

Patterns of productive activity engagement among older adults in urban China

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Abstract This study aims to identify patterns of productive activity engagement among older adults in urban China. Once patterns are identified, we further explore how a set of individual characteristics is associated with these patterns. Using data from the 2011 baseline survey of the China Health and Retirement Longitudinal Study (CHARLS), we performed a latent class analysis (LCA) on a national representative sample of adults aged 60 years and over ($N = 3019$). A specified range of productive activity indicators that fit the context of urban China was used for performing LCA (including working, grandchildren's care, parental care, spousal care, informal helping, and formal volunteering). A multinomial logistic regression was used to assess whether individual characteristics are associated with the identified patterns. The results indicated that a four-class model fit the data well, with the interpretable set of classes: spouse carer (51.2 %), working grandparents (21.7 %), multifaceted contributor (16.6 %), and light-engaged volunteer (10.5 %). Age, gender, education, number of children, proximity with the nearest child, household composition and functional status contributed to differentiating these classes. This study captured the reality of productive engagement among older adults by drawing attention to how multiple productive activities intersect in later-life stages. Our findings have implications for policy-makers, health care practitioners, and community advocates to develop programs that facilitate this aging population in assuming meaningful productive activities.

Keywords Productive aging · Activity patterns · Role theory · China

Introduction

Engaging in productive activities is crucial not only for maintaining the well-being of older adults but also for performing valued functions to families and society (Gonzales et al. 2015). In urban China, encouraging productive engagement is increasingly recognized as constructive in supporting older adults to remain healthy (Sun 2013). However, most studies fail to capture the whole picture of late-life productive engagement, because they address only one or two productive activities (Morrow-Howell et al. 2001). Moreover, studies examining multiple productive activities simultaneously (e.g., Baker et al. 2005; Hinterlong et al. 2007) are limited by the methodology, that is, aggregating the number of activities or the time committed to each activity performed, making it difficult to reflect the complex ways that multiple productive activities may intersect (Jung 2011). Conceptualization of late-life productive engagement needs to focus on distinct patterns of productive activities that inform the differentiation of subgroups of older adults in relation to well-being outcomes.

The major purpose of this study was to assess whether distinct patterns of productive activity engagement exist for a national representative sample of older adults in urban China. We examined data from the China Health and Retirement Longitudinal Study (CHARLS) and employed latent class analysis (LCA) to determine whether a set of discrete productive activities could be used to identify latent classes of this sample. Once the patterns are determined, we further describe how these patterns are associated with a variety of individual characteristics.

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Conceptualizing productive activities in late life

Productive activity refers to the production of socially valued goods or services, whether paid or not (Herzog et al. 1989). A review of operational definitions suggests that there is a lack of consensus on the breadth of activities counted as productive. At the narrowest level, they include paid working, formal volunteering, caregiving, and informal helping to others (Morrow-Howell et al. 2001). Some broader definitions include capacity-building, self-care, or daily household maintenance activities (Bass and Caro 1993; Butler and Schechter 1995).

Sociocultural contexts shape the realities in which older adults perform productive activities (Morrow-Howell and Wang 2013). Chinese older adults are expected to be socially integrated and to play contributory roles in both family and society (Peng and Fei 2013). This is in line with the notion that productive activity should generate social benefits beyond the individual. Thus, activities that are not intended to benefit others (e.g., self-improvement or self-directed activities) are regarded as less relevant.

We also take the position that productive activity is a behavioral expression of the commitment to specific social roles (Morrow-Howell et al. 2001). Accordingly, we consider paid working, formal volunteering, caregiving, and informal helping as basic categories of productive activities that are conducted within roles, and place individuals within a variety of social networks. Under each of these categories, we specify productive activities that fit the context of urban China.

Paid working

While recent evidence has suggested a trend toward delayed retirement in many Western countries (Dosman et al. 2006), employment among Chinese urban seniors is framed by mandatory retirement age (60 and 55 years for males and females, respectively). However, continued work to maintain economic security has become a necessity for many Chinese retirees (Ling and Chi 2008). For example, a notable number of reemployed urban seniors (8–10 %) were reported from 2010 to 2012 (Human Resources and Social Security 2013).

Formal volunteering

Formal volunteering refers to older adults providing services ‘with the intent of benefiting others, with whom there was no contractual, familial, or friendship obligation’ (Van Willigen 2000). In recent years, this form of productive activity has been promoted heavily in urban China by national programs which encourage older adults to engage in various types of community services (Xie 2008),

including voluntary labor, public safety maintenance, mutual help groups, youth education, and volunteer organizations (CNCA 2008).

Family caregiving

Family life is the main venue where Chinese older adults fulfill their contributory roles and expectations of reciprocity among family members (Mjelde-Mossey et al. 2009). It is most common for urban Chinese seniors to provide informal care to a close family member, usually a spouse, parent or parent-in-law, or young grandchild (Sun 2013). The respective role obligation of caregivers varies by family relationship with the care recipient (Penning and Wu 2015). Caring for a spouse in late life is characterized as highly obligatory, while caring for a parent reflects the cultural norm of filial piety (Cheng and Chan 2006). In contrast, caring for a grandchild gives older adults more choices about whether to participate, while also representing a highly valued productive role in the Chinese aging tradition (Mjelde-Mossey et al. 2009; Silverstein et al. 2006).

Informal helping

Informal helping refers to older adults providing help to others living outside the household, including neighbors, friends, and relatives (Hogan et al. 1993). Given the cultural tradition that highlights the value of mutual help, this form of productive activity is common across different cohorts of elderly Chinese people (Li et al. 2010).

Correlates of productive activities

There is an extensive body of literature documenting the factors associated with specific productive activities, especially at the individual level. In general, men are more likely to engage in paid employment and women are more likely to provide informal help, while gender effects vary in terms of formal volunteering (Bukov et al. 2002). There is evidence of an age-related decline across various productive activities. The decline is most evident in terms of paid employment, whereas a curvilinear association between age and volunteering is revealed in some studies, with engagement in volunteering reaching its peak at midlife (Bussell and Forbes 2002). Marital status is less associated with engagement in formal activities; however, several studies indicate that married people are more likely to be informal helpers and caregivers as well as holding multiple productive roles (Jegermalm and Jeppsson Grassman 2009). A positive relationship between higher education and participation in productive activities has been consistently reported as independent of specific activities, but it is more pronounced in relation to formal

volunteering and paid employment (Hank 2011; Ling and Chi 2008). Better health (measured in a variety of ways) increases the chance of participating in all kinds of productive activities (Jang et al. 2004; Lennartsson and Silverstein 2001). Social support is also related to engagement in productive activities. For example, co-residence with children has been said to provide more opportunities for contributory activities by older adults, while living alone predicts a lower level of active engagement outside the home (Choi 2003).

Theoretical perspectives on intersecting productive activities

In addition to the sociocultural context that shapes the extent and the kinds of productive activities in which older people engage, the intersections of late-life productive activities are conditioned by two characteristics: the social status individuals occupy and the compatibility between different activities. Role theory explains different social roles with the transitions individuals may undertake during the adult life course (Hooyman and Kiyak 2008). In particular, it provides nuanced perspectives on how productive activities that are performed within specific social roles may intersect in later life.

The role substitution hypothesis helps understand how changes in the status of individuals shape their daily experiences (Lum and Lightfoot 2005). Retirement is the most frequently examined context in late life where unpaid productive activities substitute for paid working. Following the cessation of employment and the reduced scope of family roles, retirees are expected to increase their engagement in volunteering activities (Wahrendorf and Siegrist 2010). Studies supporting this perspective report that starting volunteering was positively associated with leaving paid work, or a transition into part-time work (Carr and Kail 2013; Mutchler et al. 2003).

Role theory also provides a lens to understand the compatibility between different productive activities, with respect to time availability and opportunities for engagement across activities. The role strain perspective highlights the constraints of time when taking roles in parallel. It is allied with the time-use position in that more time committed to one activity inevitably reduces the time for others, given the limits of a 24-hr day (Carr and Kail 2013). In contrast with the role strain perspective, the role enhancement perspective explains the extent to which activities may facilitate opportunities for engaging with others, by emphasizing the social resources and networks in which individuals are embedded. Certain activities may complement each other through the exchange of social resources and provide access to broader social networks.

These two competing theoretical expectations are represented in the literature on the links between caregiving and other productive activities. From the role strain perspective, caring for a family member has been commonly regarded as an obstacle to other activities, due to its heavy commitment of time and efforts. There is relevant evidence of a negative relationship of eldercare to labor force participation during early late life among women, but not among men (Gordon et al. 2012; Lee and Tang 2013). Keeping in mind the role of gender in clarifying the working–caring relationship, we expect that the pattern of concurrent engagement in working and family caregiving is less likely to be found among women as compared with men.

On the other hand, research supports the role enhancement perspective that certain types of caregiving increase engagement in formal volunteering or informal helping (Burr et al. 2005; Rozario et al. 2004). For example, caring for a grandchild and caring for an older parent may encompass important features of role enhancement, as they offer unique opportunities to provide help to surroundings (sometimes to repay assistance received before that makes their tasks of providing care to a dependent family member residing in the community more feasible), embedding individuals within complex social networks that include other caregivers, support groups, and organizations (for example, day care centers) (Chumbler et al. 2004; Szinovacz and Davey 2006). Instead, caring for a spouse has been documented as often occurring in one's later old age and in one's own home, requiring a substantial investment of time and effort, and assuming the caregiver as the predominant source of primary caregiving with less support from other relatives (Pinquart and Sörensen 2011; Robison et al. 2009). It shows a great diversity of caregiving experiences among older individuals, making it necessary to consider the characteristics of the caregiving activities (such as the time committed to caregiving and the type of relationship between the caregiver and care recipient) when examining the links between caregiving and other activities (Farkas and Himes 1997). Following this research, we consider a simultaneous inspection of three types of caregiving with levels of time commitment (parental care, grandchild care, and spousal care) as informative in capturing the complex links of caregiving to other productive activities.

Pending more understanding of the patterned ways that productive activities may intersect (the literature on productive activity patterns is sparse as well), we take an exploratory approach to examine factors at the individual level which relate to the patterns. Following the integrated model of formal and informal volunteering proposed by Wilson and Musick (1997), we expect that factors such as education and functional health (referred to as human

resources) predict more formal activity patterns, and that factors such as the number of and the proximity to children, as well as household composition (referred to as social resources), predict patterns characterized by informal caring and helping activities.

It should also be noted that productive activities are only among a variety of meaningful activities older people may choose to perform, and there are many other sets of activities (e.g., introspective, leisure, relational, and spiritual activities) that are not tied to any specific social roles. Rather than assuming that all older individuals should fall into one of the patterns that is categorized by certain level of productive engagement with a particular role, our utilization of these role theory rooted perspectives is primarily for informing the understanding of the pattern diversity. In sum, given the complex ways that late-life productive activities may intersect, this study aims to classify the patterns of productive activities and to identify a set of individual characteristics associated with various patterns.

Method

Data

This study used data from the baseline survey of the China Health and Retirement Longitudinal Study (CHARLS) conducted between June 2011 and March 2012. It is a nationally representative sample survey of people aged 45 years and over and their spouses, based on a four-stage, stratified, cluster probability sampling design. Face-to-face, computer-aided personal interviews (CAPI) were conducted. For more details regarding the design and data collection procedures, see Zhao et al. (2013). The overall sample contains 17,587 individuals, of whom 40.2 % (7069) resided in urban areas (according to China's National Bureau of Statistics' criteria). We focused on urban respondents aged 60 years and above ($N = 3019$).

Measures

Productive activity measures

We included six measures of productive activity: working, caring for grandchildren, caring for spouse, caring for parents/parents-in-law, formal volunteering, and providing informal help. Working was measured dichotomously by asking respondents whether they had a job at the time of the survey. Caring for grandchildren was measured by first asking the respondents whether they had spent any time taking care of grandchildren under 16 years old during the last year. Respondents who answered in the affirmative were then asked how many weeks they took care of the

grandchild last year. Caring for parents/parents-in-law was measured in the same way. The measures of time involvement in these two activities are highly skewed, with most caregivers reporting over 20 weeks during the last year. Given that our goal was to create categories which are easily interpreted, we used previously defined categories of time involvement to preserve comparability: none = 0, low = 1 to 29 weeks, and high = 30 weeks or more.

In terms of caring for spouse, CHARLS did not ask respondents directly whether they were spousal caregivers or not. Instead, it asked all respondents reported having difficulties in any basic (ADL) or instrumental activities of daily living (IADL) who most often helped them with these difficulties. If a respondent reported his/her spouse as the primary helper, the spouse of this respondent was identified as a spousal caregiver. The respondent was also asked how many days and how many hours per day during the last month his/her spouse spent on taking care of him/her. Based on these measures, we summed the total hours the identified Spouse Carer spent on care during the last month, and grouped them into three categories: none = 0, low = 1 to 99 h, and high = 100 h or more.

Formal volunteering was measured by asking the respondents whether they engaged in the following activities: doing voluntary or charity work, taking part in community-related organizations or other kinds of social clubs. Respondents who answered in the affirmative were then asked how often they engaged in these activities (not regularly, almost every week, almost daily). Based on this, we grouped the involvement level: none = no engagement, low = not regularly, and high = every week or more often. Informal helping was dichotomized as providing help to people who lived apart and did not pay for the help, including relatives, friends, neighbors, and sick or disabled adults.

Correlates

We included a variety of demographic, social, and health functioning characteristics, to examine their associations with activity patterns: age (continuous), gender (male = 0; female = 1), marital status (married = 1; not/never married = 0), education (no schooling = 0; did not finish primary school = 1; primary school = 2; middle school = 3; high school and above = 4), number of children alive (continuous), and proximity with the nearest child (the same/adjacent dwelling = 1; the same neighborhood = 2; the same county/city = 3; the same province = 4; another province/abroad = 5). Household composition was measured categorically: 1 = one-generation (living alone or with spouse only), 2 = two-generation (living with children and/or children-in-law), 3 = multi-generation (living with children and/or children-

in-law and grandchildren/parents/parents-in-law), and 4 = skipped-generation (living with grandchildren and/or parents/parents-in-law while adult children did not live in this household). Functional status limitation was based on a dichotomous variable indicating whether the respondent had difficulty with one or more of the following: walking short distances, getting up from a chair, climbing stairs, stooping or kneeling or crouching, extending arms above shoulder level, lifting weights over 5 kg, and picking up a small coin.

Statistical analysis

The statistical analysis proceeded in two steps. First, latent class analysis (LCA) was used to identify empirically whether heterogeneous subgroups existed among the study sample, with regard to their performance in the six indicators of productive activities. As opposed to traditional variable-oriented approaches, LCA applies the individual-oriented approach, assuming that data were driven from more than one population. It also holds several advantages over traditional forms of cluster methods (Hagenaars and McCutcheon 2002; Vermunt and Magidson 2002): (a) using maximum likelihood procedures to assign each respondent into classes by estimating the model-based posterior membership probabilities; (b) offering a set of model fit statistics to determine the optimal number of classes, including likelihood ratio Chi-squared (L^2) and degrees of freedom (df), Akaike information criterion (AIC) and Bayesian Information Criteria (BIC) estimate, the Lo–Mendell–Rubin (LMR) test, and Entropy; (c) allowing for violations of statistical assumptions (e.g., linearity, normal distribution, or homogeneity of variance). Mplus Version 6.1 software program was used for this analysis (Muthén and Muthén 2010).

Second, a multinomial logistic regression was performed to assess a set of associates of the latent class memberships. We include this analysis for descriptive purposes, meaning the inclusion of associates is far from exhaustive but mainly represents a set of commonly used individual characteristics. SPSS version 19.0 was used for this analysis.

Results

Sample characteristics

Table 1 presents descriptive statistics of the study sample. The mean age of the sample was close to 69 years, with an almost even distribution by gender. The majority of all respondents were married (79 %), while a notable size of them was widowed (19.3 %). A bit more than half of the

respondents received primary school or higher education. Only 2.4 % of respondents reported moving to the county/city within the previous 12 months. Respondents in the sample had an average of three children. 38.4 % of respondents co-resided with at least one adult child, while 29.4 % had at least one child living in the same neighborhood. One-generation households were the most common (56.5 %), followed by multi-generation and two-generation households (21.7, 16.7 %). The respondents who lived in skipped-generation households accounted for 5.1 % of the sample, with the majority (130 of 154) living only with their grandchildren. Of all respondents, 28.7 % reported having at least one mobility limitation.

Table 2 presents the characteristics of activity engagement for the analytic sample and by gender. The most common productive activity reported was caring for grandchildren (24.2 %), followed by formal volunteering (16.0 %), working (10.6 %), caring for a spouse (9.2 %), and caring for parents/parents-in-law (5.3 %). Only 4.5 % of respondents reported engaging in informal helping, which may be due to the CHARLS containing only one loosely defined survey item to measure this activity. Gender differences were found for paid working (more men) and caring for parents/parents-in-law (more women). Please refer to Table 2 for more detailed descriptions of the involvement level for the activities under study.

Activity patterns

Table 3 presents the model fit statistics of the four models: the two- through five-class models. As suggested in literature (Lo et al. 2001; Nylund et al. 2007), these statistics were estimated compositely through the stepwise addition of classes: the value of BIC and AIC should be relatively lower with a non-significant L^2 ; a significant result of the LMR test suggested a significant improvement in model fit compared to the model with one fewer class; and higher value of entropy indicated higher certainty of classification ranging from 0 to 1. Accordingly, the four-class model yielded the best solution for this analysis. Importantly, under the productive aging framework, we had to consider carefully the theoretical fit of each model. It also favored the four-class model as showing more theoretical distinctions in the visual depictions.

Next, labels were applied to characterize these four classes. The labeling process relied mainly on the conditional probabilities presented in Table 4 that show the likelihood that individuals belong to a certain class scored on observed activity indicators. The largest group (51.2 %) was labeled as ‘Spouse Carer.’ These respondents were likely to have very low engagement across all types of productive activities except for caring for spouse, for which the conditional probabilities (both low and high

Table 1 Descriptive characteristics of the sample ($N = 3019$)

Variable	<i>n</i>	%	M (SD)	Range
Age			68.67 (7.16)	60–101
60–64	1135	37.6		
65–69	676	22.4		
70–74	559	18.5		
75–79	386	12.8		
80+	263	8.7		
Gender				
Male	1458	48.3		
Female	1559	51.6		
Marital status				
Married	2385	79.0		
Separated/divorced/never married	51	1.7		
Widowed	582	19.3		
Education				
No schooling	778	25.8		
Did not finish primary school	548	18.2		
Primary school	716	23.7		
Middle school	526	17.4		
High school and above	444	14.7		
Over 12-month urban residents				
Yes	2948	94.6		
No	71	2.4		
Number of alive children			3.00 (1.58)	0–10
Proximity with the nearest child				
The same/adjacent dwelling	1158	38.4		
The same neighborhood	887	29.4		
The same county/city	596	19.7		
The same province	105	3.5		
Another province/abroad	193	6.4		
No alive child	80	2.6		
Household composition				
One-generation	1707	56.5		
Two-generation	503	16.7		
Multi-generation	655	21.7		
Skipped-generation	154	5.1		
One or more mobility difficulties	867	28.7	0.61 (1.25)	0–7

involvement) were the highest across groups (0.078, 0.081). The second largest group (21.7 %) was labeled as ‘Working Grandparents.’ Individuals in this class demonstrated the highest likelihood of maintaining a job (0.198), and the second highest likelihood across groups of caring for grandchildren under 16 years old with both low and high involvement (0.227, 0.108). The third largest group, ‘Multifaceted Contributor’ (16.6 %), was identified by the highest probabilities of engaging in three activities simultaneously across groups: informal help (1.000), caring for grandchildren with both low and high involvement (0.239,

0.188), and caring for parents/parents-in-law with both low and high involvement (0.065, 0.153). Moreover, this group’s probability of engaging in formal volunteering with high involvement (0.078) ranked as the highest across groups. The smallest group (10.5 %), ‘Light-engaged Volunteer,’ was characterized by the highest likelihood of formal volunteering with low involvement (1.000). Persons in this group also showed the second highest probability of providing informal help (0.070) across groups.

In addition to the results for the overall sample, Table 4 also presents the sizes of groups (latent class membership

Table 2 Characteristics of activity engagement of the sample and by gender

Productive activity variables	Total N = 3019 n (%)	Male N = 1458 n (%)	Female N = 1559 n (%)	χ^2	p
Paid work				21.639	0.000
None	2699 (89.4)	1237 (84.8)	1460 (93.6)		
Yes	320 (10.6)	221 (15.2)	99 (6.4)		
Caring for grandchildren				0.276	0.944
None	2289 (75.8)	1109 (76.1)	1179 (75.6)		
Low	411 (13.6)	195 (13.4)	215 (13.8)		
High	319 (10.6)	154 (10.6)	165 (10.6)		
Caring for parents/parents-in-law				0.115	0.039
None	2860 (94.7)	1394 (95.6)	1464 (93.9)		
Low	91 (3.0)	37 (2.6)	55 (3.5)		
High	68 (2.3)	27 (1.9)	40 (2.6)		
Caring for spouse				1.145	0.564
None	2742 (90.8)	1316 (90.3)	1424 (91.3)		
Low	138 (4.6)	72 (4.9)	66 (4.2)		
High	139 (4.6)	70 (4.8)	69 (4.4)		
Informal helping				0.937	0.087
None	2882 (95.5)	1401 (96.1)	1478 (94.8)		
Yes	137 (4.5)	57 (3.9)	81 (5.2)		
Formal volunteering				2.134	0.344
None	2537 (84.0)	1213 (83.2)	1322 (84.8)		
Low	451 (14.9)	227 (15.6)	224 (14.4)		
High	31 (1.1)	18 (1.2)	13 (0.8)		

Note Bold numbers are used to highlight significant results of χ^2 test, at the level of $p \leq .05$

Table 3 Latent class analysis model fit statistics

	LR χ^2	AIC	BIC	Entropy	LMR test
Class 2	203.543 (df = 301)	14,036	14,162	0.495	81.109***
Class 3	164.604 (df = 290)	14,019	14,212	0.572	38.488***
Class 4	138.634 (df = 279)	14,015	14,136	0.681	25.933**
Class 5	131.432 (df = 269)	14,017	14,341	0.653	21.177

AIC Akaike information criterion, BIC Bayesian information criterion, LR χ^2 likelihood ratio Chi-squared, LMR Lo–Mendell–Rubin

** $p \leq 0.01$; *** $p \leq 0.001$

probabilities) for each gender. ‘Spouse Carer’ remains the largest group for each gender, but the probability of women belonging to this group was higher than that of men (61.2 vs. 43.7 %). ‘Working Grandparents’ represents the second largest group (28.7 %) for men (which is in line with the overall sample), whereas ‘Multifaceted Contributor’ represents the second largest group for women (19.2 %). For men, the probability of belonging to the ‘Light-engaged Volunteer’ group (12.6 %) was slightly higher than that of being in the ‘Multifaceted Contributor’ group (11.6 %). For women, the probability of belonging to the ‘Working Grandparents’ group (10.3 %) was slightly higher than that of belonging to the ‘Light-engaged Volunteer’ group (9.3 %).

Correlates of activity patterns

Table 5 presents a set of correlates of the four classes, after controlling for all the variables. The Spouse Carer was the reference group. We discuss only statistically significant results. Men were more likely than women to be in the Working Grandparents group and women were more likely to be in the Multifaceted Contributor group. Younger persons were more likely to be in all other three groups, with the effect being most pronounced in terms of Working Grandparents versus Spouse Carer (*** $p \leq 0.001$). Higher educated individuals were more likely to appear in the Light-engaged Volunteer (*** $p \leq 0.001$) and the Working Grandparents. Persons having fewer numbers of children

Table 4 Conditional probabilities for four-class model with gender functioning as covariate

	Light-engaged volunteer	Working grandparents	Multifaceted contributor	Spouse carer
Paid work				
None	0.984	0.802	0.875	0.939
Yes	0.016	0.198	0.125	0.061
Caring for grandchildren				
None	0.818	0.665	0.573	0.822
Low	0.086	0.227	0.239	0.078
High	0.096	0.108	0.188	0.100
Caring for parents/parents-in-law				
None	0.975	0.911	0.782	0.977
Low	0.025	0.054	0.065	0.012
High	0.000	0.034	0.153	0.010
Caring for spouse				
None	0.924	1.000	0.923	0.841
Low	0.038	0.000	0.061	0.078
High	0.038	0.000	0.016	0.081
Informal helping				
None	0.930	1.000	0.000	0.984
Yes	0.070	0.000	1.000	0.016
Formal volunteering				
None	0.000	0.876	0.674	1.000
Low	1.000	0.102	0.248	0.000
High	0.000	0.022	0.078	0.000
Latent class probabilities				
The whole sample	0.105	0.217	0.166	0.512
Male	0.126	0.287	0.116	0.437
Female	0.093	0.103	0.192	0.612

Table 5 Multinomial logistic regression results for predictors and activity clusters

Covariates	Light-engaged volunteer		Working grandparents		Multifaceted contributor	
	OR	CI	OR	CI	OR	CI
Age	0.999*	0.980–1.108	0.889***	0.871–0.906	0.935**	0.904–0.967
Male	1.263	0.864–1.845	1.480**	1.20–1.819	0.705*	0.551–0.902
Married	1.101	0.796–1.524	0.775	0.585–1.028	0.770	0.467–1.268
Education	1.780***	1.597–1.983	1.228**	1.033–1.459	1.175	1.067–1.294
Household composition						
Two-generation	0.778*	0.509–1.191	0.928	0.648–1.328	0.842*	0.433–1.638
Multi-generation	1.129	0.752–1.696	1.307	0.706–2.419	1.916**	1.374–2.671
Skipped-generation	1.467	0.878–2.451	2.306**	1.531–3.474	1.494	0.682–3.271
Number of children	0.894**	0.841–0.980	0.957	0.886–1.034	1.764**	1.652–1.897
Proximity to child	0.949	0.829–1.086	0.913	0.743–1.122	0.841*	0.741–0.955
Functional status	2.207***	1.633–2.983	1.654***	1.300–2.104	1.717*	1.076–2.741

$p < 0.001$, * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$, two tailed. Spouse Carer is the reference group

were more likely to be Light-engaged Volunteer but less likely to be Multifaceted Contributor and persons living in closer proximity with their children were more likely to be

Multifaceted Contributor. In terms of household composition, persons living in one-generation household were less likely to be Light-engaged Volunteer or Multifaceted

Contributor; persons living in multi-generation households were more likely to be Multifaceted Contributor; persons living in skipped-generation households were more likely to be Working Grandparents. With respect to functional limitation, persons with no limitations were more likely than persons with at least one limitation to be in all other three groups compared to the Spouse Carer group, with the effect being more evident for Light-engaged Volunteer and Working Grandparents ($***p \leq 0.001$).

Discussion

In this study, we delineated the patterned ways that older adults engage in multiple productive activities and examined these patterns in relation to a set of individual characteristics. A key strength of this study was that we undertook a comprehensive assessment of productive engagement in later life, by allowing for the intersection of multiple productive activities. With respect to how they are shaped by the social roles that individuals occupy at specific life stages, and whether they are compatible with each other, our derived patterns could increase our understanding of these socially valuable behaviors performed by older people.

This study has enabled us to identify four distinct patterns of productive activity among a representative sample of urban Chinese seniors, namely Spouse Carer, Working Grandparents, Multifaceted Contributor, and Light-engaged Volunteer. The findings of these patterns support notions based on role theory that productive activity patterns are closely related to individuals' social roles and shaped by their status during specific life stages. In particular, we identified a group labeled as 'Light-engaged Volunteer' containing persons who were most likely to volunteer and also most likely not to be employed or involved in any kind of family caregiving. It shows evidence of the role substitution perspective (also the time-use point), which regards the exit from the labor market and the reduction in family obligations as releasing a large amount of time and freedom for individuals committing themselves to more volunteering activities (Carr and Kail 2013).

Our findings also provide support for theoretical perspectives regarding the links between caregiving and other productive activities. For example, the identification of the group 'Multifaceted Contributor' supports the role enhancement perspective by showing the picture of individuals concurrently engaging in three productive activities based on informal social networks, which include informal helping, caring for grandchildren, and caring for parents/parents-in-law. This finding is consistent with the literature showing the complementary effect between caregiving and informal helping activities (Burr et al.

2005). Meanwhile, it also confirmed our speculation on the value of a simultaneous study of the three types of caregiving in reflecting how caregiving experiences could be diverse and closely linked to specific life stages. In particular, this group combined the two normative practices of caring for a young grandchild and caring for frail parents, suggesting that providing care to different family members are not necessarily discrete phenomena, but coincide during a specific lifetime (Robison et al. 2009). Furthermore, an interesting finding emerged that the group 'Multifaceted Contributor' also represented the highest likelihood of formal volunteering with high involvement. Somewhat unexpectedly, this group illustrated potential as paralleling a distinct subtype of participants labeled as 'doers' or 'super helpers' by previous studies (Burr et al. 2007; Jegermalm and Grassman 2013), where persons could be both family-oriented informal caregivers and outward-oriented 'active citizens' engaging in formal or informal helping activities. Yet, given that this group was based on a relatively small number of individuals, we should consider the identification of this pattern as tentative until more relevant studies are conducted in China.

A large group was identified as 'Spouse Carer,' and persons in this group were most likely to provide spousal care but also most unlikely to engage in any other productive activities under study. This suggests that caring for a disabled spouse was very unlikely to be combined with other productive activities by Chinese urban seniors, which adds to the role strain perspective and previous work that regards caring for a disabled spouse as suppressing caregivers' capacity to engage in a variety of other productive activities (Choi et al. 2007; Trukeschitz et al. 2013). Also, persons in this group were shown as being much older than persons in other groups, in line with our speculation that caring for spouse normally occurred in one's later old stage. Putting it into the context of urban China, this later old stage may be most likely to represent the 'disengaging' lifetime, during which many older people may find the opportunities for their continued engagement in productive activities becoming less available or desirable (e.g., no younger grandchildren in need of care; age-related barriers for doing formal volunteering). Alternatively, it is possible that some of them may choose to participate in other meaningful but unproductive activities (such as leisure and spiritual activities), which deserves more detailed descriptions by future studies with more information about these activities.

Our results also show evidence of a gender effect on placing individuals in the group 'Working-Caring Engager.' Persons in this group were most likely to maintain a paid job and at the same time to fulfill their family obligation of providing care to grandchildren. This group presented as the second largest group for the sample of men

(28.7 %) but not for the sample of women (10.3 %), which confirmed our expectation that the working–caring competition was more significant for women than for men (Lee and Tang 2013). Further studies should further explore the gender differences with regard to how men and women make choices in responding to the potential time constraint or competing opportunities between family-bounded and market-based productive activities.

In addition to the matter of gender for working–caring responsibility, our follow-up analysis of correlates revealed that persons located in the identified patterns differed significantly with regard to a variety of individual characteristics. As expected, our results revealed the predictive ability of age, education, and mobility (often referred to as human resources) in locating persons in the two groups oriented by formal activities: ‘Light-engaged Volunteer’ and ‘Working Grandparents’ were more likely to be younger, higher educated, and have less mobility limitations. In particular, the characterization of ‘Multifaceted Contributor’ confirmed our expectation that social resources represent an important set of characteristics increasing the likelihood of informal helping and caring activities (Wilson and Musick 1997), showing that persons in this group are more likely to have more children, be in closer proximity with children, and live in multi-generation households. This finding also supports what has been speculated by Burr and colleagues (2007) who identified a similar subtype of participants and that persons of this type may be equipped with more resources to benefit others. While in our analysis these resources have been largely represented as intergenerational support, future studies should examine a wider range of variables especially with regard to social support that may facilitate such active patterns of engagement among this subtype of persons.

Several limitations in this study are worth mentioning. First, we analyzed the cross-sectional patterns of productive activities in relation to a relatively small set of correlates. In reality, productive engagement will be more of a continuous process with transitions between different activities. Future studies could, therefore, build on these results by a longitudinal design to examine the changing patterns of productive activities with a wider range of correlates. Second, limited by the use of available data, two productive activities (paid working and informal helping) were measured dichotomously. We acknowledge that better quantification, such as the intensity of involvement in activities, may help advance our understandings of the patterns. Yet, to our knowledge, of the datasets available, the CHARLS contains the most comprehensive range of productive activities (and offered informative measures on most of these activities) that fit the context of urban China. Third, this study focused only on an urban sample, so the generalizability of our findings was constrained. It is important to understand productive engagement among

rural older adults, but to date, the concept of productive activity is less recognized in rural China, especially in terms of formal activities. We believe more efforts should be made to validate the measurements of productive engagement applicable among rural older adults (Li et al. 2014).

Conclusion

This study is the first to capture patterns of productive activity engagement among a representative sample of older adults in urban China. It has advanced understanding of how multiple productive activities intersect in late life by identifying four patterns of productive activity engagement among the Chinese population, as well as confirming our speculation on the value of differentiating three types of caregiving activities. The findings from our study also have several practical implications. First, given the considerable heterogeneities of urban seniors in the range of productive activities they actually perform, more specialized programs should be developed to cover different target groups. Second, as the findings confirmed the complex links between caregiving activities and other productive activities, supportive programs for older caregivers should be designed with careful consideration of the actual type of caregiving that individuals perform at specific life stages, as well as its potential of being combined with other productive activities. Third, our study identified a relatively large group of potentially vulnerable older adults with low engagement across the majority of productive activities. It is essential for policy-makers and practitioners to offer alternative ways that fit their capacity and need, to avoid their exclusion from the current framework of productive aging in urban China.

References

- Baker LA, Cahalin LP, Gerst K, Burr JA (2005) Productive activities and subjective well-being among older adults: the influence of number of activities and time commitment. *Soc Indic Res* 73:431–458. doi:10.1007/s11205-005-0805-6
- Bass S, Caro F (1993) *Achieving a productive aging society*. Auburn House Pub. Co, London
- Bukov A, Maas I, Lampert T (2002) Social participation in very old age: cross-sectional and longitudinal findings from BASE. *J Gerontol B Psychol Sci Soc Sci* 57B:P510–P517. doi:10.1093/geronb/57.6.P510
- Burr JA, Choi NG, Mutchler JE, Caro FG (2005) Caregiving and volunteering: are private and public helping behaviors linked? *J Gerontol B Psychol Sci Soc Sci* 60:S247–S256
- Burr JA, Mutchler JE, Caro FG (2007) Productive activity clusters among middle-aged and older adults: intersecting forms and time commitments. *J Gerontol B Psychol Sci Soc Sci* 62:S267–S275

- Bussell H, Forbes D (2002) Understanding the volunteer market: the what, where, who and why of volunteering. *Int J Nonprofit Volunt Sect Mark* 7:244–257
- Butler RN, Schechter M (1995) Productive aging. The encyclopedia of aging. Springer, New York, pp 763–764
- Carr DC, Kail BL (2013) The influence of unpaid work on the transition out of full-time paid work. *Gerontologist* 53:92–101. doi:10.1093/geront/gns080
- Cheng S-T, Chan AC (2006) Filial piety and psychological well-being in well older Chinese. *J Gerontol B Psychol Sci Soc Sci* 61:P262–P269
- Choi LH (2003) Factors affecting volunteerism among older adults. *J Appl Gerontol* 22:179–196. doi:10.1177/0733464803022002001
- Choi NG, Burr JA, Mutchler JE, Caro FG (2007) Formal and informal volunteer activity and spousal caregiving among older adults. *Res Aging* 29:99–124. doi:10.1177/0164027506296759
- Chumblor NR, Pienta AM, Dwyer JW (2004) The depressive symptomatology of parent care among the near elderly: the influence of multiple role commitments. *Res Aging* 26:330–351. doi:10.1177/0164027503262425
- CNCA (2008) White paper of China's ageing undertakings. China National Committee on Ageing. <http://www.cnca.org.cn/en/irroot10075/4028e47d18edb7d401190901aefd098b.html>. Accessed 20 May 2016
- Dosman D, Fast J, Chapman SA, Keating N (2006) Retirement and productive activity in later life. *J Fam Econ Issues* 27:401–419. doi:10.1007/s10834-006-9022y
- Farkas JJ, Himes CL (1997) The influence of caregiving and employment on the voluntary activities of midlife and older women. *J Gerontol B Psychol Sci Soc Sci* 52:S180–S189
- Gonzales E, Matz-Costa C, Morrow-Howell N (2015) Increasing opportunities for the productive engagement of older adults: a response to population aging. *Gerontologist* 55:252–261
- Gordon JR, Pruchno RA, Wilson-Genderson M, Murphy WM, Rose M (2012) Balancing caregiving and work: role conflict and role strain dynamics. *J Fam Issues* 33:662–689. doi:10.1177/0192513x11425322
- Hagenaars JA, McCutcheon AL (2002) Applied latent class analysis. Cambridge University Press, New York
- Hank K (2011) Societal determinants of productive aging: a multilevel analysis across 11 European countries. *Eur Sociol Rev* 27:526–541. doi:10.1093/esr/jcq023
- Herzog AR, Kahn RL, Morgan JN, Jackson JS, Antonucci TC (1989) Age differences in productive activities. *J Gerontol* 44:S129–S138
- Hinterlong JE, Morrow-Howell N, Rozario PA (2007) Productive engagement and late life physical and mental health—findings from a nationally representative panel study. *Res Aging* 29:348–370. doi:10.1177/0164027507300806
- Hogan DP, Eggebeen DJ, Clogg CC (1993) The structure of intergenerational exchanges in American families. *Am J Sociol* 1:1428–1458
- Hooyman NR, Kiyak HA (2008) Social gerontology: a multidisciplinary perspective. Pearson Education, Upper Saddle River
- Jang Y, Mortimer JA, Haley WE, Graves ARB (2004) The role of social engagement in life satisfaction: its significance among older individuals with disease and disability. *J Appl Gerontol* 23:266–278
- Jegermalm M, Grassman EJ (2013) Links between informal caregiving and volunteering in Sweden: a 17-year perspective. *Euro J Soc Work* 16:205–219
- Jegermalm M, Jeppsson Grassman E (2009) Caregiving and volunteering among older people in Sweden—prevalence and profiles. *J Aging Soc Policy* 21:352–373
- Jung Y (2011) Engagement in productive activities and well-being in later life. Dissertation, University of California
- Lee Y, Tang F (2013) More caregiving, less working: caregiving roles and gender difference. *J Appl Gerontol*. doi:10.1177/0733464813508649
- Lennartsson C, Silverstein M (2001) Does engagement with life enhance survival of elderly people in Sweden? The role of social and leisure activities. *J Gerontol B Psychol Sci Soc Sci* 56:S335–S342. doi:10.1093/geronb/56.6.S335
- Li H, Chi I, Xu L (2010) Factors associated with volunteerism among community-living older adults in urban China. *Soc Dev* 32:62–75
- Li YW, Xu L, Chi I, Guo P (2014) Participation in productive activities and health outcomes among older adults in urban China. *Gerontologist* 54:784–796. doi:10.1093/geront/gnt106
- Ling DC, Chi I (2008) Determinants of work among older adults in urban China. *Aust J Ageing* 27:126–133. doi:10.1111/j.1741-6612.2008.00307.x
- Lo Y, Mendell NR, Rubin DB (2001) Testing the number of components in a normal mixture. *Biometrika* 88:767–778
- Lum TY (2013) Advancing research on productive aging activities in greater Chinese societies. *Ageing Int* 38:171–178. doi:10.1007/s12126-012-9171-2
- Lum TY, Lightfoot E (2005) The effects of volunteering on the physical and mental health of older people. *Res Aging* 27:31–55
- Mjeldde-Mossey LA, Chin I, Lubben J, Lou VWQ (2009) Relationship between productive activities, family relations, and aging well for elders in China. *Journal of Ethnic and Cultural Diversity in Social Work* 18:276–292. doi:10.1080/15313200903310742
- Morrow-Howell N, Wang Y (2013) Productive engagement of older adults: elements of a cross-cultural research agenda. *Ageing Int* 38:159–170
- Morrow-Howell N, Hinterlong J, Sherraden M (2001) Productive aging: theoretical choices and directions. In: Morrow-Howell N, Hinterlong J, Sherraden M (eds) Productive aging: concepts and challenges. Johns Hopkins University Press, Baltimore
- Mutchler JE, Burr JA, Caro FG (2003) From paid worker to volunteer: leaving the paid workforce and volunteering in later life. *Soc Forces* 81:1267–1293
- Muthén LK, Muthén BO (2010) Mplus user's guide, v. 6.1 Los Angeles, CA: Muthén & Muthén
- Nylund KL, Asparouhov T, Muthén BO (2007) Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study. *Struct Equ Model* 14:535–569
- Peng D, Fei W (2013) Productive ageing in China: development of concepts and policy practice. *Ageing Int* 38:4–14. doi:10.1007/s12126-012-9169-9
- Penning MJ, Wu Z (2015) Caregiver stress and mental health: Impact of caregiving relationship and gender. *Gerontologist* gnv038
- Pinquart M, Sörensen S (2011) Spouses, adult children, and children-in-law as caregivers of older adults: a meta-analytic comparison. *Psychol Aging* 26:1
- Robison J, Fortinsky R, Kleppinger A, Shugrue N, Porter M (2009) A broader view of family caregiving: effects of caregiving and caregiver conditions on depressive symptoms, health, work, and social isolation. *J Gerontol B Psychol Sci Soc Sci* 64B:788–798. doi:10.1093/geronb/gbp015
- Rozario PA, Morrow-Howell N, Hinterlong JE (2004) Role enhancement or role strain assessing the impact of multiple productive roles on older caregiver well-being. *Res Aging* 26:413–428
- Security HRaS (2013) China population and employment statistics yearbook. National Bureau of Statistics of China. <http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm>. Accessed 20 May 2016
- 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:S256–S266

- Sun J (2013) Chinese older adults taking care of grandchildren: practices and policies for productive aging. *Ageing Int* 38:58–70. doi:[10.1007/s12126-012-9161-4](https://doi.org/10.1007/s12126-012-9161-4)
- Szinovacz ME, Davey A (2006) Effects of retirement and grandchild care on depressive symptoms. *Int J Aging Human Dev* 62:1–20
- Trukeschitz B, Schneider U, Mühlmann R, Ponocny I (2013) Informal eldercare and work-related strain. *J Gerontol B Psychol Sci Soc Sc* 68:257–267. doi:[10.1093/geronb/gbs101](https://doi.org/10.1093/geronb/gbs101)
- Van Willigen M (2000) Differential benefits of volunteering across the life course. *J Gerontol B Psychol Sci Soc Sci* 55:S308–S318
- Vermunt JK, Magidson J (eds) (2002) *Applied latent class analysis*. Cambridge University Press, New York
- Wahrendorf M, Siegrist J (2010) Are changes in productive activities of older people associated with changes in their well-being? Results of a longitudinal European study. *Eur J Ageing* 7:59–68
- Wilson J, Musick M (1997) Who cares? Toward an integrated theory of volunteer work. *Am Sociol Rev*: 694–713
- Xie B (2008) Civic engagement among older Chinese internet users. *J Appl Gerontol* 27:424–445. doi:[10.1177/0733464808315292](https://doi.org/10.1177/0733464808315292)
- Zhao Y et al (2013) *China health and retirement longitudinal study—2011–2012 national baseline users’ guide*. National School of Development, Peking University, Beijing