Personal goals and changes in life-space mobility among older people ☆

Milla Saajanaho [a,*], Merja Rantakokko [a], Erja Portegijs [a], Timo Törmäkangas [a], Johanna Eronen [a], Li-Tang Tsai [a], Marja Jylhä [b], Taina Rantanen [a]

[a] Department of Health Sciences, University of Jyvaskyla, Jyvaskyla FI-40014, Finland
[b] School of Health Sciences, University of Tampere, FI-33014 Tampere, Finland

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ABSTRACT

Objective. Life-space mobility – the spatial extent of mobility in daily life – is associated with quality of life and physical functioning but may also be influenced by future orientation expressed in personal goals. The aim of this study was to explore how different personal goals predict changes in older people's life-space mobility.

Methods. This prospective cohort study with a 2-year follow-up included 824 community-dwelling people aged 75 to 90 years from the municipalities of Jyväskylä and Muurame in Central Finland. As part of the Life-Space Mobility in Old Age study (LISPE), which was conducted between 2012 and 2014, the participants responded to the Life-Space Assessment and Personal Project Analysis in addition to questions on socio-demographics and health. Data were analyzed using generalized estimation equation models.

Results. The results showed that goals indicating a desire to be active in daily life, to stay mentally alert, and to exercise were associated with higher life-space mobility, and that the associations remained over the follow-up years. Goals related to maintaining functioning predicted higher life-space mobility at the 2-year follow-up. In contrast, goals reflecting improvement of poor physical functioning predicted lower life-space mobility. The results remained significant even when adjusted for indicators of health and functioning.

Conclusions. This study indicates that supporting older people in striving for relevant personal goals in their lives might contribute to a larger life-space and thus also to improved quality of life in old age.

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Introduction

Going outside one's home and moving in and outside of the neighborhood is an important element in living a meaningful life in old age, as it enables the use of community amenities and participation in social activities (Satariano et al., 2012). Restrictions in life-space mobility, a measure reflecting everyday movement in different life-space areas (bedroom, home, outside home, neighborhood, town, outside town; Baker et al., 2003), is common in old age (Allman et al., 2006; Barnes et al., 2007). Besides higher age, functional limitations have consistently been correlated with lower life-space mobility. Also, female sex, lower education and income, depressive symptoms, cognitive decline, and transportation problems are associated with life-space restriction (Al Snih et al., 2012; Barnes et al., 2007; Peel et al., 2005; Sartori et al., 2012). Higher life-space mobility has been associated with sense of autonomy (Portegijs et al., 2014a), extraverted personality, social activity, and orienting more toward the future instead of only the present day (Barnes et al., 2007). Higher life-space mobility correlates with better quality of life (Rantakokko et al., 2013, under review) and may even decrease the risk of frailty and mortality (Xue et al., 2008). Consequently, finding ways to maintain or increase life-space mobility could contribute to well-being in old age.

People often act according to their personal goals (Deci and Ryan, 2000), which are highly individualized states that people strive to achieve or avoid in the future (Freund and Riediger, 2006). In old age, personal goals most often relate to health, close relationships, and leisure time activities (Lawton et al., 2002; Saajanaho et al., 2014a). Previous research has indicated that older people's goals are affected by their health and functional limitations (Lawton et al., 2002; Saajanaho et al., 2014a). Previously, goal engagement in old age has been associated with more activity participation (Holahan, 1988) and better psychological well-being (Lawton et al., 2002). Also, having relevant personal goals may help older people maintain higher exercise activity (Saajanaho et al., 2014b). Goal engagement may be a resource for facing age-related health deterioration (Haase et al., 2013) and thus potentially prevent people from drifting into a vicious circle resulting in decreased life-space mobility and eventually home confinement—a situation that in practice renders active aging impossible.

Life-space mobility is affected by multiple factors, and not by physical functioning alone (Allman et al., 2006). Previous studies have not explored how goal engagement is reflected in life-space mobility,

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although it seems reasonable to assume that some goals require moving in a larger life-space than others. Personal goals can function as a pathway to maintaining valued behaviors throughout the life course (Baltes, 1997). It can be argued that not striving for personal goals could constitute a risk factor for life-space restriction, whereas engagement in relevant personal goals could contribute to maintaining and achieving higher life-space mobility. The purpose of this study was to explore how the content of older people's personal goals affects life-space mobility over a 2-year follow-up.

Methods

Participants

The present data came from the Life-Space Mobility in Old Age study (LISPE), which was a 2-year prospective cohort study of community-dwelling older people aged 75 to 90 years conducted in the municipalities of Jyväskylä and Muurame in Central Finland. Details of the recruitment procedure and the study flow of LISPE have been described in detail elsewhere (Rantanen et al., 2012). A random sample of 2550 people was drawn from the national population register. These individuals were contacted to ascertain their interest in taking part in the study. To be included, the participants had to be living independently in their own homes, not have any severe problems in communication, and be willing to participate in the study. Finally, 848 people (62% female) participated in a structured home interview implemented between January and June in 2012. The first follow-up was conducted one year, and the second follow-up two years after the baseline assessment. The first follow-up was conducted via telephone interviews and the second follow-up via telephone interviews and postal questionnaires. During the two follow-up years, 41 participants died and 15 were admitted to institutional care. Other reasons for attrition were inability to communicate (12), moving outside the study area (6), poor health (5), not willing (6), and not reached (2). The present analyses utilize data on 824 older people who had answered the question on personal goals at baseline. Of these, 795 participated in the 1-year and 742 in the 2-year follow-up.

This study was approved by the ethical committee of the University of Jyväskylä, Finland, and the participants gave their written informed consent. Good scientific practice was followed throughout the study in accordance with the principles laid down by the Declaration of Helsinki.

Measurements

Life-space mobility

Life-space mobility was measured using the University of Alabama at Birmingham Study of Aging Life-Space Assessment Baker et al. (2003) in face-to-face interviews at baseline and in telephone interviews at the first and second follow-ups. The Life-Space Assessment was translated into Finnish (Rantanen et al., 2012). A test–retest study found the measurement to be fairly reliable and responsive to change in the Finnish context regardless of season (Portegijs et al., 2014b). The assessment includes six nested life-space tiers starting from the bedroom and expanding to include home, yard, neighborhood, town, and beyond town. The participants were asked how often they moved in these different life-space tiers and whether they needed help from any devices or another person to do so. For the analysis, we used the life-space mobility composite score (LSMC score), which reflects the distance, frequency, and level of independence of mobility. The score ranges from 0 to 120 with higher scores indicating higher life-space mobility.

Personal goals

The content of personal goals was asked with a revised version of Brian R. Little's (1983) Personal Project Analysis. The following instruction was used in the interview: "We all have different personal goals that we strive to realize in our daily lives or reach in the future. The goals may be related to any life domain, such as hobbies, daily life, health, family, or friends. Think about the goals you have at the moment. The goals can be big or small; the main thing is that they are important for you." The participants reported between zero and seven personal goals. A coding scheme with 25 goal categories was designed for the purpose of classifying goal content, utilizing the coding scheme developed by Salmela-Aro et al. (2009). The goals were classified independently by two trained assessors, and the percentage rate of agreement between the assessors was 89%. Discrepancies between the assessors were discussed until total

agreement was achieved. Each of the 25 personal goal categories was coded on a dichotomous scale, 1 indicating having at least one goal in the category, and 0 no goals in the category. A person could have goals in several different categories or several goals in one category. We added a separate category of "no goals," in which 1 indicated having no goals and 0 at least one goal in any of the 25 goal categories. The goal categories and examples of their content are presented in Table 1.

Covariates

Participants' date of birth was derived from the national population register, while the data for all the other covariates were collected during home interview. The other covariates were years of education, perceived economic situation (good or very good vs. moderate, poor, very poor) and perceived difficulties in walking 2 km (no difficulties, minor difficulties and major difficulties/unable). Number of chronic diseases was calculated based on physician-diagnosed conditions, self-reported from a list of 22 chronic conditions, including e.g., coronary artery disease, arthritis, diabetes, cancer, Parkinson's disease, Alzheimer's disease or other dementia, depression, visual impairment, and hearing loss. Diagnoses not included in the list were prompted with an additional open question (Portegijs et al., 2014a).

Statistical analysis

The descriptive characteristics of the participants are reported as mean values and standard deviations for continuous variables and percentage distributions for categorical variables. Independent-sample t-test and chi-square test were used to compare differences in the descriptive characteristics between those who did versus those who did not report at least one personal goal. The correlations between the study variables were computed using Spearman's rank correlation coefficient.

To study the changes in the LSMC score based on reporting vs. not reporting personal goals in each goal category, we conducted a generalized estimating equations (GEE) model (Liang and Zeger, 2006) by specifying an unstructured outcome covariance matrix. This feature is an advantage in comparison with models that are based on the assumption of compound symmetry (i.e., constant covariance) of the outcome covariance matrix (e.g., repeated-measures variance analysis). We estimated main effects of personal goals on life-space mobility and time interaction effects for the 1- and 2-year follow-ups. Due to the large number of goal categories, we only included in the analysis goal categories for which a significant difference ($p < .10$) was observed in the LSMC score at baseline or at either of the follow-ups. Also, categories in which fewer than 30 participants reported having goals were not analyzed further as lack of power prevented meaningful multivariate modeling. This resulted in 11 goal categories for inclusion in the GEE model. As the correlations between the goal categories were low (range from $-.131$ to $.194$), indicating no substantial collinearity, we were able to include all of them in the same model as individual dummy predictor variables. We conducted an age and sex-adjusted model, and a model which was further adjusted for years of education, perceived economic situation, number of chronic conditions, and perceived difficulties in walking 2 km (fully adjusted). There were no substantial differences between the models, and thus we report only the results of the fully adjusted model. A separate GEE model with similar adjustments, in which at least one goal reported was as a predictor variable, was used to study changes in the LSMC score. The level of statistical significance was set at $p < .05$. The analyses were conducted using SPSS 20.0 for Windows (IBM SPSS Inc.).

Results

Descriptive results

The average age of the participants was 80.6 ± 4.2, 62% of them were women, and 41% reported having at least minor difficulties in walking 2 km. The average LSMC score was 64.3 ± 20.5 at baseline, 62.6 ± 22.0 at the first follow-up, and 61.7 ± 21.9 at the second follow-up. The participants reported between zero and seven personal goals. Those who did not report any goals were older, had somewhat less education, more often reported having difficulties in walking 2 km, and had a lower LSMC score compared to those reporting at least one personal goal (Table 2).

Table 1
The personal goal categories, examples of their content, number of participants reporting them, and average life-space mobility score at baseline by reporting vs. not reporting goals in each goal category ($n = 824$, LISPE study conducted in Central Finland in 2012–2014).

Personal goal category	Example	% (*n*) reporting	Life-space mobility score		
			Goal		
			Yes (mean ± SD)	No (mean ± SD)	*p*-value*
Maintaining health	"To stay healthy"	32 (263)	66 ± 19.8	64 ± 20.7	.165
Maintaining functioning	"To maintain functional ability"	20 (165)	68 ± 18.6	63 ± 20.8	.009
Activeness in daily life	"Going outside everyday"	16 (133)	69 ± 19.4	63 ± 20.5	.002
Travel/summer cottage	"To travel to some place warm"	15 (124)	68 ± 17.3	64 ± 20.9	.006
Family	"To visit children"	14 (119)	63 ± 21.1	64 ± 20.4	.580
Independent living	"To be able to take care of myself and my home"	15 (124)	62 ± 22.0	65 ± 20.2	.187
Hobbies at home	"To do handicrafts"	14 (111)	69 ± 19.3	63 ± 20.5	.004
Exercise	"To exercise more"	10 (85)	72 ± 17.2	63 ± 20.6	<.001
Meeting other people	"Spending time with friends"	13 (107)	69 ± 18.7	64 ± 20.7	.012
Life as it is	"That life would stay as it is"	9 (76)	64 ± 21.9	64 ± 20.2	.920
Healthy lifestyle	"Living healthy"	8 (68)	65 ± 19.2	64 ± 20.6	.792
Participation in social events	"To participate in war veterans' events"	6 (48)	69 ± 19.3	64 ± 20.5	.087
Helping others	"To support children in their lives"	6 (48)	69 ± 19.3	64 ± 20.5	.073
Other's health and well-being	"Good future for our grandchildren"	6 (45)	69 ± 19.2	64 ± 20.5	.131
Mental health	"To stay mentally alert"	5 (38)	75 ± 14.9	64 ± 20.6	<.001
Recovery/Managing illnesses	"That cancer treatment would work"	5 (38)	56 ± 20.8	65 ± 20.4	.008
Improving functioning	"To be able to walk normally, as before"	4 (34)	54 ± 21.9	65 ± 20.3	.004
Hobbies outside home	"Continue going to concerts"	4 (33)	66 ± 20.1	64 ± 20.5	.546
Economic issues	"To save money"	4 (32)	68 ± 26.5	64 ± 20.2	.239
Living arrangements	"To move to the city center"	4 (32)	64 ± 19.4	64 ± 20.5	.955
Character	"To be as good a person as possible"	2 (20)	64 ± 17.9	64 ± 20.5	.976
End-of-life issues	"I have lost all interest in life, I'm waiting for death"	2 (13)	54 ± 21.0	64 ± 20.4	.081
Common good	"To participate in the development of society"	2 (14)	66 ± 22.0	64 ± 20.5	.782
Philosophy of life/religion	"To live according to God's will"	2 (12)	56 ± 28.1	64 ± 20.3	.178
Other	"To have a dog"	1 (11)	65 ± 12.8	64 ± 20.6	.803
No goals	"I have no goals anymore"	6 (51)	56 ± 21.1	65 ± 20.3	.002

* Independent-sample *t*-test.

Personal goals related to maintaining health (32% had at least one goal in this category) and maintaining functioning (20%) were the most frequently reported by the participants. The LSMC score at baseline was significantly higher among those reporting goals related to maintaining functioning, activeness in daily life, exercise, hobbies at home, meeting other people, mental health, or travel/summer cottage when compared to those not reporting such goals. Those with goals related to recovery/managing illnesses or to improving functioning had significantly lower LSMC score compared to those not reporting such goals (Table 1).

The associations of personal goals with life-space mobility

The GEE model showed that those who did not report any personal goals had a somewhat lower LSMC score than those who reported at least one personal goal in any of the goal categories

(marginal mean ± SD: 61 ± 2.6 vs. 65 ± 0.6; $p = .06$). This difference persisted throughout the two follow-up years (59 ± 2.6 vs. 63 ± 0.6 at the first follow-up and 57 ± 2.5 vs. 61 ± 0.6 at the second follow-up; group × time interaction effect $p = .994$; fully adjusted model).

The time effect on the fully adjusted GEE model with 11 goal categories as separate predictor variables was not significant ($p = 0.981$). Participants who reported goals related to maintaining functioning had a relatively stable LSMC score, whereas the scores of those with no such goals decreased over the years. Those with goals related to activeness in daily life, exercise, and mental health had a higher LSMC score at baseline compared to those with no such goals. The differences between the groups persisted over the 2-year follow-up for goals related to exercise and mental health, and over the 1-year follow-up for goals related to activeness in daily life. Those who reported goals related to improving functioning had a lower LSMC score at

Table 2
Descriptive characteristics of the total study population and by reporting vs. not reporting any personal goals ($n = 824$, LISPE study conducted in Central Finland in 2012–2014).

	All	Endorsing at least one personal goal		
		Yes (*n* = 773)	No (*n* = 51)	
	M (SD)	M (SD)	M (SD)	*p*-value*
Age in years	80.6 ± 4.2	80.4 ± 4.2	82.4 ± 4.1	.001
Years of education	9.6 ± 4.2	9.7 ± 4.2	8.6 ± 4.1	.066
Number of chronic conditions	4.4 ± 2.4	4.4 ± 2.5	4.2 ± 2.2	.711
Life-space mobility score	64.3 ± 20.5	64.8 ± 20.3	55.8 ± 21.1	.005
	%	%	%	
Women	62	63	57	.412
Good economic situation	51	51	51	.971
Difficulties in walking 2 km				.065
No difficulties	59	60	43	
Minor difficulties	20	20	29	
Major difficulties/unable	21	21	28	

Note: years of education $n = 817$; economic situation $n = 822$.
* Independent-sample *t*-test for continuous variables and chi-square test for categorized variables; significance level $p < .005$.

Table 3
Goal categories jointly predicting changes in life-space mobility score in a GEE model (LISPE study conducted in Central Finland in 2012-2014, 824 participants).

		Baseline		Follow-up 1		Follow-up 2		GEE model p-values	
		Mean	SE	Mean	SE	Mean	SE	Group	Group × time
Maintaining functioning	No	66	2.7	64	3.0	61	3.4	0.075	0.001
	Yes	67	3.0	65	3.3	66	3.5		
Activeness in daily life	No	65	2.8	63	3.1	63	3.4	0.048	0.443
	Yes	68	3.0	66	3.2	64	3.6		
Travel/summer cottage	No	67	2.7	64	3.0	64	3.3	0.886	0.515
	Yes	66	3.0	65	3.3	63	3.7		
Hobbies at home	No	66	2.7	65	3.0	63	3.5	0.671	0.312
	Yes	67	3.0	65	3.2	64	3.5		
Family	No	67	2.8	65	3.1	63	3.4	0.847	0.287
	Yes	66	3.0	65	3.2	65	3.6		
Meeting friends	No	64	2.7	65	2.9	63	3.3	0.185	0.054
	Yes	69	3.0	65	3.4	64	3.7		
Exercise	No	65	2.7	63	3.0	61	3.4	0.007	0.766
	Yes	68	3.1	67	3.3	66	3.6		
Helping others	No	66	2.5	64	2.8	63	3.0	0.435	0.775
	Yes	67	3.4	66	3.8	65	4.2		
Mental health	No	64	2.7	63	3.0	62	3.1	0.030	0.762
	Yes	69	3.2	67	3.6	65	4.1		
Recovery/managing illnesses	No	69	2.5	67	2.7	65	3.2	0.076	0.680
	Yes	64	3.4	63	4.0	62	4.1		
Improving functioning	No	70	2.4	68	2.7	67	2.7	0.045	0.917
	Yes	64	3.8	62	4.2	60	4.9		

Note. GEE model; adjusted for age, sex, years of education, economic situation, number of chronic conditions and difficulties in walking 2 km; Mean = marginal mean, SE = standard error of marginal mean.

baseline than those with no such goals, and the difference between the groups remained over both follow-up years (Table 3).

Discussion

Personal goals indicating a desire to be active in daily life, to exercise, and to stay mentally alert were associated with higher life-space mobility and the associations persisted in the longitudinal analysis. At baseline, goals related to maintaining functioning were not associated with the LSMC score but were predictive of maintaining higher life-space mobility when compared to those not reporting such goals, among whom the LSMC score decreased over the following two years. In turn, goals reflecting the desire to improve physical functioning were associated with a lower LSMC score at the 2-year follow-up. Also, reporting at least one personal goal in any of the goal categories was associated with a higher LSMC score over the follow-up years. Since higher life-space mobility correlates with better quality of life (Rantakokko et al., 2013) and decreased risk for frailty and mortality (Xue et al., 2008), our results indicate that striving for both physical and mental activity may even increase well-being in old age.

Life-space mobility is strongly associated with functional ability (Peel et al., 2005; Portegijs et al., 2014a), but it also reflects interest in moving around and participating in social networks (Barnes et al., 2007). As goals may indicate an orientation toward the future, the current results are in line with those of a previous study indicating that older people who orient more to the future have larger life-space than those who focus mostly on the present day (Barnes et al., 2007). Endorsing goals in life may also signify willingness, and the ability, to plan the future, which has also been associated with larger life-space (Sartori et al., 2012). Several goal categories predicted higher life-space mobility, even when the analysis was adjusted for, e.g., health conditions and functional limitations. This strengthens the notion that in addition to physical functioning, psychosocial factors also contribute to life-space mobility. Similar finding was reported by Portegijs et al. (2014a) who concluded that alongside physical performance, sense of autonomy is also associated with life-space mobility.

The finding that reporting personal goals related to activeness in daily life and to exercise were associated with higher life-space mobility

may be explained by the notion that those who endorse such goals are also more physically active (Saajanaho et al., 2014b), and thus in a better physical condition and able to move within a larger life-space. Personal goals are reflective of older people's health and functional abilities (Lawton et al., 2002; Saajanaho et al., 2014a). It is possible that the people with activity-related goals were initially healthier and thus able to better maintain their higher life-space mobility over the years. However, the associations between activity-related goals and life-space mobility were not attenuated even when the analysis was adjusted for indicators of health and functioning. Some of the goals related to activeness in daily life did not require travelling far from home (e.g., gardening) and as such do not explain the correlation with higher life-space mobility. However, these goals may reflect a tendency to be generally active in life, potentially manifested as higher life-space mobility. The same tendency may explain the result that goals related to mental health predicted higher life-space mobility. In our data, these goals often reflected strivings to stay mentally alert and thus may relate to higher activity participation, in turn reflected in higher life-space mobility. Also, goals related to maintaining functioning may indicate strivings to stay active and take care of one's health and functional ability. This was not reflected in life-space mobility immediately but did predict a higher LSMC score over time. The associations of different activity-related goals with life-space mobility suggest that although goal disengagement is common in old age (Saajanaho et al., 2014a), persistence in the pursuit of active life goals might be more beneficial for older people's physical well-being. Maintaining activity despite age-related functional decline may even decrease mortality risk (Hirvensalo et al., 2000).

Goals related to improving functioning were associated with lower life-space mobility, and the difference in the LSMC score between those who reported these goals versus those who did not, remained the same over the 2-year follow-up. In our data, these goals were often reported by people with poorer health and functioning, and thus typically indicated a desire to regain an earlier state of functional ability. As life-space mobility is strongly associated with physical functioning, it is understandable that these goals relate to lower life-space mobility. However, as goals related to improving functioning did not predict a higher LSMC score in the 2-year follow-up, they may stem from ruminating over one's own

situation instead of active striving toward improved functioning. As goals render life meaningful (Betzler, 2013), it would be important to encourage older people with functional problems to strive for, e.g., recreational goals in their lives. Such goals might motivate them to extend their life-space, which, in turn, might promote their functional ability.

This study is the first to examine the relations between personal goals and life-space mobility among older people. Moreover, by utilizing a longitudinal study design, we were able to demonstrate that some personal goals may predict changes in life-space mobility in old age. Due to the low correlation between the goal categories, we were able to include all of them in the same GEE model. This allowed us to identify which specific goals were the most significant predictors of changes in life-space mobility. Also, we were able to adjust our models for indicators of health and functioning, strengthening the assumption that goals may motivate older people to maintain a larger life-space irrespective of their physical condition. The participants represented both sexes and a wide age range of community-dwelling older people, which adds to the generalizability of the study.

There are also some limitations that need to be considered when interpreting the results of this study. The participants were somewhat healthier than average for their age. Moreover, people with severe communication problems, most likely due to cognitive impairment, were excluded from the study. The associations found might have been stronger had the participants shown more variation in physical and cognitive functioning. While we conclude that goals may be relevant for older people's life-space mobility, we also recognize that the ability to move around one's neighborhood and beyond and the level of independence one has in travelling contribute to older people's possibilities to set personal goals. In the personal project analysis, the participants reported their goals without using a structured questionnaire. Thus, the participants might have had additional goals that they did not report in the interview. We have no data on the participants' goals at the follow-up and thus cannot know if or how they changed, or how any such changes might have been reflected in life-space mobility longitudinally. Also, we cannot know to what degree the participants acted according to their personal goals.

Conclusion

Striving for personal goals may encourage older people to leave their home and move within a wider life-space. This may have important health benefits, as leaving the home is the single most important factor for increasing physical activity among older people (Tsai et al., 2015). In particular, goals related to being active, exercising, and maintaining functioning may benefit the quality of life of older people by enabling them to maintain a wider life-space (Rantakokko et al., 2013, under review). On the contrary, lack of interest in moving outside the home may result in some older people spending time mainly at home (Barnes et al., 2007), inevitably leading to sedentary behavior (Tsai et al., 2015). Consequently, supporting older people in striving for meaningful goals in their lives might contribute to a larger life-space and improved quality of life in old age.

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Conflict of interest statement

The authors declare that there are no conflicts of interest.

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