

Purpose in life in adulthood and older adulthood: integrative review

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Abstract *Purpose in life (PiL) is defined as the sense that life has meaning and intentionality, and plays a guiding role in life goals and decision making regarding the use of personal resources. Objectives: to recognize and analyze data on PiL and conditions associated with good aging or with positive adaptation in aging. Method: an integrative review of articles in peer-reviewed journals published in the PubMed/Medline, Scopus, Web of Science, PsycInfo and Scielo/BVS/Lilacs databases was performed using the terms “purpose in life” and “aging” in the title, without temporal restriction. Results: twenty-seven articles were selected, 22 of which were conducted under large prospective longitudinal studies, 3 were cross-sectional studies and 2 were experimental studies. The studies revealed robust associations between high PiL scores and lower risk of death, Alzheimer’s disease, coronary and cerebrovascular diseases, disability, and sleep disorders; high PiL and positive outcomes in health, cognition, emotional regulation, subjective well-being, and sense of adjustment; PiL as a moderator or resilience resource between risks and adversities and good adaptation. These data are useful for research and intervention involving long-lived and vulnerable older persons.*

Key words *Goals, Personal satisfaction, Longevity, Aging*

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Introduction

In the 1980s and 1990s, the study of subjective well-being already attracted the interest of psychologists who were concerned with identifying variables associated with good quality of life in old age. The construct was described as composed of two sets of variables: global satisfaction with life and satisfaction related to positive and negative domains and affect. In 1989, psychologist Carol D. Ryff¹ proposed that these aspects of subjective well-being were hedonic in nature and, although necessary, were insufficient to explain the adaptation of adults and older persons. Referring to Aristotelian philosophical tradition, the author argued that the eudaimonic aspect (eu = good + daimon = talent or potential) should also be considered. The pursuit of personal excellence would be relevant to the continuity of development and to the sense of adjustment of adults and older persons¹⁻³.

Ryff operationalized psychological well-being (PWB) or eudaimonic well-being based on classical theoretical propositions on adult development (life structures/life goals⁴, individuation⁵, personal development/qualities of ego⁶, search for meaning⁷, maturity⁸, self-government⁹, self-fulfillment¹⁰, and executive processes of personality¹¹, life-span theory¹²) and combined qualitative and quantitative strategies in a research program^{1-3,13-15}. This operationalization of PWB occurred through a scale based on six dimensions or factors: self-acceptance, personal growth, autonomy, environmental mastery, positive relationships with others, and purpose in life. In the original version¹, the scale had 20 items in each domain, but subsequent versions produced instruments with 14 or fewer items, with good psychometric indicators of validity^{3,13-15}.

Theoretically, purpose in life (or simply purpose) is one of the two most important aspects to the definition of eudaimonic well-being (the other is personal growth). The construct was defined as a sense that life has meaning, direction and intentionality, and that this sense plays a guiding role in establishing life goals and decision making regarding the use of personal resources. Adults and older persons with a strong sense of purpose have life goals and a sense of direction, they feel that their past and current life is meaningful, and they have beliefs that give meaning to their lives, and have desires and goals that are worth living for¹⁻³. The operationalization of the concept was made by one of the sub-scales of the measure of eudaimonic well-being. The Sub-Scale of Pur-

pose had a first version with 14 items, and other versions with 3, 7 or 10 items^{3,15,16}, but the most used is the one with 10 items¹⁶.

The term Purpose in Life (PiL) also makes reference to another tradition of research and practice, mainly the clinical one, which maintains the notions of directionality and intentionality but adds the concepts of existential meaning, belief in transcendence, and investment in the pursuit of ultimate end of existence. These components are seen as essential to the maintenance of psychological health, especially in life-threatening situations, loss of dignity, suffering and hopelessness, when they act as a resource of resilience, useful to promote adaptation in the face of adversity or of a significant risk^{7,17,18}.

Since the late 1980s, when the Ryff Scale¹⁻³ was made public, research on purpose as an element of eudaimonic well-being grew more systematically and rapidly than research about the sense of meaning in philosophical-religious-psychological terms. Large ongoing longitudinal prospective cohort studies in the United States¹⁹⁻²² and another study in development in Australia²³, started in the 2000s, have included among their objectives the investigation of associations between PiL and aspects of successful adaptation in adulthood and old age.

Research on conditions that help in the adaptation of older persons, as for example PiL, is of particular relevance in developing countries characterized by strong social inequality, inefficient health service networks and social security, and low levels of education and income of the population. Together, these factors determine the accumulation of disadvantages throughout life, which are potentiated by adversities and losses associated with aging. From the theoretical point of view, psychological variables, including PiL, can function as protective factors and as dispositional factors in relation to competence and self-fulfillment, self-care in health, cognition, activity and motivation for social participation. These possibilities are an incentive for conducting research and controlled interventions in samples of Brazilian elderly.

In the present work, PiL in old age it was chosen as object of study firstly because it has been suggested that this variable is likely associated with favorable outcomes in this phase of life. Subjective variables are recognized as important influences on physical and mental health, cognition and participation of the elderly, despite their disadvantages in terms of health or for socioeconomic reasons. Knowledge about the behavior

of this variable among older persons can contribute to the planning of works oriented to the improvement of their psychological well-being. The other reason for this study is that it fills a gap in the production of knowledge about this phenomenon in old age in our country.

Literature reviews are a useful for gathering, relating, and synthesizing data from studies published on a given subject. They aid in the analysis of theoretical knowledge, help to make decisions about further research questions and about the methods to be adopted to answer them, as well as contribute to the planning of interventions relevant to the population. Integrative reviews are less restrictive than systematic reviews and meta-analyses that, based on theories, compare designs and numerical data²⁴. They are well suited to start the empirical investigation of a given phenomenon, when the available theoretical propositions can serve as lenses to observe and intervene in reality.

We planned an integrative literature review with the goal to identify and analyze significant theoretical and empirical information about associations between PiL and conditions related to good aging or positive adaptation in aging.

Method

Integrative literature review is a method that synthesizes relevant information from available research on a given topic, and uses the product of such work to guide the practice and to plan further researches. It is organized in six phases: elaboration of the guiding question and the objective; systematic search through sampling or based on pre-established criteria according to the expected product; data collection; critical analysis; discussion of results; and presentation of the integrative review²⁴.

Articles about purpose in life published in peer-reviewed journals were searched. The articles were indexed in the following databases: Medical Literature Analysis and Retrieval System Online (Medline/PubMed); Virtual Library in Health, Latin American and Caribbean Health Sciences Literature, the Scientific Electronic Library Online (BVS/Lilacs and SciELO); Scopus (Elsevier Science); Web of Science (Thompson Reuters) and the PsycInfo Data Base Record (American Psychological Association), with the descriptors “purpose in life” and “aging”, without temporal restriction. The inclusion criteria were: research articles with sample of adults and older

persons aged 50 and over, published in English, Portuguese or Spanish; articles that had the term “purpose in life” in the title and that adopted the definition of PiL in terms of directionality, intentionality and orientation by goals and objectives that give meaning to the choices and use of individual resources¹⁻³. Articles whose definition integrated philosophical concepts of meaning, ultimate ends of existence, transcendence and religiosity (theoretical criteria) were excluded, as well as reviews and psychometric articles (methodological criteria). Articles that appeared in more than one database were considered only once. The searches were conducted in June 2016 and updated in May 2018.

Results and discussion

The initial search in the databases identified 387 titles that met the specification of the subject and the age of the participants (“Purpose in life” and “aging”). Of these, 87 were selected because they had the term “purpose in life” in the title and 30 were eliminated because they were repetitions. The resulting 57 articles had the abstract, introduction, instruments, and bibliography examined by two evaluators who worked first independently and then together to identify the underlying theoretical approach. A total of 32 articles were selected. They had a definition of PiL that involved the notions of directionality and goal-oriented behavior. Twenty-five articles were excluded because their definition of purpose included philosophical and religious elements. Further, two systematic reviews, one of meta-analysis and two of psychometric nature, were excluded. At the end, 27 articles were kept, read in full length, and used in the literature review. Figure 1 shows the flowchart that represents these actions and their results.

Twenty-two of the studies analyzed had been developed in the context of large longitudinal studies in the United States and one had been conducted in Australia: the Rush Memory and Aging Project (RMAP)¹⁹, the Health and Retirement Study (HRS)²⁰, Midlife Development in the United States (MIDUS)²¹, the Veteran Affairs Normative Aging Study (NAS)²², and the Australian Longitudinal Study of Aging (ALSA)²³. The inclusion of PiL among the measures of interest in these studies created excellent conditions of repetition, which have contributed to the increase of external validity of the results and of internal validity of PiL measures, and have contributed to

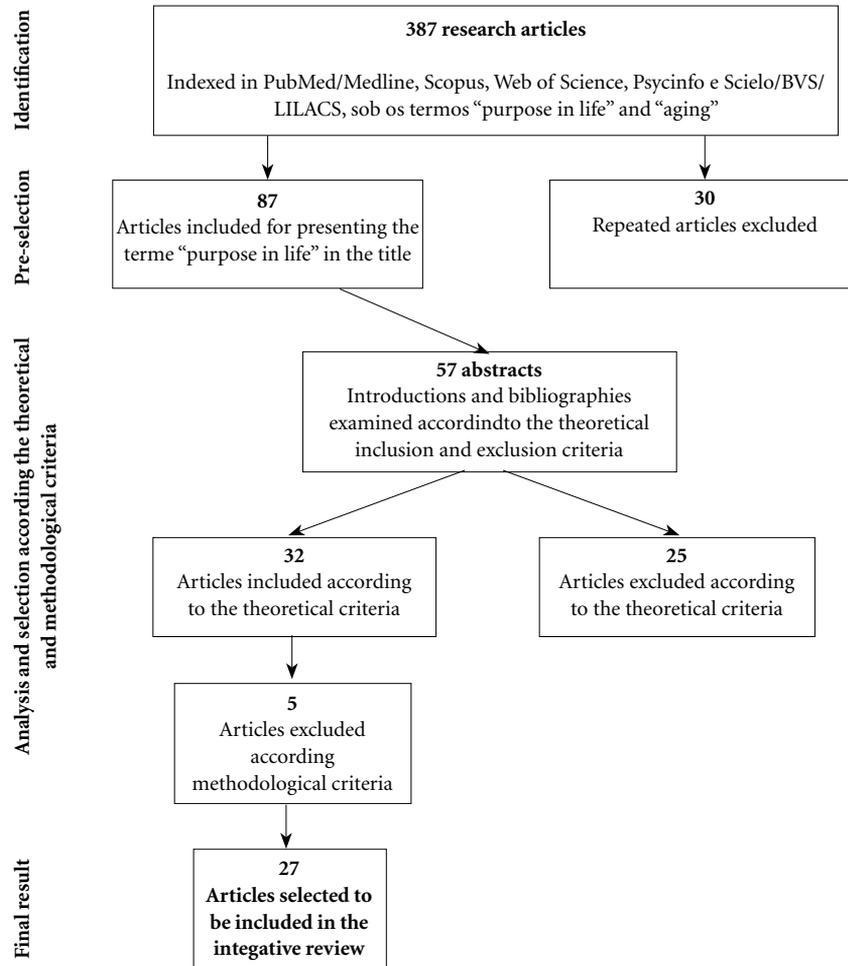


Figure 1. Flowchart of steps of the bibliographic search for the integrative review of the literature about PiL in the aging process. Campinas, SP, 2018.

theoretical advances.

The authorship of the articles is another indicative of integration between the studies. The authors can be grouped into four main blocks, led by researchers associated with longitudinal studies: in the RMAP, Boyle is the first author of four studies^{16,25-27} and coauthor in two^{28,29}; in HRS, Kim is the first author of five publications^{29,31-34}; in the MIDUS, Hill and Turiano are responsible for four studies^{37,39,41,42} and co-authors in two others^{42,52}; and Burrow is the first author of two articles^{36,52}. These and almost all other authors (n = 58 in the 27 articles) form groups with typical production. One article was published in 2009,

two in 2010, one in 2011, one in 2012, three in 2013, four in 2014, six in 2015, four in 2016, two in 2017, and in from 2018.

The Rush Memory and Aging Project (RMAP)¹⁹ is a longitudinal, epidemiological, clinical-pathological, and cohort study that focuses on chronic conditions common in old age, with emphasis on cognitive and motor decline and risk of Alzheimer's disease. From September 1997 to November 2011, 1,556 adults and older persons recruited from retirement communities living in northeastern Illinois, United States, agreed to participate in the study. A total of 1,489 people completed the baseline measures

(73.1% women). The mean age was 80.1 years and the mean schooling was 14.4 years. Among this sample, 1,409 did not present dementia in the clinical evaluation. The study focused on: (a) the relationship between risk factors and incident Alzheimer's disease (AD); (b) incident mild cognitive impairment (MCI) and decline in cognitive and motor functions; (c) the relationship between neurobiological indexes and AD, MCI and cognitive and motor functions; (d) the neurobiological trajectories linking risk factors and clinical phenotypes. Three follow-ups were performed involving *postmortem* neuropathological exams in the brains of the elderly who died.

The Health and Retirement Study (HRS)²⁰ also involved a representative sample of men and women aged 50 and over. It began in 1991 as a longitudinal study of a cohort born between 1931 and 1941 in the pre-retirement period along with their spouses of any age. The sample was expanded in 1993 and 1998. Since then, every six years, a new cohort of people between the ages of 51 and 56 is included. Data are expected to be collected every four years. When a participant dies, an interview is conducted with family members to investigate the circumstances of the death and the socioeconomic conditions. Data on physical conditions, biomarkers, anthropometry, blood pressure, functional capacity, and psychosocial and socioeconomic variables are collected.

The Survey of Midlife Development in the United States (MIDUS)²¹ is a study of national scope. It involved 7,108 participants from 25 to 75 years of age at the baseline, which occurred in 1995 and 1996. The design of this study involves follow-up measures at intervals of 9 to 10 years. The aim is to investigate the role of behavioral, psychological and social factors in determining age-related variations in physical and mental health.

The Normative Aging Study (NAS)²² is a longitudinal interdisciplinary study established in 1961 by the Veterans Hospital Administration (Boston, USA). The cohort consisted of 2,280 men recruited from a universe of 6,000 examined at the beginning of the study, in 1961, when they were between 21 and 80 years of age. Most were white individuals, survivors of World War II and the Korean War. The only inclusion criterion was that they were healthy, i.e. free of any known chronic condition at the start of the study. Follow-ups were performed every 3 years until 1999. The focus of NAS is non-pathological aging, i.e., the relationships between normal aging and the natural history of chronic diseases. The param-

eters came from clinical medicine, biochemistry, the five senses, dental health, anthropometry and behavior.

The Australian Longitudinal Study of Aging (ALSA)²³ included a sample of 2,087 men and women aged 65 years and older at baseline. The study sought to conduct a large prospective population survey whose data could be compared with those produced by studies in the United States. It began in 1992, with older persons randomly selected from Southern Australia's electoral records, stratified by sex, age (five cohorts), and location where they lived. Between 1992 and 2000, six waves of objective measures of successful old age indicators were conducted with respect to health, physical functionality, cognition, affectivity and personality.

The present review also included two studies of a prospective nature, with smaller, non-probabilistic samples, not integrated to the abovementioned longitudinal studies. One investigated the path of changes in PiL in middle-aged adults (n = 163) throughout five measurement waves of the Foley Longitudinal Study of Adulthood⁴⁴. Another study was developed in a rural area of the province of Nara, Japan, with a total population of 6,900 people and looked for data on mortality in older persons who presented disability in IADL (instrumental activities of daily living) and BADL (basic activities of daily living). The participants were all 65 years old and older (n = 1,853) with valid answers in baseline measurements, performed by postal service⁴⁵.

Chart 1 presents information on the authors, objectives, countries, designs and participants of the 27 studies analyzed. In this table and in the following, the articles were first assembled according to methodological criteria (type of design) and, within each type, in chronological order.

The measure of PiL used in 24 of the 27 studies was that constructed by Ryff et al.^{1-3,14,16} to function as one of the six sub-scales of their eudaimonic model of psychological well-being. The other three studies adopted measures compatible with the construct (asking if the elderly believed they had a motive and interests worth to live for)⁴⁵, scale of achievement motives⁴⁶, scale of involvement with life⁴⁷, and scale of achievement of goals⁵⁰. Two studies introduced as an additional measure the full scale of psychological well-being^{1-3,33} and the sub-scale of positive relations with others^{1-3,37,38}. Chart 2 summarizes the variables and measures used.

A range of psychological variables was associated with measures of PiL, including positive

Chart 1. Integrative review of research articles on purpose in life: objectives, designs, and participants. Campinas, SP, Brazil, 2018.

| Authors, year, country | Objectives | Designs and participants |
|---|---|---|
| Boyle et al., 2009 ¹⁶ ; USA | To evaluate the association between PiL, health conditions, and mortality in the elderly. | RMAP and MARS: 1,238 older persons (μ age = 75 ± 7.8) without dementia at baseline (BL), with follow-up 5 years later. |
| Boyle et al., 2010 ²⁵ ; USA | To test the hypothesis that the higher the level of PiL in older persons, the lower is the risk for MCI and AD. | RMAP: 951 elderly without dementia at BL, with 7 annual follow-up measurements, when the levels of incident MCI and changes in cognitive function were also evaluated. |
| Boyle et al., 2010 ²⁶ ; USA | To test the hypothesis that the higher the level of PiL, the lower is the risk of disability occurring in older persons without dementia. | RMAP: 970 elderly without dementia. Baseline measurements and annual follow-ups. |
| Boyle et al., 2012 ²⁷ ; USA | To test the hypothesis that PiL reduces the deleterious effects of pathological changes caused by AD on cognition in old age. | RMAP: 246 participants without dementia at BL with annual follow-ups. |
| Yu et al., 2015 ²⁸ ; USA | To test the hypothesis that higher levels of PiL are associated with lower risk for stroke. | RMAP: 43 elderly without dementia, with annual clinical exams and postmortem cerebral autopsy. |
| Wilson et al., 2018 ²⁹ ; USA | To test the hypothesis that high levels of PiL in ambulatory patients are associated with a lower risk of subsequent hospitalizations. | RMAP: 805 participants initially with μ age = 81.1 ± 6.8 , without dementia. Medicare Records (1999-2010). |
| Kim et al., 2013 ³⁰ ; USA | To investigate the extent to which PiL is associated with myocardial infarction in adults and older persons with coronary heart disease. | HRS: 1,546 participants from the 8th (2006) and 9th (2008) waves; 50 years +, coronary disease at baseline. |
| Kim et al., 2013 ³¹ ; USA | To determine whether PiL is related to reduction of the incidence of stroke. | HRS: 6,379 participants of the HRS who have never had a stroke (50 years and over). Data from the 8th (2006), 9th (2008) and 10th wave (2010) and data on the circumstances of death (of the deceased person). |
| Kim et al., 2014 ³² ; USA | To investigate the associations between PiL and use of preventive services and between PiL and hospitalizations. | HRS: 7,168 participants of the HRS (50 years and +), followed-up for 6 years. |
| Kim et al., 2015 ³³ ; USA | To test the hypothesis that PiL is associated with a reduction in the incidence of sleep disorders. | HRS: 4,144 participants without or with minimal sleep disturbances at baseline (2006) participated in a follow-up study (2010). |
| Kim et al., 2017 ³⁴ ; USA | To evaluate whether a high level of PiL in older patients with good physical functioning is associated with a lower risk for low grip strength and slow gait. | HRS: Follow-up measurements (2006 and 2010); μage men = 70.8 ± 6.5; μage women = 63.0 ± 8.2. |
| Schaefer et al., 2013 ³⁵ ; USA | To test whether PiL is associated with better emotional recovery after exposure to negative stimuli. | MIDUS II: Experimental study with a sub-sample from 2006 (n = 584). Randomized presentation of 90 figures with positive, negative and neutral emotional stimuli and attention task randomly interrupted by distractors. |
| Burrow et al., 2014 ³⁶ ; USA | To test the moderating role of PiL among negative affections in daily life and current, past and future satisfaction. | MIDUS II: Secondary data analysis of 1,745 participants (μ age = 56.51 ± 12.08). |

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Chart 1. Integrative review of research articles on purpose in life: objectives, designs, and participants. Campinas, SP, Brazil, 2018.

| Authors, year, country | Objectives | Designs and participants |
|--|---|--|
| Hill, Turiano, 2014 ³⁷ ; USA | To investigate whether PiL promotes longevity in adulthood and old age. | MIDUS: 6,163 adults and elderly individuals aged 20 to 75 years (μ age = 46.9 \pm 12.9), followed-up for 14 years. |
| Zilioli et al., 2015 ³⁸ ; USA | To investigate the prospective associations between PiL and allostatic load over 10 years. | MIDUS II: 985 adults and older persons participating in the Biomarker Sub-Study conducted at the time of the second wave of this study (μ age 46.14 \pm 11.7). |
| Hill et al., 2016 ³⁹ ; USA | To examine PiL as a predictor of family income and net worth. | MIDUS: 7,108 participants recruited in 1995-1996 and reassessed in 2004 (MIDUS I) and 2006 (MIDUS II) 25 to 74 years of age; μ age = 46.5 \pm 13. |
| Lewis et al., 2017 ⁴⁰ ; USA | To test the associations between PiL and episodic memory, executive functioning, and global cognition. | MIDUS II: 3,489 participants (μ age = 56.3 \pm 12.27, varying from 32 to 84 years, with complete records of PiL and cognitive measures). |
| Hill et al., 2018 ⁴¹ ; USA | To examine whether adversities experienced in childhood and adolescence predict a decrease in the sense of PiL in adult life and in old age. | MIDUS II: 3,385 participants (2005-2006) with complete information on sociodemographic data, adversities before age 18, and PiL in MIDUS I. |
| Hill et al., 2015 ⁴² ; USA | To know the characteristics of men with greater chance to present a high level of PiL and a decrease in PiL over time. | NAS: 587 elderly from the 2003 (μ age = 74.1 \pm 6.2) and 2006 (n = 386) follow-ups. |
| Windsor et al., 2015 ⁴³ ; Australia | To examine associations between individual differences in the sense of PiL and well-being indicated by health, cognition and depressive symptoms. | ALSA: 1,475 participants (μ age = 77.06 \pm 6.27) evaluated in 6 moments (1992 to 2010). |
| Ko et al., 2016 ⁴⁴ ; USA | To examine changes in PiL over 5 years. | FLSA: Exploratory study with 163 participants (μ age = 56.37 \pm 1.00) (from the 5 waves). |
| Tomioka et al., 2016 ⁴⁵ ; Japão | To investigate the relation between maintenance of pleasurable hobbies and PiL with mortality and declining independence 42 months later. | Prospective data of older persons aged 65 years and over, with an increased risk of death (n = 1853), a decline in BADL (n = 1254) and IADL (n = 1162). Mortality analysis between 2011 and 2014. |
| Sano, Kyougoku, 2015 ⁴⁶ ; Japão | To test the model of structural relations among achievement motive, PiL, social participation and role expectations. | Descriptive cross-sectional study: 281 elderly (μ = 77.1 \pm 8.7). |
| Polenick et al., 2018 ⁴⁷ ; USA | To investigate associations between PiL of caregivers and care recipients and the emotional and physical difficulties of caregivers. | Descriptive cross-sectional study: 315 spouses (65 years +) caregivers of partners with functional disability (μ marriage time = 42.75 \pm 17.81). NSOC and NHATS. |
| Hooker, Masters, 2016 ⁴⁸ ; USA | To examine the relationship between PiL and level of physical activity measured by an accelerometer. | Descriptive cross-sectional study: convenience sample (n = 104; μ age = 35.5 \pm 15.5, varying from 18 to 80 years). |
| Mak, 2011 ⁵¹ ; USA | To examine the relationship between goal compliance and PiL, as reported by people with dementia. | Experimental study: 91 elderly (μ age = 75.28 \pm 9.23); 46 assigned by lot to the experimental group (EG) that carried out an artistic activity oriented to the goal. Participants of the control group (CG) made a creative drawing of their choice. |
| Burrow et al., 2014 ⁵³ ; USA | To explore the association between PiL and comfort of living in contexts with ethnic diversity. | Three studies with white adults, one of them experimental: 1) investigation of the level of PiL and comfort with ethnic diversity; 2) exposure to demographic projections; and 3) essay on demographic projections (EG) or neutral theme (CG) + test of comfort with ethnic heterogeneity. |

affections and emotional self-regulation in laboratory situation³⁵; evaluations of current, past and future satisfaction, which would protect the PiL of adults and older persons who have high and stable or increasing satisfaction and would

negatively affect those with decreasing levels of satisfaction³⁶; locus of control in health³⁸; personality factors such as neuroticism (negative correlation with PiL), optimism and organization (positive correlations with PiL)^{16,42,43}; depressive

Chart 2. Integrative review of research articles on purpose in life: variables and measures. Campinas, SP, Brazil, 2018.

| Authors, year, country | Variables and measures |
|---|---|
| Boyle et al., 2009 ¹⁶ ; USA | Inability for BADL; depressive symptoms; neuroticism; self-reported illness; vital status; and mortality. |
| Boyle et al., 2010 ²⁵ ; USA | Identical measures to the previous study plus evaluation of the size of the network of social relationships and frequency of interactions. |
| Boyle et al. 2010 ²⁶ ; USA | Inability for BADL; mobility; health, neurological and neuropsychological measures; cognitive and psychosocial aspects. |
| Boyle et al., 2012 ²⁷ ; USA | Self-report of physical exercises; genotyping for Apo 4; pathological changes associated with AD assessed by postmortem neuropathological examination of brain structures. |
| Yu et al., 2015 ²⁸ ; USA | Current clinical and postmortem neuropathological examination of brain structures made by examiners who were blind to previous information. |
| Wilson et al., 2018 ²⁹ ; USA | Secondary Medicare data on ambulatory care sensitive conditions which can help prevent hospitalizations; annual measures of cardiovascular risk conditions, depressive symptoms and sociodemographic information. |
| Kim et al., 2013 ³⁰ ; USA | Self-reported health; medical records; smoking, physical activity, alcoholism, BMI, obesity and blood pressure; use of medication, high blood pressure, high cholesterol, diabetes, hospitalization; optimism and positive affections, anxiety and hostility, depression. |
| Kim et al., 2013 ³¹ ; USA | Hypertension, diabetes, blood pressure, BMI and coronary diseases; functional capacity for IADL and BADL; depression, anxiety, hostility, negative affection, optimism, positive affection and social participation. |
| Kim et al., 2014 ³² ; USA | Use of health services; depression, anxiety and negative affection; religiosity and positive affection. |
| Kim et al. 2015 ³³ ; USA | Psychological well-being 1-3; Sleep disorders; anxiety and depression; physical exercises; alcoholism and smoking; self-reported illnesses, self-rated health and disabilities. |
| Kim et al., 2017 ³⁴ ; USA | Measurement of grip strength in Kg f measured by a dynamometer; gait speed indicated by time (s) to travel 2.5 m in usual pace. |
| Schaefer et al., 2013 ³⁵ ; USA | Positive and negative affections and subjective well-being; age, number of blinks, and time between the psychological measures and the experiment. |
| Burrow et al. 2014 ³⁶ ; USA | Perceived change between satisfaction 10 years ago and at the present moment, and about the expectation of satisfaction within the next 10 years; daily telephone interviews (8 days) on the experience of 14 negative affections and on the number and intensity of stressors experienced in the previous day. |
| Hill, Turiano, 2014 ³⁷ ; USA | Positive relationships with others 1-3; positive and negative affections; mortality and survival time since the beginning of the study. |
| Zilioli et al., 2015 ³⁸ ; USA | Cardiovascular function, lipid and glucose metabolism, chronic inflammation, sympathetic and parasympathetic nervous system activity, hypothalamic-pituitary-adrenal axis; locus of control, positive and negative affections and positive relationships with others 1-3. |
| Hill et al., 2016 ³⁹ ; USA | Personality (traits; 5 factors); one item evaluating satisfaction with life; net worth and family income values. |
| Lewis et al., 2017 ⁴⁰ ; USA | Cognitive test battery applied through telephone calls (immediate and delayed recall of word list, fluency, digits in reverse order, numerical series, counting, self-reported health). |
| Hill et al. 2018 ⁴¹ ; USA | Indicators of adversities before age 18 (4 items for physical abuse, 4 for emotional abuse, 3 for poverty, 3 for home arrangement, and 2 for health at age 16). |

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Chart 2. Integrative review of research articles on purpose in life: variables and measures. Campinas, SP, Brazil, 2018.

| Authors, year, country | Variables and measures |
|--|--|
| Hill et al., 2015 ⁴² ; USA. | Personality (traits; 5 factors); questionnaire on health concerns. |
| Windsor et al. 2015 ⁴³ ; Australia. | Mobility, subjective health and depressive symptoms; information processing speed; episodic memory. |
| Ko et al., 2016 ⁴⁴ ; USA. | Personality (traits; 5 factors) and productivity. |
| Tomioka et al. 2016 ⁴⁵ ; Japan | One item evaluating whether older persons had a reason to live and pleasurable hobbies (PiL indicator); independence in BADL and IADL; alcoholism and smoking, number of diseases, cognition and depression. |
| Sano, Kyougoku, 2015 ⁴⁶ ; Japan. | PiL assessed by a scale of commitment to life/ optimism; mastery over self; depressive symptoms; positive affections; self-reported physical exercises. Objective measures of time, intensity and daily caloric expenditure in activities measured by means of an accelerometer, 3 days a week. |
| Polenick et al., 2018 ⁴⁷ ; USA. | PiL indicated by scoring of scale of achievement motive in rehabilitation; perceived economic condition, out-of-home activities and hobbies; social participation; scale of role expectations. |
| Hooker, Masters, 2016 ⁴⁸ ; USA. | One item on PiL applied to caregivers and care recipients; for caregivers: measures of care tasks, available supports, participation in valued activities, age, health, sex and schooling; for care recipients: physical health and cognition. |
| Mak, 2011 ⁵¹ ; USA. | Tenacious Goal Pursuit scale; measure of PiL associated with experimental activity; measure of severity of dementia and cognitive status through telephone interviews. |
| Burrow et al., 2014 ⁵² ; USA. | Questionnaire about the perceived change between satisfaction 10 years ago and at the present moment, and between this and the expectation of satisfaction within the next 10 years; daily telephone interviews (8 days) on the experience of 14 negative affections and on the number and intensity of stressors experienced in the previous day. |

symptoms^{16,27,43} that correlate negatively with PiL; social participation, role expectations and achievement motive, whose correlations with PiL are positive³⁷.

However, neither the advancement of age nor any other sociodemographic variables protected the participants of the study reported by Hill et al.⁴¹ from the deleterious effects of experiencing adversities before the age of 18, suggesting that there is a limit to the performance of subjective variables of a motivational nature, such as PiL. Purpose in life tends to decline with age⁴², reflecting the effect of losses associated with aging or social prejudice in relation to the provision of opportunities of achievement for older people. However, there appears to be a dispositional pattern of PiL which is stable and tends to persist for relatively long periods regardless of age⁴⁴.

It was interesting to note that, with exception of age in some investigations, sociodemographic variables proved to be weak predictors of PiL. This data suggests that the phenomenon integrates a dimension that can be called structural or inherent to the human being, a notion that

finds support in the theoretical foundations⁴⁻¹¹ of the eudaimonic model^{1-3,14-16} of psychological well-being in which PiL is inserted. The fact that older persons with a moderate level of dementia were able to respond to the sub-scale of purpose and were affected by the level of PiL strengthens this idea. Something that may have contributed to this result is the generally high educational level of participants in the American, Australian, and Japanese studies. In the study by Hill et al.³⁹, income and net worth were significantly associated with PiL in the baseline measures and in subsequent follow-up measures, weakening the idea of PiL as a basic human need. These seemingly conflicting data need clarification. Data from Brazilian adults and elderly people with different levels of schooling and income and with different cognitive conditions from those observed in the countries of origin of these surveys may contribute to the debate.

The most impressive data observed in the set of studies analyzed concern the association between high level of PiL and better cognitive function, even despite the presence of neuropatholog-

ical alterations typical of Alzheimer's disease, as well as slower evolution of AD and MCI incidents and slower rhythm of cognitive decline in the presence of high level of PiL²⁷. These data suggest that PiL promotes gains in neural reserves that protect the brain from the deleterious effects of changes associated with AD. Most of the physiological systems of the body, including the brain, withstand a considerable level of damage before presenting clinical manifestations of deficit²⁷.

Lower risk for AD in individuals with high PiL and statistically significant associations between high PiL scores and cognitive functions were also documented^{25,40,43}. Adults and older persons with high PiL and good levels of global cognition and cognition in domains usually are more often involved in activities; they are competent in allocating time, energy and resources to reach their goals and usually invest more in their own health, which are conditions that benefit cognition. Further, there are relationships between PiL and reduced levels of inflammatory factors, such as IL-6 receptor, and between PiL and greater resistance to stress and better immune function, which are influenced by the indicated factors⁵³. Individuals with good biomarkers, low allostatic load, and more cognitive resources invest more personal resources in goals that benefit the acquisition of new repertoires and subjective well-being^{38,40}.

The second set of data that draws attention in the literature sample analyzed concerns the capacity of PiL to predict mortality. The studies of Boyle *et al.*¹⁶, Hill and Turiano³⁷, Windsor *et al.*⁴³ and Tomioka *et al.*⁴⁵ assumed survival and mortality as dependent variables. In the first study, high PiL was associated with a higher probability of survival; the second indicated a higher risk of death for male, older and less educated elderly people and those who scored low on positive relationships with others and PiL; the third showed an increase in age as a risk factor for mortality and an increase in the PiL score as a predictor of survival; the last, associated low PiL scores with mortality and with decline in IADL and BADL. The biological bases of the association between PiL and mortality are unknown, but it is believed that high levels of PiL contribute to the functioning of multiple biological systems, protecting them from the deleterious effects of diseases and other adverse health conditions, using the same reasoning presented with regard to the incidence and progression of AD and MCI.

Studies of the potential of PiL to predict stroke and myocardial infarction, which are themselves predictors of physical and cognitive impairment,

is one of the preferred goals of clinical practice and research, hence the importance of data reported by Yu *et al.*²⁸ and by Kim *et al.*^{30,31}. According to the authors, high PiL scores are associated with lower risk for stroke and for myocardial infarction. There are two possible explanations for the associations between PiL and stroke. First of all, PiL can help by promoting healthy lifestyles. Second, PiL may be directly implicated in neuroendocrine functions, for example levels of salivary cortisol, epinephrine and norepinephrine, which are related to subjective well-being. Another possible mechanism includes the action of inflammatory markers, such as C-reactive protein, IL-6, and tumor necrosis factor alpha. Third, PiL relates to several other psychological constructs, such as sense of coherence, sense of control, resilience, and optimism. It is a component of psychological well-being and a potentially modifiable factor promoting healthy aging^{28,31}.

The simple absence of negative psychological status and traits such as anxiety, hostility, depression and negative affections is insufficient to explain or prevent the occurrence of myocardial infarctions. Protein mechanisms may travel along biological (e.g. promoting better immune system function and better regulation of HDL levels), behavioral (e.g., optimism, positive emotions, self-efficacy, and problem-focused coping) and social (e.g., positive social relationships and participation in community affairs) trajectories, all of which are associated with high levels of PiL³⁰.

High levels of PiL were associated with a lower risk of disability in BADL and mobility, regardless of sociodemographic variables, fragility, cardiovascular risk, vascular diseases, depression, neuroticism, and social networks²⁶. In the study by Kim *et al.*³⁴, each additional point in PiL was associated with a 13% decrease in the risk of developing low grip strength and with 14% decrease in the risk of presenting slow gait. There is insufficient data linking PiL and physical functions. Relationships are believed to be based in part on indirect effects (e.g., through health behaviors), and in part on direct effects (e.g., through change in biological functions). Thus, people with high levels of PiL are more proactive in health care, have better impulse control, and are more likely to engage in healthy activities. They have a better level of regulation of the physiological systems associated with physical functions (e.g., fewer inflammatory markers). These conditions mediate the relationship between PiL and functional capacity³⁴.

Windsor *et al.*⁴³ and Tomioka *et al.*⁴⁵ confirmed these associations with similar data. Zili-

oli et al.³⁸ observed better conditions to cope with stressors during a 10-year follow-up of elderly with high level of PiL. These advantages probably reflect and explain the occurrence of positive health assessments in the presence of high PiL levels^{42,43}.

High PiL in elderly patients in outpatient care predicts lower hospitalization rates than intermediate levels of PiL²⁹. Further, higher PiL is associated with a greater probability of engaging in measures of self-care in health³². Unlike the positive effects related to higher scores on PiL, lower scores predict sleep disorders³³ and other negative outcomes²⁹ (Chart 3).

The cross-sectional studies involved convenience samples and focused on theoretical questions^{46,47} and validity of physical activity measures in relation to PiL⁴⁸. One of the three experimental studies analyzed involved a sample of MIDUS³⁵ and was guided by the theory of social-emotional selectivity. According to the theory, aging implies an adaptive decline in intensity, variability and reaction time related to emotional expression, as well as a decline in the ability to discriminate signs of negative emotions in photographs and speech. The decline would be protective by allowing the elderly to save physiological resources to invest in selected domains, such as cognition. At the same time, elderly people retain the ability to perceive facial expressions of fear, even in photographs of crowds, possibly because of their adaptive value for the species⁴⁹. The intervention was important because it documented the possibility of intervening in PiL or in conditions associated with it. The second was guided by the notion of goal-oriented behavior as a fundamental strategy for the management of external and internal stressors⁵⁰. Such a notion is inherent in the concept of PiL, but the novelty of the study was to test the possibility of communication with older persons with dementia regarding PiL and to effectively know if PiL affects their behaviors. Both endeavors were successful, providing important data to interventions with adults and older persons with dementia⁵¹. The third experimental study was different from the others due to the sensitive theme, attitudes regarding ethnic diversity in relation to other affective variables, including PiL, and cognitive variables⁵². The study was a relevant attempt to test the possibility of intervening in these conditions, in favor of society (Chart 4).

Final considerations

We performed an integrative review of literature on PiL that aimed to carry out the analysis of a sample of articles selected by theoretical and methodological criteria. In the decision to select articles that include the term in the title, we intended to focus on studies considered significant in the contexts in which they were produced and published. The vast majority of articles analyzed worked with secondary data or with sub-samples from large studies conducted in the United States, within the tradition of longitudinal studies. All are pioneers in the relationship between PiL and numerous biological, psychological and social variables indicative of good adaptation in old age.

The aging of the population and the increasing longevity in Brazil associated with normative and non-normative changes that occur in old age call attention to conditions of risk to adaptation, which generate the need to study variables that favor the well-being of the elderly and successful aging. Among them, the most important are those that can be modified, as for example psychological or eudaimonic well-being and one of its components, the purpose of life. For these reasons, the ultimate objective assumed by this work is to offer researchers and health professionals an analysis on relevant aspects of this construct, which can assist them in decision making during interventions.

In short, the data analyzed indicate that the tendency to extract meaning from life experiences and to have a sense of intentionality and direction can guide the behavior, contributing to successful aging. Adults and older persons with high levels of purpose in life, whose work is oriented by goals in life, face aging better, invest more in self-care and in developing their own skills, engage more socially, and tend to participate in meaningful activities. People with a higher level of purpose have a more positive view of aging and of their lives.

People with higher levels of PiL tend to be more resilient and their active pursuit of goals is likely to increase their goal-oriented strength and the efficiency of their biological systems. PiL is associated with numerous known psychological states and traits that can provide good health, such as optimism, self-efficacy, and absence of depression. It is associated with behaviors compatible with health preservation such as healthy eating, and regular physical activity, and avoidance of risks such as heavy alcohol consumption or smoking.

Chart 3. Integrative review of research articles on purpose in life: results of interest of the longitudinal studies. Campinas, SP, Brazil, 2018.

| Authors, year, country | Results of interest |
|---|---|
| Boyle et al., 2009 ¹⁶ ; EUA | Mortality: 12.2%. High PiL score was associated with a greater chance of survival (OR = 0.60, 95% CI 0.42-0.87, $p < 0.001$). Negative correlations between PiL and depressive symptoms, disability and neuroticism; positive correlations between PiL and income. |
| Boyle et al., 2010 ²⁵ ; EUA | In this study, 16.3% developed AD. Regardless of depressive symptoms, neuroticism, social network size and number of chronic diseases, high levels of PiL were associated with a lower risk for AD (OR = 0.48, 95% CI 0.33-0.69, $p < 0.001$); elderly people with high PiL scores were 2.4-fold more likely to remain without AD. High PiL score was associated with a lower risk of MCI (OR = 0.71, 95% CI, 0.53-0.95, $p = 0.02$) and a slower rate of cognitive decline. |
| Boyle et al., 2010 ²⁶ ; EUA | High levels of PiL were associated with a lower risk of disability in BADL (OR = 0.60, 95% CI 0.45-0.81), IADL (OR = 0.56, 95% CI 0.40-0.78) and mobility (OR = 0.61, 95% CI 0.44-0.84), without differences caused by demographic variables, cognition, depression, social networks, neuroticism, fragility, cardiovascular risk and vascular diseases. |
| Boyle et al., 2012 ²⁷ ; EUA | Association of high levels of PiL with better cognitive function, even in the presence of neuropathological alterations and accumulation of beta-amyloid protein plaques. Among people presenting AD and high levels of PiL, the disease progressed more slowly. Significant interactions between level of PiL and depressive symptoms, social network size, number of diseases, level of physical activity, number of people with Apo 4, time since onset of AD, and death. |
| Yu et al., 2015 ²⁸ ; EUA | Macroscopic infarctions in 154 (34%) and microscopic infarctions in 128 (28.3%) older persons. The higher the PiL level, the lower the risk of having one or more macroscopic infarctions (OR = 0.780, 95% CI = 0.495-1.229). |
| Wilson et al., 2018 ²⁹ ; EUA | In 4 years, 2,403 hospitalizations occurred (442 with primary diagnosis, 1,322 with secondary diagnosis, 279 with no diagnosis for outpatient care, and 233 were not hospitalized; high baseline PiL and during follow-up were associated with a 25.3% lower risk of hospitalization than a moderate level of PiL, an effect not observed among patients not recommended for outpatient care. Chronic diseases and socioeconomic status reduced, but did not eliminate the association of PiL with hospitalization. |
| Kim et al., 2013 ³⁰ ; EUA | Higher PiL levels were associated with a lower risk of myocardial infarction in the subsequent 2-year follow-up (OR 0.73 95% CI 0.57-0.93, $p = 0.01$). The association remained even with adjustment for the severity of the coronary disease, self-assessment of health, sex, alcohol use, BMI and blood pressure. |
| Kim et al., 2013 ³¹ ; EUA | The higher the PiL score at baseline, the lower is the probability of stroke during the follow-up. At each standard deviation of increase in PiL, an adjusted risk ratio of 0.78 for stroke (95% CI, 0.67-0.91, $p = .002$) was recorded. |
| Kim et al., 2014 ³² ; EUA | Each point in PiL was associated with a higher probability of performing cholesterol tests [OR = 1.18, 95% CI = 1.08-1.29] or colonoscopy [OR = 1.06, 95% CI = 0.99-1.14]; mammography (OR = 1.27, 95% CI = 1.16-1.39); Pap smear examination [OR = 1.16, 95% CI = 1.06-1.28]; and prostate examination [OR = 1.31, 95% CI = 1.18-1.45]. Each additional point in PiL led to 17% less nights in the hospital [RP = 0.83, 95% CI = 0.77-0.89]. |
| Kim et al., 2015 ³³ ; EUA | A total of 1326 participants developed sleep disorders between 2006 and 2010. In the multivariate analysis, each additional point in PiL was associated with an OR = 0.84 for sleep disorders (95% CI = 0.77-0.92), regardless of sociodemographic variables. The other variables attenuated, but did not eliminate the influence of PiL. |

it continues

PiL acts as a significant protection factor in relation to mortality; cardiovascular and cerebrovascular diseases; cognitive changes compatible with AD and MCI; functional limitation and immobility; hospitalizations; and other negative health outcomes. It is relatively little affected by sociodemographic variables. It is stable through-

out the ages, in adult life and in old age. Although it is a promoter of successful development and aging, the scope of its action to modify and prevent risks associated with aging is limited by the process of decline in more advanced old age.

Purpose can be improved by engaging in meaningful activities such as leisure, educational,

Quadro 3. Revisão integrativa de artigos de pesquisa sobre propósito de vida: resultados de interesse dos estudos longitudinais. Campinas, SP, Brasil, 2018.

| Authors, year, country | Results of interest |
|--|--|
| Kim et al., 2017 ³⁴ ; EUA | After adjusting for sociodemographic variables, each additional point in PiL was associated with a 13% decrease in the risk of developing low grip strength (95% CI = 1% -23%) and 14% decrease in the risk of developing slow gait (95% CI = 8% -20%). Associations with gait time were maintained for all co-variation models, but associations with grip strength did not reach an acceptable level of significance after adjusting for health factors, depressive symptoms, and baseline health behaviors (RR = 0.91, 95% CI = 0.80-1.04). |
| Schaefer et al., 2013 ³⁵ ; EUA | High PiL level assessed in the previous 2 years predicted a better recovery from exposure to negative stimuli indicated by the number of blinks, even with adjustments for initial reactivity to the stimulus during presentation of figures, gender, age, positive and negative affections, and subjective well-being. |
| Burrow et al., 2014 ³⁶ ; EUA | Hierarchical analysis of conglomerates resulted in three profiles: 1. Continuously high satisfaction (n = 439); 2. Rising satisfaction (n = 1,033) and 3. Declining satisfaction (n = 274), with participants with the highest levels of negative affections in daily life. Older persons in conglomerates 1 and 2 had lower levels of negative affections than those of the 3. |
| Hill, Turiano, 2014 ³⁷ ; EUA | The participants who died (569) were older, male, the less educated, with low PiL level and less positive relationships with others. At each standard deviation of increase in PiL, the risk of dying in the next 14 years decreased by 15%. |
| Zilioli et al., 2015 ³⁸ ; EUA | Higher PiL levels at baseline predicted lower levels of allostatic load 10 years later, even with adjustment of other psychological factors potentially associated with allostatic load. PiL was a strong predictor of individual differences in health-related control locus, which was partially related to allostatic loading. |
| Hill et al., 2016 ³⁹ ; EUA | Participants with higher levels of PiL had higher initial levels of family income and net worth, and were more likely to improve these conditions in the 9-year follow-up, moderated by age rather than sex. |
| Lewis et al., 2017 ⁴⁰ ; EUA | High PiL score was associated with high scores in memory, executive functioning, and global cognition, regardless of sociodemographic variables. Age did not moderate the relationship between PiL and cognition. |
| Hill et al., 2018 ⁴¹ ; EUA | PiL correlated negatively with all indicators of adversity, with the exception of family structure and health adversity. Adversities before age 18 were associated with lower levels of PiL in adult life, regardless of sociodemographic factors. Age did not protect against the negative effects of exposure to adversity. |
| Hill et al., 2015 ⁴² ; EUA | Fourteen percent (14%) of men declined more than one standard deviation in PiL. PiL levels in 2003 correlated negatively with age and positively with self-reported health and with 5 personality factors, but none predicted changes in PiL in 2006. |
| Windsor et al., 2015 ⁴³ ; Austrália | Individuals with a high sense of PiL had lower levels of disability, better performance in speed and memory tests, better self-reported health, and fewer depressive symptoms. Each additional point in PiL led to 4% decrease in the risk of death (OR 0.96, 95% CI [0.94, 0.97]). Age was associated with increased risk of death (OR = 0.69, 95% CI [0.62, 0.78]). |
| Ko et al., 2016 ⁴⁴ ; EUA | The majority had high and stable scores in PiL throughout the 5 years; low scores were also stable. Personality and black race predicted high levels of PiL (effect size = 0.42 and 0.25, p = 0.008 and 0.003). |
| Tomioka et al., 2016 ⁴⁵ ; Japão | A total of 248 elderly died, 119 declined in BADL and 178 in IADL. Absence of pleasurable hobbies or PiL were associated with increased risk of death (OR 2.08; 95% CI 1.47-2.94), decline in BADL (OR 2.74; 95% CI 1.44-5.21), and decline in IADL (OR 1.89; 95% CI 1.01-3.55). |

philanthropic, social, cultural or family activities. Even small behavioral changes can contribute to a greater sense of purpose, usefulness and relevance. Interventions focused on the improvement

of PiL in the elderly can contribute to strengthen neurological and cognitive reserves, the sense of control, competence and goal-oriented behavior. They may be of great value in attenuating, de-

Chart 4. Integrative review of research articles on purpose in life: results of interest from descriptive cross-sectional studies and experimental studies on PiL. Campinas, SP, Brazil, 2018.

| | |
|---|---|
| Sano, Kyougoku, 2015 ⁴⁶ ; Japan | Positive correlations between roles of friend, lover and participant of an organization and achievement motive, social participation, and role expectations. Direct effect of achievement motive on PiL (0.445; $p < 0.001$); indirect effect mediated by social participation or role expectations (0.170; $p < 0.001$); total effect on PiL = 0.615. |
| Polenick et al. 2018 ⁴⁷ ; USA | The higher the PiL of caregivers, the less are the physical and emotional difficulties of care. PiL of the care recipients was not associated with the emotional difficulties of the caregivers, but the association between the PiL of caregivers was moderated by the PiL of care recipients. The PiL of caregivers was responsible for reducing their emotional difficulties. The PiL of care recipients did not influence the level of physical difficulties of caregivers. The gender of the caregivers did not affect the associations. |
| Hooker, Masters, 2016 ⁴⁸ ; USA | PiL was positively associated with movements objectively measured by an accelerometer, regular practice of moderate and vigorous physical activity, self-report of physical activity; the associations were not dependent on sociodemographic variables. PiL was positively correlated with optimism, mastery over self, and positive affections, and negatively correlated with depressive symptoms. Absence of relations with the two measures of physical activity. |
| Schaefer et al., 2013 ³⁵ ; USA (*) | High level of PiL assessed in the 2 previous years revealed a better recovery from exposure to negative stimuli, indicated by the number of blinks, even with adjustments for the initial reactivity to the stimulus during the presentation of figures, sex, age, positive and negative affections and subjective well-being. |
| Mak, 2011 ⁵¹ ; USA | Both bivariate and hierarchical regression analyses showed statistically significant relationships between PiL measurements, which were not moderated by the level of severity of dementia. Those who completed the goal-oriented activity perceived more PiL in the activity than those who completed the non-goal-oriented activity. |
| Burrow et al., 2014 ⁵² ; USA | In all three studies, high PiL levels had a positive effect on comfort with diversity and attenuated the feelings of threat resulting from exposure to projections of increased ethnic diversity. The effects persisted even when adjusted for positive affections and perceived connections with different ethnic groups. |

(*) Deliberately included in Box 3 as a longitudinal study and in Box 4 as an experimental study.

laying, and slowing down the rate of cognitive decline and the development of morbidity and disability in old age.

Increased longevity among Brazilian elderly imposes challenges to society and aging individuals. The possibility of loss of physical and cognitive capacities and of experiencing individual

and family adversities increases in advanced old ages. Gerontological research should produce knowledge about variables that can contribute to healthy longevity. PiL stands out as a significant marker of physical and mental health, with potential to guide innovative gerontological interventions.

Collaborations

CC Ribeiro worked directly on the planning, research, execution and final writing of the manuscript; MS Yassuda contributed to the conception, writing, guidance and final revision of the text and AL Neri contributed to the conception, writing, guidance and final revision of the text

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