





Social participation of older adults in the SABE Study (2010): a latent class analysis according to sex

Eduardo Amorim Rocha¹ 
Yeda Aparecida de Oliveira Duarte² 
Daniella Pires Nunes^{1,3} 

Abstract

Objective: To investigate the social participation patterns of older adults and their differences according to sex. **Method:** A cross-sectional, analytical study of 1,266 older adults participating in the 2010 Wellbeing and Aging Study (SABE) in the city of São Paulo, São Paulo state, was conducted. Social participation was measured using 14 questions, classified based on the taxonomy of Levasseur et al.: socially oriented activities (SOAs), task-oriented activities (TOAs), and social engagement (SE). Latent class analysis was used to identify patterns. **Results:** Four latent groups were identified: class 1 - variability in activities, especially SE; class 2 - variability in both SOAs and TOAs; class 3 - SOAs only; and class 4 - low variability in all activities. Men endorsed competitive activities, avoiding activities associated with the female domain, while the opposite occurred for women. Women exhibit greater variability in socialization activities, possibly reflecting freedom after transitional events that diminish gender roles. Lower social participation among men reflects dependence on work- and family-related interactions. **Conclusion:** There are different patterns of social participation associated with sex-related expectations, which influence the definition of social activities among older adults. Understanding these patterns enables professionals and policymakers to tailor programs and social actions by considering differing preferences according to sex.

Keywords: Aging. Social Participation. Older Adult.

¹ Universidade Estadual de Campinas, Programa de Pós-Graduação em Gerontologia. Campinas, SP, Brasil.

² Universidade de São Paulo - USP, Escola de Enfermagem, Departamento de Enfermagem Médicocirúrgica. São Paulo, SP, Brasil.

³ Universidade Estadual de Campinas, Faculdade de Enfermagem, Área de Enfermagem Médico-Cirúrgica, Campinas, SP, Brasil.

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Correspondence
Eduardo Amorim Rocha
rocha.ea@hotmail.com

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INTRODUCTION

The development of strategies to promote active healthy aging is recommended by the World Health Organization (WHO)¹. Social participation (SP) is one of the pillars toward this objective^{1,2}. Greater SP is associated with the adoption of healthy behaviors, presence of social support, and improvement in physical and mental functioning^{3,4}. Moreover, SP promotes increased trust of individuals in their community and facilitates access to emotional support⁴.

In the older population, the issue is particularly relevant because late life is marked by a decline in SP, partly as a result of changes in roles and social arrangements typical of this stage of life (e.g., retirement, loss of loved ones), as well as changes in physical health⁵. A systematic review showed that the most common SP trajectory is downward, with few studies reporting stability, and fewer still demonstrating increased social participation at advanced ages⁵. In another study, results revealed that two-thirds of the sample exhibited decline in the activities they participated in over time, while only one-third maintained levels of engagement⁶. Factors such as migration, morbidity, and psychosocial aspects underlie this change over time⁶.

Many studies have sought to elucidate the antecedents and outcomes of SP, considered a modifiable factor in aging⁷. Evidence shows that SP influences mental health and functionality in older adults⁷⁻⁹, and is associated with better cognitive levels¹⁰, lower risk of incident disability, and mortality¹¹. Additionally, older adults with greater social participation exhibit lower risk of presenting depressive symptoms⁷, while low SP levels increase this risk¹².

Differences in SP also exist in relation to gender¹³, where participation proves more positive and beneficial for women than men⁸. For females, creating and maintaining social relationships is more central to promoting health-promoting behaviors¹⁴. By contrast, men engage more in work-related activities, while women participate in a broader range of social activities¹³.

In Brazil, SP level is the lowest (8.53%) of the three pillars of active aging (i.e., health, participation,

and security)². Evidence shows the more advanced the age, the lower SP tends to be¹⁵. Brazilian older adults who participate in social activities — clubs, religious groups, community groups, or senior centers — report better perceived health¹⁶. Nationally, the prevalence of social participation also varies widely (17.4% - 89%) depending on the form of measurement, region of the country, and access to community services¹⁶.

Despite being central to active healthy aging, SP has been treated inconsistently in the literature¹⁷ due to differences in concepts determining its measurement and results. For example, the inclusion of paid work in the definition and measurement of social participation in the older adult population may result in lower prevalence, while non-inclusion may have the opposite effect⁵.

Thus, Levasseur et al.¹⁷ systematized the definitions found in the literature and proposed the definition that social participation is a person's involvement in activities that provide interaction with other people in society or the community. In this construct, the authors note that activities may be socially oriented (SOA), task-oriented (TOA), and social engagement (SE).

Although this systematization has contributed to the literature, the measure used by most studies is the sum of participation in different activities, limiting understanding of this phenomenon. This approach disregards the effects of different types of activities on health indicators¹⁸ and precludes understanding of the different patterns of activity adopted by older adults¹⁹.

SP can manifest as single or groups of different activities. The accumulation hypothesis holds that the more a person participates in a task, the greater the chance of participating in others²⁰. The competition hypothesis holds that engagement in some tasks precludes participation in others (e.g., engaging in tasks caring for spouse or grandchildren may prevent participation in recreational activities)²⁰. This information is not reflected when only the sum of activities is taken into account.

Latent class analysis (LCA) allows the identification of different behavioral patterns from observable

indicators²¹. In the context of SP, this analysis allows the identification of patterns among people, pooling them into groups according to their similarities in social activities involved. In the literature, different latent groups of social participation among older adults have been identified²²⁻²⁴. However, these studies reveal high variability in the latent groups identified.

The objective of the present study was to identify the patterns/profiles of social participation among community-dwelling older adults according to sex. Revealing the different patterns of social participation adopted by older adults may offer a new perspective on this phenomenon, capturing its dynamicity. Standardizing the conceptualization of these profiles employing a consolidated theoretical framework will enable comparisons with future studies seeking to elucidate how different clusters of activities adopted by older adults act on health outcomes in a similar or different fashion.

METHOD

A cross-sectional study drawing on data from the Health, Well-being and Aging Study (SABE) was conducted. The SABE study began in 2000, under the coordination of the Pan American Health Organization (PAHO), with the goal of investigating health conditions in the older adult population across seven urban centers in Latin America. In Brazil, the study was conducted in the city of São Paulo based on a probabilistic sample comprising 2,143 participants. From 2006 onward, and only in the São Paulo city, the study became longitudinal with multiple cohorts. New waves of data collection were performed in the years 2006, 2010, and 2015, evaluating 2,143, 1,413, and 1,345 participants, respectively²⁵. The 2010 wave was approved by the Research Ethics Committee (COEP) of the School of Public Health of the University of São Paulo (COEP Opinion No. 23/10). The data were provided by the coordination of the SABE Study, which also approved the execution of the present study.

The current study was based on 2010 data. Participants who failed to provide a response for at least one of the social participation variables were excluded, giving a final sample of 1,266 participants.

Social participation encompassed 14 variables (Chart 1) for evaluating respondent involvement in social activities, based on the theoretical framework of Levasseur et al.¹⁷ Each activity was coded dichotomously (yes; no).

Levasseur et al.'s¹⁷ taxonomy distinguishes each level according to the degree of involvement with others and the main goal of the activities pursued. Within this structure, the concepts of *participation*, *social participation* and *social engagement* are distributed across different levels. The broadest concept, *participation*, encompasses all six levels; *social participation* corresponds to levels 3 to 6; and *social engagement* to levels 5 and 6. The objectives associated with each level and the corresponding concepts are outlined below.

- **Level 1:** Basic-needs oriented, without the presence of other people (i.e., activities that prepare for connecting with others) (Participation);
- **Level 2:** Basic-needs oriented, in the presence of others but without interaction (Participation);
- **Level 3:** Socially oriented (i.e., involving interaction, but not performing another activity together) (Social participation);
- **Level 4:** Task-oriented (i.e., performing activities together) (Social participation);
- **Level 5:** Oriented toward helping others (Social participation and social engagement);
- **Level 6:** Oriented toward society (Social participation and social engagement).

All levels, with the exception of level 1, were represented by at least one indicator (i.e., one social participation variable). Indicators for level 1 were not included because this level involves no social interaction. Although level 2 also entails no interaction, a single indicator was adopted that reflects greater engagement in activities outside the home and situations involving higher social exposure (i.e., travelling outside the city). The indicators were classified according to this taxonomy, enabling the latent groups identified to be distinguished and labeled (Chart 1).

Chart 1. Description of social participation variables according to Levasseur et al.'s taxonomy¹⁷. SABE Study, São Paulo, São Paulo state, 2010.

Description of indicator (adapted from original study protocol)	Classification of indicator according to Levasseur et al.'s taxonomy ¹⁷
Contact by letter, telephone or e-mail	Level 3: Socially oriented – Social participation
Visits friends and relatives	Level 3: Socially oriented – Social participation
Volunteer work outside the home	Level 5: Oriented toward helping others – Social participation and social engagement
Travels outside the city	Level 2: Basic-needs oriented – Participation
Participates in a regular exercise program	Level 4: Task-oriented – Social participation
Invites people to come to their home	Level 3: Socially oriented – Social participation
Goes out with others to public places	Level 3: Socially oriented – Social participation
Participates in organized social activities	Level 4: Task-oriented – Social participation
Engages in handicraft activities	Level 4: Task-oriented – Social participation
Plays board or card games	Level 4: Task-oriented – Social participation
Engages in musical activities	Level 4: Task-oriented – Social participation
Engages in cultural activities	Level 4: Task-oriented – Social participation
Participates in political activities	Level 6: Oriented toward society – Social participation and social engagement
Participates in online chats or uses social networks	Level 3: Socially oriented – Social participation

LCA was used to investigate social participation patterns. LCA aims to identify response patterns in observable indicators, based on the theoretical assumption that a latent variable — not directly measurable — explains these patterns among groups of individuals. Thus, LCA estimates the probability of each person belonging to a given group, based on the similarity of item endorsement patterns²⁶. Unlike variable-centered approaches, LCA adopts a person-centered perspective, seeking to group them according to common latent characteristics. In this study, the analysis was initially applied to the total sample and subsequently performed separately by sex, with the purpose of exploring possible differences in social participation patterns.

To evaluate the model with the best fit, Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and Sample-size-adjusted BIC (aBIC) were used, considering that lower values indicate better fit to the data. Identifying the ideal number of latent classes was carried using the Adjusted Lo-Mendell-Rubin Likelihood Ratio Test, which compares a model with k classes to the previous $k-1$

model, indicating whether the addition of a new class results in significant improvement in fit. A p -value <0.05 suggests that the model with more classes offers better performance. The entropy value was also analyzed, which expresses the degree of separation between latent classes, considered satisfactory for a value >0.80 . Analyses were conducted in R software, using the **poLCA** package²⁶. The chi-square test with Rao-Scott correction was employed for the analysis of differences between classes and sex.

DATA AVAILABILITY

The full dataset underpinning the study results are available upon request from the corresponding author.

RESULTS

The sample comprised individuals aged between 60 and 103 years (mean = 70 years), and more than half of the participants were female (59.9%). Most participants lived with others (84.5%) and reported

having a partner (54.6%). Mean years of education was 5.5 years, ranging from 0 to 21 (SD = 4.4) years. Regarding monthly income, 42.4% of participants reported insufficient income to meet their basic needs.

For the overall sample, models with 1 to 6 classes were estimated, with the 7-class model excluded due to convergence issues, defined as the presence of classes containing less than 5% of the sample. On the analyses stratified by sex, models with up to 7 classes were estimated. The 8-class model among women and the 7-class model among men were not considered because they had classes containing less than 5% of the sample.

The fit indices (AIC, BIC, aBIC), p -values for comparisons of consecutive models, and entropy values are presented in Table 2. For the overall sample, given that the entropy value was below the established criterion (>0.8), the 6-class model was not considered against the other models. Model 4 exhibited better fit values (BIC and aBIC) and was selected as the most adequate due to its better interpretability according to the guiding theory of social participation. For men, the 4-class model had

the lowest BIC value and an entropy value >0.8 , and also represented the model with best interpretability. The 4-class model was also selected for women due to its superior interpretability over model 5, while the other models with 6 and 7 classes contained groups with low representativeness (less than 10% of sample).

The probability of endorsement in each social participation indicator, according to latent group and sex, is presented in Figure 1. The latent groups identified were conceptualized according to the number of items endorsed at each level of the social participation taxonomy. Items where the endorsement probability was >0.5 were considered more strongly endorsed by people in that group.

Statistically significant differences were found between sex and social participation patterns (p -value=0.006). Hence, LCA was performed separately to better identify and characterize groups, Chart 2 presents groups characterized according to the concepts of participation, social participation, and social engagement, and to nature of activities pursued (socialization, task, helping others, helping society).

Table 1. Fit Indices for Latent Group Models based on social participation variables in older adults. SABE Study, São Paulo, São Paulo state, 2010.

Classes	Overall sample (n=1,266)						Women (n= 811)						Men (n= 455)					
	AIC	BIC	aBIC	Entropy	LL	<i>p</i> LRT	AIC	BIC	aBIC	Entropy	LL	<i>p</i> LRT	AIC	BIC	aBIC	Entropy	LL	<i>p</i> LRT
1	22813.51	22885.53	22841.05	1	-11392.76		14412.67	14478.44	14433.98	1	-7192.33		8346.91	8404.60	8360.17	1	-4159.46	
2	14883.40	15032.56	14940.44	0.99540	-7412.70	<0.01	9426.82	9563.07	9470.98	0.99	-4684.41	< 0.01	5356.77	5476.26	5384.22	0.99	-2649.39	< 0.01
3	13574.34	13800.66	13660.89	0.9064	-6743.17	<0.01	8452.74	8659.47	8519.74	0.93	-4182.37	< 0.01	5014.89	5196.18	5056.54	0.88	-2463.44	< 0.01
4	13455.12	13758.60	13571.18	0.8204	-6668.56	<0.01	8388.91	8666.10	8478.74	0.87	-4135.45	< 0.01	4958.43	5201.53	5014.29	0.86	-2420.22	< 0.01
5	13406.51	13787.14	13586.37	0.8148	-6629.71	<0.01	8365.21	8712.90	8477.91	0.81	-4108.61	< 0.01	4941.19	5246.09	5011.24	0.86	-2396.59	< 0.001
6	13373.06	13830.84	13548.13	0.7962	-6597.53	<0.01	8339.55	8757.70	8475.70	0.82	-4080.78	< 0.01	4950.23	5316.94	5034.48	0.86	-2386.11	0.18

Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Sample-size-adjusted BIC (aBIC), Adjusted Lo-Mendell-Rubin Likelihood Ratio Test (*p* LRT), Log-Likelihood (LL).

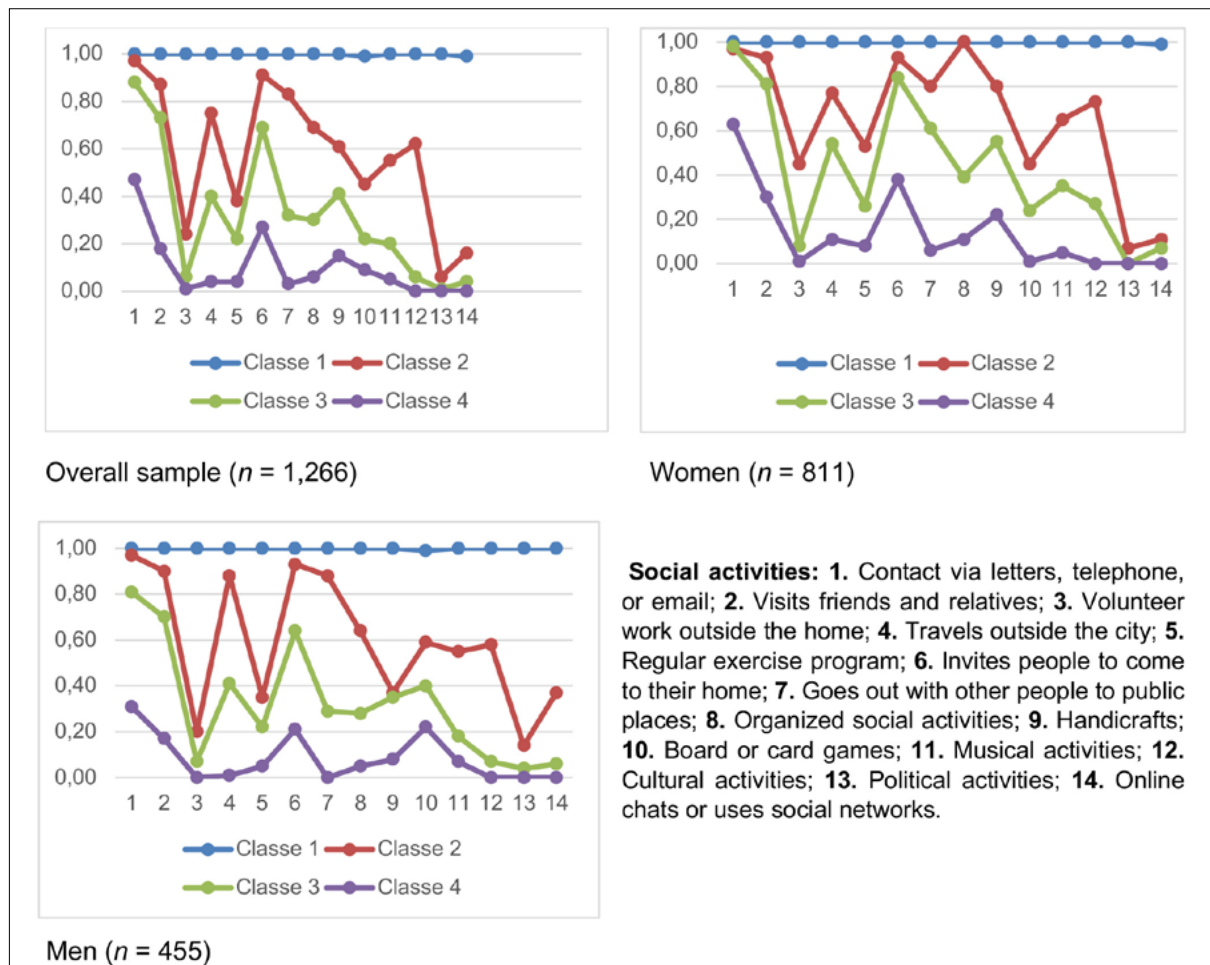


Figure 1. Probability of endorsement in each social participation indicator, according to latent group identified on latent class analysis. SABE Study, São Paulo, São Paulo state, 2010.

Chart 2. Characteristics of latent groups for social participation and sex. SABE Study, São Paulo, São Paulo state, 2010.

Classes	Overall sample	Women	Men
Class 1	High variability of social participation and social engagement (27.65%).	High variability of socialization activities, task-oriented and social engagement (27.25%).	High variability of socialization activities, task-oriented and social engagement (28.35%).
Class 2	Variability for social participation (slightly lower than class 1), absence of social engagement (18.32%).	High variability of socialization activities, except via digital channels; good variability of task-oriented activities, except card and board games . No social engagement (10.85%).	High variability of socialization activities except via digital channels; good variability of task-oriented activities, except exercises and handicrafts . No social engagement (11.21%).
Class 3	Predominantly socially oriented (absence of task-oriented social participation, absence of social engagement) (31.20%).	Predominantly socially oriented, except via digital channels, with participation only in handicrafts as task-oriented activities (29.35%).	Predominantly socially oriented, except via digital channels and in public places (e.g., restaurants or cinema) . No task-oriented participation or social engagement (39.12%).
Class 4	Absence of social participation and social engagement (22.83%).	Low social participation and social engagement (32.55%).	Low social participation and social engagement (21.32%).

For both sexes, class 1 stands out for high variability of socialization and task-oriented activities and social engagement. The general profile of class 2 is also similar across different sexes, where there is variability in participation in task-oriented social activities and variability in means of socialization, except via digital channels. In this class, there were gender specific differences for tasks not engaged in. Women showed endorsement for all tasks, except card and board games, while men showed no endorsement for exercise programs and handicrafts (Chart 2).

The third latent group identified for each sex was also similar overall, and marked by a predominance of activities involving socialization *per se*, with the exception of socializations via digital channels. Specifically for men, there was low probability of endorsement for socializations in public places (e.g., restaurants or cinema). Men in this class did not show high probabilities of endorsement for task-oriented activities, while women exhibited high probability for handicrafts only. Lastly, the fourth class proved similar for both sexes, consisting of participants with low participation and absence of social engagement (Chart 2).

DISCUSSION

The objective of the present study was to identify types of social participation in a sample of Brazilian community-dwelling older adults. Using the latent class analysis (LCA) technique, four classes were identified based on the taxonomy proposed by Levasseur et al.¹⁷ Class 1 included participants with high variability in activities and social engagement. Class 2 exhibited high variability in activities, but to a lesser degree than Class 1, and absence of social engagement. The third class contained people who participated solely in socialization oriented activities, and not in task-oriented activities nor activities whose purpose was change in society (social engagement). The fourth class was characterized by people with low social participation and absence of social engagement.

The four-class model also proved to be the best fit for data in other studies^{19,23,27}. However, the naming of classes differed across studies. The study

by Lestari et al.²³ investigated social relationships comprehensively, including frequency, social support, and employed task-oriented activity indicators only. In the study by Van Hees et al.²⁷, task-oriented activities were grouped into a single indicator, and thus failed to reflect participation diversity.

The use of taxonomy allowed the nature of each pattern to be distinguished qualitatively, proving superior to three-class models generally defined by participation frequency and intensity^{22,24}. In the present study, taxonomy helped distinguish intermediate classes, i.e., those not categorized by broad or low variety of participation. The intermediate groups stand out for absence of social engagement and differ regarding activity variability: one oriented toward socialization activities and another that also includes task-oriented activities. The use of taxonomy and selection of diverse indicators allowed the investigation of the plurality of SP of people beyond the extreme ends of the continuum, facilitating division into two qualitatively distinct classes.

The emergence of a single class with high social participation corroborates the accumulation hypothesis, i.e., people who engage in one social activity tend to also engage in others²⁰. Although the study used no care activity indicators, the frequent formation of a class with low participation may reflect the competition hypothesis (i.e., participation, generally care activities, precludes participation in other types of activity).

After identifying associations between class and sex, patterns of social participation for each sex were investigated. For both sexes, Class 1 was characterized by high variability in SP and the presence of social engagement, and class 4 by low social participation and absence of social engagement. The intermediate classes were structured differently in men and women, revealing specific preferences concerning task-oriented social activities. Thus, these constitute distinct SP profiles with respect to tasks and socializations. In the second group of greater variability in social activities, women endorsed all task-oriented activities, with the exception of card and board games, whereas men endorsed all activities, except handicrafts and exercise.

The sex-based disparities reveal the maintenance, in leisure-time pursuits, of a gender expectation system that determines expectations of males and females. This structure is rooted in a historically constructed process to delimit roles, fostering a power system that favors male domination²⁸. Although contested, this mindset persists in leisure-time pursuits²⁸. Among males, greater endorsement of competitive activities is expected; whereas women are expected to engage in motherhood, care tasks, and passivity²⁸. Thus, women's lower endorsement of card and board games may reflect this delimitation, while men tend to identify aesthetic and expressive activities as pertaining to the female domain, explaining lower endorsement of handicrafts.

The cohort of this study experienced the enactment of laws in Brazil banning engagement in leisure activities deemed incompatible for women (Law No. 3,199/1941), a scenario which may have impacted the way this group perceived these activities. From childhood, the differentiation conferred to sexes encourages men to engage in more physical demanding activities, such as soccer and grappling, while women are encouraged to pursue lighter exercise, such as ballet, dance, and walking²⁸.

Men and women differed regarding adoption of regular physical exercise. This activity was endorsed by women in more than one class, while for men this was constrained to Class 1. The effect of social participation in physical exercise on health outcomes may be stronger for women⁹. This greater sensitivity to the protective factor initiates a feedback process, where the positive effects of social participation in physical activities increase adoption. Thus, the wider adoption of exercise activities by women may reflect the greater benefits experienced by them.

For both men and women, a class formed that participated almost exclusively in socially oriented activities. However, in this group, men endorsed activities in public places to a lesser extent than women. Men typically depend more on women to maintain their SP levels and prioritize family interactions, while women exhibit greater variation in social contacts (i.e., community and friendship domain) and leisure activities¹³.

Women also showed participation in handicraft activities. This disparity may be a reflection of differences experienced after external events associated with this phase of life. Men tend to participate more in work-related social activities and are consequently more susceptible to the changes brought on by retirement²⁹. Women tend to enjoy greater diversity in activities prior to retirement and, therefore, are more resistant to this phenomenon¹³.

Retirement and widowhood are transitional events characteristic of more advanced ages accompanied by different consequences for men and women regarding social participation⁸. While for women widowhood is a transition phase that liberates them from obligations associated with gender roles, thus allowing them to be more innovative in activities they participate in, for men there is a decrease in activities after retirement, as their pattern of engagement is strongly influenced by the provider role¹³.

Moreover, the range of activities offered to women by senior centers is broader³⁰, impacting adhesion of men due to lower interest in these activities¹³.

The findings point to the need for future studies to address the gender variable and gain a deeper understanding of the social construction of social participation in old age. The sex variable, used in the present study, refers exclusively to biological aspects (man and woman), which may be a limiting factor for understanding expectations associated with gender. Another relevant limitation involves the absence of care activity indicators. These activities may determine, albeit partially, availability for engagement in other forms of social participation. Hence, these indicators should be included in future studies investigating social participation profiles.

The use of secondary data restricted the possibility of using a greater number of indicators and prevented their equal distribution across the appropriate levels of taxonomy. Moreover, the temporal cutoff of the sample may mean that some advances in means of social interaction, such as wider use of social networks, are not reflected. Despite these limitations, the study stands out for its grouping of social participation indicators based on the homogeneity of responses, furthering understanding on the profile of

the older adult population by clarifying relationships of this phenomenon according to sex.

CONCLUSION

There are different patterns of social participation and gender expectations determine the social activities of older adults. For the overall and sex-stratified samples, the four-class model had the best fit and interpretability. Men and women are grouped into different social participation profiles. A difference in intermediate classes was evident in terms of preferences in activities adopted, a phenomenon influenced by gender expectations.

Men endorse more activities of a competitive nature, avoiding activities characteristic of females, whereas the opposite holds true for women. Women in intermediate classes show greater variability of socialization activities than men, reflecting liberation from gender roles after transitional changes experienced in later life (i.e., widowhood), whereas men reveal dependence on socializations linked to work and family interactions.

Understanding the different social participation profiles helps to better characterize the preferences

of older adults, informing the creation of programs promoting participation and increasing adherence. The use of this taxonomy to define indicators and social participation patterns in future studies is important to facilitate comparisons. Lastly, investigating different patterns of social participation associated with health outcomes is fundamental in determining whether specific patterns are more or less beneficial for health.

AUTHORSHIP

- Eduardo A. Rocha – Conceptualization, Writing - Original Draft, Writing - Review and Editing, Methodology, Final approval of the version.
- Yeda A. O. Duarte – Project Administration, Validation and Visualization, Conception and design, Writing or critical review, Final approval of the version.
- Daniella P. Nunes – Project Administration, Formal Analysis, Writing - Review and Editing, Methodology, Software, Supervision, Validation and Visualization.

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