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TRENDS IN THE SCIENTIFIC PUBLICATION ON RETIREMENT: A BRIEF REPORT

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ABSTRACT
This study aimed to synthesize the scientific publication on retirement between 1991 and 2015. Analysis were done using the software Iramuteq to systematize papers extracted from Scopus database that included the word retirement (N = 18,362). Results have shown that North American and European countries are among the most productive. Health and economics are the most researched fields and are interconnected by a common interest in public policy. Relevant topics, such as retirement education, were absent from the main results. It is discussed that the number of publications is associated with national investment in research and development and has little relationship with the proportion of elderly individuals. A broader and interdisciplinary research agenda is recommended.

Key words
retirement; literature review; public policy; bibliometrics; semantic analysis

RESUMO
Este estudo teve por objetivo sintetizar a produção científica sobre aposentadoria entre 1991 e 2015. Análises foram realizadas utilizando-se o software *Iramuteq* para sistematizar artigos extraídos da base de dados *Scopus* que incluíram a palavra aposentadoria (N = 18,362). Resultados mostraram que países norte americanos e europeus são os mais produtivos. Saúde e economia são os campos de pesquisa mais pesquisados e estão interconectados por um interesse comum em política pública. Tópicos relevantes, tal como educação para aposentadoria, estão ausentes dos resultados principais. Discute-se que o número de publicações é associado com o investimento nacional em pesquisa e desenvolvimento e tem pouca relação com a proporção de indivíduos idosos. É recomendada uma agenda de pesquisa mais ampla e interdisciplinar.

Palavras-chave
aposentadoria; revisão de literatura; política pública; bibliometria; análise semântica

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TENDENCIAS EN LA PUBLICACIÓN CIENTÍFICA SOBRE JUBILACIÓN: UN BREVE INFORME

Professional life used to last as long as did workers' physical capacity (Thane, 2006). During the second half of the 19th century, Europe witnessed the first large-scale changes in this context, with a growing population of poor and frail elderly individuals unable to work. Starting in England, the first modern retirement modalities spread out to Western Europe, Oceania and North America. In the first half of the 20th century, Latin American countries adopted social security systems containing large discrepancies between contributions and benefits, which would prove to be unsustainable due a fastly aging population (Tuesta, 2011). Social security in Africa is still very limited, excluding mainly women and informal workers (Darkwa & Mazibuko, 2002).

The situations that led to the emergence of retirement – old age and poverty – coexist with new demands that make social security governmental systems unsustainable: between 2008 and 2013, social security was reformulated in 54% of the countries (United Nations; UN, 2015). Quality of life during retirement is threatened by factors such as chronic disease, comorbidities, and impairment (World Health Organization a; WHO, 2015). In addition to financial and health issues, lack of attention to other adjustment predictors, such as leisure and social support, may increase the risks posed to one's quality of life during retirement (Barbosa, Monteiro, & Murta, 2016).

The continued growth of life expectancy around the world indicates a social reconfiguration in which people live longer but not necessarily better (WHO a, 2015). For this reason, WHO developed a plan of action to promote "a world in which everyone can live a long and healthy life" (WHO a, 2015, p. 9) and ensure that the next decade be the Decade of Healthy Aging. It aims to establish evidence and implement evidence-based practices that enable everyone to do the things they value. More specifically, one of the strategic objectives is to conduct research to synthesize evidence on healthy aging. In this context, this study's objective was to synthesize the publication of scientific papers on retirement between 1991 and 2015. This investigation can facilitate the implementation of evidence-based strategies that favor a long and healthy life during retirement.

Method

Data Collection

All publications were extracted from the electronic database Scopus. The search included the following criteria: (1) papers or reviews; (2) published between 1991 and 2015; (3) containing the term *retirement* in the title, abstract or keywords fields. The initial planning also included data from Web of Science; however, differences in type of information provided and database formatting prevented a joint analysis. Scopus was chosen because it contained around half more publications than Web of Science.

Software General Description

Keywords were analyzed using Iramuteq, version 0.7 alpha 2. Its functioning is based on a linguistic model in which the meaning of words results from their organization and distribution throughout a text (Smallman, 2015). Relevant words are identified using grammatical and statistical filters while referring to an internal dictionary. In comparison to traditional content analysis, computer methods analyze more data in less time, reducing sampling and researcher biases. On the other hand, results generated by algorithms can distort the original textual context, overestimate differences between word classes or ignore classes with lower representativeness. To minimize these effects, results should be interpreted according to its original context.

Data Analysis Process

Data analysis followed the method developed by Lahlou and described by Smallman (2015). It was divided into three stages: data collection, modeling and analysis. The text database was prepared for analysis during data collection. During the modeling, filters were chosen to select among active forms (substantives, adjectives, verbs and adverbs) or complementary forms (e.g., pronouns and prepositions), indicating the frequency and significance of words to be extracted. In the analysis step, the automatic categorization performed by the program generated classes of words to be interpreted.

The main categorization is the Descending Hierarchical Classification (DHC), which groups text segments with lexical similarities into a large class. The algorithm compares expected and observed frequencies of words and divides this set into two classes. It repeats this process until establishing two classes that present the largest possible difference between each other. Each class ranks its words based on the strength of the association between the word and the class. CHD was interpreted by assigning meaning to classes or subgroups of words in each class.

Specificity and similarity analyses were also performed. Specificity analysis organizes the text according to variables chosen by the researcher – in this study, year of publication, first author's country, author and journal. Similarity analysis organizes words correlated in the text and produces groups formed by terms that repeat together. To enable a visual representation of results, this analysis considered only the 50 most common words.

Results

Data extraction identified 18,362 records. Only 47% out of this total contained keywords assigned by the authors, while 66% contained indexed keywords, which are assigned by the database. For this reason, indexed keywords were chosen for analysis.

The frequency of publications on retirement in 2015 was 3.9 times higher than in 1991 (Figure 1). This number is higher than the 3.5 times growth recorded in the Scopus' annual publication for the same period, which went from 479,480 to 1,657,210.

Figure 1

Table 1 ranks publication frequency per country, author, and journal. United States ranked first, with 4.6 times more papers than United Kingdom, which ranked second. Among journals, Journal of Gerontology, Series B (interdisciplinary papers) ranked first. According to information provided by the journals' websites, the most common topics are interdisciplinary subjects (n = 9; especially public health, social sciences and psychology) and economic issues (n = 8). Additionally, journals from both fields publish papers addressing public policies. The most productive author was Kenneth Langa, an american physician from the University of Michigan. He researches epidemiology and the impact of chronic diseases on the elderly, especially Alzheimer and other forms of dementia. According to information provided by the authors' or their institutions' websites, impact of epidemiological and psychosocial factors on health ($n \geq 9$) and retirement's economic aspects ($n \geq 8$) are the most common research topics. Authors in the health field, however, report interest mainly on aging, and not on retirement. It suggests that research on health during retirement results from an overlap between retirement and aging.

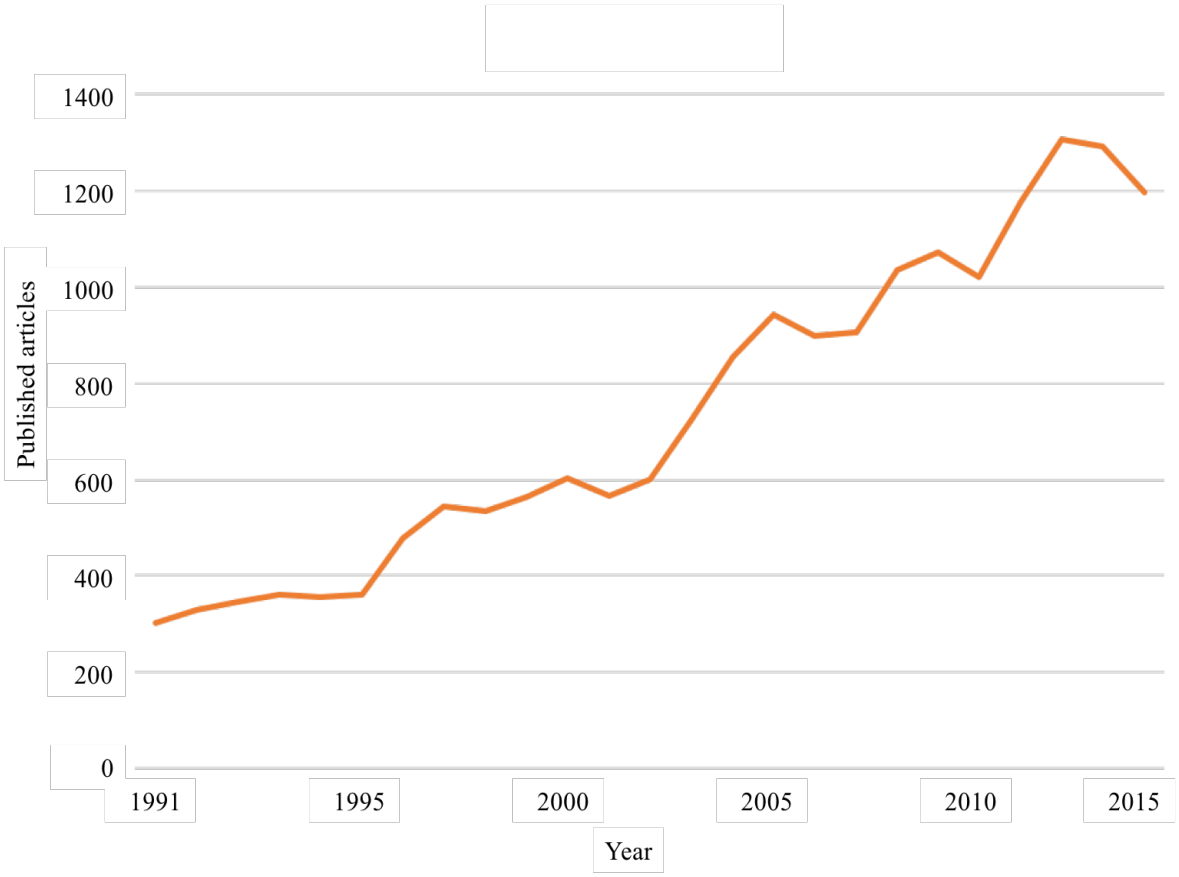

Figure 1. Number of papers and reviews containing the term *retirement* recorded yearly in the Scopus database between 1991 and 2015.

Table 2 presents the 20 most frequent keywords at the first and last years analized. In 1991, a set of words related to the economic aspects of retirement stood out, such as *economics*, *pension, employment*, *organization and management*, *financial management*, *investment* and *health insurance*. In 2015, however, only three terms were related to this group: *economics*, *employment* and *income*. On the other hand, a group of terms related to health and health research stood out. It was composed of *major clinical study*, *controlled study*, *psychology*, *depression,* and *health status*. *Aged 80 and over* also appeared as a common expression, referring to an age group that was absent in the previous classification.

Table 1

Distribution of 20 countries, authors and journals with the highest number of publications on retirement between 1991 and 2015.

Rank	Country	n	Author	n	Journal	n
1	USA	6347	Langa, K.M.	84	Journals of Gerontology Series B Psychological Sciences and Social Sciences	185
2	United Kingdom	1378	VanDerhei, J.	49	Benefits Quarterly	151
3	Germany	961	Henkens, K.	48	Social Security Bulletin	146
4	Australia	815	Copeland, C.	48	Gerontologist	142
5	Canada	755	Glymour, M.M.	43	Ageing and Society	137
6	France	621	Kivimaki, M.	42	EBRI Issue Brief	131
7	Netherlands	459	Vahtera, J.	33	Research on Aging	126
8	Sweden	370	Resnick, B.	33	Journal of the American Geriatrics Society	112
9	Spain	312	Iams, H.M.	31	Journal of Public Economics	96
10	Finland	284	Zins, M.	30	Modern Healthcare	94
11	Italy	283	Fronstin, P.	27	Journal of Aging and Social Policy	86
12	Japan	229	Mitchell, O.S.	27	International Journal of Aging and Human Development	85
13	China	227	Lahelma, E.	26	Journal of Medical Economics	85
14	Denmark	198	Pentti, J.	25	Social Science and Medicine	81
15	Switzerland	196	Schofield, D.J.	25	Journal of Financial Counseling and Planning	76
16	Brazil	177	Avendano, M.	25	Educational Gerontology	74
17	Israel	172	Paganini-Hill, A.	24	Business and Health	73
18	Belgium	143	Goldberg, M.	23	Journal of Aging and Health	73
19	New Zealand	124	Gustman, A.L.	22	Gerontologie Et Societe	72
20	Norway	122	Clark, R.L.	22	Journal of Pension Economics and Finance	69
21			Hank, K.	22		
22			Moore, J.	22		

Table 2

Figure 2 presents the results concerning the DHC of keywords. A semantic overlap between words of different classes is expected because this classification is based on an algorithm. Seven thematic fields emerged: Class 1 – comprises 11.7% of the words and refers to economics and legal aspects including terms such as *legal aspects*, *employee retirement*; Class 2 – comprises 15.4% of the words and refers to biomedical psychosocial determinants including terms such as *smoke*, *hypertension* and *obesity*; Class 3 – comprises 13.6% of the words and refers to occupational health, with the following terms *absenteeism*, *occupational diseases* and *cost of illness*; Class 4 – encompasses 15.4% of the words and refers to sociodemographic determinants, including terms such as *socioeconomics*, *income* and *age*; Class 5 – encompasses 16.2% of the words and refers to psychological/psychosocial determinants, including *psychological*, *adaptation* and *personal satisfaction*; Class 6 – encompasses 16.1% of the words and refers to health systems, including terms such as *physician*, *nurse* and *medical*

education; and Class 7 – encompasses 11.7% of the words and refers to demographic aspects, including terms such as *pension system*, *eurasia*, and *aging population*.

Table 2
Comparison between the most common keywords in publications on retirement published in 1991 and in 2015.

Keyword	1991	Keyword	2015
age	239	age	486
retirement	198	retirement	343
economics	69	major_clinical_study	135
pension	64	controlled_study	106
middle_age	51	statistics_and_numerical_data	93
socioeconomic	45	socioeconomic	83
homes_for_the_aged	44	very_elderly	82
support	37	psychology	78
financial_management	32	depression	76
employment	30	80_and_over	72
organization_and_management	28	health_status	67
age_factors	26	employment	62
insurance	25	adult	62
legal_aspect	24	economics	61
investment	24	questionnaire	58
health_insurance	21	longitudinal_study	55
questionnaire	20	cohort_analysis	52
adult	20	young_adult	52
psychological_aspect	20	income	47
tax	19	risk_factor	47

Figure 3 presents similarity analysis. Two large groups of words clustered around the terms *retirement* and *age*. The group associated with *retirement* refers to economic aspects, such as *economics*, *employment*, *pension* and *income*. The group associated with *age* refers to health aspects and its determinants, such as *major clinical study*, *health status*, *psychological* and *risk factors*.

Class 1:	Legal aspect, employee retirement, health insurance, health benefits, employee, United States, insurance, pension, managed care program, liability.
Class 2:	Major clinical study, controlled study, body mass, smoke, diabetes mellitus, hypertension, obesity, risk factor, prevalence, disease association.
Class 3:	Absenteeism, disability evaluation, occupational disease, work capacity, work disability, major clinical study, cost of illness, occupational health, sick leave, medical leave.
Class 4:	Socioeconomic factors, socioeconomics, health status, income, statistic, age, longitudinal studies, statistical model, health survey, sex factors.
Class 5:	Psychological, adaptation, age, home for the aged, adaptive behavior, psychological aspect, personal satisfaction, housing for the elderly, attitude, human relation.
Class 6:	History, 20th century, physician, manpower, nurse, medical education, medical, attitude of health personnel, personnel management, nursing staff.
Class 7:	Pension system, Eurasia, elderly population, aging population, social policy, Europe, labour market, economic factors, demographic factors, North America.

Figure 2. Thematic classes resulting from the Descending Hierarchical Classification of the indexed keywords.
Note: To facilitate visualization, only the 10 most frequent words in each class are presented.

It is also relevant to identify topics the analysis did not indicate. For instance, research on retirement education – preparing workers to cope with retirement – is socially relevant and highly applicable, but scarce. The expressions *program development*, *educational programs*, and *intervention studies* had a total of only 115 occurrences.

Discussion

The objective of this study was to synthesize the scientific publication on retirement between 1991 and 2015. For that, the publications included in Scopus were selected. The analysis of indexed keywords showed how publications addressing retirement are organized and indicated the main research topics in the field.

The scientific publication of papers on retirement grew at a pace similar to the growth of the general scientific publication. Among the most prolific countries, 14 are located in North America and Europe; only one is located in Latin America (Brazil), while none is located in Africa. This geographical distribution may not be random: there is a correlation of 0.84 between studies addressing retirement and national investment in research and development (UNESCO, 2013). On the other hand, there is a correlation of -0.06 between studies addressing retirement and the relative elderly population (WHO b, 2015). Apparently, studies on retirement reflect the national investment in research rather than the country's social demands. Regions with lower scientific production are vulnerable to the risks of importing knowledge, such as inappropriate cultural adaptations, and its consequences, such as implementing interventions with low cultural sensitivity (Castro, Barrera Jr., & Steiker, 2010). Attending the social demands on retirement and aging with sensitivity will depend on regional scientific policies encouraging the production of knowledge focused on contextual specificities.

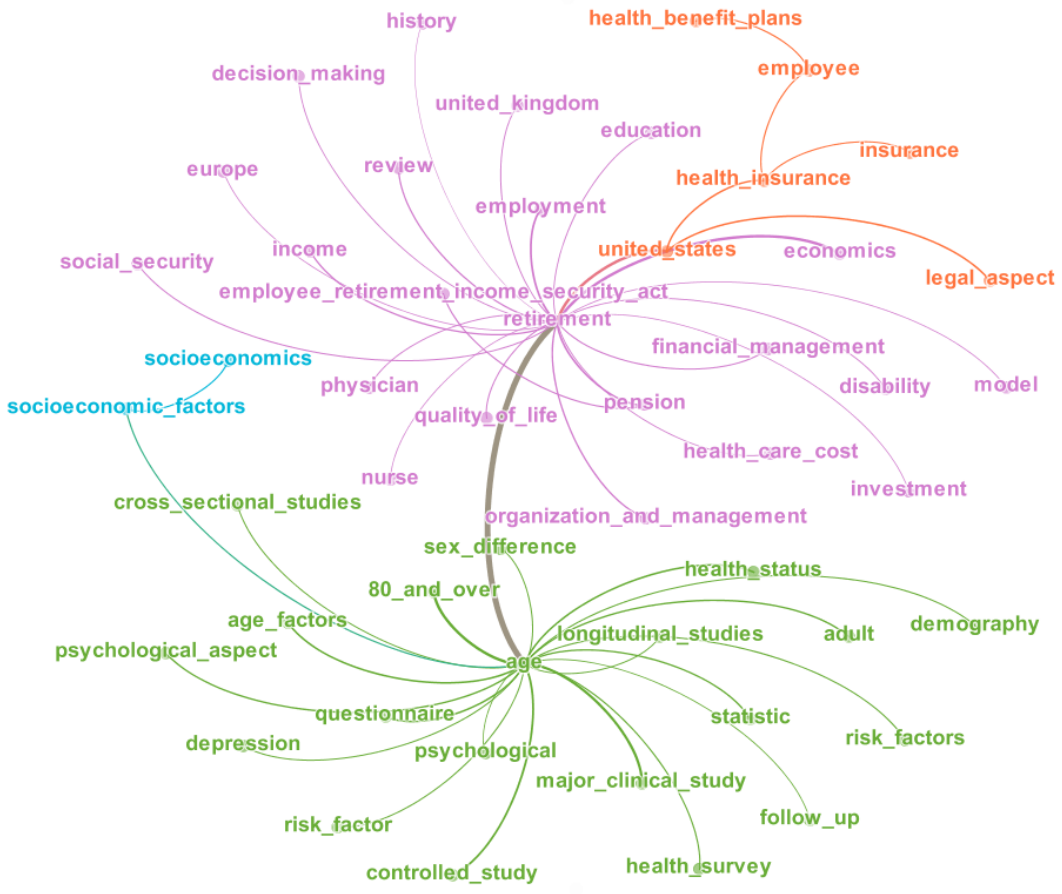

Figure 3. Groups of correlated words identified in the similarity analysis.

In a broader level, the research field on retirement is divided into two large thematic fields: health and economics. After a century and a half, retirement research still focus the same two aspects that led to its emergence in the first place. If one of the goals of WHO's global strategy is helping people "to be able to continue to do the things they value" (WHO a, 2015, p. 12), health and money are important conditions, but not enough (Barbosa et al., 2016). This is the reason why retirement research should be expanded. For instance, preparing workers for retirement is a long existing demand (Lawton, 1941) and can be effective (Leandro-França et al., 2016) but little has been produced about it. Similarly, factors such as leisure and social support, among others, can improve quality of life during retirement (Barbosa et al., 2016), indicating distinct and promising research fields.

This study contributes to the body of studies addressing retirement by organizing knowledge production. Such systematization may ease its use in applied situations and support researchers planning new studies. Research regarding public policies can foster integration between health and studies in economics, optimizing the application of knowledge from each field in order to meet social demands.

Having a map of the knowledge available in the field may promote the development of scientific development tailored strategies.

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