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Social activities, loneliness and life satisfaction in old age: a time use study.

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Abstract: The concept of actively ageing is strictly related to the notion of dealing with time: finding a new role in society means to replace structured time use routines with new ones, giving old people the chance to establish and discover a renewed meaning of life.
Research has shown that being active is an important determinant of LS. Moreover, not only the type of activity seems to be important, but also its social dimension.
In this study we use Time Use survey for understanding if and to what extent involvement in different activities – measured through time devoted to each activity – is associated with different levels of LS. Moreover, we want to know if performing those activities alone or with other people is significantly associated to LS level, with the hypothesis that impairment in social interactions and isolation are important sources of dissatisfaction in old age, while supportive social relationships and intimacy may increase emotional strength and LS.
We select a subsample of 12,247 individuals, aged more than 60 from the 2015-2016 Italian Time Use Survey. We use OLS regression models for studying the association between self-reported LS (10 point Likert scale) and the time spent in passive, active, and social pursuits.
By starting from the hypothesis that different aspects are likely to be important in the evaluation of self, and, in turn, in determining wellbeing, for men and women, we run separate analyses by gender. Moreover by considering that being active, and, in particular, being active in social activities and spending time not alone may have a more relevant role in determining LS when the older adult is in a condition of social frailty, such as that defined by living alone, we split our analyses by living arrangements (alone vs. with others). We can expect, in fact, that the potential gender differences in the predictors of LS vary for older persons living alone, as they have specific characteristics and needs, and, even if they are not necessarily socially isolated, their condition places them in a potential vulnerable position.
Results show that being active is important for LS in old age. Spending time in social activities resulted to be associated with LS, regardless the sex. At the same time, the proportion of daily activities spent with other people is relevant only for people not living alone.

Keywords: Active Ageing Theory, Time use in old age, Social activities, Loneliness, Life satisfaction

1. Introduction

In recent years, with the progressive ageing of societies, theoreticians, researches, practitioners and policy makers have increasingly focused their attention on the older adults and on the ageing process (Wilhelmson et al., 2005). Particular attention has been directed to successful aging and to older people's wellbeing. The term 'successful aging' has been popularized by Rowe and Kahn (1987) who included three main components in the definition of the term: 'low probability of disease and disease-related disability, high cognitive and physical functional capacity, and active engagement with life' (Rowe and Kahn, 1997). Wellbeing has been said to be the subjective counterpart of 'successful ageing' (Stanley and Cheek 2003; Adams, Leibbrandt and Moon, 2011) and this explains the attention that the wellbeing of older people receives in literature as well as in policies

Among the three aspects of subjective wellbeing that can be distinguished (evaluative, hedonic, and eudemonic wellbeing[1], see Steptoe, Deaton, and Stone, 2015), the evaluative dimension measured by life satisfaction (LS) is usually considered a key indicator of wellbeing and is one of the most commonly used measures of successful aging too (Tate, Lah, & Cuddy, 2003). Therefore, it's becoming of paramount importance to find out the determinants of wellbeing in later life. Rowe and Hahn themselves in their definition of successful ageing (1997) posed '*active engagement*' as one of the major elements, defining it as 'remaining involved in activities that are meaningful and purposeful' and 'maintaining close relationships'. Thus both the productive activity and interpersonal relations are recognised as important determinants for successful ageing.

Research has shown that being active is an important determinant of LS among older adults. In particular, the *activity theory of ageing* emphasizes the link between an active lifestyle and wellbeing in older age (Adams, Leibbrandt, and Moon, 2011). Participation in activities should provide, indeed, opportunities for the role supports that are necessary for maintaining a positive self-concept in older ages (Baker et al., 2005): for example, productive activities, such as housework or volunteer work, may provide a sense of usefulness. In addition, activities connected with physical or outdoor activity, such as gardening or sports, may be beneficial to LS, as they contribute to improve health and physical functioning (Hogan, 2005).

As suggested also in the definition of successful ageing, the *activity theory* maintained that in addition to the participation in activities also the social dimension is important: the greater the time spent in being active, the higher the wellbeing is; similarly, the more an activity implies social engagement, the higher the wellbeing is. Research has, indeed, stressed the importance of social

[1] The evaluative dimension refers to 'peoples' thoughts about the quality or goodness of their lives' (Steptoe, Deaton, and Stone, 2015, p. 641); hedonic aspect is connected with everyday feelings or moods; 'eudemonic wellbeing focuses on judgments about the meaning and purpose of one's life' (Steptoe, Deaton, and Stone, 2015, p. 641).

relationships for LS (Cheng and Chan, 2006). In general, individuals rely on social relationships for emotional and psychological reasons, as well as for other social and economic aspects: relations with others satisfy, indeed, the basic human needs for belongingness and provide emotional and instrumental assistance when difficulties arise. Researchers has argued that social relations may be particularly important in old age. Thus, both the time spent in being active and the social dimension of this time should be considered to evaluate the wellbeing in later life.

Literature suggested that the determinants of life satisfaction may differ by gender and living arrangements of individuals (Pinquart and Sörensen, 2001; Gaymu and Springer, 2010; Oshio, 2012; Meggiolaro and Ongaro, 2015). Subjective wellbeing is, indeed, influenced by the individual's aspirations, and these in turn depend on personal preferences and values, which can be connected with gender and the individual life circumstances of people. Obtaining a positive outcome in something important to self would result in an increase of LS: in other words, predictors of LS reflect in a certain sense the priorities of people. Specifically, the priority given to being active and social relations might be different for men and for women and between older people living alone and those living with others individuals. Thus, we may expect that also the role of being active and of social dimension in determining wellbeing vary by gender and living arrangement. In addition, it is worth asking to what extent potential gender differences in the role of being active and of social dimension for LS remain valid for persons living alone.

Studies investigating on the relation between active ageing and wellbeing have undoubtedly contributed in increasing scientific knowledge on the determinants and consequences of people's use of time at older ages, but most of them conceptualize (and thus measure) activity levels in a blurred way. Indeed, similar studies generally rely on stylized retrospective questions to capture people's time use (i.e., recall question on time spent on a specific activity, during a reference period of one week or one month) or on the frequency of performance of selected activities in a defined period (past month or week). This sort of questions not only commonly generates recall problems that are even more likely at older ages, but also mechanism of social desirability may influence the respondents: for instance, as media stress the importance of physical regular exercise for healthy aging, the respondent can emphasise the time spent in such an activity to conform to the social expectations.

The novelty of this paper is to study how time dedicated to active pursuits and to social relations is connected with wellbeing of old people, relying on a different source of data: the Time Use Survey. The time use diaries provide indeed a very accurate measurements of time spent on different activities and reduce recall problems because activities are not removed from context and because the time periods studied are clearly defined and short (Gauthier 2003). In the current study we

focus on the social dimension of time, under the hypothesis that participating in social activities as well as spending time with other people, regardless of the type of activity performed, are associated to higher level of wellbeing. Lastly, we consider whether these associations vary by gender and living arrangement.

We decide to concentrate on Italy, as a case-study, because it represents a peculiar context under many perspectives. Italy is experiencing an unprecedented process of population aging: a rapid rise in the numbers of older people, along with persistently low fertility and extended life expectancy (Tommasini and Lamura, 2009), and thus an increasing number of old people is more likely to be/remain kinless (Verdery et al. 2019). It is self-evident that in one the most aged country in the world the wellbeing of older people has become a key social issue. In this specific context, characterised by strong family ties (Dalla Zuanna, 2001; Dalla Zuanna and Micheli, 2004), the role of social relations may play a crucial part on elderly wellbeing. Italy is an interesting context also to study gender differences, as it is characterized by a still relatively unbalanced gender system (Anxo et al., 2011), and thus differences in socialisation of old men and women could be particularly strong in shaping expectation and behaviour in later life.

Our study relies on data collected from the most recent Italian Time Use Survey (2015-2016). In particular, we select a subsample of 12,247 individuals, aged 60 years and over and we focus on self-reported LS (10 point Likert scale). In the analysis we take into account the time spent in passive activities (passive leisure, sleeping, personal care) and active pursuits (social, and cultural activities, sports, hobbies, cultural, caregiving, transports, work, housework). It is worthwhile to note that besides the social activities usually considered in the literature, we also focus on another aspect of the social dimension of life considering whether individuals are alone or with other when spending time in passive and active pursuits. Some separate analyses by gender and living arrangements (alone vs. with others) are carried out with the aim of verifying whether the associations between LS and time spent in different activities and the social dimensions of time vary by gender and living arrangement.

2. Background

2.1 The importance of the social dimension of activity in older age in a gender perspective

The activity theory of ageing (Havighurst, 1961) stated that getting older implies for individuals the loss of roles, for example with retirement and widowhood, and that to maintain a positive sense of self, older individuals need to find new roles (Ferraro, 1997). In the same direction, also the definition of successful ageing considered participation in activities as one of the main components

of successful ageing (Rowe and Kahn, 1997). In this perspective participation in some activities guarantees older individuals role continuity or role replacement which may help to maintain a sense of meaning or purpose and a sense of identity in individuals (Baker et al., 2005; Adams, Leibbrandt, and Moon, 2011): for example, a productive activity, such as volunteer work, may provide a sense of usefulness.

Moreover, being active often implies the achievement of personal goals, thus adding a sense of satisfaction with outcomes, mental stimulation, and increased self-esteem (Warr, Butcher, and Robertson, 2004; Wahrendorf et al., 2008). Lastly, activities connected with physical activity, such as gardening or sports, may have a benefit on LS connected with the benefit they have in health and physical functioning: any activity involving movement implies, indeed, the stimulation of bodily systems, promoting motion and muscle tones, internal benefits to digestion and cardiovascular health (Hogan, 2005).

Further developments of the activity theory of ageing distinguished three types of activity: informal, implying social interaction with relatives, friends or neighbours; formal, implying participation in formal groups and organisations; and solitary, consisting in activities an individual does alone hobbies. Empirical researches suggested that informal activities are more likely to influence wellbeing than formal or solitary activity and thus activity theory should emphasise the social dimension of ageing (Adams, Leibbrandt, and Moon, 2011). In fact, the definition of successful ageing in itself (Rowe and Khan, 1997) underlined the importance to consider social relationships.

The social dimension of the activities can enhance older adults' wellbeing through several pathways.

Social interactions may lead to social integration that allows individuals to satisfy the basic human needs for belonging and reduce the risks of social isolation.

The social activity may supply, from one hand, the emotional intimacy which reinforce one's self-concept and the sense of being, from the other hand, the socio-emotional and instrumental support which may be fundamental when difficulties arise.

In addition, since social interactions have essential intrinsic cognitive components, the social engagement may contribute to enhanced cognitive function (Fratiglioni et al., 2000).

Several studies focused on the determinants of wellbeing among older people have emphasised the importance of gender (see, for example, Cheng and Chan 2006; Oshio, 2012; Meggiolaro and Ongaro, 2015): in particular, the role of being active and of the social dimension of engagement may be different for older men and women.

In fact, research on gender-differentiated correlations of activities with older people's wellbeing is scarce, and, in general, what emerged is that associations between wellbeing and activity is similar

between men and women (Warr, Butcher, and Robertson, 2004). Conversely, literature on the different role of social engagement for men and women is richer and started from the hypothesis that women are more sensitive than men to social relations.

The higher importance assigned to relatedness by women than by men is, in general, justified by their socialization for the role of nurturing and caretaking individuals (Esplen, 2009; Lindsey, 2015), and the differences in the importance to relatedness tend to persist in old age (Chen e Chang, 2006): current cohorts of elderly tend to have been socialised in the context of the male breadwinner model with men who have to invest in economic success and occupational careers and women in family care, in the roles of child-rearing, home-making and caregiving. Thus, different aspects are likely to be important in the evaluation of self, and, in turn, in determining wellbeing, for men and women.

In addition, older women are more likely than older men to maintain closeness and contact with network members (friends and extended family members) and to invest in relationships (Gurung, Taylor, & Seeman, 2003). This stronger allocation of resources to social relations by women than by men suggests that social activities may be more important for older women's subjective wellbeing than for men's one (Chen e Chang, 2006).

These results are not confirmed in Italy: Meggiolaro and Ongaro (2015) did not find gender differences in the determinants of life satisfaction among the older adults, and, in particular, they found that social integration significantly contribute to the life satisfaction of older men and women in the same way. The authors tried to explain the result presenting the hypothesis that, even in a Mediterranean context such as Italy, the differences in socialisation of the individuals considered in the analysis are not strong enough to influence the determinants of their life satisfaction in older ages. Alternatively, they suggested that in old ages family and social networks are aspects which become relevant for men's wellbeing too. In other words, the study confirmed what found by other research on the importance of institutional and cultural context: factors associated with wellbeing in later life are contextually bound and related to the culture, values and social norms prevailing in different sets of societies (Horstmann et al., 2010; Gagliardi et al., 2012).

In the current study, we try to further develop these aspects considering more in details than previous studies the different activities performed in a day.

2.2 The role of time allocation in older age: hypotheses

The concept of actively ageing is strictly related to the notion of dealing with time: finding a new role in society means to replace structured time use routines with new ones, giving old people the chance to establish and discover a renewed meaning of life.

Time allocation among different activities changes, indeed, with age (for example, after retirement, the time previously devoted to work has to be reallocated in a series of – passive or active – activities). The way time is allocated, mainly driven by personal wants, attitudes, and needs, but also shaped and limited by age-related issues (poor health, solitude, economic hardship) is likely to influence individual well-being. Each activity has a different personal and social utility level, and older people are expected to spend their time in those activities they evaluate as the most rewarding and meaningful for their role development.

Later life can be characterized by challenges and inconvenient happenings, but it can be a highly productive and rewarding time, depending on an individual's approach to aging (Nilsson et al., 2015). Remaining/getting involved in (voluntary and leisure) activities and encouraging different types of social interactions, thus fostering ongoing stimulation, socialization, connectivity, and sense of belonging is essential for the wellbeing and LF of old people. As described above, several researches have studied the relation between active ageing and wellbeing, but there is an evident and already criticized lack of a common classification of activities to be taken into account in order to test the validity of the activity theory of ageing. Most of those studies cited above use different criteria for classifying activities, based on their level of physical, intellectual, social demand and engagement, on their formality/informality level, on the motivation for the activity.

In addition, even if the benefits of social activities in later life are recognized and confirmed to be associated with higher levels of wellbeing, yet it is unclear whether different types of activity are equally important for the wellbeing of older adults, or for all groups of older adults.

We aim at filling these gaps, by using data from time use diaries, allowing us to have information on how old people spend their daily time, allocating it among several, highly detailed, activities, and considering also whether the importance of the different activities for older people's wellbeing varies according to gender and living arrangement.

In particular, we consider various kinds of activities likely to influence LS. Social activities are considered since they can affect wellbeing by guarantying social connectedness, socio-emotional support, role recognition, sense of belonging); productive activities (and the social roles inherently tied to most of them) may influence wellbeing as they are likely to generate satisfaction with the outcomes reached, economic gains, mental stimulation, sense of purpose and usefulness, self-efficacy or self-esteem (Wahrendorf et al. 2008). Similarly, recreational or leisure activities may affect wellbeing through their intellectual or physical demands, but also through satisfaction in sharing interests with other people.

Our hypothesis is that, such activities can imply/require different levels of social engagement, in terms of interpersonal intimacy or intensity, and that such a degree of social connectedness is likely to be important for subjective well-being too.

Beyond giving the chance to focus on an exhaustive set of daily activities, time use diaries supply information allowing to understand whether the individual is alone or with other people when carrying out each daily activity. In this way it is possible not only to take into account the intrinsic level of social connectedness characterizing each activity, but also to test if the effective level of isolation/integration old people experience when performing activities is associated with lower/higher levels of LS.

In addition, the current study considers also whether there are differences in the associations between life satisfaction and the time spent in various activities and the time spent not alone by gender and living arrangements of individuals: we may expect that, being active, and, in particular, being active in social activities and spending time not alone may have a more relevant role in determining LS, especially when the older adult is in a condition of social frailty, such as that defined by living alone.

Older persons living alone have, indeed, specific characteristics and needs, and, even if they are not necessarily socially isolated, their condition places them in a potential vulnerable position.

Lastly, we can expect that also the potential gender differences in the predictors of LS vary by living arrangements. The more sensitivity of women than men to social relations may, indeed, disappear in the context of older adults living alone, when men do not or no longer have a spouse to take care of the social aspects of life. For example, Gaymu and Springer (2010) found that family network is of importance for men living alone and this may be due to the fact that they have to invest into the familial sphere, traditionally reserved for women.

3. Data and strategy of analysis

This study relies on the most recent Italian Time Use Survey, carried out by ISTAT in 2015-2016. Such data are collected through the use of time use diaries. The diary is a tool used to record, in a detailed way, information on what the respondent did during the survey day. Notably, the respondents are asked to fill the diary by specifying the activities carried out (it is generally possible to include two simultaneous activity records, distinguishing between main and concurrent activity), where and with whom the activity occurred, and the level of satisfaction associated to each activity. The activities of interest are pre-coded so that the respondent is given an exhaustive list of activities to choose among when describing its daily time allocation scheme. The diary is divided in 144 fixed

time intervals, each lasting 10 minutes, and the activity recorded is the one taking the longest time within the 10 minutes interval.

The advantage of such survey data is that they provide detailed information on different dimensions of time use: it is possible to know the time per day individuals spend on major groups of activities, how many individuals participate in each activity, how activities are organized during the day (chronology/sequences of events), by neither neglecting the location, nor the social setting the activity is performed in. Moreover, time use data integrate a broad range of interrelated information, placing the performance of a specific activity within the context of individual lifestyle, as well as relating it to the demographic and socio-economic characteristics of the performer.

In the current paper we select a quite large subsample of 12,247 individuals, aged 60 years and over.

By following activity theory principles we define *activity* as any patterned action or pursuit which goes beyond physical or personal maintenance routine.

Specifically, we are interested in understanding if and to what extent time spent in mere *social activities*, or time spent in other activities but with a certain degree of social engagement, is associated with higher levels of LS in old age.

To this end, we take into account the time old people spend (in minutes) in different activities, by classifying them in:

- Basic/Personal need (split in sleeping, personal care activities)
- Productive Activities (split in paid work, housework, others' care activities)
- Social activities (including volunteering)
- Active Leisure (split in sport, hobbies, cultural activities, transports, eating[2])
- Passive Leisure (including watching TV, resting, reading, listening to music).

Beyond understanding which activity is linked to higher/lower levers of wellbeing, we want to know if performing those activities alone or with other people is significantly associated to LS level. To this end we focus also on the proportion of leisure time spent with other people in a day.

We measure subjective wellbeing with self-reported LS (10 point Likert scale) and use ordinary least squares (OLS)[3] regression models to study the effects of the predicting variables of interest (time use at older age) on LS, by controlling for a series of individual variables.

[2] We include eating among active leisure activities because in Italy food is far from being an ordinary source of nourishment. Mealtimes is a social practice; it constitutes important occasions for individuals not only to enjoy the activities of feeding and eating, but also to nurture relationships that reinforce or modify their social roles.

[3] Although life satisfaction is an ordinal variable which would seem to require an ordinal regression method, the question that measures life satisfaction has 11 response categories on a numerical scale from 0 to 10. When categorical dependent variables have many levels (like in our case) most of existing studies on LS use OLS models, as ordinal regression would be very cumbersome. The debate on the best method to be used is the subject of a great deal of debate as using the OLS model when the dependent variable is ordered results in violations of the basic assumptions OLS is

In order to test the hypothesis at the base of this paper, we run different OLS models:

- A first model (model 1), run on the whole sample, including as covariates the different type of activities, for understanding which of them are significantly correlated with LS;
- In a second model (model 2), we add information on the proportion of daily (social and leisure) activities old people perform in company with other people (regardless if they are friends or relatives), in order to understand whether , beyond the type of activities, their social dimension is significantly associated with LS or not.
- We then split the sample by sex and living arrangement, and run four different models, for understanding if the relation between time spent in different activities and LS at older ages differs among men living alone, men living not alone, women living alone, and women living not alone (models 3-6).

In all the models, control variables include age brackets (60-75, more than 75 years old), geographical area of residence (North, Centre, South), and education (high, medium, low). In the first two models, we also control for sex and living arrangement (alone, in couple, not in couple with other people, in couple with other people).

In addition, we include in the model other variables informing on the social network setting of old people in the sample, and on their general level of social isolation/inclusion. We aim at testing if, beyond the daily involvement in different (more or less) engaging (from a social point of view) activities, having a well-rooted social network to count on in case of need, or to share leisure moments with, is associated with LS levels too. Specifically, we use the frequency of contacts old people have with their friends, a 7-levels-categorical variable (everyday, more than once a week, once a week, less than 4 times a month, sometimes in a year, never, do not have friends). We also consider other eight dummy variables informing whether, in case of need, old people can rely on the help/availability of, respectively, their parents, children, siblings, grandchildren, relatives, friends, and neighbors. We control for two dummy variables on the resort to a paid housekeeper and to a paid caregiver for old people.

As anticipated, our main variable of interest is the time old people spend in different activities. It is measured in term of minutes dedicated to each activity in a day. Figure 1 shows average duration (in minutes) spent by individuals aged more than 60 years, by sex, in different activities all along a 24 hours day, together with the percentage of individual performing each activity (percentage of

grounded on (the OLS estimator does not give the best – BLU – estimates). However, the practical effect of violating such assumptions is minor and sometimes the simplicity of interpreting an OLS outweighs the technical correctness of an ordered logit or probit model. Specifically, there are more than 4-5 categories and the distribution looks quasi-normal, the OLS model gives more or less the same results as the ordered models (same significance levels, same predicted outcomes).

doers). The activities carried out by almost all the people in the sample are those related to the satisfaction of basic needs (personal care and eating), to passive leisure and to housework (that are all commonly performed at home). Both women and men spend about 4 hours per day in passive leisure activities. Conversely, gender differences are remarkable in housework, as women dedicate around 4h30' to housework, while men about half of time. As far as active leisure is concerned, less than 50% of aged Italian people practice sports, hobbies and cultural activities for less than one hour per day (on average), with interesting gender differences in both duration and participation, which are always higher for men than for women, with the exception of cultural activities that are performed more by women. Women spend half of the time in sport and hobbies with respect to men. Interestingly, social activities are performed by men and women in a similar way both in terms of participation (about 60% of the sample) and duration (less than 1 hour a day).

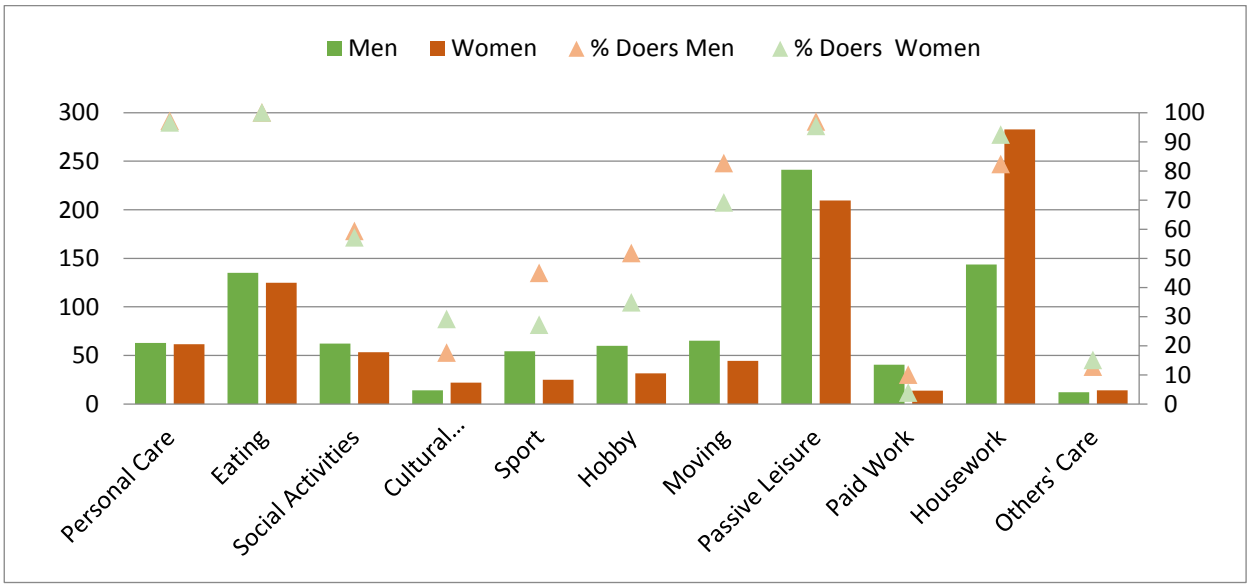

Figure1: Average durations (in minutes – left axis) and % of doers (right axis), by activity and sex

Source: Authors' elaboration on Italian Time Use Survey (Istat, 2014-15)

In order to show how much of each activity is performed alone or not, we computed the percentage of time old individuals spend alone in each activity (Figure 2). Hobbies and passive leisure are for more the most 'solitary' ones, while active leisure activities and of course the mere social activities (by definition) are the most 'social'.

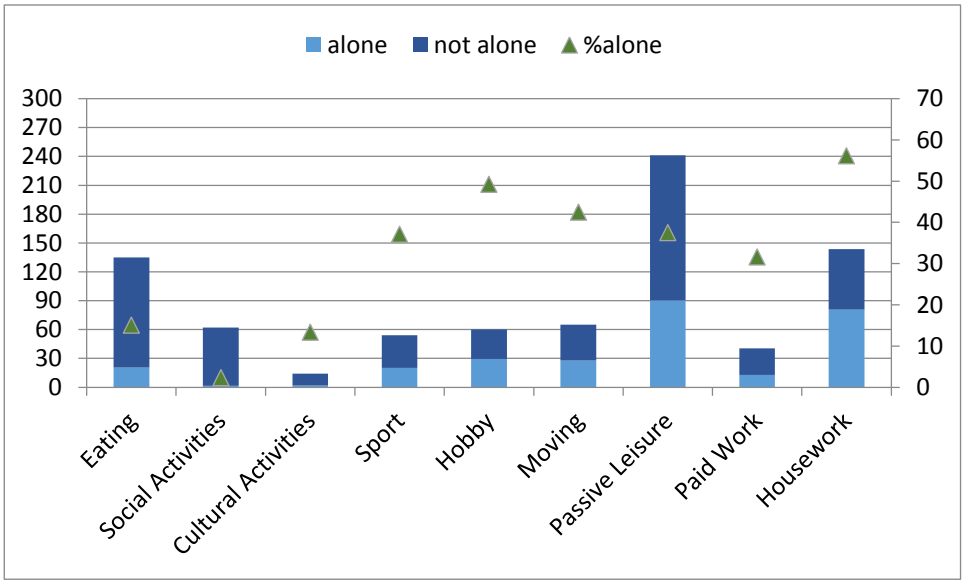

Figure 2: Average durations spent alone and not alone (in minutes – left axis) and % of time spent alone (right axis), by activity

Source: Authors' elaboration on Italian Time Use Survey (Istat, 2014-15)

4. Results

To interpret the results of the models, a premise has to be done. When dealing with time diary data, recording the allocation of time in activities all along a 24 hours day, it is necessary to take into account that the individual daily organization follows some compensation strategies: choosing or been forced to carry out an activity, means to renounce in spending time in other kind of available activities, in a typical trade-off mechanism that, in a strictly economic perspective, could be defined as utility maximization process. In our analysis we choose sleep as the 'reference' activity, as it is the activity all people carry out, and we analyse results by using the following interpretive method: which are the consequences of renouncing to one minute sleeping in favour of another activity on LS?

4.1 Does time spent actively and engaged socially matter for LS in old age?

The first column of Table 1 shows the results of the first model (model 1) run on the whole sample and specifically focused on the association between different activities and LS. When focusing on *productive activities* (regardless if paid or not), it emerges that housework is the most strongly (positively) activity correlated to LS, in terms of magnitude. Conversely, being involved in paid work, even if significant, brings to a very modest increase in LS levels, while the care for the others is not significantly associated to LS. The concept of active aging explicitly assumes that older adults desire to carry out productive activities, even if empirical studies do not provide unequivocal

evidence that old people prefer productive activities (in a market productivity sense) over non-productive ones. Our results confirm that LS in old age is only weakly linked to time spent in productive activities.

Conversely, time spent in all sort of *active* leisure time activities (hobbies, sports, cultural activities) significantly correlates to higher levels of LS in old ages, and the effect is bigger in magnitude than for productive activities. Probably, confirming what found in literature (for example, Mcauley and Blissmer, 2000), practicing sport, exercise or physical activities enhances physical self-efficacy and self-esteem and prevent a wide range of health problems and issues; in this way, old people can achieve not only physical or health-related benefits, but also social and psychological benefits, thus having a positive impact on LS. At the same time, pursuing hobbies and participating in cultural activities give old people the chance to fill their time in a meaningful way, by cultivating personal interests, thus enhancing their cognitive abilities and brain stimulation, and having a positive effect on LS. In the same line of reasoning time spent in transports (moving from a place to another one for carrying out different activities) can be considered as a proxy of a dynamic lifestyle, and it results to be associated to higher levels of LS.

As far as eating is concerned, we included such an activity among active leisure activities because in Italy food is far from being only an ordinary source of nourishment (see footnote 2): mealtimes can be a social practice and can constitute important occasions for individuals not only to enjoy the activities of feeding and eating, but also to nurture relationships that reinforce or modify their social roles. Indeed, in Fig. 1 we showed that among old people this activity is performed alone only in 15% of the cases. Our results confirm that the Italian old people appreciate the mealtime as the relationship between time spent in eating and LS is positive and not negligible in magnitude.

Spending time in passive leisure is significantly correlated to LS, but the relationship is remarkably weaker than for any active leisure pursuits. OLS regression results thus confirm what stated by the activity theory: staying active - but preferably in leisure time - enhances LS at older ages through a series of different mechanisms.

Moving to social activities, we find that spending one hour more in those activities, with respect to sleeping, is associated to an increase (0.147 points) in LS levels (Model 1), and the effect virtually does not change (0.149) when we include in model 2 also the proportion of time spent not alone when performing leisure activities. This means that dedicating time specifically to social relationship is beneficial per se for the LS, and it is much more that simply enjoy the company of someone for some hours in a day. Such a result confirms our hypothesis that social capital, that is, connections among individuals' social networks and the norms of reciprocity and trustworthiness

that arise from them, supports LS and well-being through several mechanisms, favouring sense of belonging, mutual support, role recognition.

In model 2 we added information on the proportion of time spent not alone (when performing leisure activities), with the idea that beyond social activities (that imply social engagement by definition) also other activities taken into account in the present study can imply/require a certain level of social engagement, in terms of interpersonal intimacy or intensity, and that such a degree of social connectedness is likely to be important for influencing subjective well-being. Result confirm our hypothesis: the proportion of daily leisure activities spent with other people is significantly and positively associated to LS, even when we control for those variables generally used for measuring the elderlies' social connectedness (availability of help in case of need and frequency of contacts with friends). The coefficients related to the time spent in different activities which were significant in model 1 continue to be significant: thus not only participation in social activities is important for LS, but also the social dimension of other kind of activities seems to matter.

Table 1. Coefficients of the ordinary least squares regression models for the LS for the whole sample (individuals aged 60 years and over – models 1 and 2)

		(1) Full model 1 b/se	(2) Full model 2 b/se
Time spent in:	Personal Care	-0.036	-0.035
		(0.02)	(0.02)
	Paid Work	0.002***	0.002***
		(0.00)	(0.00)
	Housework	0.133***	0.137***
		(0.01)	(0.01)
	Others Care	0.014	0.015
		(0.02)	(0.02)
	Passive Leisure	0.070***	0.075***
		(0.01)	(0.01)
	Cultural Activities	0.134**	0.129**
		(0.04)	(0.04)
	Hobby	0.143***	0.149***
		(0.02)	(0.02)
	Sport	0.164***	0.164***
		(0.02)	(0.02)
	Transports	0.171***	0.171***
		(0.02)	(0.02)
	Eating	0.163***	0.158***
		(0.02)	(0.02)
	Social Activities	0.147***	0.149***
		(0.01)	(0.01)
Help availability, in case of need, from:	Parents	0.096	0.098
		(0.12)	(0.12)
	Children	0.208***	0.204***
		(0.03)	(0.03)
	Siblings	0.128***	0.126**
		(0.04)	(0.04)
	Grandchildren	0.119**	0.119**

		(0.04)	(0.04)
	Relatives	0.093	0.093
		(0.05)	(0.05)
	Friends	0.077	0.072
		(0.04)	(0.04)
	Neighbors	0.043	0.045
		(0.05)	(0.05)
	Everyday	0.111*	0.111*
		(0.05)	(0.05)
How often seeing friends:	Once a week	-0.039	-0.039
		(0.05)	(0.05)
	Less than 4 times a month	-0.169***	-0.170***
		(0.05)	(0.05)
	Sometimes in a year	-0.342***	-0.341***
		(0.06)	(0.06)
	Never	-0.693***	-0.696***
		(0.06)	(0.06)
	Do not have friends	-0.688***	-0.691***
		(0.10)	(0.10)
Availability of a:	Paid housekeeper	0.018	0.019
		(0.06)	(0.06)
	Paid Caregiver	-0.593***	-0.624***
		(0.07)	(0.08)
Sex	Female	-0.020	-0.030
		(0.04)	(0.04)
Age	60-75 Years Old	-0.053	-0.053
(Ref. More than 75 years)		(0.04)	(0.04)
Education	High Education	0.255***	0.255***
(Ref. Medium Education)		(0.06)	(0.06)
	Low Education	-0.111**	-0.112**
		(0.04)	(0.04)
Living arrangement	Alone	-0.427***	-0.326***
(Ref. In couple)		(0.04)	(0.05)
	In couple + Others	-0.015	-0.012
		(0.04)	(0.04)
	Alone + Others	-0.355***	-0.325***
		(0.06)	(0.06)
Geographical Area	Center	-0.306***	-0.311***
(Ref. North)			
		(0.04)	(0.04)
	South	-0.317***	-0.323***
		(0.04)	(0.04)
	Proportion of time spent not alone		0.195**
			(0.07)
	Constant	5.486***	5.314***
		(0.15)	(0.16)
	r2	0.125	0.126

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2. Do Gender and Living arrangement matter?

In the second step of our analysis, we split the models for testing the hypothesis that different factors could be differently correlated to LS, depending on the sex and living arrangement of old individuals (Table 2).

Our results confirm similar results between the four groups with regard to productive activities (housework and paid work) and to most active leisure pursuits. In particular, it is beneficial for all to dedicate time to their hobbies and to meals. Time spent in playing sports or in transports seems positively correlated to LS in all groups, with the exception of those old men who live alone. Even time dedicated to passive leisure does not correlates with the LS of men living on their own, while has a positive relationship with the wellbeing of the other groups.

Results confirms that time dedicated to social activities is beneficial for aged people's LS, regardless the sex and the living arrangement: the effect is significant for all groups and similar in magnitude. At the same time, interestingly, the proportion of daily activities spent with other people correlates to LS only among men and women who do not live alone. It is possible that for those living alone it is less important to spend a certain amount of time with others, rather than to specifically dedicate time to social relations. One might argue that that mechanisms of resilience to solitude bring people living alone to get used to isolation, or maybe even to love it. In addition, we may suppose also that they develop some forms of socio-emotional selectivity: people living alone increasingly invest in a core group of emotionally intimate network members, and thus in selected smaller and denser ties and networks having greater multiplicity, that is, each social contact provides a greater variety of support types (Carstensen, 1992). If similar mechanisms are in act, it is possible to explain why for people living alone social activities are important for LS, but a greater level of engagement with other people when performing other kind of activities does not make any difference for their well-being.

On the whole, we might state that the results obtained are very similar across sex and living arrangement, with the exception of the group of men living alone whose level of LS seems uncorrelated to most of the variables included in the model. This is a quite interesting result but its explanation is far from obvious: it is plausible that men living alone are a very selected group, and different mechanisms with respect to the other groups considered in the analysis may explain their LS.

Table 2. Coefficients of the ordinary least squares regression model for the LS by gender and living arrangement (individuals aged 60 years and over – models 3-6)

		(3) Men not alone b/se	(4) Men alone b/se	(5) Women not alone b/se	(6) Women alone b/se
Time spent in:	Personal Care	0.001	-0.127	-0.071	-0.030
		(0.04)	(0.09)	(0.04)	(0.05)
	Paid Work	0.002***	0.001*	0.001**	0.002**
		(0.00)	(0.00)	(0.00)	(0.00)
	Housework	0.161***	0.089*	0.110***	0.184***
		(0.02)	(0.04)	(0.02)	(0.02)

	Others Care	0.064	0.114	-0.058	0.108
		(0.03)	(0.10)	(0.03)	(0.07)
	Passive Leisure	0.100***	0.006	0.043*	0.094***
		(0.02)	(0.04)	(0.02)	(0.02)
	Cultural Activities	0.100	0.312	0.061	0.202
		(0.06)	(0.17)	(0.07)	(0.11)
	Hobby	0.150***	0.146**	0.152***	0.157***
		(0.02)	(0.06)	(0.03)	(0.04)
	Sport	0.161***	0.110	0.167***	0.254***
		(0.02)	(0.06)	(0.03)	(0.05)
	Transports	0.159***	0.015	0.165***	0.307***
		(0.03)	(0.07)	(0.03)	(0.05)
	Eating	0.132***	0.163*	0.153***	0.241***
		(0.03)	(0.08)	(0.04)	(0.05)
	Social Activities	0.148***	0.152**	0.124***	0.184***
		(0.02)	(0.05)	(0.02)	(0.03)
Proportion of time spent not alone		0.305**	0.330	0.202*	-0.067
		(0.11)	(0.28)	(0.12)	(0.16)
Help availability, in case of need, from:	Parents	0.031	-0.018	0.222	0.191
		(0.17)	(0.47)	(0.20)	(0.40)
	Children	0.301***	0.056	0.159**	0.222*
		(0.05)	(0.16)	(0.06)	(0.09)
	Siblings	0.194***	-0.027	0.073	0.035
		(0.06)	(0.16)	(0.06)	(0.11)
	Grandchildren	0.096	0.021	0.102	0.134
		(0.08)	(0.18)	(0.08)	(0.09)
	Relatives	0.043	0.074	0.199*	0.005
		(0.08)	(0.21)	(0.09)	(0.13)
	Friends	0.117	-0.106	0.133	-0.021
		(0.07)	(0.17)	(0.08)	(0.11)
	Neighbors	-0.032	0.404	-0.004	0.049
		(0.09)	(0.21)	(0.09)	(0.11)
How often seeing friends:	Everyday	0.134	-0.030	0.200*	0.033
		(0.08)	(0.18)	(0.10)	(0.13)
	Once a week	-0.041	0.052	-0.023	-0.090
		(0.08)	(0.21)	(0.08)	(0.13)
	Less than 4 times a month	-0.205**	-0.176	-0.122	-0.146
		(0.08)	(0.22)	(0.08)	(0.13)
	Sometimes in a year	-0.346***	-0.522*	-0.311***	-0.288*
		(0.09)	(0.26)	(0.09)	(0.14)
	Never	-0.774***	-0.542*	-0.623***	-0.717***
		(0.11)	(0.28)	(0.10)	(0.14)
	Do not have friends	-0.880***	-0.228	-0.689***	-0.650**
		(0.18)	(0.38)	(0.16)	(0.20)
Availability of a:	paid housekeeper	0.078	0.298	0.013	-0.131
		(0.10)	(0.19)	(0.10)	(0.12)
	paid caregiver	-0.737***	-0.954**	-0.655***	-0.297*
		(0.15)	(0.30)	(0.13)	(0.15)
Age (Ref. More than 75 years)	60-75 Years Old	0.045	-0.008	0.038	-0.400***
		(0.06)	(0.16)	(0.07)	(0.10)
Education (Ref. Medium Education)	High Education	0.219*	-0.090	0.337**	0.420*
		(0.09)	(0.22)	(0.11)	(0.18)
	Low Education	-0.086	-0.207	-0.105	-0.121
		(0.06)	(0.15)	(0.06)	(0.10)
Living Arrangement Not Alone (Ref. In couple)	In couple + Others	0.024		-0.091	
		(0.06)		(0.07)	
	Alone + Others - Single	-0.591**		-0.301	
		(0.18)		(0.16)	
	Alone + Others - Divorced	-0.290		-0.504**	
		(0.20)		(0.17)	
	Alone + Others - Widowed	-0.366**		-0.238**	
		(0.14)		(0.08)	

Living Arrangement Alone (Ref. Single)	Divorced		-0.307		-0.208
			(0.20)		(0.18)
	Widowed		-0.287		-0.259
			(0.20)		(0.14)
Geographical Area (Ref. North)	Center	-0.315***	-0.409*	-0.340***	-0.198*
		(0.07)	(0.18)	(0.07)	(0.11)
	South	-0.361***	-0.495***	-0.312***	-0.164*
		(0.06)	(0.15)	(0.06)	(0.09)
	Constant	5.012***	5.944***	5.527***	4.737*
		(0.25)	(0.61)	(0.26)	(0.35)
	r2	0.120	0.125	0.126	0.126

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Conclusions

The way old people allocate their time and make choices about their daily organization is the result of several interacting factors: preferences, interests, needs, health impairments, social and cultural environment, economic resources. Older age is often viewed as a period of losses because of the accompanying physical, sensory, cognitive and social changes. These age-related changes can result in role loss, which in turn could lead to social disengagement and reduced life satisfaction. But, if older people are able (and given the chance) to preserve their roles, life satisfaction may be maintained (Baum & Christiansen, 2005). Successful ageing (Baltes and Baltes, 1990) can thus be considered as the result of using adaptive behaviours to adjust to the changes associated with ageing and remain engaged in a meaningful and fulfilling life. The first objective of this work indeed was to understand how much time spent actively is correlated to LS in older age. and the second focus is on the social dimension of time, with the aim to verify whether participating in social activities as well as spending time with other people, regardless of the type of activity performed, are associated to higher level of wellbeing among older people.

The very detailed data on time use provided by the 2015-2016 Italian Time Use Survey and collected through the use of time use diaries allowed us to consider accurate information on time spent in different activities performed by older people, with the merit of not being influenced by recall problem or by stereotyped answers. Very detailed groups of activities are defined, and whether individuals are alone or with other when spending time in passive and active pursuits is taken into account. Such an approach gave us the chance to shed light on the association between active ageing and wellbeing, by contributing in increasing scientific knowledge on the determinants and consequences of people's use of time at older ages, and also on the conceptualization (and on the measurement) of activity levels in an innovative way.

Results showed that all active pursuits are significantly related to higher levels of LS, confirming what found in literature about activities such as practicing sport, or physical exercise: they enhance physical self-efficacy and self-esteem, with social and psychological benefits, with a positive role

for LS. Similarly, also pursuing hobbies and participating in cultural activities seems to give old people the chance to fill their time in a meaningful way: a clear positive relation with LS is found as well. Also other activities connected with a dynamic lifestyle (for example, time spent in transports) are associated with higher levels of LS. Lastly, also the mealtime , that in Italy can be probably considered more as a social practice than as a mere personal care activity, in it is positively related to LS.

Time dedicated to productive activities seem less important than leisure time for the wellbeing of the old: in particular, paid work is not much influential on LS in late life. Conversely, the time spent in housework is positively correlated to the LS of the Italian old men and woman, who probably give a lot of importance to domestic comfort, as a source of fulfilment.

As regards social activities, confirming our hypothesis, they are associated to an increase in LS levels in all the models estimated: thus, connections among individuals' social networks and the norms of reciprocity and trustworthiness that arise from them, increase LS. The hypothesis that social activities are crucial for successful aging (Lin et al. 1985, 1999; Umberson et al. 1996) is supported by our findings. In fact, the analysis reveals that not only that the mere social activities correlate positively with LS, but also all the activities which imply a certain degree of social engagement (measured by the time spent with other people).

In a second step of our analyses, we consider whether the associations between time spent in different activities and LS vary by gender and living arrangement. Since our reference is a country such as Italy, characterized by a still relatively unbalanced gender system with differences in socialisation processes for men and women belonging to old generations, we could have expected differences in the role of different activities for the LS of men and women. Men and women indeed experience differentiated forms of network and different changes in their social relations during their life course. The socialization processes is likely to reflect gender dispositions originating from social and cultural norms, and therefore defining gendered roles of family and work trajectories. Those differences tend to widen with age, with men being more sensitive to family relations and women to relation with people out of family (friends, neighbours) (Oshio 2012, Cheng and Chan 2006). In fact, results showed that social activities, as well as time spent with other people and time spent in active pursuits are important for individual life satisfaction, regardless their sex.

Conversely, living arrangement seems more influential than gender with regard to factors influencing wellbeing. First, the proportion of daily activities spent with other people is relevant for both older men and women, but only for those not living alone. Is it possible to hypothesize that mechanisms of resilience to solitude bring people living alone to get used to isolation, or maybe even to appreciate it. Second, the LS of men living alone does not seem to be correlated to most of

the variable in the sample. This is a quite interesting results and explaining it is not easy: probably because men living alone are a very selected group, and different mechanisms with respect to the other groups considered in the analysis may explain their LS. It would be interesting to dedicate a specific study to this group of old people to better understand why LS is so inelastic to their time use pattern.

Clearly, due to the cross-sectional nature of the data, it is not possible to know if activity and social relations promote well-being rather than vice versa: in other words, we cannot say, for instance, that participation in social activities promotes higher LS or whether higher LS provides an incentive for being more socially active: only association can be determined. However, the current paper offers interesting and worthwhile suggestions to improve LS of older people. Policies play an important role in such a process. favouring those activities (and factors enabling them) that correlates positively with LS in old ages.

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