Catarina Filipa Silva Alves

Elderly development: Perceived cognitive performance, activities of daily living and leisure activities

Universidade Fernando Pessoa
Faculdade de Ciências Humanas e Sociais

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Dissertation presented to Universidade Fernando Pessoa as part of the requirements for the Master's degree in Clinical and Health Psychology, under the guidance of Professor Rute Meneses

Abstract

The development of the elderly can be characterized through several dimensions. The present study assesses three of those: perceived cognitive performance, Instrumental Activities of Daily Living (IADL) and leisure activities.

Perceived cognitive performance can be defined as the person's perception of what he/she can do, in this case, the elderly person's perception of his/her cognitive abilities and functions.

IADL are activities that allow a person to be independent in his/her daily life and maintain his/her social role in society. The following can be considered instrumental activities: planning and cooking one's own food, riding public transport or driving without difficulty, using cash and administering own medication.

Leisure activities are activities that allow a person to relax, rest, have fun through hobbies, are practiced in the person's free time, in which there is no relationship with professional positions, nor is a reward expected. In this study, the following activities were considered: reading, watching television, listening to music, walking, gardening, doing horticulture, knitting, playing cards and chatting with friends.

That said, and in view of the objectives of the study, this dissertation is organized in two articles. The first had as objectives: to characterize the sample's perceived cognitive performance and IADL performed; and to analyze the relationship between these two variables. The second article aimed to characterize the leisure activities performed by the sample and to analyze the relationship between perceived cognitive performance and leisure activities.

In this study, 203 people between 60 and 100 years old participated. The participants answered to a Sociodemographic and Clinical Questionnaire, the ESI-55 Cognitive Function Scale, the Lawton-Brody Scale and the Leisure Activities Index, in person or through Google Forms. Data was collected from different sites, institutions, hospitals, and online.

The results suggest that the participants show a good perception of their cognitive performance, they are moderately dependent when it comes to IADL, and they don't practice a lot of the leisure activities presented, or at least with a lot of frequency. Also, it can be seen that there are

relationships between perceived cognitive performance and IADL performed, as well as between perceived cognitive performance and leisure activities performed. These results can show a small part of the development of the elderly in Portugal.

Keywords: Elderly; Perceived cognitive performance; Instrumental activities of daily living; Leisure Activities

Resumo

O desenvolvimento dos idosos pode caracterizar-se por várias dimensões. O presente estudo avalia três delas: desempenho cognitivo percecionado, atividades instrumentais de vida diária e atividades lazer.

O desempenho cognitivo percecionado pode ser definido como a perceção da pessoa sobre o que consegue fazer, neste caso, a perceção do idoso sobre as suas capacidades e funções cognitivas.

As Atividades Instrumentais de Vida Diária (AIVD) são atividades que permitem a uma pessoa ser independente no seu dia-a-dia e manter o seu papel social na sociedade. As seguintes podem ser consideradas atividades instrumentais: planear e cozinhar a própria comida, andar de transportes públicos ou conduzir sem dificuldade, usar dinheiro e administrar a própria medicação.

As atividades de lazer são atividades que permitem a uma pessoa relaxar, descansar, divertir-se através de passatempos, são praticadas nos tempos livres da pessoa, em que não existe uma relação com cargos profissionais, nem é esperada uma recompensa. Neste estudo foram consideradas as seguintes atividades: ler, ver televisão, ouvir música, passear, fazer jardinagem, fazer horticultura, fazer tricô, jogar cartas e conversar com os amigos.

Dito isto, e tendo em conta os objetivos do estudo, esta dissertação é organizada em dois artigos. O primeiro tinha como objetivos: caracterizar o desempenho cognitivo percecionado da amostra e as atividades instrumentais de vida diária realizadas; e analisar a relação entre estas duas variáveis. O segundo artigo visou caracterizar as atividades de lazer realizadas pela amostra e analisar a relação entre o desempenho cognitivo percecionado e as atividades de lazer.

Neste estudo participaram 203 pessoas entre os 60 e os 100 anos. Os participantes responderam a um Questionário Sociodemográfico e Clínico, à Escala de Função Cognitiva ESI-55, à Escala de

Lawton-Brody e ao Índice de Atividades de Lazer, presencialmente ou através do *Google Forms*. Os dados foram recolhidos de diferentes sítios, instituições, hospitais e online.

Os resultados sugerem que os participantes mostram uma boa perceção do seu desempenho cognitivo, são moderadamente dependentes quando se trata das AIVD, e não praticam muitas das atividades de lazer apresentadas, ou pelo menos com muita frequência. Além disso, pode ver-se que existem relações entre o desempenho cognitivo percecionado e as AIVD realizadas, bem como entre o desempenho cognitivo e as atividades de lazer realizadas. Estes resultados podem mostrar uma pequena parte do desenvolvimento dos idosos em Portugal.

Palavras-chave : Idosos; Desempenho cognitivo percecionado; Atividades instrumentais de vida diária; Atividades de lazer

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Life brings a lot of difficult moments, very hard obstacles to get through, but with those come important people that will help along the way, and for them I'm grateful.

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Introduction

Introduction

The increase of the older population is due to better living conditions, such as the quality of nutrition, ability to treat diseases, scientific discoveries, and due to the decrease in birth rates (Ordem dos Psicólogos 2015).

Aging has been a topic of great interest for some time, due to the growth of the senescent population and the importance of its specificities. The Instituto Nacional de Estatística (2020) shows that the elderly population, will increase between 2018 and 2080, from 2.2 to 3.0 million in Portugal.

The aging process can be characterized in several ways, through several theories, due to all its multifactorial characteristics. Using only age to characterize aging is not enough to explain its process, since saying that a person is older only after 65 years old does not take into account all other psychosocial and socioeconomic characteristics (Netto, 2013). That said, aging can be seen as a phase of life, as well as childhood and adolescence, however, unlike these, the beginning of this phase is perceived through loss of functionality, social status and economic status (Netto, 2013).

There is a need to study aging, in a multidisciplinary way, based on different theories and approaches, which seek an in-depth explanation of the specificities of the aging process (Neri, 2013). As mentioned before, the number of the elderly population is increasing, therefore it is crucial to study and understand all its consequences, effects and variables involved in this age group, as well as the physical, psychological and social conditions that are associated with senescence (Netto, 2013). There is a need to design studies on gerontology due to the importance of the aging process and all that it entails, so that it is possible to have an in-depth explanation of the experience of the elderly, what they go through during their daily life and their relevance in society (Netto, 2013).

Age is characterized by significant changes in a subject's life, physical, biological, economic and social changes (Dardengo & Mafra, 2018). Furthermore, aging demonstrates the decrease of essential capacities for the person's autonomy, becoming more dependent on others, in order to perform basic tasks of daily living (Fechine & Trompieri, 2012).

There may be a cognitive decline, which may be different from person to person, as it is subject to educational, social, health, intellectual and cognitive aspects (Fechine & Trompieri, 2012).

When approaching aging, one must also take into account the culture in which one is inserted, the values of society, the economic and political state of the country, as the definition of this concept can be changed if one thinks about these aspects, giving the notion that aging is a process of continuity and evolution (Rodrigues & Soares, 2006).

In the present study, although the main interest is in a normative aging process and not focusing on the losses of aging, it is normal for individuals to have some kind of cognitive deficit, some loss of self-care capacity and dependence in activities (Apóstolo et al., 2011). Therefore, cognitive aging researchers believe that it is necessary to investigate and create interventions with the aim of preventing cognitive decline and/or maintaining its functioning (Kelly et al., 2017). Many of the factors that influence this maintenance are social factors, interpersonal relationships and the lifestyle that the person has had throughout his/her life cycle (Kelly et al., 2017). Clearly, this cognitive decline, the inability to maintain interpersonal relationships, perform activities that the person wants, be more dependent on what the person does and the decrease in motivation to perform tasks are factors that are present in older people (McAlpine & Rhee, 2016).

Due to all these causes, it will be interesting to make an assessment of the Activities of Daily Living (ADL) and the dependence or independence of the senescent in their performance, as this can vary from person to person. According to Imaginário et al. (2017), these can be divided into two types of activities. Firstly, basic activities, which are necessary for the person's survival and self-care, and Instrumental Activities of Daily Living (AIDL), which are more social and allow the person to remain framed in society. It is important for the elderly to perform such activities to maintain and promote their cognitive performance. When performing AIDL, they stimulate the more complex mental functions, since the person finds him/herself in situations where problem solving is more evident than in the basic activities of daily living (Imaginário et al., 2017). Nevertheless, the performance of both types of activities are crucial in this age group, however some functional limitations, such as hearing

or vision difficulties, which are very common in senescence, often prevent the elderly from performing these activities independently (Schneider et al., 2008).

On the other hand, there are activities that can overcome these difficulties and motivate the elderly to participate in them, which are also fundamental for the maintenance of their cognitive performance. These are called leisure activities, meaning that when the person volunteers to perform them (s)he retains some kind of pleasure and does not feel any professional, family or social obligation to do it (Martins, 2010). These are activities that can make someone feel more free in their life, causing them more comfort and be interested in what life has to offer (Martins, 2010).

This theme becomes pertinent not only because of my personal preferences, but more importantly, this is a topic that with it brings several benefits. First, at the theoretical level, it shows us a greater knowledge about certain psychosocial factors of the development of the elderly, gives the possibility of creating different perspectives regarding their lives and the activities that they perform/prefer throughout the more adult age. Second, at a practical level, it allows us to understand what kind of interventions can be beneficial for the elderly, for a greater comfort of the same, always considering their individuality.

Having said that, this study aims to characterize and evaluate a sample of elderly people living in Portugal, regarding their perceived cognitive performance, IADL and leisure activities they perform.

To this end, online research was conducted in proper search engines (RCAAP; B-on; Google Academic) and through books to understand the best approach and what tools to use to meet the proposed objectives. Pondering this, the ESI-55 Cognitive Function Scale, the Lawton-Brody Scale (presented by Sequeira, 2007) and, finally, the Leisure Activities Index (Martins, 2010) were used.

This study is divided into 2 parts (Article I and Article II) for a better understanding of the theme and results.

Article I consists of the characterization of perceived cognitive performance and AIDL performed, giving access to the level of dependence of the study sample. In addition, the relationship between these two variables is evaluated.

The results of this article showed that the sample has a good perception of its cognitive performance but showed a moderate dependence. Furthermore, in the results, it is noted that there is a relationship between perceived cognitive performance and the AIDL that the sample was able to perform, however it is not a very intense relationship.

Article II has a very similar structure to the previous one. In this article, only the characterization and evaluation of leisure activities is realized. Considering the characterization of perceived cognitive performance, already existing in the previous article, the relationship was also evaluated between perceived cognitive performance and the leisure activities that the elderly in the study performed the most, considering that only nine were presented by the instrument used.

The results of this article showed that the sample does not often practice leisure activities in general. Furthermore, in this article it can be observed a relationship between the variables, however, also with low intensity.

It should be noted that this study belongs to another broader study entitled “Envelhecer em Portugal em Contexto Pandémico: Perfis Psicossociais” (“Aging in Portugal in the Pandemic Context: Psychosocial Profiles”) whose main researcher is Rute Meneses.[1]

[1] To facilitate the reading of this Master's Dissertation, the bibliographic references of this introduction are presented at the end of the Dissertation, they can be found from page 63 to page 65.

Article I

Elderly Development: Perceived cognitive performance and activities of daily living

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Abstract: Introduction: The Portuguese population finds itself with its elderly population growing more and more. Thus, aging is an essential topic for the present day and for the future. Aging entails many losses and gains, namely loss of cognitive and functional abilities. However, it is seen as something negative and the only way that aging is characterized, although aging is more than that. What they go through and what they think is also very important to characterize the elderly population. The perception of the elderly's own cognitive performance is a good way to know what (s)he is able to do or not. Sometimes, in certain daily activities, just the fact that the person feels able to perform them makes the person feel better, thus performing. IADL (Instrumental Activities of Daily Living) are more difficult tasks that require more cognitive capacity. IADL are activities that allow the person to live in community with autonomy and comfort. That said, this study focuses on studying these two variables and the relationship between. **Method:** The ESI-55 Cognitive Function Scale and the Lawton-Brody Scale were administered to 203 people between 60 and 100 years old, in person and online, through a Google Form. **Results:** A statistically significant relationship was found between the variables investigated, however it was a low negative correlation. **Conclusion:** The perception of a person's cognitive performance can be related to the ability to perform IADL, but this relation was not strong in the sample studied.

Consequently, that there is a need for further studies on perceived cognitive performance, as it is a variable that can influence various aspects of the senescent's life and its daily living.

Keywords: Elderly; Perceived cognitive performance; Instrumental activities of daily living

Resumo: Introdução: A população portuguesa encontra-se com a sua população idosa a crescer cada vez mais. Assim, o envelhecimento é um tema essencial para os dias de hoje e para o futuro. O envelhecimento implica muitas perdas e ganhos, nomeadamente a perda de capacidades cognitivas e funcionais. No entanto, é visto como algo negativo e a única forma de o envelhecimento ser caracterizado, embora o envelhecimento seja mais do que isso. As coisas pelo que passam e o que acham também é muito importante para caracterizar a população idosa. A perceção do desempenho cognitivo do próprio idoso é uma boa maneira de saber o que ele(a) é capaz de fazer ou não. Às vezes, em certas atividades diárias, apenas o facto de a pessoa se sentir capaz de executá-las faz com que a pessoa se sinta melhor, assim realizando-as. As AIVD (Atividades Instrumentais de Vida Diária) são tarefas mais difíceis que requerem mais capacidade cognitiva. As AIVD são atividades que permitem à pessoa viver em comunidade com autonomia e conforto. Dito isto, este estudo é centrado nestas duas variáveis e na relação entre elas. **Método:** A Escala de Função Cognitiva ESI-55 e a Escala Lawton-Brody foram administradas a 203 pessoas entre 60 e 100 anos, presencialmente e online, através de um Formulário do Google. **Resultados:** Foi encontrada uma relação estatisticamente significativa entre as variáveis investigadas, no entanto foi uma correlação negativa baixa. **Conclusão:** A perceção do desempenho cognitivo de uma pessoa pode estar relacionada com a capacidade de realizar AIVD, mas esta relação não foi forte na amostra estudada. Consequentemente, há necessidade de mais estudos sobre o desempenho cognitivo percecionado, uma vez que é uma variável que pode influenciar vários aspetos da vida do senescente.

Palavras-chave: Idosos; Desempenho cognitivo percebido; Atividades instrumentais de vida diária

Introduction

Aging emerges as a focus of study in several sciences, in this case with the increase of scientific knowledge of Gerontology. It was through this science that it was possible to observe that the aging process can be studied through a multidisciplinary approach, it is this characteristic that will lead to more knowledge and enrich the area in question (Sequeira, 2018).

Although the focus of this article is the perception of the senescent's cognitive performance, it is still important to emphasize the concept of self-efficacy, which can be designated as what the subject believes he is capable of doing (Bandura, Azzi & Polydoro, 2008, cited in Assunção & Chariglione, 2020). This belief leads the person to present a greater or lesser ability in their daily performance in different tasks (Bandura, Azzi & Polydoro, 2008, cited in Assunção & Chariglione, 2020). That is, if the elder believes that a certain task is simple for him/her, he/she will be able to perform it more effectively, even if in reality the task is complicated, showing a better performance in it. This performance will be reflected in the individual's cognitive functions, hence the importance of this factor for the subject of the work.

That said, it can be observed that when the person believes negatively in his/her own abilities, there may be harmful consequences for the performance of certain activities that imply the subject's cognitive functions (Assunção & Chariglione, 2020).

When talking about self-perception of health, cognitive health is also included, and people who have a good perception of health also have a higher processing speed, a better performance of attentional capacity and visual memory (Dostálová et al., 2021).

The self perception of cognitive abilities is more related to someone's personality traits and self-esteem than cognitive performance itself, it is more about what people think about themselves and how much they think they are capable of doing (Herreen & Zajac, 2018).

The importance of age is a factor that can vary according to the study's variables, but it's helpful to determine the association between cognitive performance and how the person functions daily (Royall et al., 2007).

Executive control function has a high association with the subject's functionality, with memory having a lesser relevance in what counts in the independence of activities of daily living (Royall et al., 2005).

When a person is faced with some disability of the aging process, (s)he will find strategies to overcome it and compensate for this problem, this can be quite discreet and perceived as adaptive to aging (Becattini-Oliveira et al., 2019). However, it is a problem when one wants to assess a person's disabilities through his/her perception, as he/she may believe that he/she does not have cognitive or functional disabilities, and that he/she is just adapting to the adversities that senescence entails, however it may be the beginning of cognitive disability (Becattini-Oliveira et al., 2019).

Nonetheless, the individual's perception of his/her cognitive abilities is crucial to understanding how functional he/she is, since, sometimes, other types of evaluations are not accessible to the person (Becattini-Oliveira et al., 2019). This monitoring and evaluation of the deficits or limitations that the elderly person is experiencing are very important, so that a diagnosis and/or intervention is possible for the difficulties at the moment, so that a more serious problem can be prevented, therefore bringing some satisfaction to the person (Sequeira, 2018).

When speaking about daily activities, one can also mention basic activities of daily living these are the ones that imply necessary mobility and self-care (Lenardt et al., 2011). This study focuses on Instrumental Activities of Daily Living (IADL), these are activities that allow the person to be independent and to maintain their social role in society (Lenardt et al., 2011; Sequeira, 2018). That is, the person is cable of planning and cooking his/her own food, to go somewhere using public transport or driving without difficulty, using money and administering his/her own medication (Lenardt et al., 2011; Leal, et al., 2020; Sequeira, 2018).

Although the independence of the senescents has connotations with the activities of daily living that they can perform, it can also be related with their age, how they make use of their leisure time, their cognitive function and the level of education they have (Sant' Helena et al., 2020). Basically, there is a need to keep the elderly active, performing enriching activities

for their development and for them not to lose their independence on a daily basis (Sant' Helena et al., 2020).

The elderly who have greater cognitive dependence also have a greater dependence on IADL, as these activities require good physical and cognitive capacity to be performed (Leal et al., 2020). Memory and information processing difficulties can be observed, especially in people who have a higher level of deficit due to some neurological disease (Lini et al., 2020).

On the other hand, the ability to perform IADL may be more associated with the age and diseases of the elderly than with their cognitive decline (Almeida et al., 2017). The study by Sousa et al. (2019) showed this, however it is important to note that the participants in this study were older people, from a senior university. Therefore, they are people with a higher level of education than most and who are constantly testing their cognitive abilities.

The person's cognitive abilities appear to be a very important aspect for a good performance of the IADL (Becattini-Oliveira et al., 2019; Fan & Wong, 2019). However, it is inevitable that the ability to perform activities of daily living declines with increasing age, regardless of the individual’s cognitive performance (Ran et al., 2017).

Although not the focus of this study, it is important to mention that the assessment of IADL can be influenced by the person's gender (Lawton & Brody, 1969). Activities such as shopping, washing clothes and cooking are more associated with women and their level of ability in older age. While, for man, these activities are often not performed frequently, therefore their inability to do them is less clear. That said, the use of transportation or the use of money are the two most significant activities for men's assessment (Lawton & Brody, 1969).

Through the study by Santos et al. (2021), it can be observed that there is a relationship between the dependence of the hospitalized senescents and their level of cognitive decline, and greater dependence in activities of daily living are associated with greater cognitive deficit. However, the authors of this study found that there was a relationship between greater autonomy in daily activities and absence of cognitive impairment.

Taking previous research into consideration, the objectives of the present study are:

- To assess the perception of cognitive performance of a sample of elderly individuals living in Portugal;
- To know the daily activities performed by this sample; and
- To study the relationship between their perception of cognitive performance and their activities of daily living.

Method

Participants

The sample under study is a non-probabilistic, convenience sample, as the probability of someone belonging to this study's sample is not the same for all people; it is convenient because the participant has some convenience for the researcher and his/her study (Marôco, 2021).

This study included participants aged 60 years and over, consisting of institutionalized and non-institutionalized individuals living in Portugal at the time of data collection.

The total number of participants was 203, with ages ranging from 60 to 100 years (M=74.98; SD=10.81). The most predominant age of the sample was 88 years.

Most of the sample is made up of females, showing an imbalance between the sexes. Most of the sample were widowed.

As for the level of education, many of the participants completed primary, secondary and higher education.

Regarding their health status, most participants considered it good or fair. It is important to mention that a large percentage of the sample considered not having cognitive problems at the time.

The majority of the sample was not institutionalized.

In Table 1, one can observe the sociodemographic characterization of these participants and all missing cases.

Table 1

Sociodemographic Characteristics of Sample (N=203)

Sociodemographic characteristics	*N*	%
Sex		
Female	128	63.1
Male	75	36.9
Missing	1	-
Marital Status		
Single	26	12.9
Married	73	36.1
Divorced/ Separated	20	9.9
Widowed	83	41.1
Missing	2	-
Education		
Does not know how to write or read	15	7.4

Knows how to write and read	41	20.2
Primary School	55	27.1
High school	45	22.2
Higher education	47	23.0
Missing	1	-
Perception of health		
Poor	24	11.8
Fair	71	35.0
Good	71	35.0
Very good	23	11.3
Excellent	14	6.9
Missing	1	-
Cognitive problems		
Yes	12	5.9
No	190	94.1
Missing	2	-
Institutionalized		
Yes	78	38.6
No	124	61.4
Missing	2	-

Material

In view of the objectives of this study, the following instruments were used:

- a Sociodemographic and Clinical Questionnaire, created specifically for the study and that includes item 1 from SF-36, regarding health perception (Ribeiro, 2005);

- the Epilepsy Surgery Inventory 55 Survey (ESI-55) Cognitive Function Scale, to assess the perception of cognitive performance; and

- the Lawton-Brody Scale (version presented by Sequeira, 2007), with the objective of evaluating the IADL of the participants.

Sociodemographic and Clinical Questionnaire: For a robust characterization of the participants, taking into considerations the aims of the broader project, in which this study is integrated, 36 multiple choice and open-ended questions were asked.

For the purpose of this study, only some characteristics of the participants were analyzed, such as age, sex, education, marital status, institutionalization, and some clinical issue, such as their health status and possible cognitive problems presented.

The Epilepsy Surgery Inventory 55 Survey (ESI-55) Cognitive Function Scale: This instrument assesses 11 health-related concepts, such as: health perception, energy levels, quality of life, social functioning, emotional well-being, cognitive function, role limitations due to emotional problems, memory problems, physical health problems and physical function and pain (Vickrey et al., 1992, cited in RAND, 1993).

Due to the objectives of this project, only the ESI-55 Cognitive Function Scale was used, which measures the personal perception of the person's cognitive functioning, considering the last four weeks that have passed (Vickrey, 1993, cited in Meneses, 2005).

The scale used contains 5 items of the total ESI-55, these being items 35, 36, 38, 49 and 50 (RAND, 1993). That said, one has to pay particular attention to the rating of this instrument,

since it is divided into two parts; a higher score indicates a more positive state of health (RAND, 1993).

First, it is necessary to recode the items following a proper table, this recoding is equivalent to a score, which goes from 0 to 100, then the minimum total score of each scale is 0 and the maximum score is 100, these numbers represent percentages of the score that the person can obtain (RAND, 1993).

In the second scoring stage, the items related to each scale are grouped, creating 11 scales for the 11 concepts studied by the instrument (RAND, 1993). That said, the scale used is the grouping of the 5 items described previously.

In items 35, 36 and 38, the response options range from 1 to 6, with each value corresponding to another value from 0 to 100 (1-0; 2-20; 3-40; 4-60; 5- 80; 6-100); items 49 and 50 have responses ranging from 1 to 4 (1-0; 2-33.3; 3-66.7; 4-100) (RAND, 1993).

Its internal consistency, in this study, is satisfactory, since the values of Cronbach's Alpha are α=0.91. For clinical application of an instrument, higher values of Cronbach's Alpha are more desirable, between α=0.90 and α=0.95 (Bland & Altman, 1997).

Table 2 shows a comparison of the Cronbach's Alpha values between this study and the version presented by Sequeira (2007).

Table 2

Internal Consistency of the ESI-55 Cognitive Function Scale

ESI – 55 Cognitive Function Scale	Present Study (N=203)	RAND (1993) (N=200)
Nº items	5	5
Cronbach's Alpha	α=0.91	α=0.83

Lawton-Brody Instrumental Activities of Daily Living Scale (Lawton & Brody, 1969), adapted and translated version by Sequeira (2007): The Lawton-Brody Scale is an

instrument that assesses IADL in the elderly (Lawton & Brody, 1969). It assesses the degree of dependence on IADL in two ways, a more global way, but also in a divided way (Sequeira, 2018).

This instrument is divided into 8 activities such as: Taking care of the house; Washing clothes; Prepare meals; Shopping; Use the phone; Use transport; Use money; and medication administration (Sequeira, 2018).

Each item has different levels of dependency. The housekeeping item has 5 levels of dependency; the items preparing meals, shopping, using the phone, and using transport have 4 levels; and, finally, the items washing clothes, using money and taking responsibility for medicines have 3 levels of dependency. Therefore, the rating of each of the activities is scored between 1 to 3, 1 to 4 and 1 to 5 points to characterize the dependence of the elderly; the higher the score, the greater the dependence of the person (Sequeira, 2018).

The minimum score for this instrument is 8 points and the maximum score is 30 points. As far as cut-off points are concerned, there are three. Obtaining 8 points is equivalent to complete independence; between 9 and 20 points is equivalent to a moderate level of dependence, the person needs some help; > 20 points is equivalent to severe dependence, the person needs a lot of help (Sequeira, 2018).

This instrument shows a satisfactory internal consistency, since the values of Cronbach's Alpha in this study are α=0.95.

Table 3 shows a comparison of the Cronbach's Alpha values between this study and the original.

Table 3

Internal Consistency of the Lawton-Brody Scale

Lawton – Brody Scale	Present Study (N=203)	Sequeira (2007) (N=180)
Nº items	5	5
Cronbach's Alpha	α=0.95	α=0.92

Procedure

First, after designing the project, authorizations from the authors of the instruments intended for data collection to include them in the project were obtained. The project was submitted to the Ethics Committee of Universidade Fernando Pessoa, which approved it.

The project was publicized by the research team via social media, email and messages and through the email database from Gabinete de Comunicação e Imagem of Universidade Fernando Pessoa. Readers were asked to share the project with their contacts.

Before accessing the questions/items of the instruments, and after reading (or being read) the information to participants section of the Google Form, participants gave their informed assent / consent (online vs in person). The information included the objectives of the study and the instructions for participation. It was also explained that the data processing was confidential and allowed the anonymity of the participants, as no identification would be necessary. This was essential for the participation in the study to be carried out freely and voluntarily by the participants. At any time, the participant could withdraw from participating. An email to pose questions was also presented.

Data collection took place from February 19, 2022 to April 19, 2022. It was carried out in person at the internship of the Masters degree in Clinical and Health Psychology and through an online form, on Google Forms.

After this step was completed, an Excel table was created with all the data obtained, which was transformed into a IBM SPSS Statistics 28.0 database, compatible with Windows.

The next step was the characterization of the sample, taking into account its sociodemographic and clinical data and the variables focused in this study.

After that, an exploratory descriptive analysis of the data was carried out, to test the normal distribution of the sample and its homogeneity through the Kolmogorov-Smirnov Test and the Levene Test, respectively.

The Kolmogorov-Smirnov value (p= <.001) showed there is no normal distribution, requiring the use of non-parametric tests. Therefore, Spearman's correlation was used to analyze the association of the variables under study. Also, Levene's test showed that the variances are significantly different (p=0.32).

Before analyzing the relationship between the perception of cognitive performance and the participant's dependence on their IADL, the Kruskal-Wallis test was calculated, and only then the Spearman Correlation coefficient was calculated, since the sample does not follow a normal distribution.

Results

Characterization of the participants' perceived cognitive performance

In the sample studied, the results of the ESI-55 Cognitive Function Scale show that there were some complaints and cognitive difficulties, given the last four weeks and the participants' perception.

Most people said they have found it difficult to concentrate and think, varying from “Most of the time” to “A good bit of the time”. Few people responded “All the time”. The remaining sample was divided with approximate values between the answers “Some of the time”, “A little of the time” and “None of the time”.

Regarding difficulty maintaining attention in an activity for a long period of time, most of the sample said they felt it “A good bit of the time” and “Most of the time”, some of the participants also responded that they felt these difficulties “Some of the time”, “A little of the time” and “None of the time”. A very low percentage of the participants responded “All the time”

On issues of difficulty in reasoning and problem solving, some of the examples given were making plans, learning new things, and making decisions. The sample indicated that they felt these difficulties “Most of the time”, “A good bit of the time” and “None of the time”.

On the other hand, when it comes to trouble with memory, the majority of the participants answered “Yes, a little” and “Yes, somewhat”.

Finally, regarding speech and language difficulties, the majority of the sample answered “Yes, a little” and “No, not at all”.

To understand these results better, see Table 2.

Table 4

Results of the ESI-55 Cognitive Function Scale

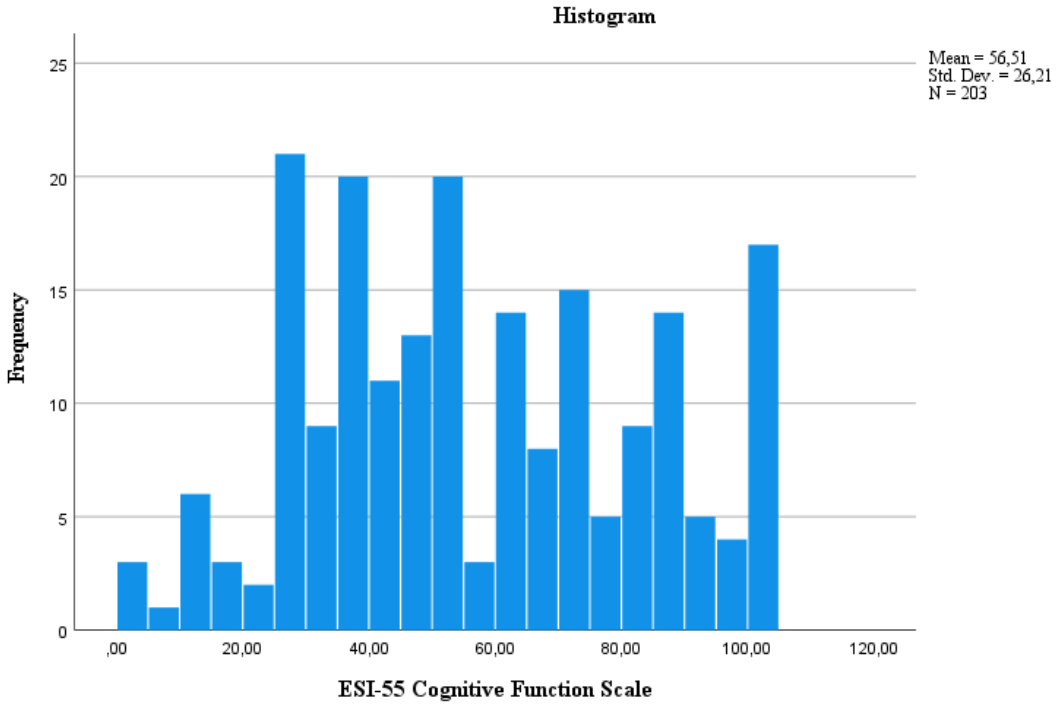
Items	Response options	*n*	%
How much of the time during the past 4 weeks have you had difficulty concentrating and thinking?	All of the time	6	3,0
	Most of the time	47	23,3
	A good bit of the time	45	22,3
	Some of the time	34	16,8
	A little of the time	36	17,8
	None of the time	34	16,8
	Missing	1	-
How much of the time during the past 4 weeks did you have trouble keeping your attention on an activity for long?	All of the time	6	3,0
	Most of the time	45	22,2
	A good bit of the time	48	23,6
	Some of the time	31	15,3
	A little of the time	41	20,3
	None of the time	32	15,8

	Missing	-	-
How much of the time during the past 4 weeks did you have difficulty reasoning and solving problems (eg., making plans, making decisions, learning new things?)	All of the time	7	3,5
	Most of the time	43	21,4
	A good bit of the time	47	23,4
	Some of the time	34	16,9
	A little of the time	33	16,4
	None of the time	37	18,4
	Missing	2	-
In the past 4 weeks, have you had any trouble with your memory?	Yes, a great deal	34	16,7
	Yes, somewhat	61	30,0
	Yes, a little	74	36,5
	No, not at all	34	16,7
	Missing	-	-
In the past 4 weeks, have you had any trouble with your speech or language?	Yes, a great deal	9	4,5
	Yes, somewhat	51	25,2
	Yes, a little	71	35,1
	No, not at all	71	35,1
	Missing	1	-

For a broader understanding, Fig. 1 presents a histogram with the results of the ESI-55 Cognitive Function Scale, which characterizes the perception of the sample's cognitive performance.

Figure 1

ESI-55 Cognitive Function Scale Frequency Histogram



This histogram shows that the lowest and highest possible scores (0-100) were reached. The mean of the total scale was 56,51 (*SD*=56,21).

Characterization of Dependence in IADL

The characterization of dependence of the participants in this study is based on the results from administrating the Lawton-Brody Scale.

The majority of the sample proved to be independent regarding the tasks of taking care of the house, answering “Takes care of the house without help” and “Only does light tasks”, however some people say they’re “Incapable of doing any task”.

In the activity of “Washing clothes”, almost half of the participants answered “Washes clothes without help”, on the other hand a good percentage answered “Incapable of washing clothes”.

The food preparation was one of the activities that showed greater independence of the participants, since more than half of the sample answered “Plans, prepares and serves without help”.

The participants also did not show great dependence on going shopping, almost half of the sample answering “Goes shopping without help”.

The activity “Use telephone” is also one of the most easily performed instrumental activities, as more than half of the participants answered “Uses the phone without difficulty”.

As for the activity “Use transport”, the answers differ a little bit, since a lot of the participants answered “Uses public transport or drives”, but also “Needs to be accompanied”.

“Use money” is also an activity that shows a lot of independence in the elderly, and in this sample almost half of the participants answered “Pays the bills, goes to the bank, etc.”. They also responded “Uses money in small quantities”, showing that only a small percentage was “Incapable of using money.”

Finally, “Responsibility for medication” is also a task that showed that the sample was independent, as more than half of the people answered “Responsible for taking medication”, and the other large part of the participants only “Needs someone to prepare medication”.

These results are presented with more detail in Table 5.

Table 5

Results of the Lawton-Brody Scale

Items	Response options	*n*	%

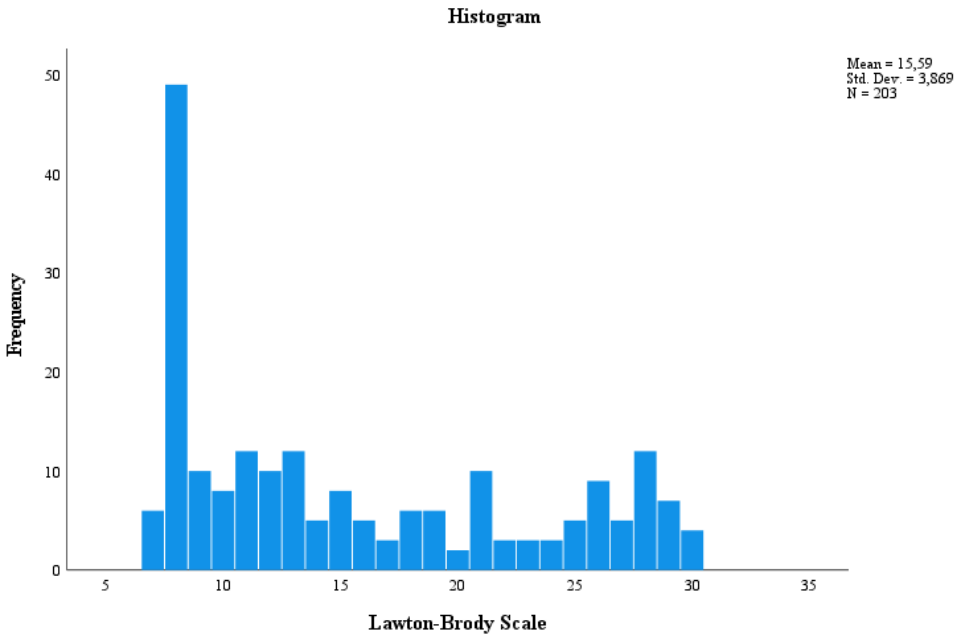
Taking care of the house	Takes care of the house without help	74	36,6
	Does everything except hard work	32	15,8
	Only does light tasks	42	20,8
	Needs help in all tasks	17	8,4
	Incapable of doing any task	37	18,3
	Missing	1	-
Washing clothes	Washes clothes without help	98	48,8
	Only washes small pieces of clothing	47	23,4
	Incapable of washing clothes	56	27,9
	Missing	2	-
Food preparation	Plans, prepares and serves without help	107	53,0
	Prepares if someone gives out the ingredients	24	11,9
	Prepares precooked meals	15	7,4
	Incapable of preparing meals	56	27,7
	Missing	1	-
Shopping	Goes shopping without help	91	44,8
	Shops for small purchases	32	15,8
	Needs company to go shopping	34	16,7
	Incapable of going shopping	46	22,7
	Missing	-	-
Use the phone	Uses the phone without difficulty	120	59,1
	Only calls to familiar places	44	21,7

	Needs help to use the phone	30	14,8
	Incapable of using the phone	9	4,4
	Missing	-	-
Use transport	Uses public transports or drives	88	44,0
	Only uses taxi	32	16,0
	Needs to be accompanied	54	27,0
	Incapable of using transport	26	13,0
	Missing	3	-
Use money	Pays the bills, goes to the bank, etc.	96	47,3
	Uses money in small quantities	67	33,0
	Incapable of using Money	40	19,7
	Missing	-	-
Medication administration	Responsible for taking medication	117	58,2
	Needs someone to prepare medication	48	23,9
	Incapable of being responsible for medication	36	17,9
	Missing	2	-

For a better understanding, Fig. 2 presents a histogram with the results of the Lawton-Brody Scale, which characterizes the dependence in IADL.

Figure 2

Lawton-Brody Scale Frequency Histogram

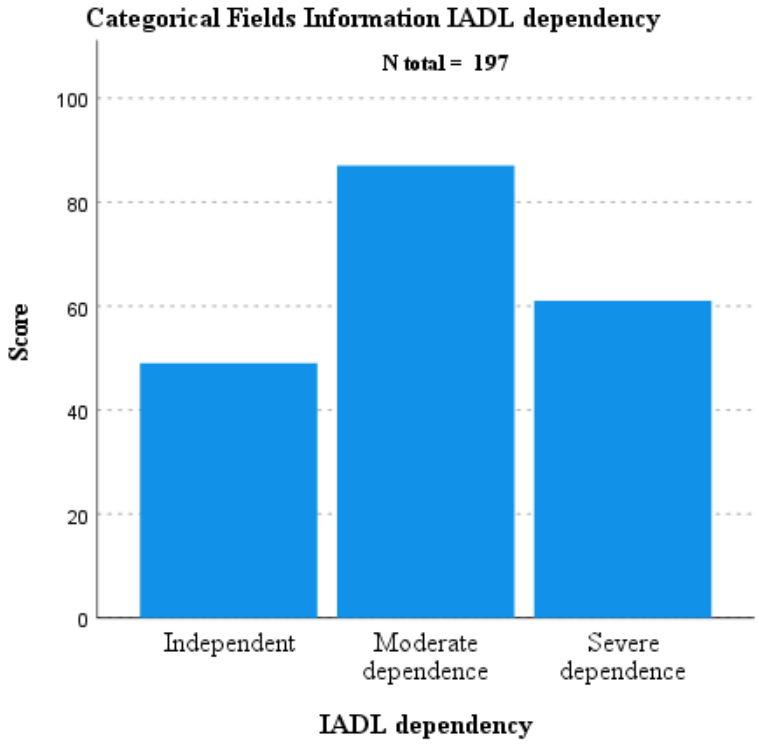


Through the histogram of Fig. 2 it can be observed that both the minimum value (8) and the maximum value (30) of the Lawton-Brody Scale were reached. The mean of the total scale was 15,99 (*SD*= 3,86; min: 7; max: 30). There are missing responses in some of the items, therefore some participants reach scores like 7 points (which does not exist in the Lawton-Brody Scale).

Through the Kruskal-Wallis test it can be observed the distribution of the sample by the 3 cut-off points of the Lawton-Brody Scale: the results of this analysis showed that most of the participants (*n*=87) fit the second cut-off point, which is equivalent to a moderate dependence (between 9 and 20 points), as can be seen in Fig. 3.

Figure 3

Levels of Dependence in IADL



Relation between Perceived Cognitive Performance and Dependence in IADL

Through the Spearman Correlation test, it was possible to know the intensity of the relationship between the two variables under study. The classification of this relationship is stipulated through certain ranges of values.

When values are (or close to being) .00 to .30 (.00 to -.30) this indicates that there is little correlation, if any; if the values are .30 to .50 (-.30 to -.50) this shows that it exists a low positive (negative) correlation; if the values are .50 to .70 (-.50 to -.70) the correlation is moderate positive (negative); if they are .70 to.90 (-.70 to -.90), one can interpret it as a high positive (negative) correlation; and, finally, if it is .90 to 1.00 (-.90 to –1.00) this is a very high positive (negative) correlation (Hinkle et al., 2003, cited in Yadav, 2018).

Table 6 presents the results of the Spearman Correlation test.

Table 6

Correlations between Perceived Cognitive Performance and Dependence in IADL

			ESI-55 Cognitive Function Scale	Lawton-Brody Scale
Spearman's rho	ESI-55 Cognitive Function Scale	Correlation Coefficient	1,000	-,270**
		Sig (2-tailed)		<,001
		N	203	203
	Lawton-Brody Scale	Correlation Coefficient	-,270**	1,000
		Sig (2-tailed)	<,001	
		N	203	203

Note: ** Correlation is significant at the 0.01 level (2-tailed).

First, it is necessary to pay attention to the p-value (p=<.001) which shows that there is a statistically significant relationship between the ESI-55 Cognitive Function Scale score and the Lawton-Brody Scale score and vice versa.

Next, it's analyzed the value of Spearman's rho (ρ= -,270) which is in the range of .00 to -.30, meaning that the intensity of the correlation is very little between the variables, although it is close to -.30, which can be interpreted as a low negative correlation.

This means that, when the participants experience more cognitive difficulties, they are less independent in their perceived IADL. When they are more independent and have good functional abilities, they have less cognitive difficulties, perceived by them. A good perception of their cognitive performance in the last four weeks was associated with less dependence for the IADL.

Discussion and Conclusion

Overall, the results showed that the cognitive performance perceived by the participants is, globally, positive, since the closer to 100, the better the health status, and the average score of the participants is 56,51, a value that is more approximated to the maximum score than the minimum score. Although, participants perceived themselves having some cognitive

difficulties in the last four weeks before the questionnaire was administered, altogether, they have a good perception of their cognitive performance. Despite that, it was seen in literature that with age, cognitive abilities tend to decrease (Ran et al., 2017). Therefore, it is normal for participants to not perceive a higher level of cognitive performance.

The greatest difficulties reported were those of concentration and thinking, maintaining attention for a long period of time and memory.

In the literature review carried out, it was seen that memory is one of the abilities that least influences the dependence or independence of IADL (Royall et al., 2005). Therefore, although the memory capacity is perceived negatively, this does not imply that the person is less independent in his/her IADL.

In turn, it can be observed that executive functions play a much more important role in functional capacity and daily activities (Royall et al., 2005). That is, functions such as reasoning, problem solving and planning have a greater significance for the subject's independence. As it can be seen in the results, not a significant percentage of participants indicated having this type of difficulty, which may explain the high level of independence of the sample.

Nonetheless, it is important to mention that the fact the participants showed difficulties in concentrating and attention span. Technically, who have a good perception of health also have a higher processing speed and a better performance of attentional capacity (Dostálová et al., 2021). When comparing this with the results of this study, they differ, since the sample had a good perception of their cognitive performance but show higher difficulty in their attentional capacity.

The independence of the participants can also be explained by the fact that this sample is made up mostly of females, as already seen in a Lawton & Brody (1969) study, this factor greatly influences the results of the Lawton-Brody Scale, as certain activities included in the scale are more significant for women than for men. Therefore, most participants are able to perform the tasks indicated in the instrument, as that is how they grew up, washing clothes, taking care of the house and going shopping, it was expected that women would do housework and men would be responsible for financial tasks (Lawton & Brody, 1969).

Consequently, the results obtained may not be related to the low values of perceived cognitive performance, but to factors external to it. Therefore, this may slightly limit the conclusions of the study, as the sample is not homogeneous.

The correlation between perceived cognitive performance and dependence of the IADL has a very low intensity, suggesting that the perception of cognitive performance that the participants showed did not have a great influence on their independence, since they proved to be independent and capable of performing the IADL, even reporting low levels of cognitive performance.

In conclusion, when comparing the studies in the literature with the results obtained in the sample studied, it can be seen that they are not completely in agreement, because although there is a significant correlation between perceived cognitive performance and IADL, it is not clear whether the perception of cognitive performance is a strong factor for the realization of IADL. In this case, it is essential to see the individual's personal characteristics (age, gender, context in which (s)he is inserted to really understand the relationship between these two variables.

The main objectives of the present study were to assess the sample's perception of cognitive performance, to know which IADL the sample was capable of performing and to study the relationship between the perception of cognitive performance and the IADL performed.

Given the results obtained, one can conclude that the perception of cognitive performance is good, although the sample reports several cognitive difficulties, namely concentration and memory difficulties at the time that the ESI-55 Cognitive Function Scale was administered.

The perception of the person, as a form of evaluation, can be problematic, for the simple fact that it depends on the present or, in this case, the last four weeks that the instrument was administered and not on a general record from months or years ago. That is, it is not known whether the participant's perception would be different if (s)he had answered earlier or later.

Therefore, this can be seen as a limitation to the study and bias of results, however, due to the nature of the study and the pandemic context in which it is inserted, studying the

perception of cognitive performance was simpler and easier than studying cognitive performance. Because data was also collected online, and so the participants understood what this study was for and how to participate, the questionnaires had to be simple, direct and short, giving the person the opportunity to respond with sincerity and attention.

Regarding the IADL, it was perceived that, in general, the study participants have the ability to perform the IADL, namely, taking care of the house, washing clothes, preparing food, going shopping, using the telephone, transport and money and being responsible for their medication. Thus, showing moderate dependence.

In all IADL, most of the sample showed the ability to perform them and without needing help to do so. It is very positive to find this data in the older population, as senescence is often seen as loss of capabilities and loss of independence (Netto, 2013), and this study shows that this is not always the result of aging.

Regarding the relationship between perceived cognitive performance and IADL, a statistically significant relationship was found between the two variables, however, with very little intensity, if any. It is not enough to think that the perception of cognitive performance is strongly related with de capacity of performing IADL.

That said, all the objectives of the study were achieved.

However, in addition to the aforementioned limitations of the study, another limitation is the fact that it was necessary to use short instruments, by which the data obtained is not very rich, instead, it would be more beneficial the use of a more in-depth instrument on perceived cognitive performance, with more specific questions to the perception of the elderly.

To conclude, it would be interesting, for future studies, to use/develop a specific instrument to assess perceived cognitive abilities and skills. Also, a study could be carried out in which the differences between institutionalized and non-institutionalized elderly are explored, because, as mentioned, the context in which the person is inserted is also important. This would also apply for the IADL, when it would be interesting to make a comparison between the gender differences in the two variables of the study.

Bibliographic References

Almeida, P., Mendonça, M. A., Marinho, M. S., Santos, L. S., Andrade, S. M. B., & Reis, L. A. (2017). Funcionalidade e fatores associados em idosos participantes de grupo de convivência. *Revista da Associação Brasileira de Atividades Motora Adaptada*, *18*(1), 53-64. https://doi.org/10.36311/2674-8681.2017.v18n1.05.p53

Assunção, J. L. A., & Charriglione, I. P. F. S. (2020). Envelhecimento cognitivo, autoeficácia e atividade física: Uma revisão sistemática. *Revista Psicologia da IMED, 12*(1), 116-132. https://doi.org/10.18256/2175-5027.2020.v12i1.3120

Becattini-Oliveira, A. C., Câmara, L. C. P., Dutra, D. F., Sigrist, A. A. F., & Charchat-Fichman, H. (2019). Performance-based instrument to assess functional capacity in community-dwelling older adults. Dementia & Neuropsychologia, *13*(4), 386-393. http://dx.doi.org/10.1590/1980-57642018dn13-040004

Bland, J. M., & Altman, D. G. (1977). Cronbach's Alpha. *British Medical Journal*, *314*, 572. http://dx.doi.org/10.1136/bmj.314.7080.572

Dostálová, R., Stillman, C., Erickson, K. I., Slepiˇcka, P., & Mudrák, J. (2021). The Relationship between physical activity, self-perceived health, and cognitive function in older adults. *Brain Sciences*, *11*(4), 492. https://doi.org/10.3390/brainsci11040492

Fan, B. J. Y., & Wong, R. Y. M. (2019). Effect of cognitive training on daily function in older people without major neurocognitive disorder: A systematic review. *Geriatrics*, *4*(3), 44. https://doi.org/10.3390/geriatrics4030044

Herreen, D., & Zajac, I. T. (2018). The reliability and validity of a self-Report measure of cognitive abilities in older adults: more personality than cognitive function. *Journal of Intelligence, 6*(1), 1. https://doi.org/10.3390/jintelligence6010001.

Lawton, M., & Brody, E. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist, 9*(3), 179-186. https://www.semanticscholar.org/paper/Assessment-of-older-people%3A-self-maintaining-and-of-Lawton-Brody/35e2f446f48838fc036f376e5ff15e1835d9b596

Leal, R. C., Veras, S. M. J., Silva, M. A. S., Gonçalves, C. F. G., Silva, C. R. D. T., Sá, A. K. L., Carvalho, V. P. S., & Silva, M. F. B. (2020). Efeitos do envelhecer: Grau de dependência de idosos para as atividades da vida diária. *Brazilian Journal of Development*, *6*(7), 53931-53940. https://doi.org/10.34117/bjdv6n7-876

Lenardt, M. H., Silva, S. C., Seima, M. D., Willig, M. H., & Fuchs, P. A. O. (2011). Desempenho das atividades de vida diária em idosos com alzheimer. *Revista Cogitare Enfermagem*, *16*(1), 13-21. http://dx.doi.org/10.5380/ce.v16i1.21106

Lini, E. V., Lima, A. P., Cardoso, F. B., Portella, M. R., & Doring, M. (2020). Factors associated with instrumental activities of daily living dependence in the elderly: A case-control study. *Ciência e Saúde Coletiva*, *25*(11), 4623-4630. https://doi.org/10.1590/1413-812320202511.03432019

Marôco, J. (2021). *Análise estatística com o SPSS Statistics*. (8th ed.). ReportNumber.

Meneses, R. (2005). *Promoção da Qualidade de vida de doentes crónicos: Contributos no contexto das Epilepsias Focais*. edições UNIVERSIDADE FERNANDO PESSOA.

Netto, P. M. (2013). O estudo da velhice. Histórico, definição do campo e termos básicos. In E. Freitas, & L. Py (Eds.), *Tratado de Geriatria e Gerontologia* (pp. 62-75). Guanabara. https://ftramonmartins.files.wordpress.com/2016/09/tratado-de-geriatria-e-gerontologia-3c2aa-ed.pdf

Ran, L., Jiang, X., Li, B., Du, M., Yu, H., & Liu, Q. (2017). Association among activities of daily living, instrumental activities of daily living and health-related quality of life in elderly Yi ethnic minority. *BMC Geriatrics, 17*, 74. https://doi.org/10.1186/s12877-017-0455-y

RAND. (1993). Epilepsy Surgery Inventory 55 Survey (ESI-55). https://www.rand.org/health-care/surveys_tools/esi.html

Ribeiro, J. (2005). O importante é a saúde: estudo de adaptação de uma técnica de avaliação do estado de saúde – SF-36. Fundação Merck Sharp & Dohme.

Royall, D. R., Lauterbach, E. C., Kaufer, D., Malloy, P., Coburn, K. L., & Black, K. J. (2007). The cognitive correlates of functional status: A review from the committee on research of the american neuropsychiatric association. *The Journal of Neuropsychiatry and Clinical Neurosciences, 19*(3), 249-265. https://neuro.psychiatryonline.org/doi/full/10.1176/jnp.2007.19.3.249

Royall, D. R., Palmer, R., Chiodo, L. K., & Polk, M. J. (2005). Executive control mediates memory's association with change in instrumental activities of daily living: The freedom house study. *Journal of the American Geriatrics Society, 53*(1), 11-17. https://doi.org/10.1111/j.1532-5415.2005.53004.x

Sant'Helena, D. P., Silva, P. C., & Gonçalves, A. K. (2020). Capacidade funcional e atividades da vida diária no envelhecimento. In E. Sampaio (Ed.), *Envelhecimento humano: Desafios contemporâneos - volume 1* (pp. 204-218). Editora Científica Digital. https://www.editoracientifica.com.br/books/livro-envelhecimento-humano-desafios-contemporaneos-volume-1

Santos, B. P., Amorim, J. S. C., Poltronieri, B. C., & Hamdan, A. C. (2021). Association between functional disability and cognitive deficit in hospitalized elderly patients.

Cadernos Brasileiros de Terapia Ocupacioal, *29*, e2101. https://doi.org/10.1590/2526-8910.ctoAO2101.

Sequeira, C. (2018). *Cuidar de idosos com dependência física e mental*. (2nd ed.). Lidel.

Sequeira, C. (2007). *Cuidar de idosos dependentes*. Quarteto.

Sousa, H. A., Moura, B. M., Júnior, E. O. C., Rezende, F. A. C., Brito, T. R. P., Neto, L. S. S., Osório, N. B., & Nunes, D. P. (2019). Limitação funcional em atividades de vida diária e fatores associados em idosos da universidade da maturidade. *Revista Humanidades e Inovação*, *6*(11), 88-97. https://revista.unitins.br/index.php/humanidadeseinovacao/article/view/1575.

Yadav, S. (2018). Correlation analysis in biological studies. *Journal of the Practice of Cardiovascular Sciences*, *8*(2), 116-121. https://www.j-pcs.org/article.asp?issn=2395-5414;year=2018;volume=4;issue=2;spage=116;epage=121;aulast=Yadav

Article II

Elderly Development: Perceived cognitive performance and leisure activities

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Abstract: **Introduction**: The increase in age may imply an increase in free time. Older adulthood is a phase in which the person leaves his/her professional position and starts retirement, with these new opportunities appear for the elderly to do other activities. Activities based on the elder preferences, which are not related to work, nor are they based on a reward, these are called leisure activities. There are many activities that the elderly can choose from, however, some activities require more cognitive capacity than others, or functional abilities. Reading, watching television, playing cards and knitting are considered cognitive activities, these are essential to prevent having a mild cognitive deficit. In addition to these, walking, gardening, playing cards and talking, despite not being closely connected with the cognitive function of each person, are very important activities for an active and satisfying lifestyle, which contribute to a more positive perception about a person's own health. This study focuses on the leisure activities performed by the elderly and its relationship with perceived cognitive performance. **Method:** In addition to a Sociodemographic and Clinical Questionnaire, the ESI-55 Cognitive Function Scale, and the Leisure Activity Index were administered in person and online, using Google Forms. A total of 203 participants, with ages ranging from 60 to 100 years (*M*=74.98; *SD*=10.81), answered the instruments. Their data was then analyzed using IBM SPSS Statistics. **Results:** It was showed that the participants don't practice leisure activities frequently and that exists a relationship between the perceived cognitive performance and the leisure activities

performed by the sample. **Conclusion**: Despite the relationship between the two variables under study, the performance of leisure activities may also be related to other factors in the life of the elderly; the motivation and frequency with which they are performed may be very different from person to person.

Keywords: Elderly; Perceived cognitive performance; Leisure activities

Resumo: Introdução: O aumento da idade pode implicar um aumento do tempo livre. A idade adulta é uma fase em que a pessoa abandona o seu cargo profissional e inicia a reforma, com estas novas oportunidades para os idosos fazerem outras atividades. Atividades baseadas nas preferências dos idosos, que não estão relacionadas com o trabalho, nem se baseiam numa recompensa, estas são chamadas atividades de lazer. Há muitas atividades que os idosos podem escolher, no entanto, algumas atividades requerem mais capacidade cognitiva do que outras, ou habilidades funcionais. Ler, ver televisão, jogar cartas e fazer tricô são considerados atividades cognitivas, estas são essenciais para evitar ter um ligeiro défice cognitivo. Além destes, caminhar, jardinar, jogar cartas e falar, apesar de não estarem intimamente ligados à função cognitiva de cada pessoa, são atividades muito importantes para um estilo de vida ativo e satisfatório, que contribuem para uma perceção mais positiva sobre a saúde de uma pessoa. Este estudo centra-se nas atividades de lazer realizadas pelos idosos e na sua relação com o desempenho cognitivo percebido. **Método:** Além de um Questionário Sociodemográfico e Clínico, a Escala de Função Cognitiva ESI-55 e o Índice de Atividade de Lazer foram administrados presencialmente e online, utilizando o *Google Forms*. Um total de 203 participantes, com idades compreendidas entre os 60 e os 100 anos (M=74,98; SD=10,81), respondeu aos instrumentos. Os seus dados foram então analisados através do *IBM SPSS Statistics*. **Resultados:** Foi mostrado que os participantes não praticam atividades de lazer frequentemente e que existe uma relação entre o desempenho cognitivo percebido e as atividades de lazer realizadas pela amostra. **Conclusão**: Apesar da relação entre as duas variáveis em estudo, a realização de atividades de lazer pode também estar

relacionada com outros fatores na vida dos idosos; a motivação e a frequência com que são realizadas podem ser muito diferentes de pessoa para pessoa.

Palavras chave: Idosos; Desempenho cognitivo percecionado; Atividades de lazer

Introduction

Leisure, in the first place, is what comes from the occupations that a person uses to rest, have fun and to acquire new knowledge (Martins, 2010).

Leisure activities are meaningful activities that do not imply any reward or profit (Martins, 2010). These activities change according to the (older) person's age and interests (Martins, 2010; Zhu et al., 2022). These are activities that are neither related to work nor to the tasks of daily living (Leitner & Leither, 2012; Verghese et al., 2006).

Pressman et al. (2009) mention the term enjoyable leisure activities. They are activities performed voluntarily by the elderly, that provide pleasure and enjoyment in their free time, without any connection with other obligations or work. According to the same authors, when older people engage in these types of activities, they show better psychological functioning, as well as when they engage in various types of leisure activities, they lessen the impact of day-to-day stress.

The activities that the elderly perform in their free time need to have, as their main characteristic, congruence with their taste, what they prefer and what brings them more satisfaction, because only then will these types of activities cause emotional and psychological well-being, so that their lives are not just full of daily tasks in their free time (Sequeira, 2018).

Participating in leisure activities and having an active role in society can be very beneficial for a healthy aging process (Adams et al., 2011; Waldman-Levi et al., 2015).

The fact that people are interested in, and engage in, various leisure activities, rather than just focusing on one, may have benefits to reduce risk of Alzheimer's disease (Verghese et al.,

2003) and improve cognition (Wang et al., 2013). Many times, the fact that the elderly person engages in various activities serves as compensation for leaving others, or even losses in other areas of the person's life (Silverstein & Parker, 2002). For example, starting to read, because you can't do gardening, or start watching TV, because you won't go for walks anymore, among other examples.

It often happens that leisure activities decrease with increasing age, even when in retirement, when there's more free time (Shaw et al., 2010). This decrease in participation can be explained because of the decline in physical and mental function (Zhu et al., 2022).

However, more important than the amount of activities that the elderly person participates in, is the frequency with which they do them (Mao et al., 2020). It has been shown that a higher frequency of participation in activities such as watching TV, reading books or the newspaper and playing cards are associated with a decreased risk of cognitive impairment (Mao et al., 2020). Elderly people who performed leisure activities less frequently showed cognitive decline (Wang et al., 2013).

The involvement of a person in leisure activities depends on a few aspects. For instance, the motivation for it, this is, the energy it takes to involve someone in something to do with his/her free time (Losier et al., 1993). Although motivation is an important topic to discuss, since it can determine the elder's satisfaction with the activity performed, it is not the only factor for the involvement of the elderly in leisure activities (Losier et al., 1993).

There's the need for leisure opportunities, meaning the choices that someone has in his/her context and living area (Losier et al., 1993). Unfortunately, sometimes, there are leisure (considerable) constraints, because there are limitations (physical/cognitive) to choose from what is available (Losier et al., 1993). Choosing what to do can be very important to the person's involvement in leisure activities, since people feel the most motivated when it's their choice to do something (Losier et al., 1993).

Although most leisure activities can be carried out individually, without interactions with other people, it is important for the elderly to maintain their social contacts, therefore, getting involved in activities that involve relating to others (family, friends, neighbors) will be crucial (Toepoel, 2013). This can be a way to involve them in a more active lifestyle, as they do not

feel so alone to do these activities, and it brings them greater satisfaction and connectivity with others (Brajsˇa-Zˇganec et al., 2011; Toepoel, 2013).

Participation in leisure activities allows the acquisition of new relationships, positive emotions, as well as the learning of new abilities (Brajsˇa-Zˇganec et al., 2011).

Old age is an opportunity to make time to do the things that someone enjoys, giving continuity to those activities and hobbies; this is beneficial for cognitive stimulation and the sustainability of it (Rue, 2010).

Cognitive leisure activities, such as reading, watching TV and playing card games, involve a very important cognitive ability: information processing (Verghese et al., 2003). It can be said that some leisure activities are related to a person's cognitive function (Park et al., 2019), more than that, different activities are associated with different areas of cognition, behavior and functional capacity (Pressman et al., 2009).

Activities such as reading books, playing games and handicraft (e.g., knitting) have been shown to have an association with the decreased probability of someone having a mild cognitive impairment (Geda et al., 2011). Leisure activities that stimulate cognitive abilities are related to good memory abilities, namely episodic memory (Salthouse et al., 2002). However, it depends on the type of activity that is performed and the person's level of education (Park et al., 2002). From those activities, some can be highlighted, such as watching TV, listening to the radio, and reading newspapers and handicraft (e.g., gardening) (Park et al., 2019).

Gardening can be one of the most beneficial activities (Collins & O'Callaghan, 2008), as it allows the elderly to exercise and get in touch with nature, both of which promote health and well-being (Hawkins et al., 2011). It is one of the leisure activities that is related to a healthy lifestyle, it is not an activity that requires a lot of effort, on the part of the elderly, and it is not seen as a task but as a hobby, making it easier for the person to get involved (Wahyuningrum & Sholihah, 2019).

In addition to gardening, playing cards, reading, talking to friends and walking are frequent leisure activities (Wang et al., 2013). In senescence, leisure activities can promote a better

quality of life, through activities such as reading books and walking (Silverstein & Parker, 2002).

The involvement of the elderly in leisure activities can create a positive meaning in their lives, in their physical health and in their social relationships (Chang et al., 2014). Since there are several types of leisure activities, which do not cost money and are easy to perform, they are a great way for people to spend their free time (Chang et al., 2014). It is worth stressing that if the elderly person has a negative perception of his/her health, his/her participation in social activities will also decrease (Sequeira, 2018).

Bearing in mind previous research, the objectives of the present study are:

- to characterize the leisure activities performed by the study participants; and
- to evaluate the relationship between the perception of cognitive performance and the leisure activities performed by the participants.

Method

Participants

Information about the sample is present in the Method section, Participants subsection of Article I (page 14).

Material

In view of the objectives of this study, a Sociodemographic and Clinical Questionnaire, created specifically for the participants of the study, was administered. The Cognitive Function Scale of the Epilepsy Surgery Inventory 55 Survey (ESI-55) was also administered to assess perception of cognitive performance. Finally, the Leisure Activities Index, developed by Martins (2010), specifically to assess the leisure activities performed by the elderly in their free time and their frequency, was administered.

Sociodemographic and Clinical Questionnaire: Information about this instrument is present in the Method section, Materials subsection of Article I (page 15).

Epilepsy Surgery Inventory 55 Survey Cognitive Function Scale (ESI-55): Information about this instrument is present in the Methods section, Materials subsection of Article I (page 15).

Leisure Activities Index, prepared by Martins (2010): This instrument was designed to find out which activities the elderly performed during their free time (Martins, 2010).

It consists of 9 questions, i.e., 9 activities, which could be considered leisure: Reading; Watching TV; Listening to music; Walking; Gardening; Doing horticulture; Knitting; Playing cards; and finally, chatting with friends. (Martins, 2010).

Each item has a Likert-type response scale, with five options, these being: Very little; Little; Neither too much, nor too little; Quite a bit; A lot; these options are scored from 0 to 4 points (Martins, 2010).

To calculate the total score of the instrument, the points for each item are added (Martins, 2010). The scale has a minimum total score of 0 and a maximum score of 36 points and the higher the total score, the more time the person spends on leisure activities (Martins, 2010). If the person scores 0 points, it means that the person does not spend time on (these) leisure activities or dedicates very little time to this type of activities (Martins, 2010).

Furthermore, the author of the instrument created a classification with three levels for the total score of the Leisure Activities Index: if the participant scores from 0 to 15.71 points, it means that (s)he does little/no leisure activities; if (s)he scores from 15.72 to 28.29 points, it indicates that the participant has a moderate frequency of practice of leisure activities; and finally, if (s)he scores above 28.29, it means the participant practice a lot of (these) leisure activities.

The instrument's internal consistency, in this study, is satisfactory, since the values of Cronbach's Alpha are α=0.95. Unfortunately, there's no known values of the Cronbach's Alpha from the author of the instrument to compare to.

Procedure

Initial information on the procedures is available for consultation in the Method section, Procedure subsection of Article I (Page 18). Considering the previous subsection Material, the difference is that instead of using the Lawton-Brody Scale, in the present study the Leisure Activities Index was used.

After the steps mentioned, an exploratory descriptive analysis of the instruments' scores was performed to test the normal distribution of the sample using the Kolmogorov-Smirnov test.

The Kolmogorov-Smirnov value (p= <.001) shows that there is no normal distribution, and it is necessary to use non-parametric tests.

Consequently, Kruskal-Wallis test was used (p=.001) to assess whether the distribution of the Cognitive Function Scale scores was the same in the categories of the Leisure Activity Index (Practices little/nothing; Practices moderately; Practices a lot).

To analyze the relationship between perceived cognitive performance and leisure activities performed, the Spearman Correlation coefficient was calculated, since the sample does not follow a normal distribution.

Results

Characterization of the participants' perceived cognitive performance

This characterization can be consulted in the Method section, in the Subsection Presentation of Results of Article I (page 19).

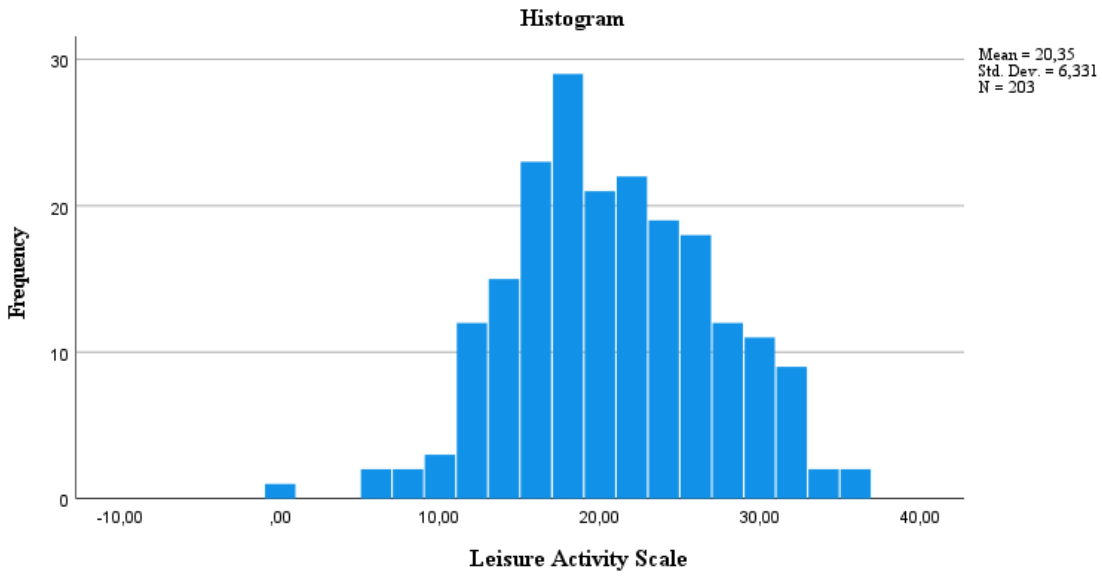
Characterization of the participants' leisure activities

The characterization of the leisure activities performed by the participants was possible through the results of the Leisure Activities Index.

To facilitate the visualization and understanding of the global results of the Leisure Activity Index, a frequency histogram is presented (Fig. 1), which characterizes the frequency with which leisure activities were performed by the sample.

Figure 1

Leisure Activity Index Frequency Histogram

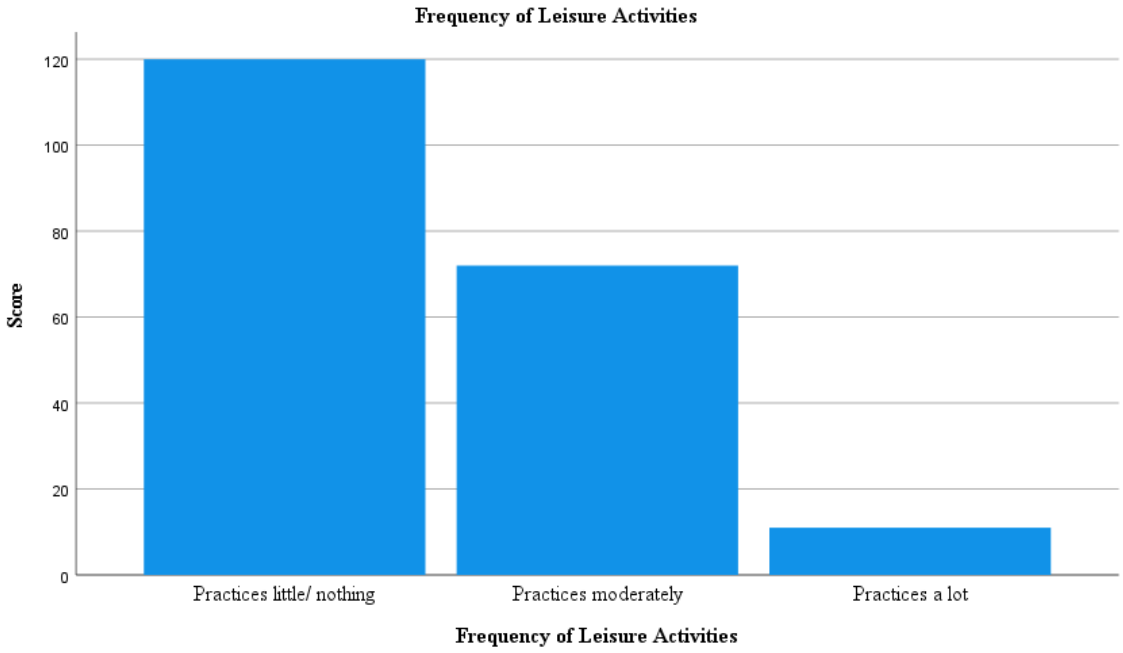


Through the histogram (Fig. 1), it is possible to see that the minimum total score (0) and the maximum total score (36) were reached. The mean of the total scale was 20,35 (*SD*= 6,33).

In other words, globally, the sample practiced little/no leisure activities or, at least, those presented by Martins (2010), since this first level of the classification includes 59.1% (*n*=120) of the sample. Then, another large part of the sample (*n*=72) moderately practiced the leisure activities considered, covering 35.5% of the sample. Finally, 5.4% (*n*=11) practiced these activities a lot (cf. Fig. 2).

Figure 2

Frequency of Leisure Activities Performed



As for the activity “Reading”, some of the sample considered that they practiced this activity “Very little” and “A lot”. A smaller percentage of the participants answered “Little”, “Neither too much, nor too little” and “quite a bit”.

Regarding the activity “Watching television”, most participants answered “Very little” and “Little”.

In the activity “Listening to music” the big percentage of the sample answered “Little” and “Neither too much, nor too little”, The rest of the sample were dispersed trough the other response options.

Considering the activity “Walking”, almost half of the participants responded “Neither too much, nor too little” and “Little” for this activity.

With respect to the activity “Gardening”, almost half of the participants responded “A lot”. A very low percentage of people answered “Very little”. The rest of the sample is divided by the remaining response options.

In the activity “Doing horticulture”, almost half of the sample answered that they practiced this activity “A lot”. A very small percentage of the participants answered “Very little”.

Regarding the activity “Knitting”, more than half of the participants indicated that they practiced this activity “A lot”. A very low percentage of the sample answered “Very little”. The rest of the people are divided with approximate values between the answers “Little”, “Neither too much, nor too little” and “Quite a bit”.

As for “Playing cards”, just a little over half of the participants indicated that they practiced it “A lot”. Once again, only a small percentage of people practiced this activity “Very little”.

Finally, in the activity “Talking to friends”, the answers with the highest percentages are “Very little” and “Little”. Lower percentages of participants indicated practicing “A lot” and “Quite a bit”.

All the results above can be seen in Table 2.

Table 2

Results of the Leisure Activities Index

Leisure Activities	Response options	*N*	%
Reading	Very little	50	24,6
	Little	29	14,3
	Neither too much, nor too little	40	19,7
	Quite a bit	38	18,7
	A lot	46	22,7

	Missing	-	-
Watching TV	Very little	76	37,6
	Little	66	32,7
	Neither too much, nor too little	40	19,8
	Quite a bit	14	6,9
	A lot	6	3,0
	Missing	1	-
Listening to music	Very little	40	19,8
	Little	41	20,3
	Neither too much, nor too little	51	25,2
	Quite a bit	33	16,3
	A lot	37	18,3
	Missing	1	-
Walking	Very little	32	15,9
	Little	43	21,4
	Neither too much, nor too little	56	27,9
	Quite a bit	35	17,2
	A lot	35	17,2
	Missing	2	-
Gardening	Very little	10	4,9
	Little	25	12,3
	Neither too much, nor too little	37	18,2
	Quite a bit	41	20,2

	A lot	90	44,3
	Missing	-	-
Doing horticulture	Very little	6	3,0
	Little	19	9,5
	Neither too much, nor too little	31	15,4
	Quite a bit	46	22,9
	A lot	99	49,3
	Missing	2	-
Knitting	Very little	12	5,9
	Little	25	12,4
	Neither too much, nor too little	26	12,9
	Quite a bit	29	14,4
	A lot	110	54,5
	Missing	1	-
Playing cards	Very little	10	4,9
	Little	23	11,3
	Neither too much, nor too little	31	15,3
	Quite a bit	34	16,7
	A lot	105	51,7
	Missing	-	-
Chatting with friends	Very little	56	27,6
	Little	51	25,1
	Neither too much, nor too little	44	21,7

Quite a bit	33	16,3
A lot	19	9,4
Missing	-	-

Relation between Perceived Cognitive Performance and Performance of Leisure Activities

The Kruskal-Wallis test resulted in a level of significance between the variables under study of .001, which indicates that it is necessary to reject the hypothesis that the distribution is equal and accept that the distribution of the Cognitive Function Scale is not equal in the categories of the Leisure Activities Index. That is, there are differences between the frequency with which leisure activities are performed and the perceived cognitive performance.

Due to what was mentioned previously, the sample does not follow a normal distribution, and therefore it was necessary to use a non-parametric test. In this case, the Spearman Correlation test was used to find out if there was a relationship between the two variables studied, and how strong the relationship was, if any.

Table 2 presents the results of the Spearman Correlation test.

Table 2

Correlations between Perceived Cognitive Performance and Performance of Leisure Activities

			ESI-55 Cognitive Function Scale	Leisure Activities Index
Spearman's rho	ESI-55 Cognitive Function Scale	Correlation Coefficient	1,000	-,267**
		Sig (2-tailed)		<,001
		N	203	203

Leisure Activities Index	Correlation Coefficient	-,267**	1,000
	Sig (2-tailed)	<,001	
	N	203	203

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Firstly, it is necessary to pay attention to the p-value (p=<.001), which shows that there is a significant relationship between the ESI-55 Cognitive Function Scale score and the Leisure Activity Index score.

Next, one should focus on the Spearman's rho value (ρ=-.267), which is in the range of .00 to -.30. According to the value' ranges presented before, explained in Article I, in the Results section (page 27), it shows that the intensity of the correlation between the variables is very little.

Therefore, when participants experience more perceived cognitive difficulties, they engage less frequently in leisure activities. When there's a higher frequency of leisure activities, less cognitive difficulties are perceived by the participants.

Discussion

Although it was not possible to identify a lot of research on the perception of cognitive performance, there is some research on how cognitive performance can decrease with age and, along with this, the performance of new activities and hobbies also decrease, so the results obtained in this study are completely in line with previous research (Shaw et al., 2010; Zhu et al., 2022).

In the literature reviewed, for the elderly to perform an activity, it is not enough just to have good cognitive skills or to want to do it, but also to have the opportunity to choose what they want to do (Losier et al., 1993). This is an important aspect to consider when analyzing the results, since the Leisure Activity Index assesses nine leisure activities, some of which are carried out outdoors or require equipment or prior knowledge. Therefore, in this sample, the

low frequency of activities performed may (also) be explained by other factors than just the perception of the participants' cognitive performance.

Some activities are more related to the person's cognition, as mentioned earlier (Park et al., 2019; Pressman et al., 2009; Verghese et al., 2003). The most mentioned activities were reading, watching television and playing cards. Bearing in mind the results of the Leisure Activities Index, of these, only "Playing cards" is one of the activities most practiced by the participants.

A low frequency of leisure activities performed, especially "reading" and "watching television", may be related to the results obtained regarding the perception of the sample's memory capacity, since the participants indicated having memory difficulties, and the activities mentioned are related to good memory skills (Salthouse et al., 2002). Taking into account that there was a low perception of memory skills, it is understandable that participants did not get (frequently) involved in activities that require these skills.

Also, there is differences in cognitive performance with age, especially when it comes to memory and the attention (Ventura, 2004). Furthermore, sustained attention also tends to decrease with age (Mani et al., 2005). Therefore, this can explain the difficulties of the sample in maintaining attention for a long time.

A leisure activity performed more frequently was "Gardening". As evidenced in the literature, gardening is one of the best activities for the life of the elderly, in this case, not for the cognitive benefits, but for a better physical performance, for the exercise and simplicity of the task, there is a greater adherence to the activity (Collins & O'Callaghan, 2008; Hawkins et al., 2011). Through the results it can be observed that this is one of the most practiced activities, probably because of benefits.

"Playing cards" is a convivial activity, it gives more motivation to carry out this activity, since the elderly, according to the literature review, have greater satisfaction in activities of this type, in which they can have company and feel connected with others (Wang et al., 2013). In addition, it provides the opportunity for new acquisitions, which will have implications for the person's cognitive performance, by stimulating the activity (Silverstein & Parker, 2002).

"Knitting" is also an activity that tends to decrease in someone having mild cognitive impairment (Geda et al., 2011), and, as can be seen, the sample stated performing this activity very often. However, in this study, the objective was to assess the perceived cognitive performance, and not the cognitive abilities that the elderly have, therefore, in this regard, the literature reviewed does not help much.

The activity "walking", according to what was found in the literature, is an activity much sought after by the elderly (Silverstein & Parker, 2002), however, in this study, most participants neither participated much nor participated little, so it may be a very subjective activity to assess.

The results of the ESI-55 Cognitive Function Scale, in this study, showed that the participants have a positive perception of their cognitive performance and the results of the Leisure Activity Index showed that de sample of this study does not practice with frequency the nine leisure activities that were presented.

According to the results obtained in the sample studied, there was a statistical significant relationship between perceived cognitive performance and leisure activities performed. However, this correlation has a very low intensity. Consequently, the results suggest that the perception of cognitive performance of the participants does not have a great influence on the leisure activities performed by them.

Conclusion

The free time of the elderly and the hobbies they choose to do can be numerous. These can be related to the person, their context, or even region. In this study, nine leisure activities which are (supposedly) carried out during free time, with no other objective than the satisfaction and pleasure of the senescent, were explored. These activities have different characteristics and mechanisms: some tend to have a greater influence on the person's cognitive abilities and others are more related to physical abilities.

In this study, the objectives of this study were to characterize the leisure activities performed by the study participants and then evaluate the relationship between the perception of

cognitive performance and the leisure activities performed by the participants, regardless of what skills would be needed to perform them.

In the first instance, it can be said that, in fact, there was a relationship between these two variables, but it is not a very intense one, so there are other factors that may be influencing (more) the results regarding leisure activities performance.

Through the characterization of leisure activities performed and their frequency, it was possible to realize that leisure activities that tend to be considered cognitive leisure activities, such as reading and watching television, were not performed frequently. They are related to the prevention of cognitive deficit, so this result can be related to the fact that there were many reported difficulties with memory and the maintenance of attention in a given activity.

However, another activity within this group is playing cards, and, unlike the other two, it was performed very frequently by the sample. This activity, in addition to being in the group of cognitive leisure activities, is an activity that implies socialization and coexistence with others, a factor that brings positive emotions to the life of the elderly and satisfies them more than the activities that require higher cognitive performance or to be performed alone (Brajsˇa-Zˇganec et al., 2011; Toepoel, 2013).

This study has some limitations with implications to the conclusions that can be reached. To begin with, it was not possible to identify literature on the perceived cognitive performance of the elderly, which would help to better understand whether/to what extent this perception would be an influencing factor of the person's (leisure) actions.

Secondly, the people who participated in the study may not identify with the leisure activities of the instrument used or certain activities are more stimulated than others when it comes to institutionalized participants.

Older age tends to provide more free time in the case individuals are already retired. If this is not the case, and they are still working, it is normal not to participate frequently in leisure activities. Therefore, the fact that the sample practices very little leisure activities, doesn’t mean it’s related to the perception they have of their cognitive performance, but with the context in which the person finds (him)herself. That said, it would be interesting to evaluate

de different contexts the elderly are in, for a more in-depth assessment of the leisure activities performed by them.

In conclusion, performing leisure activities brings a positive meaning to the life of the elderly and even the perception of better health (Pressman et al., 2009). Therefore, the fact that the participants performed very little leisure activities, doesn't corroborate the studies presented, since they perceived their health in a positive way.

Bibliographic References

Adams, K. B., Leibbrandt, S., & Moon, H. (2011). A critical review of the literature on social and leisure activity and wellbeing in later life. *Ageing & Society, 31*(4), 683-712. https://doi.org/10.1017/S0144686X10001091

Brajša-Žganec, A., Merkaš, M., & Šverko, I. (2011). Quality of life and leisure activities: How do leisure activities contribute to subjective well-being?. *Social Indicators Research, 102*, 81–91. https://doi.org/10.1007/s11205-010-9724-2

Chang, P., Wray, L., & Lin, Y. (2014). Social relationships, leisure activity, and health in older adults. *Health psychology, 33*(6), 516–523. https://doi.org/10.1037/hea0000051

Collins, C. C., & O'Callaghan, A. M. (2008). The impact of horticultural responsibility on health indicators and quality of life in assisted living. *HortTechnology, 18*(4), 611-618. https://doi.org/10.21273/HORTTECH.18.4.611

Geda, Y. E., Topazian, H. M., Lewis, R. A., Roberts, R. O., Knopman, D. S., Pankratz, V. S., Christianson, T. J. H., Boeve, B. F., Tangalos, E. G., Ivnik, R. J., & Petersen, R. C. (2011). Engaging in cognitive activities, aging, and mild cognitive impairment: a population-based study. *The Journal of Neuropsychiatry and Clinical Neurosciences, 23*(2), 149–154. https://doi.org/10.1176/jnp.23.2.jnp149

Hawkins, J. L., Thirlaway, K. J., Backx, K., & Clayton, D. A. (2011). Allotment gardening and other leisure activities for stress reduction and healthy aging. *HortTechnology*, *21*(5), 577-585. https://doi.org/10.21273/HORTTECH.21.5.577

Leitner, M., & Leitner, S. (2012). Introduction to leisure services for elders. In M. Leitner & S. Leitner (Eds.), *Leisure in Later Life* (pp. 1-32). Sagamore Publishing. http://faculty.wiu.edu/P-Schlag/chapters/Chapter1.pdf

Losier, G. F., Bourque, P. E., & Vallerand, R. J. (1993). A motivational model of leisure participation in the elderly. *The Journal of psychology*, *127*(2), 153–170. https://doi.org/10.1080/00223980.1993.9915551

Mao, C., Li, Z., Lv, Y., Gao, X., Kraus, V. B., Zhou, J., Wu, X., Shi, W., Li, F., Liu, S., Yin, Z., Zeng, Y., & Shi, X. (2020). Specific leisure activities and cognitive functions among the oldest-old: The chinese longitudinal healthy longevity survey. *The Journals of Gerontology: Series A*, *75*(4), 739–746. https://doi.org/10.1093/gerona/glz086

Mani, T. M., Bedwell, J. S., & Miller, L. S. (2005). Age-related decrements in performance on a brief continuous performance test. *Archives of Clinical Neuropsychology*, *20*(5), 575-586. https://doi.org/10.1016/j.acn.2004.12.008

Park, S., Choi, B., Choi, C., Kang, J. M., & Lee, J. (2019). Relationship between education, leisure activities, and cognitive functions in older adults. *Aging & Mental Health*, *23*(12), 1651-1660. https://doi.org/10.1080/13607863.2018.1512083

Pressman, S. D., Matthews, K. A., Cohen, S., Martire, L. M., Scheier, M., Baum, A., & Schulz, R. (2009). Association of enjoyable leisure activities with psychological and physical well-being. *Psychosomatic Medicine*, *71*(7), 725–732. https://doi.org/10.1097/PSY.0b013e3181ad7978

Rue, A. (2010). Healthy brain aging: Role of cognitive reserve, cognitive stimulation, and cognitive exercises. *Clinics in Geriatric Medicine, 26*(1), 99-111. https://doi.org/10.1016/j.cger.2009.11.003

Salthouse, T. A., Berish, D. E., & Miles, J. D. (2002). The role of cognitive stimulation on the relations between age and cognitive functioning. *Psychology and Aging, 17*(4), 548–557. https://doi.org/10.1037/0882-7974.17.4.548

Shaw, B. A., Liang, J., Krause, N., Gallant, M., & McGeever, K. (2010). Age differences and social stratification in the long-term trajectories of leisure-time physical activity. *The Journals of Gerontology: Series B, 65B*(6), 756–766. https://doi.org/10.1093/geronb/gbq073

Silverstein, M., & Parker, M. G. (2002). Leisure activities and quality of life among the oldest old in Sweden. *Research on Aging, 24*(5), 528-547. https://doi.org/10.1177/0164027502245003

Toepoel, V. (2013). Aging, leisure, and social connectedness: How could leisure help reduce social isolation of older people?. *Social indicators research, 113*, 355–372. https://doi.org/10.1007/s11205-012-0097-6

Ventura, R. L. (2004). Deterioro cognitive en el envejecimiento normal. *Revista de Psiquiatria y Salud Mental Hermilio Valdizán, 5*(2), 17-25. http://www.hhv.gob.pe/wp-content/uploads/Revista/2004/II/2-DETERIORO_COGNITIVO.pdf

Verghese, J., LeValley, A., Derby, C., Kuslansky, G., Katz, M., Hall, C., Buschke, H., & Lipton, R. B. (2006). Leisure activities and the risk of amnestic mild cognitive impairment in the elderly. *Neurology, 66*(6), 821–827. https://doi.org/10.1212/01.wnl.0000202520.68987.48

Verghese, J., Lipton, R. B., Katz, M. J., Hall, C. B., Derby, C. A., Kuslansky, G., Ambrose, A. F., Sliwinski, M., & Buschke, H. (2003). Leisure activities and the risk of dementia in the elderly. *The New England Journal of Medicine, 348*(25), 2508-2516. https://www.nejm.org/doi/full/10.1056/NEJMoa022252

Wahyuningrum, M. A., & Sholihah, S. M. (2019, july 22). *Influence of gardening activities towards decreasing hypertension of elderly pressure* [Paper presentation]. 1st International Respati Health Conference, Indonésia. https://prosiding.respati.ac.id/index.php/PIC/article/view/75/0

Waldman-Levi, A., Erez, A. B., & Katz, N. (2015). Healthy aging is reflected in well-being, participation, playfulness, and cognitive-emotional functioning. *Healthy Aging Research, 4*(8). https://www.longdom.org/abstract/healthy-aging-is-reflected-in-wellbeing-participation-playfulness-and-cognitiveemotional-functioning-3763.html

Wang, H. X., Jin, Y., Hendrie, H. C., Liang, C., Yang, L., Cheng, Y., Unverzagt, F. W., Ma, F., Hall, K. S., Murrell, J. R., Li, P., Bian, J., Pei, J. J., & Gao, S. (2013). Late life leisure activities and risk of cognitive decline. *The journals of gerontology, Series A: Biological sciences and medical sciences, 68*(2), 205–213. https://doi.org/10.1093/gerona/gls153

Zhu, C., Zhou, L., & Zhang, X. (2022). Effects of leisure activities on the cognitive ability of older adults: A latent variable growth model analysis. *Frontiers in Psychology, 13*, 838878. https://doi.org/10.3389/fpsyg.2022.838878

CONCLUSION

Conclusion

The evolution of the elderly population in Portugal requires the existence of studies that cover the multifaceted process of aging. The objective with this project was to evaluate some psychosocial factors of the development of the elderly, through perceived cognitive performance, Instrumental Activities of Daily Living (IADL) and leisure activities that the elderly perform. To this end, specific objectives were outlined for each of the articles presented throughout the dissertation, so that together they would correspond to the general objective.

In Article I, the objectives were to assess the perception of cognitive performance of a sample of elderly individuals living in Portugal, know the daily activities performed by them and then, study the relationship between their perception of cognitive performance and their activities of daily living.

For this, first, through a narrative review of the literature, IADL, which are of great importance for the survival of the elderly and their independence in the community, were defined. In addition, scientific literature was reviewed in order to understand if the perception of cognitive performance is significantly relevant for the accomplishment of these activities. After synthesizing this knowledge, it was possible to characterize the sample, using the analysis of variables and the study of the relationship between them.

The study sample showed a low level of perceived cognitive performance reporting various difficulties in memory, difficulty in maintaining attention and in executive functions. With regard to IADL, in this case, the dependence or independence of the sample was studied, it was revealed that most participants had a moderate dependence.

It was concluded that although the perceived cognitive performance and the level of dependence of the sample were correlated, the intensity of this correlation was very low, almost null. There may be other variables that have a stronger correlation with IADL than perceived cognitive performance. It became clear, nevertheless, that the higher the level of perceived cognitive performance, the lower the dependence on IADL, and the greater the dependence on IADL, the lower the level of perception of cognitive performance.

In Article II, the focus to characterize the leisure activities performed by the study participants and to evaluate the relationship between the perception of cognitive performance and the leisure activities performed by the participants.

The steps to reach the proposed objectives were similar to those of the previous article, and a narrative review of the literature was used to understand the definition of leisure activities and some types of activities that are performed by the elderly. The possibilities seem endless, however, in this study, the focus was on nine leisure activities: Reading; Watching TV; Listening to music; Walking; Gardening; Doing horticulture; Knitting; Playing cards; and Chatting with friends. These activities were chosen due to the instrument used for data collection, that seemed particularly adequate for the target population and the broader project in which these two studies are included.

In view of this, it was possible to see that certain activities were performed more frequently than others. More practical activities, such as gardening, doing horticulture, knitting, and playing cards, were more practiced by the elderly of the study, unlike the other activities considered. Activities that require greater information processing, such as reading and watching television, were rarely performed, revealing that the sample, in general, performed very little leisure activities.

It was concluded that the perception of cognitive performance was related to the frequency with which the leisure activities were performed, however, as happened in Chapter I, the intensity of this correlation is very low.

Although the objectives were met, the study is not without limitations, some of which have already been mentioned in each chapter.

The data was collected in institutions for the elderly, which is a population at risk, and in the context of the COVID-19 pandemic, when there were immense isolations (by hospitalized participants) making it impossible to gather a larger and more robust sample. The time to collect the data was also scarce, due to the potential participants' schedules, restricting the participation of more people.

In addition, the fact that there is almost no study (as far as the literature review showed) that presents the importance of the perception of the elderly regarding their cognitive

performance, only studies on the perception of their health in general were found, which meant that there was not much possibility to compare the results obtained with what was identified in previous research.

That said, for future studies, it would be interesting to use an instrument to assess the perception of cognitive performance and an instrument to assess cognitive performance, and compare the results, as more in-depth conclusions could be drawn on this topic. Also, it would be a way to expand the number of studies on the perception of the elderly about their own cognitive ability and objective ability. It would also be important to understand the motivations that the elderly have to perform certain actions and activities, in this case, activities of daily living and leisure activities.

Still, also for a more robust assessment, it would be relevant to analyze the differences between the activities performed by hospitalized/institutionalized people and those who are not in this situation, as this is a factor that can prevent the person from performing certain activities.

Finally, the topics discussed throughout this dissertation show great importance in the development of the elderly and in the process of healthy aging. Nowadays, there is a duty to contribute so that the elderly have a dignified and comfortable life, that they are able to be independent and live in society, for this, this type of studies are necessary to bring awareness and knowledge about them, not only about the negative side of older adulthood, but all the possibilities it brings and how to foster them.

Bibliographic References

Introduction

Apóstolo, J. L. A., Cardoso, D. F. B., Marta, L. M. G., & Amaral, T. I. O. (2011). Efeito da estimulação cognitiva em Idosos. *Revista de Enfermagem*, *3*(5), 193-201. https://doi.org/10.12707/RIV18043

Dardengo, C. F. R., & Mafra, S. C. T. (2018). Os conceitos de velhice e envelhecimento ao longo do tempo: Contradição ou adaptação?. *Revista de Ciências Humanas*, *18*(2), 1-23. https://periodicos.ufv.br/RCH/article/view/8923

Fechine, B. R. A., & Trompieri, N. (2012). O processo de envelhecimento: As principais alterações que acontecem com o idoso com o passar dos anos. *Revista Científica Internacional*, 1(7), 106-132. https://www.fonovim.com.br/arquivos/534ca4b0b3855f1a4003d09b77ee4138-Modifica----es-fisiol--gicas-normais-no-sistema-nervoso-do-idoso.pdf

Imaginário, C., Machado, P., Rocha, M., Antunes, C., & Martins, T. (2017). Atividades de vida diária como preditores do estado cognitivo em idosos institucionalizados. *Revista Portuguesa de Enfermagem de Saúde Mental*, *18*, 37-43. http://dx.doi.org/10.19131/rpesm.0190

Instituto Nacional de Estatística. (2020, março 31). Projeções de População Residente em Portugal. https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdest_boui=406534255&DESTAQUESmodo=2&xlang=pt.

Kelly, M. E., Duff, H., Kelly, S., Power, J. E. M., Brennan, S., Lawlor, B. A., & Loughrey, D. G. (2017). The impact of social activities, social networks, social support and

social relationships on the cognitive functioning of healthy older adults: a systematic review. *Systematic Reviews, 6,* 259. https://doi.org/10.1186/s13643-017-0632-2

Martins, R. M. L. (2010). Os idosos e as actividades de lazer. *Millenium - Journal of Education, Technologies, and Health, 38*(15), 243-251. https://revistas.rcaap.pt/millenium/article/view/8260

Neri, A. L. (2013). Teorias psicológicas do envelhecimento: Percurso Histórico e teorias atuais. In E. Freitas, & L. Py (Eds.), *Tratado de Geriatria e Gerontologia* (pp. 102-118). Guanabara. https://ftramonmartins.files.wordpress.com/2016/09/tratado-de-geriatria-e-gerontologia-3c2aa-ed.pdf

Netto, P. M. (2013). O estudo da velhice. Histórico, definição do campo e termos básicos. In E. Freitas, & L. Py (Eds.), *Tratado de Geriatria e Gerontologia* (pp. 62-75). Guanabara. https://ftramonmartins.files.wordpress.com/2016/09/tratado-de-geriatria-e-gerontologia-3c2aa-ed.pdf

Ordem dos Psicólogos Portugueses (2015). O Papel dos Psicólogos no Envelhecimento. Lisboa.

Rodrigues, L. S., & Soares, G. A. (2006). Velho, idoso e terceira idade na sociedade contemporânea. *Revista Ágora, 4,* 1-29. https://periodicos.ufes.br/agora/article/view/1901

Sacramento, A. M., Chariglione, I. P. F. S., Melo, G. F., & Cárdenas, C. J. (2021). Avaliação da autoeficácia e da memória em idosos: Uma análise exploratória. *Psicologia: Teoria e Pesquisa, 37,* e373113. https://doi.org/10.1590/0102.3772e373113

Schneider, R. H., Marcolin, D., & Dalacorte, R. R. (2008). Avaliação funcional de idosos. *Scientia Medica, 18*(1), 4-9. https://revistaseletronicas.pucrs.br/ojs/index.php/scientiamedica/article/view/2090

McAlpine, D. D., & Rhee, T. G. (2016). Mental health, cognitive ability, and dementia across the life course. In M. Meyer & E. Daniele (Eds.), *Gerontology: changes, challenges, and solutions - volume 2* (pp. 157-180). Praeger. https://libgen.is/book/index.php?md5=5843C57DABE68C86FB7E6BF59B0F924F

Article I

Almeida, P., Mendonça, M. A., Marinho, M. S., Santos, L. S., Andrade, S. M. B., & Reis, L. A. (2017). Funcionalidade e fatores associados em idosos participantes de grupo de convivência. *Revista da Associação Brasileira de Atividades Motora Adaptada, 18*(1), 53-64. https://doi.org/10.36311/2674-8681.2017.v18n1.05.p53

Assunção, J. L. A., & Charriglione, I. P. F. S. (2020). Envelhecimento cognitivo, autoeficácia e atividade física: Uma revisão sistemática. *Revista Psicologia da IMED, 12*(1), 116-132. https://doi.org/10.18256/2175-5027.2020.v12i1.3120

Becattini-Oliveira, A. C., Câmara, L. C. P., Dutra, D. F., Sigrist, A. A. F., & Charchat-Fichman, H. (2019). Performance-based instrument to assess functional capacity in community-dwelling older adults. Dementia & Neuropsychologia, *13*(4), 386-393. http://dx.doi.org/10.1590/1980-57642018dn13-040004

Bland, J. M., & Altman, D. G. (1977). Cronbach's Alpha. *British Medical Journal, 314*, 572. http://dx.doi.org/10.1136/bmj.314.7080.572

Dostálová, R., Stillman, C., Erickson, K. I., Slepiˇcka, P., & Mudrák, J. (2021). The Relationship between physical activity, self-perceived health, and cognitive function in older adults. *Brain Sciences, 11*(4), 492. https://doi.org/10.3390/brainsci11040492

Fan, B. J. Y., & Wong, R. Y. M. (2019). Effect of cognitive training on daily function in older people without major neurocognitive disorder: A systematic review. *Geriatrics*, *4*(3), 44. https://doi.org/10.3390/geriatrics4030044

Herreen, D., & Zajac, I. T. (2018). The reliability and validity of a self-Report measure of cognitive abilities in older adults: more personality than cognitive function. *Journal of Intelligence*, *6*(1), 1. https://doi.org/10.3390/jintelligence6010001.

Lawton, M., & Brody, E. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist, 9*(3), 179-186. https://www.semanticscholar.org/paper/Assessment-of-older-people%3A-self-maintaining-and-of-Lawton-Brody/35e2f446f48838fc036f376e5ff15e1835d9b596

Leal, R. C., Veras, S. M. J., Silva, M. A. S., Gonçalves, C. F. G., Silva, C. R. D. T., Sá, A. K. L., Carvalho, V. P. S., & Silva, M. F. B. (2020). Efeitos do envelhecer: Grau de dependência de idosos para as atividades da vida diária. *Brazilian Journal of Development*, *6*(7), 53931-53940. https://doi.org/10.34117/bjdv6n7-876

Lenardt, M. H., Silva, S. C., Seima, M. D., Willig, M. H., & Fuchs, P. A. O. (2011). Desempenho das atividades de vida diária em idosos com alzheimer. *Revista Cogitare Enfermagem*, *16*(1), 13-21. http://dx.doi.org/10.5380/ce.v16i1.21106

Lini, E. V., Lima, A. P., Cardoso, F. B., Portella, M. R., & Doring, M. (2020). Factors associated with instrumental activities of daily living dependence in the elderly: A case-control study. *Ciência e Saúde Coletiva, 25*(11), 4623-4630. https://doi.org/10.1590/1413-812320202511.03432019

Marôco, J. (2021). *Análise estatística com o SPSS Statistics*. (8th ed.). ReportNumber.

Meneses, R. (2005). *Promoção da Qualidade de vida de doentes crónicos: Contributos no contexto das Epilepsias Focais*. edições UNIVERSIDADE FERNANDO PESSOA.

Netto, P. M. (2013). O estudo da velhice. Histórico, definição do campo e termos básicos. In E. Freitas, & L. Py (Eds.), *Tratado de Geriatria e Gerontologia* (pp. 62-75). Guanabara. https://ftramonmartins.files.wordpress.com/2016/09/tratado-de-geriatria-e-gerontologia-3c2aa-ed.pdf

Ran, L., Jiang, X., Li, B., Du, M., Yu, H., & Liu, Q. (2017). Association among activities of daily living, instrumental activities of daily living and health-related quality of life in elderly Yi ethnic minority. *BMC Geriatrics, 17*, 74. https://doi.org/10.1186/s12877-017-0455-y

RAND. (1993). Epilepsy Surgery Inventory 55 Survey (ESI-55). https://www.rand.org/health-care/surveys_tools/esi.html

Ribeiro, J. (2005). O importante é a saúde: estudo de adaptação de uma técnica de avaliação do estado de saúde – SF-36. Fundação Merck Sharp & Dohme.

Royall, D. R., Lauterbach, E. C., Kaufer, D., Malloy, P., Coburn, K. L., & Black, K. J. (2007). The cognitive correlates of functional status: A review from the committee on research of the american neuropsychiatric association. *The Journal of Neuropsychiatry and Clinical Neurosciences, 19*(3), 249-265. https://neuro.psychiatryonline.org/doi/full/10.1176/jnp.2007.19.3.249

Royall, D. R., Palmer, R., Chiodo, L. K., & Polk, M. J. (2005). Executive control mediates memory's association with change in instrumental activities of daily living: The

freedom house study. *Journal of the American Geriatrics Society, 53*(1), 11-17. https://doi.org/10.1111/j.1532-5415.2005.53004.x

Sant'Helena, D. P., Silva, P. C., & Gonçalves, A. K. (2020). Capacidade funcional e atividades da vida diária no envelhecimento. In E. Sampaio (Ed.), *Envelhecimento humano: Desafios contemporâneos - volume 1* (pp. 204-218). Editora Científica Digital. https://www.editoracientifica.com.br/books/livro-envelhecimento-humano-desafios-contemporaneos-volume-1

Santos, B. P., Amorim, J. S. C., Poltronieri, B. C., & Hamdan, A. C. (2021). Association between functional disability and cognitive deficit in hospitalized elderly patients. *Cadernos Brasileiros de Terapia Ocupacioal, 29*, e2101. https://doi.org/10.1590/2526-8910.ctoAO2101.

Sequeira, C. (2018). *Cuidar de idosos com dependência física e mental*. (2nd ed.). Lidel.

Sequeira, C. (2007). *Cuidar de idosos dependentes*. Quarteto.

Sousa, H. A., Moura, B. M., Júnior, E. O. C., Rezende, F. A. C., Brito, T. R. P., Neto, L. S. S., Osório, N. B., & Nunes, D. P. (2019). Limitação funcional em atividades de vida diária e fatores associados em idosos da universidade da maturidade. *Revista Humanidades e Inovação, 6*(11), 88-97. https://revista.unitins.br/index.php/humanidadeseinovacao/article/view/1575.

Yadav, S. (2018). Correlation analysis in biological studies. *Journal of the Practice of Cardiovascular Sciences, 8*(2), 116-121. https://www.j-pcs.org/article.asp?issn=2395-5414;year=2018;volume=4;issue=2;spage=116;epage=121;aulast=Yadav

Article II

Adams, K. B., Leibbrandt, S., & Moon, H. (2011). A critical review of the literature on social and leisure activity and wellbeing in later life. *Ageing & Society, 31*(4), 683-712. https://doi.org/10.1017/S0144686X10001091

Brajša-Žganec, A., Merkaš, M., & Šverko, I. (2011). Quality of life and leisure activities: How do leisure activities contribute to subjective well-being?. *Social Indicators Research, 102*, 81–91. https://doi.org/10.1007/s11205-010-9724-2

Chang, P., Wray, L., & Lin, Y. (2014). Social relationships, leisure activity, and health in older adults. *Health psychology, 33*(6), 516–523. https://doi.org/10.1037/hea0000051

Collins, C. C., & O'Callaghan, A. M. (2008). The impact of horticultural responsibility on health indicators and quality of life in assisted living. *HortTechnology, 18*(4), 611-618. https://doi.org/10.21273/HORTTECH.18.4.611

Geda, Y. E., Topazian, H. M., Lewis, R. A., Roberts, R. O., Knopman, D. S., Pankratz, V. S., Christianson, T. J. H., Boeve, B. F., Tangalos, E. G., Ivnik, R. J., & Petersen, R. C. (2011). Engaging in cognitive activities, aging, and mild cognitive impairment: a population-based study. *The Journal of Neuropsychiatry and Clinical Neurosciences, 23*(2), 149–154. https://doi.org/10.1176/jnp.23.2.jnp149

Hawkins, J. L., Thirlaway, K. J., Backx, K., & Clayton, D. A. (2011). Allotment gardening and other leisure activities for stress reduction and healthy aging. *HortTechnology, 21*(5), 577-585. https://doi.org/10.21273/HORTTECH.21.5.577

Leitner, M., & Leitner, S. (2012). Introduction to leisure services for elders. In M. Leitner & S. Leitner (Eds.), *Leisure in Later Life* (pp. 1-32). Sagamore Publishing. http://faculty.wiu.edu/P-Schlag/chapters/Chapter1.pdf

Losier, G. F., Bourque, P. E., & Vallerand, R. J. (1993). A motivational model of leisure participation in the elderly. *The Journal of psychology*, *127*(2), 153–170. https://doi.org/10.1080/00223980.1993.9915551

Mao, C., Li, Z., Lv, Y., Gao, X., Kraus, V. B., Zhou, J., Wu, X., Shi, W., Li, F., Liu, S., Yin, Z., Zeng, Y., & Shi, X. (2020). Specific leisure activities and cognitive functions among the oldest-old: The chinese longitudinal healthy longevity survey. *The Journals of Gerontology: Series A*, *75*(4), 739–746. https://doi.org/10.1093/gerona/glz086

Mani, T. M., Bedwell, J. S., & Miller, L. S. (2005). Age-related decrements in performance on a brief continuous performance test. *Archives of Clinical Neuropsychology*, *20*(5), 575-586. https://doi.org/10.1016/j.acn.2004.12.008

Park, S., Choi, B., Choi, C., Kang, J. M., & Lee, J. (2019). Relationship between education, leisure activities, and cognitive functions in older adults. *Aging & Mental Health*, *23*(12), 1651-1660. https://doi.org/10.1080/13607863.2018.1512083

Pressman, S. D., Matthews, K. A., Cohen, S., Martire, L. M., Scheier, M., Baum, A., & Schulz, R. (2009). Association of enjoyable leisure activities with psychological and physical well-being. *Psychosomatic Medicine*, *71*(7), 725–732. https://doi.org/10.1097/PSY.0b013e3181ad7978

Rue, A. (2010). Healthy brain aging: Role of cognitive reserve, cognitive stimulation, and cognitive exercises. *Clinics in Geriatric Medicine*, *26*(1), 99-111. https://doi.org/10.1016/j.cger.2009.11.003

Salthouse, T. A., Berish, D. E., & Miles, J. D. (2002). The role of cognitive stimulation on the relations between age and cognitive functioning. *Psychology and Aging*, *17*(4), 548–557. https://doi.org/10.1037/0882-7974.17.4.548

Shaw, B. A., Liang, J., Krause, N., Gallant, M., & McGeever, K. (2010). Age differences and social stratification in the long-term trajectories of leisure-time physical activity. *The Journals of Gerontology: Series B, 65B*(6), 756–766. https://doi.org/10.1093/geronb/gbq073

Silverstein, M., & Parker, M. G. (2002). Leisure activities and quality of life among the oldest old in Sweden. *Research on Aging, 24*(5), 528-547. https://doi.org/10.1177/0164027502245003

Toepoel, V. (2013). Aging, leisure, and social connectedness: How could leisure help reduce social isolation of older people?. *Social indicators research, 113*, 355–372. https://doi.org/10.1007/s11205-012-0097-6

Ventura, R. L. (2004). Deterioro cognitive en el envejecimiento normal. Revista de Psiquiatria y Salud Mental Hermilio Valdizán, 5(2), 17-25. http://www.hhv.gob.pe/wp-content/uploads/Revista/2004/II/2-DETERIORO_COGNITIVO.pdf

Verghese, J., LeValley, A., Derby, C., Kuslansky, G., Katz, M., Hall, C., Buschke, H., & Lipton, R. B. (2006). Leisure activities and the risk of amnestic mild cognitive impairment in the elderly. *Neurology, 66*(6), 821–827. https://doi.org/10.1212/01.wnl.0000202520.68987.48

Verghese, J., Lipton, R. B., Katz, M. J., Hall, C. B., Derby, C. A., Kuslansky, G., Ambrose, A. F., Sliwinski, M., & Buschke, H. (2003). Leisure activities and the risk of dementia in the elderly. *The New England Journal of Medicine, 348*(25), 2508-2516. https://www.nejm.org/doi/full/10.1056/NEJMoa022252

Wahyuningrum, M. A., & Sholihah, S. M. (2019, july 22). *Influence of gardening activities towards decreasing hypertension of elderly pressure* [Paper presentation]. 1st

International Respati Health Conference, Indonésia. https://prosiding.respati.ac.id/index.php/PIC/article/view/75/0

Waldman-Levi, A., Erez, A. B., & Katz, N. (2015). Healthy aging is reflected in well-being, participation, playfulness, and cognitive-emotional functioning. *Healthy Aging Research*, *4*(8). https://www.longdom.org/abstract/healthy-aging-is-reflected-in-wellbeing-participation-playfulness-and-cognitiveemotional-functioning-3763.html

Wang, H. X., Jin, Y., Hendrie, H. C., Liang, C., Yang, L., Cheng, Y., Unverzagt, F. W., Ma, F., Hall, K. S., Murrell, J. R., Li, P., Bian, J., Pei, J. J., & Gao, S. (2013). Late life leisure activities and risk of cognitive decline. *The journals of gerontology, Series A: Biological sciences and medical sciences*, *68*(2), 205–213. https://doi.org/10.1093/gerona/gls153

Zhu, C., Zhou, L., & Zhang, X. (2022). Effects of leisure activities on the cognitive ability of older adults: A latent variable growth model analysis. *Frontiers in Psychology*, *13*, 838878. https://doi.org/10.3389/fpsyg.2022.838878