ELSEVIER

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed



Contextualizing productive aging in Asia: Definitions, determinants, and health implications



Pei-Chun Ko^{a,b,*}, Wei-Jun Jean Yeung^{a,b}

- ^a Asia Research Institute, National University of Singapore, 10 Kent Ridge Crescent, AS8 07-01, 119260, Singapore
- b Centre for Family and Population Research, National University of Singapore, Ventus, Level 3, 03-01, 8 Kent Ridge Drive, 119246, Singapore

1. Introduction

Population aging across East Asia, South Asia and Southeast Asia is occurring on different scales and at varying speeds. The aging trend is more drastic in Asia than in Europe and North America due to a more rapid increase in life expectancy and decline in fertility rates (Smith, 2012). Currently, Japan is a super aging society where 27% of the population is 65 or over. South Korea, Singapore, and Thailand follow with 13%, 11%, and 10.5% of the population aged 65 and above in 2015, respectively (Yeung and Thang, 2018; United Nations (UN), 2017). China and India, with the two largest populations of the world, are expected to have 14% of their population aged 65 and over in 2044 (Martin, 2012). Indonesia, Thailand, Vietnam and Myanmar are at the key stage where improved average life expectancy and declining fertility rates have resulted in rapidly greying populations (Teerawichitchainan and Knodel, 2015).

With diverse socioeconomic and cultural characteristics in Asia (Raymo et al., 2015; Yeung et al., 2018), the aging trend not only tests the capacities and welfare resources of the countries for providing long-term care (LTC) for older adults (Yeung and Thang, 2018), but also challenges economic sustainability with the projected shrinking work-force. Issues related to older adults' social isolation, ageism, and changing family support have also loomed large in many societies (Berkman et al., 2012; Keasberry, 2001; Kreager, 2006; Teerawichitchainan and Knodel, 2015; Yeung and Cheung, 2015).

An emerging and promising strategy for sustainable aging societies is to view older adults as assets that benefit society with their longer healthy life expectancy and rich human capital. This concept, often termed *Productive Aging*, emphasizes that older adults can be more effectively integrated and engaged in activities that generate continuous contributions to family, community and society (Butler and Gleason, 1985; Butler and Schechter, 1995; Herzog et al., 1989; Bass and Caro, 1996; Hinterlong et al., 2001). In response to the public myth of unproductivity and the loss of social roles for elderly in the United States in the seventies, *Productive Aging* was developed to call for a recognition of older adults' various contributions and to take institutional action for building the capacity of older individuals (Butler, 1975; Butler and

Gleason, 1985; Hinterlong et al., 2001). Criticism and concern about the subjective meaning of "productivity", potential exploitation of older adults and additional obligations for older adults have been well acknowledged in scholarly work (Bass and Caro, 2001; Moody, 2001). Studies have been cautious about such misleading outcomes that have the potential to push older adults to be more productive and have emphasized that *Productive Aging* was meant to change social norms, policies and programs and support them in building their capacity (Gonzales et al., 2015; Morrow-Howell et al., 2001; Morrow-Howell and Wang, 2013).

Empirical studies refer to "productive activities" as those that produce goods and services, including working, caregiving, volunteering, etc. (Butler and Gleason, 1985; Glass et al., 1995; Herzog and Morgan, 1992; Hinterlong et al., 2001). It is important to differentiate it from two widely used terms: *Successful Aging* (Rowe and Kahn, 1997), which focuses on biological benefits of keeping healthy and staying engaged in all kinds of activities, and *Active Aging* (WHO, 2002), which focuses on maximizing opportunities of being healthy and participating in activities to enhance quality of life, *Productive Aging* emphasizes social integration and policy responses to rapid changes in the labor market and family structures in this era of population aging (Morrow-Howell and Wang, 2013).

2. Purpose of the special issue

The literature on productive aging, which thus far has been mainly based on Western developed societies, includes study of (1) the individual and societal factors that enable engagement in productive activities; and (2) the health benefits of productive engagement. For the former, studies have not only documented the prevalence and patterns of engagement to examine the classic disengagement or activity theory (Morrow-Howell et al., 2001), but have also confirmed the close relationship between current individual resources (socioeconomic resources and health) and productive engagement in later life (Bass and Caro, 1996; Bukov et al., 2002; Burr et al., 2007; Butler and Gleason, 1985; Glass et al., 1995). For the health benefits of productive aging, various studies drawing from role enhancement theory and social

^{*} Corresponding author. Asia Research Institute, National University of Singapore, 10 Kent Ridge Crescent, AS8 07-01, 119260, Singapore. E-mail addresses: arikp@nus.edu.sg (P.-C. Ko), ariywj@nus.edu.sg (W.-J.J. Yeung).

P.-C. Ko, W.-J.J. Yeung Social Science & Medicine 229 (2019) 1–5

capital theory have found that engagement is positively associated with self-rated health and mental health, and that older adults' life satisfaction improves as they engage in productive activities such as paid work or other activities (Luoh and Herzog, 2002; Hao, 2008; Hinterlong et al., 2007; Pinquart and Sörensen, 2001; Van Willigen, 2000).

Scholars have highlighted the need to investigate productive aging in other socioeconomic and policy contexts that are culturally and institutionally different from Western countries to advance understanding of how cultural values for the aged and the changing family institution are associated with productive engagement (Chen et al., 2018; Liu and Lou, 2016, 2017; Morrow-Howell and Wang, 2013). This special issue includes work that focuses on Asian countries, where cultural values of supporting aging parents and coresidence with them are common practices (Croll, 2006; Yamada and Teerawichitchainan, 2015). Older adults' support networks are embedded within family, and hence their wellbeing is connected with resources distributed among family members (Silverstein et al., 2006). Grandparents' involvement in childcare is an example of how family structures are associated with the productive activity (Chen et al., 2011; Knodel et al., 2015).

Studies that investigate the extent to which social welfare systems influence productive engagement in this region are needed for making policy recommendations. Strauss and Trommer (2017) attribute the prevalence of productive engagement in work, caregiving and volunteering among older Europeans to the European welfare regimes which are grouped according to the degree of de-commodification (public provision for individuals and families regardless of their labor market participation) and de-familialization (the degree of public provision that reduces family dependency and care responsibilities). They found higher involvement of older adults in work, caregiving and volunteering in countries where public assistance was provided regardless of older adults' labor market participation and aims to reduce individual dependency on family than in countries where public provision was more related to labor market participation and designed to emphasize family as the main supporting unit for older adults. This study underscores the importance of institutional support in facilitating older adults' participation in productive activities.

In Asia, South Korea, Taiwan and Thailand have already implemented universal health care (Cheng and Chiang, 1998; Cho et al., 2004; Kespichayawattana and Jitapunkul, 2008), while other emerging economies, such as China and Vietnam are at various phases of providing institutional support to sustain older adults' health and financial security (Chongsuvivatwong et al., 2011; Yamada and Teerawichitchainan, 2015; Yeatts et al., 2013). Compared to European countries, the development of social welfare in Asia is more heterogeneous and changes rapidly. More research is warranted for an understanding of older Asians' productive engagement under different welfare settings.

For reasons noted above, this special issue aims to present new empirical findings with cross-sectional and longitudinal investigations of family, labor market, and institutional factors that advance understanding of key sociodemographic determinants and health outcomes of productive activities among older adults in Asia.

3. Themes of the special issues

The 19 articles in this issue are grouped into three themes: (1) patterns and determinants of productive engagement in later life; (2) health benefits in productive aging; and (3) policy and institutional context of productive aging.

3.1. Patterns and determinants of productive engagement in later life

Based on these articles, we summarize the prevalence of the three common types of productive activities – economic activities, caregiving to family (esp. grandparenting) and socially productive activities in Table 1. Although somewhat different measures were used in the

papers, Table 1 provides a rough comparison and shows the heterogeneity across the regions. Indonesia (66.4%) and China (63.9%) have the highest participation rates in economic activities (but both include high percentages of agricultural activities). They are followed by Thailand (38.4%), Vietnam (37.3%) and India (37.2%), comparable to prevalence in France (34.6%), England (32.9%) and the US (about 40%) (Burr et al., 2007; Bureau of Labor Statistics, U.S. Department of Labor, 2017; Di Gessa and Grundy, 2017). Prevalence in mostly urban areas such as in Hong Kong (10.9%) and urban South Korea (14.2%) is lower, comparable to those in Italy (13.1%) and Spain (13.5%) (Komp et al., 2010).

India has the highest percentage of grandparental caregiving (56.2%) among Asian societies. These rates are slightly higher or comparable to those found in France (58%); Sweden (54%), and the US (about 52%) (Fuller-Thomson and Minkler, 2001; Hank and Buber, 2009). Grandparental caregiving is not as prevalent in Vietnam (34%), Myanmar (33%), China (28.2%) or Thailand (28%). As the definitions of grandparental caregiving vary across studies, the comparisons should be interpreted cautiously.

For socially productive activities such as volunteering, informal helping, caring for non-kin members or various kinds of community activities, Taiwan has the highest participation rate of 54%, similar to Denmark at about 56% (Hank, 2011). Indonesia (46%; rural areas) and Singapore (44.5%) have the second and third highest participation rates, similar to rates in France (46.5%) and Switzerland (44.5%). Hong Kong (34.5%), India (31.6%), Japan (30.9%) and South Korea (39%) are similar to Austria (39%) and Germany (31.5%). China has the lowest participation rate (11.6%).

Papers under the first theme show variation by gender, age, urbanicity, family circumstances, cultural norms and policy context. Kim (2018) identifies various types of productive activities—work, family care, etc. —among older Koreans (65+) based on time use data. She finds that the traditional gender division of labor is maintained by Koreans in later life in that older women are more likely to participate in family care and older men are more likely to engage in paid activities. Similarly, Visaria and Dommaraju (2018) show that older Indian women continue to play the role of caregiver to grandchildren, whereas older men are more involved in activities outside the household. Giang et al. (2018) also find consistent gender patterns in Vietnam, where older men engage in economic activities and older women engage in caregiving.

Utomo et al. (2018) note that older adults in rural Indonesia participate in economic, communal and caregiving activities, albeit variations by village according to socioeconomic conditions—those living in rich villages have lower rates of participation in economic activities and communal activities. The authors' fieldwork observations highlight that building health care infrastructure to provide sufficient medical resources for older adults is necessary to promote productive aging.

Tong et al. (2018) show that living with married children reduces the likelihood of working among older adults in Hong Kong. However, living with unmarried children is associated with higher likelihood of working for older adults and especially so when they live with unmarried sons rather than with daughters.

Another way to attain productive aging is for older adults to engage in lifelong learning. Thang et al. (2018) find that lifelong learning in Singapore enables productive engagement because formal and informal learning in educational activities can equip learners with work-related skills and information, and can enhance communication skills for higher involvement in family and community activities.

Ko and Yeung (2018) explore the long-term impacts of childhood conditions on later-life productive engagement among older Chinese. The long-term effects of childhood SES and health on productive engagement in later life are mediated by mid-life work and later-life cognition and disabilities. Furthermore, engagement in socially productive activities is associated with the social atmosphere of the neighborhood in which they grew up.

 Table 1

 Prevalence of productive activities in later life in Asia.

Sources: Huang (2018); Lam and Bolano (2018); Kim (2018); Ko and Yeung (2018); Luo et al. (2018); Tong et al. (2018); Teerawichitchainan et al. (2018); Utomo et al. (2018); Visaria and Dommaraju (2018).

	Economic Activities (%)	Caregiving to family (esp. grandparenting) (%) $^{\rm h}$	Socially Productive Activities (%)
Australia (65+) ^a	16.8	12.8	28.5
China (55+)	63.9	28.2	11.6
Hong Kong (65+)	10.9	-	34.5°
India (60+)	37.2	56.2	31.6 ^f
Indonesia (60+) ^b	66.4	16.5	46 ^g
Japan (65+)	-	-	30.9 ^c
Myanmar (60+)	23	33	_
Singapore (65+)	-	-	44.5°
South Korea (65+; 55+)	14.2 ^d	$12.2^{ m d}$	39 ^e
Thailand (60+)	38.4	28	-
Taiwan (65+)	-	-	54 ^c
Vietnam (60+)	37.3	34	-

- ^a Based on person-wave data (Lam and Bolano, 2018); 65 + denotes the sample of older adults aged 65 or over.
- ^b Rural Indonesia (Utomo et al., 2018).
- ^c Sample based on the definition of whether the respondent is an active member of the listed 11 volunteer organizations in World Value Survey (Huang, 2018).
- ^d Sample based on urban areas (65+) (Kim, 2018).
- ^e Sample based on national representative data (55+) (Lee and Yeung, 2018).
- f Based on the definition of participating community and group meetings (Visaria and Dommaraju, 2018).
- g Based on whether the respondent participate in neighborhood cleaning activities, neighborhood watch and village meetings (Utomo et al., 2018).
- h Prevalence in caregiving to family: Australia and South Korea; Prevalence of grandparenting: China, India, Indonesia, Myanmar, Thailand and Vietnam (Luo et al., 2018; Teerawichitchainan et al., 2018; Utomo et al., 2018; Visaria and Dommaraju, 2018).

3.2. Health benefits of productive aging

Wang et al. (2018) found that family and community-based engagement is beneficial to self-rated health because engagement increases older adults' psychosocial resources, such as sense of control, making new social networks. Komonpaisarn and Loichinger (2018) found that regular caregiving of grandchildren negatively affects self-rated health, physical disabilities and wellbeing of the older adults.

Lam and Bolano (2018) found that having a spouse who engages in community activities is associated with better mental health for older adults, suggesting that spousal engagement in community activities not only provides better mental health for older adults but also promotes their partners' mental wellbeing.

The study by Liu et al. (2018) shows that the association between caring for grandchildren and life satisfaction is significant only for older men, implying the traditional gender roles in grandparenting-older men provide childcare by doing fun and flexible tasks where older women provide childcare by doing time-consuming and obligatory tasks. Living arrangement (those living with a spouse and other family members) moderates the effect of contributory behavior on life satisfaction.

Gender differences in health outcomes are also shown in Lee and Yeung (2018), who find engaging in friendship organizations is associated with a better cognitive functioning for men whereas for women, engaging in religious activities has a similar impact. Luo et al. (2018) find that health benefits of productive activities not only vary by gender, but also by residency status (urban or rural). In relation to "sandwiched" grandparents in four-generation families in China, Xu (2018) shows that grandparents who care for grandchildren, their own parents, or their in-laws (the great grandparents in the four-generation households) have a higher level of life satisfaction, mental health and reduced levels of hypertension. They found some differences by ruralurban residence and gender-grandfathers in urban areas enjoy the most health benefits as they receive emotional rewards when conforming to the norms of filial piety. In contrast, for grandmothers in rural areas, providing care for parents or parents-in-law negatively impact their health.

3.3. Policy and institutional context

Miao et al. (2018) find that engaging in volunteer work increases

the level of social cohesion and decreases depression in older adults in urban Shanghai, China.

Hu and Das (2018) find that paid work has limited but positive mediating effects on older adults' wellbeing in both China and India. However, unpaid work has a positive effect only among urban older adults in China, where the provision of basic pension for older adults decreases the need for them to continue working and enables them to engage in nonpaid work that may benefit their wellbeing.

Chiao (2018) shows that, for older adults in Taiwan, volunteering and social participation are associated with better cognitive functioning even after controlling for the positive effects of using the national universal health services.

Huang (2018) finds a consistent positive effect of engaging in volunteering for older adults in Hong Kong, Japan, Singapore, Korea and Taiwan. Government policies should focus on providing resources for establishing social enterprises and local self-help and mutual aid organizations to be inclusive of relatively older adults.

Moving to Southeast Asia, Teerawichitchainan et al. (2018) compare Myanmar, Thailand and Vietnam and find Thailand has the highest participation rate in later-life employment as mentioned in the overview. They explain that Thailand's older adults have relatively higher education and the country has more advanced national policies that support older adults in productive engagement than Myanmar and Vietnam. The study emphasizes the importance of the institutional setting in enhancing older adults' economic engagement.

4. Concluding remarks

This collection of articles extends literature on productive aging in multiple aspects. Most importantly, it stresses the importance of cultural and institutional factors that literature on productive aging and its impact should take into account. First, the papers document various productive activities among older adults in Asian societies with different economic development levels. These include traditional productive activities, such as employment, volunteering and grandparental childcare (e.g., Chiao, 2018; Lam and Bolano, 2018), but also agricultural activities, culturally meaningful activities (e.g., village meeting, elderly community meeting in rural Indonesia), self-enhancement and intergenerational support (e.g., Miao et al., 2018; Thang et al., 2018; Utomo et al., 2018; Wang et al., 2018).

P.-C. Ko, W.-J.J. Yeung Social Science & Medicine 229 (2019) 1–5

Second, the articles in the special issue demonstrate the important role of family structures and dynamics of intergenerational support in productive aging in Asia. Cultural values across Southeast and East Asian societies have reinforced that family is the first pillar of support to older adults (Raymo et al., 2015; Yeung and Thang, 2018). The special issue not only shows that older adults are more likely to provide care and participate in volunteering when they stay with their adult children (e.g., Utomo et al., 2018). There is evidence that older adults continue to provide financial support in several Asian societies (as shown in Tong et al., 2018). Compared to the focus of individual characteristics in productive aging seen in Western studies (Di Gessa and Grundy, 2017; Hank, 2011), considering family structures and living arrangements are necessary for research and for policy makers to understand productive aging in Asia.

Third, gender differences in the health impacts of productive engagement in later life seems more prominent in Asia (e.g., Lee and Yeung, 2018; Luo et al., 2018; Liu et al., 2018) than in the West (Luoh and Herzog, 2002; Hao, 2008; Hinterlong et al., 2007; Pinquart and Sörensen, 2001). Such findings reflect the existing gender inequality in educational attainment and labor market participation in many Southeast and East Asian societies or other gendered practices embedded in the kinship systems or religious decrees (Raymo et al., 2015; Yeung et al., 2018). Future research in productive aging in Asia shall adopt a life course perspective to examine how gender roles shape men's and women's trajectories of employment, family care, and how these activities are associated with their well-being and health.

Fourth, the studies underscore the significance of examining the opportunity structures and constraints for older adults in productive activities as reflected in the rural-urban differences, which is less addressed in Western contexts (Warburton and Stirling, 2007). Rapid economic development in Asia has resulted in labor migration of young adults from rural to urban areas, leaving older adults behind. This is illustrated in several studies in this special issue (such as Luo et al., 2018) suggesting that more investigations are needed.

Lastly, this study shows that a life course perspective is useful in understanding productive aging. Few studies in existing literature address the impacts of early-life conditions on later-life engagement (Brandt et al., 2012; Youssim et al., 2015). Ko and Yeung (2018) suggest that early life family SES shapes one's education and employment trajectories which affect later-life engagement.

Against the backdrop of a more rapid population aging and generally weaker public support for older adults in Asia, this special issue provides systematic analyses of older adults' productive engagement and health implications of engagement across Asia. Looking forward, we hope that more research with innovative theoretical and methodological approaches will inform policy making for building capacity and providing institutional support for older adults' and their productive engagement in Asia.

Acknowledgements

Eight of the papers in this collection were presented at the conference "Contextualizing Productive Aging in Asia" held in the Asia Research Institute of National University of Singapore in March 2017, organized by the two guest editors. The call for papers resulted in 53 submissions from a wide range of disciplines, including sociology, economics, anthropology, social gerontology, psychology, geography, social work and public health, of which 10 were selected to be reviewed for this issue. A second call for papers was issued in October 2017, and 16 more papers were selected for review. In the end, 19 articles were accepted for publication in this Special Issue.

The guest editors of the special issue, also the conference conveners, would like to thank Asia Research Institute at the National University of Singapore for funding the conference. We thank Saharah Abubakar for assistance in copyediting the papers. We also thank Susan Elliot and the staff at *Social Science & Medicine*, especially Jenna Dixon for helping us

in the guest editing process.

References

- Bass, S., Caro, F., 1996. Theoretical perspectives on productive aging. In: Crown, W. (Ed.), Handbook on Employment and the Elderly. Abc-Clio Greenwood, California, pp. 262–275
- Bass, S., Caro, F., 2001. Productive aging: a conceptual framework. In: Morrow-Howell, N., Hinterlong, J., Sherraden, M. (Eds.), Productive Aging: Concepts and Challenges. JHU Press, Maryland, pp. 37–78.
- Berkman, L.F., Sekher, T., Capistrant, B., Zheng, Y., 2012. Social networks, family, and care giving among older adults in India. In: Smith, J.P., Majmundar, M. (Eds.), Aging in Asia: Findings from New and Emerging Data Initiatives. National Research Council, The National Academies Press, Washington, D.C., pp. 261–278.
- Brandt, M., Deindl, C., Hank, K., 2012. Tracing the origins of successful aging: the role of childhood conditions and social inequality in explaining later life health. Soc. Sci. Med. 74, 1418–1425.
- Bukov, A., Maas, I., Lampert, T., 2002. Social participation in very old age: cross-sectional and longitudinal findings from BASE. Berlin aging study. J. Gerontol. B Psychol. Sci. Soc. Sci. 57 (6), P510–P517.
- Bureau of Labor Statistics, U.S. Department of Labor, 2014. Older workers: labor force trends and career options. https://www.bls.gov/careeroutlook/2017/article/older-workers.htm
- Burr, J.A., Mutchler, J.E., Caro, F.G., 2007. Productive activity clusters among middle-aged and older adults: intersecting forms and time commitments. J. Gerontol. B Psychol. Sci. Soc. Sci. 62 (4), S267–S275.
- Butler, R.N., 1975. Why Survive? Being Old in America. Harper & Row, New York.Butler, R.N., Gleason, H.P., 1985. Productive Aging: Enhancing Vitality in Later Life.Springer. New York.
- Butler, R.N., Schechter, M., 1995. Productive aging. In: Maddox, G. (Ed.), The Encyclopedia of Aging. Springer, New York, pp. 763–764.
- Chen, F., Liu, G., Mair, C.A., 2011. Intergenerational ties in context: grandparents caring for grandchildren in China. Soc. Forces 90 (2), 571–594. https://doi.org/10.1093/sf/sor012
- Chen, Y.-C., Wang, Y., Cooper, B., McBride, T., Chen, H., Wang, D., Morrow-Howell, N., 2018. A research note on challenges of cross-national aging research: an example of productive activities across three countries. Res. Aging 40 (1), 54–71.
- Cheng, S.-H., Chiang, T.-L., 1998. Disparity of medical care utilization among different health insurance schemes in Taiwan. Soc. Sci. Med. 47 (5), 613–620.
- Chiao, C., 2018. Beyond health care: volunteer work, social participation, and late-life general cognitive status in Taiwan. Soc. Sci. Med. https://doi.org/10.1016/j. socscimed.2018.06.001.
- Cho, K.-H., Chung, Y., Roh, Y.-K., Cho, B., Kim, C.-H., Lee, H.-S., 2004. Health care for older persons: a country profile-Korea: health care for older persons in Korea. J. Am. Geriatr. Soc. 52 (7), 1199–1204.
- Chongsuvivatwong, V., Phua, K.H., Yap, M.T., Pocock, N.S., Hashim, J.H., Chhem, R., Wilopo, S.A., Lopez, A.D., 2011. Health and health-care systems in Southeast Asia: diversity and transitions. Lancet 377 (9763), 429–437.
- Croll, E.J., 2006. The intergenerational contract in the changing Asian family. Oxf. Dev. Stud. 34 (4), 473–491.
- Di Gessa, G., Grundy, E., 2017. The dynamics of paid and unpaid activities among people aged 50–69 in Denmark, France, Italy, and England. Res. Aging 39 (9), 1013–1038. https://doi.org/10.1177/0164027516654521.
- Fuller-Thomson, E., Minkler, M., 2001. American grandparents providing extensive child care to their grandchildren: prevalence and profile. Gerontol. 41 (2), 201–209.
- Giang, L.T., Pham, T.H.T., Phi, P.M., 2018. Productive activities of the older people in Vietnam. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.09.054.
- Glass, T.A., Seeman, T.E., Herzog, A.R., Kahn, R., Berkman, L.F., 1995. Change in productive activity in late adulthood: MacArthur Studies of Successful Aging. J. Gerontol. B Psychol. Sci. Soc. Sci. 50B (2), S65–S76. https://doi.org/10.1093/geronb/50B.2.S65.
- Gonzales, E., Matz-Costa, C., Morrow-Howell, N., 2015. Increasing opportunities for the productive engagement of older adults: a response to population aging. Gerontol. 55 (2), 252–261. https://doi.org/10.1093/geront/gnu176.
- Hank, K., 2011. Societal determinants of productive aging: a multilevel analysis across 11 European countries. Eur. Sociol. Rev. 27 (4), 526–541. https://doi.org/10.1093/esr/jcq023.
- Hank, K., Buber, I., 2009. Grandparents caring for their grandchildren: findings from the 2004 Survey of health, ageing, and retirement in Europe. J. Fam. Issues 30 (1), 53–73
- Hao, Y., 2008. Productive activities and psychological well-being among older adults. J. Gerontol. B Psychol. Sci. Soc. Sci. 63 (2), S64–S72.
- Herzog, A.R., Morgan, J.N., 1992. Age and gender differences in the value of productive activities: four different approaches. Res. Aging 14 (2), 169–198. https://doi.org/10.1177/0164027592142002.
- Herzog, A.R., Kahn, R.L., Morgan, J.N., Jackson, J.S., Antonucci, T.C., 1989. Age differences in productive activities. J. Gerontol.: Soc. Sci. 44 (4), S129–S138.
- Hinterlong, J.E., Morrow-Howell, N., Sherraden, M., 2001. Productive aging: principles and perspectives. In: Morrow-Howell, N., Hinterlong, J., Sherraden, M. (Eds.), Productive Aging: Concepts and Challenges. JHU Press, Maryland, pp. 3–18.
- Hinterlong, J.E., Morrow-Howell, N., Rozario, P.A., 2007. Productive engagement and late life physical and mental health: findings from a nationally representative panel study. Res. Aging 29 (4), 348–370. https://doi.org/10.1177/0164027507300806.
- Hu, S., Das, D., 2018. Quality of life among older adults in China and India: does productive engagement help? Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.

- Huang, L.H., 2018. Well-being and volunteering: evidence from aging societies in Asia. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.09.004.
- Keasberry, I.N., 2001. Elder care and intergenerational relationships in rural Yogyakarta, Indonesia. Ageing Soc. 21 (5), 641-665.
- Kespichayawattana, J., Jitapunkul, S., 2008. Health and health care system for older persons. Ageing Int. 33 (1-4), 28-49.
- Kim, J.H., 2018. Productive aging of Korean older people based on time use. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.04.020.
- Knodel, J., Pothisiri, W., Milintangul, C., Bangkaew, B., 2015. Leaving Children with Grandparents in Myanmar: Experiences and Perceptions of Migrants in Samut Sakhon Province in Thailand. Tech. Rep. CPS Publication No. 316, College of Population Studies. Chulalongkorn University, Bangkok, Thailand.
- Ko, P.C., Yeung, W.J.J., 2018. Childhood conditions and productive aging in China. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.09.051.
- Komonpaisarn, T., Loichinger, E., 2018. Providing regular care for grandchildren in Thailand: an analysis of the impact on grandparents' health. Soc. Sci. Med. https:// doi.org/10.1016/j.socscimed.2018.05.031.
- Komp, K., van Tilburg, T., van Groenou, M.B., 2010. Paid work between age 60 and 70 years in Europe: a matter of socio-economic status? Int. J. Ageing Later Life 5 (1),
- Kreager, P., 2006. Migration, social structure and old-age support networks: a comparison of three Indonesian communities. Ageing Soc. 26 (1), 37-60. https://doi.org/10. 1017/S0144686X05004411
- Lam, J., Bolano, D., 2018. Social and productive activities and health among partnered older adults: a couple-level analysis. Soc. Sci. Med. https://doi.org/10.1016/j. socscimed.2018.04.016.
- Lee, Y., Yeung, W.J.J., 2018. Gender matters: productive social engagement and the subsequent cognitive changes among older adults. Soc. Sci. Med. https://doi.org/10. 1016/j.socscimed.2018.08.024.
- Liu, H., Lou, W.Q., 2016. Patterns of productive activity engagement among older adults in urban China. Eur. J. Ageing 13 (4), 361-372.
- Liu, S., Zhang, W., Wu, L.H., Wu, B., 2018. Contributory behaviors and life satisfaction among Chinese older adults: exploring variations by gender and living arrangements. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.06.015.
- Luo, Y., Pan, X., Zhang, Z., 2018. Productive activities and cognitive decline among older adults in China; evidence from the China Health and Retirement Longitudinal Study. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.09.052.
- Luoh, M.-C., Herzog, A.R., 2002. Individual consequences of volunteer and paid work in old age: health and mortality. J. Health Soc. Behav. 43 (4), 490-509.
- Martin, M.A., 2012. Family structure and the intergenerational transmission of educational advantage. Soc. Sci. Res. 41 (1), 33-47. https://doi.org/10.1016/j.ssresearch. 2011 07 005
- Miao, J., Wu, X., Sun, X., 2018. Neighborhood, social cohesion, and the Elderly's depression in Shanghai. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.08.
- Moody, H.R., 2001. Productive aging and the ideology of old age. In: Morrow-Howell, N., Hinterlong, J., Sherraden, M. (Eds.), Productive Aging: Concepts and Challenges. JHU Press, Maryland, pp. 175-196.
- Morrow-Howell, N., Wang, Y., 2013. Productive engagement of older adults: elements of a cross-cultural research agenda. Ageing Int. 38 (2), 159–170.
- Morrow-Howell, N., Hinterlong, J., Sherraden, M., Rozario, P., 2001. Advancing research on productivity in later life. In: Morrow-Howell, N., Hinterlong, J., Sherraden, M. (Eds.), Productive Aging: Concepts and Challenges. JHU Press, Maryland, pp. 285_311
- Pinquart, M., Sörensen, S., 2001. Gender differences in self-concept and psychological well-being in old age a meta-analysis. J. Gerontol. B Psychol. Sci. Soc. Sci. 56 (4), $P195-P213.\ https://doi.org/10.1093/geronb/56.4.P195.$
- Raymo, J.M., Park, H., Xie, Y., Yeung, W.J., 2015. Marriage and family in East Asia:

- continuity and change. Annu. Rev. Sociol. 41, 471-492.
- Rowe, J.W., Kahn, R.L., 1997. Successful aging. Gerontol. 37 (4), 433-440. Silverstein, M., Cong, Z., Li, S., 2006. Intergenerational transfers and living arrangements
- of older people in rural China: consequences for psychological well-being. J. Gerontol. B Psychol. Sci. Soc. Sci. 61 (5), S256-S266.
- Smith, J.P., 2012. Preparing for population aging in Asia: strengthening the infrastructure for science and policy. In: Smith, J.P., Majmundar, M. (Eds.), Aging in Asia: Findings from New and Emerging Data Initiatives. National Research Council, The National Academies Press, Washington, D.C., pp. 17-36.
- Strauss, S., Trommer, K., 2017. Productive ageing regimes in Europe: welfare state typologies explaining elderly Europeans' participation in paid and unpaid work. Journal of Population Ageing 1-18. https://doi.org/10.1007/s12062-017-9184-4.
- Teerawichitchainan, B., Knodel, J.E., 2015. Data Mapping on Ageing in Asia and the Pacific: Analytical report. HelpAge International, East Asia and Pacific Regional Office. Chiang Mai, Thailand.
- Teerawichitchainan, B., Prachuabmoh, V., Knodel, J., 2018. Productive aging in developing Southeast Asia: comparative analyses between Myanmar, Vietnam and Thailand. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.2018.09.053.
- Thang, L.L., Lim, E., Tan, S.L.S., 2018. Lifelong learning and productive aging among the baby-boomers in Singapore. Soc. Sci. Med. https://doi.org/10.1016/j.socscimed.
- Tong, Y., Chen, F., Su, W., 2018. Living arrangements and older people's labor force participation in Hong Kong, 1986-2016. Soc. Sci. Med. https://doi.org/10.1016/j. socscimed.2018.10.011.
- United Nations (UN), 2017. World population prospects. https://esa.un.org/unpd/wpp/. Utomo, A., Mcdonald, P., Utomo, I., Cahyadi, N., Sparrow, R., 2018. Social engagement and the elderly in rural Indonesia. Soc. Sci. Med. https://doi.org/10.1016/j. socscimed.2018.05.009
- Van Willigen, M., 2000. Differential benefits of volunteering across the life course. J. Gerontol. B Psychol. Sci. Soc. Sci. 55 (5), S308-S318. https://doi.org/10.1093/ geronb/55 5 \$308
- Visaria, A., Dommaraju, P., 2018. Productive aging in India. Soc. Sci. Med. https://doi. org/10.1016/j.socscimed.2018.07.029
- Wang, W.P., Wu, L.H., Zhang, W., Tsay, R.M., 2018. Culturally-specific productive engagement and self-rated health among Taiwanese older adults. Soc. Sci. Med. https:// doi.org/10.1016/j.socscimed.2018.07.037.
- Warburton, J., Stirling, C., 2007. Factors affecting volunteering among older rural and city dwelling adults in Australia. Educ. Gerontol. 33 (1), 23-43.
- WHO, 2002. Active ageing: a policy framework. http://whqlibdoc.who.int/hq/2002/ who nmh nph 02.8.pdf.
- Xu, H., 2018. Physical and mental health of Chinese grandparents caring for grandchildren and great-grandparents. Soc. Sci. Med. https://doi.org/10.1016/j socscimed 2018 05 047
- Yamada, K., Teerawichitchainan, B., 2015. Living arrangements and psychological wellbeing of the older adults after the economic transition in Vietnam, J. Gerontol, B. Psychol. Sci. Soc. Sci. 70 (6), 957-968.
- Yeatts, D.E., Pei, X., Cready, C.M., Shen, Y., Luo, H., Tan, J., 2013. Village characteristics and health of rural Chinese older adults; examining the CHARLS Pilot Study of a rich and poor province. Soc. Sci. Med. 98, 71-78.
- Yeung, W.-J.J., Cheung, A.K.-L., 2015, Living alone: one-person households in Asia. Demogr. Res. 32, 1099-1112.
- Yeung, W.-J.J., Thang, L.L., 2018. Long term care for older adults in ASEAN plus three: the roles of family, community and the state in addressing unmet eldercare needs. J. Aging Health. https://doi.org/10.1177/0898264318796345.
- Yeung, W.-J.J., Desai, S., Jones, G.W., 2018. Families in Southeast and South Asia. Annu. Rev. Sociol. 44 (1), 469-495. https://doi.org/10.1146/annurev-soc-073117-041124.
- Youssim, I., Hank, K., Litwin, H., 2015. The role of family social background and Inheritance in later life volunteering evidence from SHARE-Israel. Res. Aging 37, 3-17.