*

all) to 4 (*a lot*) regarding difficulty with activities of daily living, averaged, and z -scored. Social anxiety was measured using nine items rated from 1 (*none*) to 4 (*severe*), averaged, and z -scored. Marital status was assessed categorically and recoded into a binary variable with 1 = married, 0 = else. Sex was collected as a binary variable, with 1 = female and 0 = male. Age was assessed continuously in years and was centered at age 60. Analyses were preregistered, and all analysis code and [Supplementary Material](https://osf.io/5duwg/) are available on the Open Science Framework (<https://osf.io/5duwg/>; <https://osf.io/a85xg/>).

Results

Generativity and Social Asymmetry

We first examined whether generativity was associated with social asymmetry, a measure of the discrepancy between social isolation and loneliness. Social asymmetry scores showed considerable dispersion, with a substantial number of individuals attaining scores close to zero, suggesting alignment between their perceived sense of loneliness and the quantity of social contact (see [Supplementary Figure 1](#)). There were, however, individuals who exhibited positive asymmetry, being more lonely than expected given isolation (social vulnerability). Others showed negative asymmetry, being less lonely than expected given isolation (social resilience). We hypothesized that higher generativity would be related to lower social asymmetry, reflecting greater resilience. We found a significant negative association between generativity levels and social asymmetry ($B = -0.25$, $SE = 0.04$), which persisted after adjusting for covariates ($B = -0.21$, $SE = 0.04$). As seen in [Table 2](#) and [Figure 1](#), individuals with higher generativity reported less loneliness than expected, given their level of social isolation.

We also explored whether changes in generativity were associated with social asymmetry at Time 2. Notably, our results revealed that the majority of individuals in our sample did not experience significant changes in generativity over the 4-year follow-up period (see [Supplementary Figure 2](#)). Generativity change was not related to social asymmetry in either unadjusted ($B = -0.01$, $SE = 0.06$) or adjusted ($B = -0.02$, $SE = 0.06$) models (see [Table 3](#)). In models including both generativity level and change, only level showed a significant unique association with social asymmetry in unadjusted ($B = -0.25$, $SE = 0.04$) and adjusted models ($B = -0.21$, $SE = 0.04$). Generativity change did not demonstrate a significant unique relationship with social asymmetry in either unadjusted ($B = -0.03$, $SE = 0.06$) or adjusted models ($B = -0.04$, $SE = 0.06$; see [Table 4](#)).

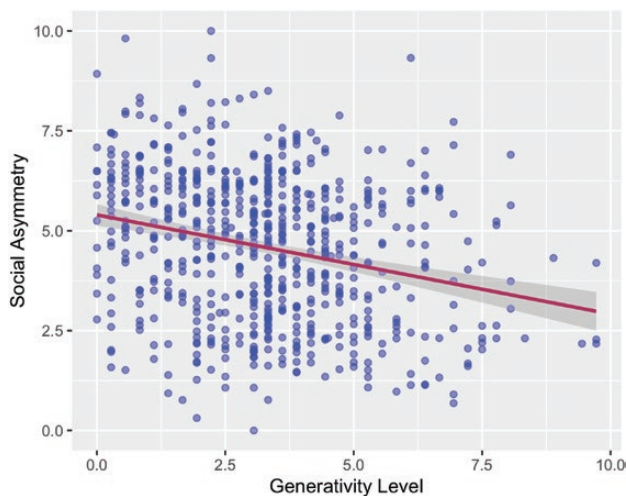
Sensitivity Analysis

We conducted a sensitivity analysis to rule out the possibility that generativity is associated with discordance generally rather than social resilience specifically. To do this, we computed the absolute value of social asymmetry and reran all the models with this outcome variable. Absolute asymmetry reflects overall discordance between loneliness and isolation regardless of direction. In unadjusted and adjusted models, neither generativity level nor change showed significant associations with absolute asymmetry (see [Supplementary Material](#) for summaries of these models). This aligns with our hypothesis that higher

Table 2. Associations Between Generativity Level and Social Asymmetry

Variable	Estimate	SE	Z	p
(Intercept)	5.904	0.216	27.351	.000
Generativity level	-0.211	0.039	-5.335	.000
Age	0.223	0.061	3.670	.000
Sex	-0.714	0.149	-4.797	.000
Education	-0.165	0.082	-2.010	.045
Income	-0.070	0.085	-0.828	.408
Social anxiety	0.248	0.078	3.175	.002
Marital status	-0.183	0.169	-1.085	.278
Functional status	0.177	0.094	1.879	.061

Note: SE = standard error.

**Figure 1.** Association between generativity level and social asymmetry.**Table 3.** Associations Between Generativity Change and Social Asymmetry

Variable	Estimate	SE	Z	p
(Intercept)	5.181	0.177	29.195	.000
Generativity change	0.017	0.058	0.296	.768
Age	0.221	0.062	3.568	.000
Sex	-0.726	0.152	-4.769	.000
Education	-0.210	0.084	-2.504	.013
Income	-0.166	0.086	-1.918	.056
Social anxiety	0.340	0.078	4.336	.000
Marital status	-0.156	0.173	-0.901	.368
Functional status	0.144	0.096	1.497	.135

Note: SE = standard error.

generativity specifically relates to lower negative asymmetry, indicating resilience to isolation.

Discussion

In the present study, we aimed to examine the role of generativity in social asymmetry among older adults in Japan, a population facing significant challenges of aging, loneliness, and social isolation. We found that higher generativity levels

Table 4. Unique Associations of Generativity Level and Change With Social Asymmetry

Variable	Estimate	SE	Z	p
(Intercept)	5.859	0.216	27.123	.000
Generativity level	-0.208	0.039	-5.266	.000
Generativity change	0.042	0.057	0.731	.465
Age	0.218	0.061	3.589	.000
Sex	-0.727	0.149	-4.891	.000
Education	-0.161	0.082	-1.959	.051
Income	-0.090	0.086	-1.054	.292
Social anxiety	0.260	0.078	3.329	.001
Marital status	-0.139	0.169	-0.823	.411
Functional status	0.189	0.094	2.004	.046

Note: SE = standard error.

were associated with lower social asymmetry scores, indicating greater resilience to social isolation. However, generativity change was not related to social asymmetry. Furthermore, higher generativity was specifically associated with lower negative social asymmetry (less loneliness than expected given social isolation) rather than lower absolute social asymmetry (overall concordance between loneliness and social isolation).

Generativity Level and Social Asymmetry

Our finding that higher generativity levels were associated with greater social resilience is consistent with previous research showing positive effects of generativity on older adults' mental and physical health (An & Cooney, 2006; McAdams et al., 1993; Moieni et al., 2020). Generativity has been theorized to potentially alleviate loneliness and social isolation by fostering meaningful relationships, facilitating social engagement and support, and promoting belonging and connectedness (Grossman & Gruenewald, 2017; Gruenewald et al., 2012; Hart et al., 2001). Moreover, generativity may buffer the adverse effects of social isolation on health by enhancing self-esteem, purpose in life, and positive affect (Keyes & Ryff, 1998; McAdams & Logan, 2004).

Our finding aligns with the cultural tradition of generativity in Japan, which encompasses familial and societal aspects. Filial piety and social responsibility are core values in Japanese culture that reflect respect and care for one's parents and ancestors, as well as gratitude and obligation to repay kindness (Imada, 2004; Karasawa et al., 2011). These values may influence how older Japanese adults perceive and express their generativity and cope with social isolation and loneliness. For instance, providing grandchild care or volunteering may allow older adults to fulfill cultural generativity expectations, potentially reducing isolation-linked loneliness. These forms of generativity may enhance a sense of connection and contribution to society and future generations and reduce their feelings of loneliness.

Generativity Change and Social Asymmetry

Our finding that generativity change over time did not affect social asymmetry is somewhat surprising, given that generativity is a process that varies across life stages and contexts (Erikson et al., 1994; McAdams et al., 1998). One possible explanation for this finding is that generativity may be quite stable across adulthood, reflecting a fundamental aspect of

individuals' values and life orientations that remains relatively constant over time (McAdams et al., 1993). Another possible explanation is that the 4-year interval was not long enough to capture meaningful changes in generativity. Alternatively, it is possible that our measure of generativity change, the RCI, was not sensitive enough to detect subtle changes in generativity over time.

Our sensitivity analysis revealed that higher generativity was specifically related to greater social resilience (lower negative social asymmetry). This suggests that generativity may protect older adults from feeling lonely when socially isolated and prevent them from feeling overly connected when socially engaged. This could reflect a balance between autonomy and relatedness that is optimal for well-being (Ryan & Deci, 2000). Alternatively, it may indicate a selective optimization with compensation strategy that prioritizes fewer but more meaningful relationships in later life (Baltes, 1997).

Limitations and Future Directions

Our study has several limitations that should be acknowledged. The regional Tokyo sample may restrict the generalizability of findings. Distinguishing between emotional and social loneliness (Weiss, 1973) could reveal nuances in generativity's protective role. While generativity may alleviate social loneliness through broader social connection, individuals with limited opportunities for intimacy may still experience emotional loneliness despite high generativity. The small-to-moderate effect sizes warrant cautious interpretation and underscore the need for further research. Our single-scale generativity measure may not capture multidimensional generativity variations. The one-time loneliness assessment precluded examining social asymmetry changes. Finally, our study spanned only 4 years, which may not be sufficient to detect meaningful changes in generativity over time. For instance, the retirement transition could substantially affect generativity, relationships, and loneliness (Segel-Karpas et al., 2018; Serrat et al., 2018).

Future work with larger, diverse samples should incorporate repeated loneliness measurements, comprehensive generativity assessments, and extended longitudinal time frames. Investigating retirement status and transitions as potential moderators and testing mechanisms linking generativity and social resilience (via psychological, behavioral, or biological pathways) are important for future research. Additionally, cross-cultural comparisons building on these findings could elucidate cultural variations in how generativity shapes social asymmetry. Finally, examining the mental and physical health implications of social asymmetry and integrating emotional–social loneliness distinctions would also significantly advance understanding of resilience versus vulnerability to isolation.

Conclusion

The study provides evidence that generativity is associated with lower social asymmetry among older adults in Japan, suggesting greater resilience to isolation. These results highlight the value of examining both subjective and objective forms of social disconnection and identify generativity as a psychosocial factor shaping this interplay. Overall, findings suggest that promoting generativity may strengthen social resilience and confer protection against isolation and loneliness within Japan's rapidly aging population.

Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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Conflict of Interest

None.

Data Availability

Analyses were preregistered, and all analysis code and [Supplementary Material](#) are available on the Open Science Framework (<https://osf.io/5duwg/>; <https://osf.io/a85xg/>).

Author Contributions

All authors contributed equally to the development of the research questions, theoretical background, and hypotheses of the study, and the design of the empirical analysis. Data analysis was performed by E. K. Graham. A. D. Ong wrote substantial parts of the manuscript, and all authors approved the final version of the manuscript.

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