



# Centenary Personality: Are There Psychological Resources that Distinguish Centenarians?

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Accepted: 15 October 2023 / Published online: 8 November 2023  
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## Abstract

The number of centenarians is increasing year by year. Considering that happier people are likely to live longer, we asked ourselves whether healthy centenarians share psychological resources or positive personality characteristics that have enabled them to face traumatic situations and the challenges life more successfully. To our knowledge this is an issue that has not been sufficiently researched. Mixed methodology was applied. Qualitative Study 1: Nineteen centenarians participated between 100 and 107 years old of which 16 were women. Semi-structured, in-depth interviews about their life story were done. Quantitative Study 2: The purpose was to control the results of Study 1. Fifteen proxies for the centenarians participated. Results: In Study 1, 35 psychological resources were identified, of which 19 were central or identifying resources of the centenarians, and 16 peripheral or the product of individual differences. The central resources were grouped into six categories: vitality, taking pleasure in interaction, commitment, control, intellectually motivated and positivity, with resilience and intelligence added. The results in Study 2 were completely concordant. In conclusion, analysis of the lives of healthy centenarians provides us with knowledge that could help in achieving a healthy old age. Additionally, the study opens up new lines of research.

**Keywords** Centenarians · Psychological resources · Personality · Aging · Well-being

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# 1 Introduction

## 1.1 The General Context: Aging Population

According to the WHO, healthy aging is a process of fostering and maintaining the functional ability that allows for well-being during the old age. Functional ability is to be able of being and doing the things that are important for them (WHO, 2019). Therefore, it is a process which is built throughout life. The world's aging population is currently the largest in human history, which is why healthy aging is one of the challenges for the World Health Organization (WHO, 2019) for 2021–2030. Until quite recently, reaching the age of 100 was a virtually unattainable milestone (Wilcox et al., 2010). However, in recent years this population has been progressively increasing and is one of the fastest-growing population groups (Borrás et al., 2020). In fact, the global number of centenarians is projected to increase 10-fold between 2010 and 2050 (WHO, 2012). Spain is one of the countries that leads the world ranking of centenarians (Córdoba et al., 2018). According to the latest data available from the National Statistics Institute (INE, 2022), in Spain there are 19,639 people aged 100 or over, of whom 77.6% are women. It is also estimated that this figure will increase to 226,932 by 2072 (INE, 2022–2072). Nevertheless, despite the numerical importance of this population, few studies have been carried out on this subject in Spain (Córdoba & Pinazo-Hernandis, 2016). So, to understand what psychological factors contribute to reach that age in good conditions is an important aim for the society.

## 1.2 Personality, Well-being and Longevity

Personality is an important factor in the health and well-being of individuals as it will influence the cognitions, attitudes, and behaviors in which the individual is involved (Pocnet et al., 2021). In addition, personality will have an impact on the subjective assessment of stressful situations and on the subsequent emotional response (Borrás et al., 2020). In short, there is no doubt that well-being and personality play a relevant role in healthy aging. On the other hand, it is important to note that although personality is stable, it is also exposed to biological and environmental changes (Helson et al., 2002). Different studies show personality can undergo changes as an adult and in old age, basically in dimensions such as neuroticism, extraversion, openness, and agreeableness (Allemand et al., 2007; Helson et al., 2002; Maiden et al., 2003). And that the most significant changes in old age are related to the presence of an organic illness, as in the context of dementia syndromes (frontotemporal lobar degeneration, Alzheimer's disease, light cognitive deterioration) or an underlying medical condition (Lautenschlager & Förstl, 2007). Nevertheless, personality traits are relatively stable throughout the life cycle (Pocnet et al., 2011; Harris et al., 2016). Most of the research on personality and longevity has focused on testing specific models or traits. Principally, studies have related healthy extreme longevity with the personality by means of the Big Five Model (Law et al., 2014), finding that healthy centenarians are characterized mainly by high responsibility and extraversion and low neuroticism (Martin et al., 2006; Masui et al., 2006; Givens et al., 2010; Baek et al., 2016). Extraversion and low neuroticism, or emotional stability, are the personality traits that best predict well-being (Schmutte & Ryff, 1997; Grant et al., 2009), and this, in turn, is also related to health and longevity (Danner et al., 2001; Diener & Chan, 2011; Veenhoven, 2008). So much so, that well-being has

been recognized as a public health issue of the utmost importance (Diener & Chan, 2011; Martín-María et al., 2017a). Nevertheless, one of the little-studied questions left by research on well-being and longevity is whether there are personality positive characteristics or psychological resources that are associated with healthy extreme longevity.

### 1.3 Psychological Resources and Longevity

According to The Conservation of Resources Theory (Hobfoll, 1989), resources are aspects that people value in their own right and/or serve as a means to an end (Merino et al., 2021). There are different kinds of resources, such as: materials (for instance, to have house), social (for example, to have a partner) psychological (for example, optimism) (Diener & Fujita, 1995). Psychological resources are the ingredients that nourish psychological well-being (Ryff, 1989; Merino & Privado, 2015), such as optimism, environmental mastery, autonomy, etc., which although stable, can be learned and shaped; they are valued for themselves because they are associated with favorable results for the individual; and they enable better adaptation to the environment and to change, promoting individual progress toward achievement of personal goals and the satisfaction of needs (Hobfoll, 2002; Merino & Privado, 2015). Unlike personality traits, psychological resources present a greater potential for learning, are always positive, contribute to well-being, and are usually more specific constructs and not macro-constructs such as, for example, extraversion (Hobfoll, 1989; Diener & Fujita, 1995). Psychological resources have been studied very little and only indirectly. Also, these psychological characteristics of personality have rarely been referred to under the term psychological resource. However, some studies identify healthy centenarians as active people, with interests, satisfied with their lives, optimistic, cheerful, calm, with life goals, strong religious beliefs, strong emotional ties to their family, and who have been able to face adversity, that is, they are resilient (Puga, 2007; Darviri et al., 2009; Hutnik et al., 2012; Jopp et al., 2016; Scelzo et al., 2018; Lagacé & Bergeron, 2021; Poulain & Herm, 2021). Resilience is the psychological resource that has received the most attention in research (Martin et al., 2010). Resilience is usually understood as the ability to face adversity, overcome challenges, and maintain mental balance. It even implies emerging stronger from the adverse experience (Rutter, 1985). As such, it is a very powerful resource to deal with the challenges, traumas, and difficulties we are subject to in life. Resilience is a protective factor in the face of stressful events and, as such, a driver of well-being in adverse situations and, consequently, a protector of the person's health (Babić et al., 2020). Thus, it makes sense that it is associated with greater longevity and has attracted much attention. To that effect, Martin et al. (2010), finding a clear association with longevity in samples of centenarians. In this respect, Martin et al. (2010) points out that healthy centenarians have a resilient personality that has enabled them to find ways of adapting to the difficulties, limitations and changes typical of extreme longevity. In addition, Borrás et al. (2020) point out that characteristics such as positive emotions, warmth, energy, sociability, and optimism can help people cope more successfully with the stressful events they face throughout their lives. Thus, personality and coping play a very relevant role in this regard, in relation to which psychological resources are the tools that make it easier for them to adapt to change, challenges and difficulties. In keeping with this, Kahana and Kahana's Theory of Proactive Coping (1996, 2003) highlights the importance in positive aging of internal (psychological) resources, such as self-esteem or hope, and external resources such as technology, social

and health services, etc., as the accumulation of these resources will be key in facing stressful events. In line with the above, according to the selection, optimization, and compensation framework by Baltes and Baltes (1990), psychological as well as material and social resources are crucial elements in successful aging in order to cope properly with losses, traumas or difficulties, as these will be the tools that favor adaptive behavior when confronting such situations. In accordance with what has been noted, we observe (1) that personality plays a relevant role in healthy aging; in fact, studies show that healthy centenarians share certain personality traits, (2) coping skills are crucial in successful aging (Kahana & Kahana (1996, 2003); Baltes and Baltes (1990) and healthy centenarians are resilient survivors (Martin et al., 2010). However, we are not certain as to what other psychological resources might be favoring the adaptation to change, challenges, and difficulties in healthy centenarians.

## 2 Objective

According to what has been stated above, the objective of this research is to know whether centenarians who have reached this age healthy share positive personality characteristics or psychological resources that have helped them to cope more successfully with the challenges, traumas, and difficulties they have, no doubt, faced during such a long life.

To respond to this objective, we will use mixed methodology: qualitative to identify these resources and quantitative to triangulate the results found. As such, the research will be structured in two studies: (1) exploratory and qualitative, and (2) control and quantitative.

## 3 Exploratory Study 1: Qualitative

### 3.1 Methodology

#### 3.1.1 Participants

The sample was made up of 19 centenarians, all of whom had reached this age in good health, that is: (1) without showing signs of dementia or cognitive impairment (2) maintaining reasonable functional autonomy (capable of standing up and walking, eating alone, doing activities, etc.). It should be noted that the sample originally consisted of 20 centenarians, but one of them had to be rejected as during the interview they developed inconsistent, contradictory arguments.

Of the 19, 16 were women and 3 were men. The age range was 100 to 107 years old. Regarding education: one had university studies, two high school, fourteen primary school studies and two were never schooled, although they knew how to read and write. For social class: high middle 5, middle 5, and low middle 9. About place of residence, 11 lived in their own home or in the home of a daughter, and 8 lived in retirement homes. All come from Spain and regarding the autonomous region: 7 were from Castile-Leon, 4 from Madrid, 3 from Andalusia, 2 from Asturias, 1 from the Basque Country, and 1 from Castilla-La Mancha.

### 3.1.2 Procedure

Four ways were utilized to identify participants: (1) networks of contacts (family members, friends, students), (2) DomusVi (a social health company dedicated to attention and care for the elderly through its services: Residences, Day Centers, Telecare, Home Help. The average age of the elderly who use these services is 85.6 years of age, with 0.90% being people over 100 years of age), (3) Social Services from municipalities with the largest population of centenarians, and (4) nursing home directors. Once the centenarian was identified, the person closest to them was contacted by telephone to arrange the day, time, and place to do the interview. They read the informed consent prior to the interview. We verified that it had been understood and they were asked to sign the informed consent. It was explained what the interview would be about and that it would last a maximum of two hours. Consent to record the interview was requested. Once the interview was completed, they were thanked for their participation and were asked permission to contact them in the future if further information was needed or to clarify any possible doubts.

### 3.1.3 Instrument

Semi-structured in-depth interviews on the life story lasting approximately two hours and guided by a flexible script that was adapted throughout the discourse given by the participant (to consult the script, see Appendix A). Through this type of interview, the elderly person accesses their autobiographical memory. The narration lets information be obtained about who the person telling the story, their own story, is and what they are like (Latorre et al., 2008). In describing the facts and, above all, how they were dealt with, the individual's way of being, the adaptive – or not – repertoire of psychological resources the person has had throughout their life is reflected.

### 3.1.4 Strategy for Qualitative Analysis

To do an in-depth analysis of the 19 interviews about the life story, we followed the steps proposed by most authors and which can be summarized, overall, in three phases: (1) transcription of the interviews, (2) categorization and codification, (3) interpretation (Flick, 2009; Guardian-Fernández, 2010). In our case, we used the Thematic Networks proposed by Attride-Stirling (2001) as a tool for analysis of transcripts, which consists of three phases: (1) Identification of Basic Theme, (2) Organizing Theme (3) Identification of Global Theme. The adaptation of this technique has been used in other studies (Merino et al., 2020a, b, 2021) and to our specific case was done as follows: 1) For identification of basic themes: (1.1) Reading and re-reading of transcripts (1.2) Identification of key behaviors; that is, those that referred to a psychological resource as a priority consideration. 2) For organization of themes: (2.1) Individual analysis: Identification of the coherency and stability between behaviors by interview, to ensure that this psychological resource is reasonably stable in this individual. (2.2) Inter-individual analysis: Verify whether the resource identified in point 2.1 is present or not in the other interviews. 3) For the global theme: analysis of connections between the psychological resources identified, in such a way that they refer to a global construct. For a better analysis understanding, see Annex 1.

Analyses were done among three researchers and meetings for analysis were held to reach inter-judge agreements.

### 3.2 Results

To define the constructs, first we turned to definitions provided by psychology and, secondly, to the Dictionary of the Royal Academy of the Spanish Language (RAE, 2022). This is because use of the dictionary in the lexical approach to personality is well known, according to which individual differences that are socially relevant in people's lives will be reflected in their language and will be expressed by a singular word (Goldberg, 1981).

From the qualitative analysis we observed that there were resources that we could identify as central, given that they were present in most of the interviews (in total nineteen). Thus, these allowed us to establish the hypothesis that they could be characteristic of centenarians, while others were peripheral (in total sixteen), that is, they reflected inter-individual differences and, consequently, there was no clear pattern. The resource frequency table is in Annex 2.

Nineteen central resources were identified that were grouped into six global constructs, added to which were resilience and intelligence, which were not grouped into any category. The global constructs were: (1) vitality, (2) taking pleasure in interaction, (3) commitment, (4) control, (5) intellectually motivated, (6) positivity. In addition: (7) resilience and (8) intelligence. These are described and exemplified below in textual quotes (verbatim). To not overburden the analysis, a maximum of two verbatim per resource will be used.

1) Vitality, in accordance with Ryan and Deci (2001) vitality refers to feeling alive, alert, and full of energy. The centenarians interviewed are strongly connected to life, who not only live, but clearly want to continue living. They transmit energy through their attitude and voice, which is generally of good volume, rapid and strong. The psychological resources we grouped in this dimension were: activity and participation. 1.1) Activity, understood as the zest for doing things (RAE, 2022), was clearly reflected in the discourse, as they are people who have been working all their lives, always doing things, and enjoying doing them. Some stopped working at very advanced ages and, even today, they remain physically and intellectually active. There are many verbatim that reflect this characteristic; some examples are the following:

I was sewing until I was 98 (referring to her profession as a dressmaker). Now, I like to do crossword puzzles and I give the sudokus a try. I go downstairs in the elevator, but I walk up the stairs, to exercise my legs (Subject 1, woman, 100 years old). From the age of 10 until I got married, I worked in the tavern, and then sewing at home non-stop (...) Now, I really like doing wordsearch puzzles, I have fun and I'm fast. I also like playing Rumi a lot (it's a complicated game, says her daughter), to play cards (Chinchón) and dominoes (Subject 8, woman, 102 years old).

1.2) Participation is also inferred from the centenarians' discourse, because they are individuals who take part in things (RAE, 2022), who do not sit on the sidelines, who, despite their age, take advantage of the opportunities that arise to be active. Examples of behaviors that reflect this characteristic are:

On Tuesdays I go to a reading group and then we have a discussion (he recalls the last one they had), on Thursdays I go to a special gym. Every day from 10 to 11 I do exercises (Subject 5, woman, 100 years old). At 6 pm is the party for the grandparents and I'm going to go, also there's bingo and I don't want to miss it (Subject 16, man, 100 years old).

2) Taking pleasure in interaction, understood as the preference for relating and interacting with other people versus being alone (Quiroga & Navascues, 1995), is the second global construct we found. The centenarians interviewed are social, have warm ties with their families, friends, and caregivers, and are altruistic. 2.1) Sociability, the inclination of people to connect with others (Chapman-Quevedo, 2015), is inferred by the ease with which the centenarians create discourse as, in general, they are great conversationalists. This led to rapport being easily established during the interviews, and to them providing a lot of information. In addition, they claim to have always had friends and to have enjoyed social relationships throughout their life. Examples include the following:

I've never had trouble making friends, in that sense I'm really nice, I am. I've really had many friendships. (...) I have a reputation for being very talkative (Subject 2, woman, 104 years old). I've always liked to have friends and get along well with everyone (Subject 12, man, 101).

2.2) Warm bonds: this tells us that they feel and have felt loved (Ryff, 1989). Even with difficult childhoods, they have always had an adult role model (usually a female teacher) from whom they have received affection and support. Today, all of them get support from their families (children, grandchildren, great-grandchildren, nephews/nieces) and/or caregivers, and they feel supported and loved by these people. Moreover, among those who live in retirement homes, the phrase "They love me a lot here" is one of the most widely heard verbatim. Some other examples are:

They love me a lot here, every time I see a nun, she does something kind and says something nice to me, and they don't do that with everyone (Subject 16, man, 100). The best thing in my life are my children, grandchildren, and the great-grandchildren, who love me more than the grandchildren (...) I have one who's 10 years old who sits on my lap and calls me 'pretty great grandmother' (Subject 14, woman, 104 years old).

2.3) Altruism: alludes to helping others without asking for anything in return (Moya, 1999). Disinterested help is another characteristic inferred from the discourse, as they have been willing to help those in need without asking for anything in return and without being asked to do it. Some behaviors that reflect this would be:

There was an elderly couple with limited resources who came to eat lunch at my house every day (.). That man kicked the maid out, who was a gypsy, because she became pregnant and she came to work at my house (Subject 3, woman, 102). I've always helped a lot in my village, for example, if a cow was lost, I offered to look for it and I had to walk a lot of kilometers across the mountain (Subject 12, man, 101 years old).

3) Commitment, we understand this as the psychological bond the person establishes with what he or she commits to (Betanzos-Díaz & Paz-Rodríguez, 2007), for example: performing a job, caring for children or parents, loyalty to friends, to their partner, etc. Within this construct we have grouped the following psychological resources: competence, responsibility, honesty, and perseverance. 3.1) Competence, referring to high skills in performance of the task and related to good execution (Maura, 2002). In other words, expertise, or aptitude to do something. From analysis of the interviews, it is inferred that centenarians are people who show high performance in what they do. For this reason they have been highly-valued workers, whether they were cleaners, shepherds or teachers. Their bosses gave them positions of responsibility and tried to convince them not to go when they wanted to leave their jobs. For example:

My bosses really valued me. I was with them for seven years and the day I got married the lady of the house cried as if she were my mother ( Subject 10, woman, 103 years old). And, well, I was in charge of all those people, I was in charge of the cattle, of all the cattle and ranchers, I was the foreman (...) When I left the cattle drive, I went to the village and they wanted me for all the jobs. I was made secretary of the City Council. I was also president of the Chamber of Agriculture for 20 years (Subject 16, man, 100 years old).

3.2) Responsibility, with a sense of duty, feeling they have done what they needed to do. According to the RAE (2022), a responsible person is one who takes care and pays attention to what they do or decide. Some verbatim that reflect this characteristic are:

The nuns trusted me because I was very responsible. I was very hardworking. I also helped my mother a lot (....) I took care of my mother until her death, and then my husband... When my husband died, I took over the business (Subject 2, woman, 104 years old). When we returned to Spain (from Cuba), I was the one who worked and kept the family afloat. Castro kept our money, and my husband didn't work (Subject 18, woman, 107 years old).

3.3) Perseverance, is the determination to do something to achieve an end (Duckworth, 2007). We find numerous examples that refer to this construct:

Four years ago, I broke my hip, and a month or so later I was already walking, without crutches, without a walker or anything. I'm very determined (Subject 6, woman, 101). We saved up (she and her daughter) until we got the down payment for a new apartment, and we left leaving my husband there. We did it in two years (Subject 9, woman, 102).

3.4) Honesty, referred to as authentic, trustworthy, reliable (Seligman, 2003). Numerous quotes lead us to this construct:

Then the man of the house said you'll see, have the cook come to confirm what I'm saying. And I told the truth and I said, yes sir, you said you didn't want women from the street working in your house as a maid, and I said she isn't from the street, she



didn't do anything, and the other maids said, take that. And the man was so surprised that he said to me, well... I'm happy to have a person in the house I could go to court with" (Subject 4, woman, 102 years old). When it came time to do the accounts, I was never reproached for anything, never (Subject 16, man, 100 years old).

4) Control, under this description we have grouped the resources that involve action/influence from the subject on situations they face, as they understand they can have an influence on them. Control can thus be understood as a person's conviction that they are able to influence the course of events (Kobasa, 1982). In this sense, from an in-depth discourse analysis of the interviews it is inferred that centenarians, in general, show: autonomy, environmental mastery, and practicality. 4.1) Autonomy, understood as independence of criterion (Ryff, 1989). In general, it is inferred from the centenarians' discourse that they have made their own decisions, taken control of their own life, and directed it toward where they wanted to go. Some verbatim that reflect this are:

I've always followed my own judgment, even though others told me no, and time has proved me right" (Subject 1, woman, 100 years old). I've always been completely independent. Plus, look, I had my car. My husband had his car, and I had mine (...). Yes, being independent is worth a lot (...) I drove until I was 99 years old, when my daughters forbade it, it's that I've always been very independent and I didn't want to depend on anyone to bring me somewhere and take me back (...) I always had to discuss, without asking for an opinion, but just discuss (Subject 11, woman, 102 years old).

4.2) Environmental mastery: the centenarians' discourse reflects that throughout their life they have known how to organize, take advantage of the setting, and understand where the opportunities were and go after them. The centenarians' way of acting coincides with the definition of this construct given by Ryff (1989). For example:

I found out they needed a person to work in Washington at the press attaché's home and I went, but I didn't know the language or anything (Subject 4, woman, 102). I took charge of everything when my husband got sick and I had to face everything. I took over my husband's business and took care of everything myself: the accounts, the banks, giving instructions to the men, everything (Subject 2, woman, 102 years old).

4.3) Practicality. Understood as thinking or acting by adapting to reality and normally pursuing a useful purpose (RAE, 2022). Some examples are:

My mother's husband told me that, through his brother, who worked in the Ministry of Agriculture, they could place me in a laboratory with a permanent position, and since I played it safe, I thought it was fine, and I said, well, I'm going to study veterinary medicine. (...) In addition, we lived on Embajadores Street and the School of Veterinary Medicine was on the same street (Subject 5, woman, 100 years old). Referring to the end of the Spanish Civil War: When Franco came in everyone was with the Falange, and I, I'm telling you how I feel, I didn't like the Falange because I was mourning my father, but my mother told me that all your friends are in the Falange

and you're alone, and nobody is going to feel the loss of your father more than I do, and I have to raise five children. And you go to the Falange, and my mother made me the blue shirt and everything, and I went to the Falange (Subject 14, woman, 104 years old).

5) Intellectually motivated: Referring to the pleasure of having an active mind, whether it is reading, playing cards, doing crossword puzzles or sudokus. Within this dimension we find resources such as: curiosity, love of learning and self-teaching.

5.1) Curiosity, understood as the zeal for knowing, traveling, being up-to-date (Peterson & Seligman, 2004). Some examples would be:

I started traveling with a friend after my husband died. I liked traveling a lot, but he didn't. I was almost 80 years old, every year we went to a different place. We've been to Paris, Rome, Berlin, Brussels, Warsaw, Jerusalem, Turkey (Subject 5, woman, 100 years old). I'm up on what's happening in the world. I voted in the last elections, and I know who the candidates were (Subject 7, woman, 102).

5.2) Love of learning. Refers to the interest in seeking to develop new skills, subjects and bodies of knowledge (Peterson & Seligman, 2004). It's the joy of learning. Many of the centenarians interviewed are/have been voracious readers, with large collections of books. Even those who were unable to go to school learned to read and write on their own, which indicates a clear interest in learning, especially if we consider that when they were children illiteracy in Spain was 60% and this figure was even higher in the case of women and those born in rural areas (Collado, 2009). Therefore, being illiterate was fairly normalized. Moreover, they are aware of the importance of intellectual training, which is why many have fought to give their children university degrees, in some cases at the cost of great sacrifice. Some behaviors that reflect this construct are:

I've always read a lot, later I'll show you my book collection (...). We came to live in Madrid so that my children could go to the University (Subject 7, woman, 102 years old). What I know, I learned in fits and starts, reading all the papers I could get my hands on, everything, because I liked to read as much as I could. A lot of times I was with the cattle and made the mistake of reading, reading, and they got into the planted field, and the guard came and said, 'can't you see where the sheep have gotten to, they're eating what's been planted' (...) I've read everything I could. I've also written a lot (Subject 16, man, 100 years old).

5.3) Self-taught is the ability to learn new things on your own (RAE, 2022). Many of our centenarians have learned their trades on their own, without anyone teaching them. One of the centenarians, without having any training as a teacher, says:

My aunt set up a day care center and it had boys and girls. I taught the children how to read, I was about 18 years old (Subject 14, woman, 104 years old). I learned to sew alone, nobody taught me, they gave me a shirt and told me I had to make one just like it, and that's how I learned (Subject 8, woman, 100 years old).

6) The sixth global construct we find is Positivity. Our centenarians are positive, but not in the sense of necessarily optimistic or joyful, but rather in the sense that they are grateful for life and who have known how to enjoy it despite the difficulties they have experienced. 6.1) Gratitude, as being aware and grateful for the good things that happen to you (Peterson & Seligman, 2004). For example:

Well, life has given me everything, thank God. It has given me disappointments, like losing relatives, but thank God I haven't had a bad time (Subject 13, woman, 100 years old). I have a really good old age, I have very good sons-in-law, especially this one, and very good daughters also, all of them very good. Now is when I'm truly happy, enjoying life a little bit, being here (Subject 8, woman, 100 years old).

6.2) Enjoyment, the ability to identify and take advantage of the positive experiences that life offers you every day (Merino & Privado, 2015). Some examples would be:

I've always had a good life, thank God. Thank God, everything has always gone well (....) I loved enjoying the day with my husband (Subject 15, woman, 105 years old). I've lived my family life very intensely, as a mother, as a woman, I don't know... I've always had a very full life (Subject 11, woman, 102 years old).

7) Resilience. Understood as the capacity to overcome adversity, and to even be strengthened by the experience (Rutter, 1985). The centenarians interviewed are remarkably resilient. The stories they tell reflect extremely difficult episodes in their life, such as: separation of parents during childhood, abusive husbands, loss of partner or even children, being locked in a room at the retirement home because of COVID-19, etc. This is in addition to the Spanish Civil War, which all of them lived at the end of their adolescence or in young adulthood. Despite all this, the centenarians have known how to get on with their lives, in some cases to redirect them and, above all, to not be psychologically damaged by the experience of adversity. Some examples are:

In the face of life's difficulties, I haven't given up, I've gone on as much as I could. I've learned to react to whatever comes your way, straight away I've got through it, and I've known how to respond (Subject 1, woman, 100 years old). I was very close to my wife; I was 97 years old when she died and my daughter didn't think I'd get over it. At first, I was bad off, but then I thought that you only live once and you have to be strong, that my wife wouldn't like to see me feeling bad (Subject 12, man, 101 years old).

8) Finally, to add as a central resource, intelligence. Intelligence is a general cognitive ability that allows us to think abstractly, reason, plan, successfully solve problems, learn quickly (Gottfredson, 1997); it is a transversal ability that permeates other psychological resources. Many of the behaviors of centenarians lead us to intelligence, for example: they have successful academic and professional results, are self-taught, are problem-solvers, they take on challenges even though they are not specifically trained and succeed, they love to learn and are curious, their conversation is fast, agile, and they have a good memory, they at least know to read and write even without having gone to school, and they have been able to

adapt and direct their lives toward paths they find satisfying. For all these reasons, we would like to add that centenarians are intelligent people. Not for nothing, intelligence is one of the best predictors of longevity (Gottfredson & Deary, 2004). Some examples:

In school, outstanding in everything. What I liked most was math and history. The nuns took me up to the board for me to solve the problems (Subject 2, woman, 104 years old). For 20 years I was president of the Chamber of Agriculture (never had specific training) (Subject 16, man, 100 years old). My mother (baker) always asked me to put the bread in the oven because I could fit more loaves in (Subject 13, woman, 100 years old). I was always a very good student. During the war I became a teacher (although I didn't have the qualification), I taught many children (Subject 14, woman, 104 years old).

In addition to these positive personality characteristics that we consider central, we found other resources in the analyses of the different interviews that, as we pointed out at the beginning, we call peripherals, because they reflected individual differences. That is, they were present in some interviews but not in others, and sometimes they even appeared conversely. For example, we found that some centenarians are assertive and defend their rights clearly. Nevertheless, others are accommodating. That is, they adapt to whatever, shying away from conflict. The same happens with religiosity. Some declare themselves very religious and practitioners of the Catholic faith, while others claim to be agnostic, and others openly declare themselves atheist. Just as with emotional calm or tranquility, some claim to be tranquil while others claim to have always been very nervous. In total we found 16 peripheral resources: confident, frank/clear, calm, self-esteem, cheerful, religious, assertive, flexible, tolerant, courageous, sense of humor, optimistic, creative, accommodating, dominant, innovative. Finally, it is necessary to point out that the results of this research reflect that psychological resources do not significantly change over time. The work of Lautenschlager and Förstl (2007) notes that significant changes in personality during old age should be taken as a possible sign of some sort of dementia syndrome. In this sense, the stability in resources found in this study could be consistent with the fact that one of the requirements for selection in the sample was to have retained their cognitive abilities and not suffer from any type of dementia. Nevertheless, future studies should delve deeper into this question in the specific case of psychological resources.

### 3.3 Discussion

Some of the psychological resources identified as central are consistent with previous studies. This is the case of: activity, participation, sociability, warm bonds with others, competence, responsibility, love of learning and resilience (Puga, 2007; Poulain & Herm, 2021; Martin et al., 2006; Masui et al., 2006; Givens et al., 2010; Baek et al., 2016; Scelzo et al., 2018; Martin et al., 2010; Darviri et al., 2009; Hutnik et al., 2012). Others are novel because, as far as we know, we do not find them in other research. This is the case of: altruism, perseverance, honesty, autonomy, environmental mastery, practicality, curiosity, self-learning, gratitude, enjoyment, and intelligence. In addition, 16 peripheral resources were identified, product of individual differences: self-confidence, frank/clear, calm/tranquility, self-esteem, cheerful, religiosity, assertiveness, flexibility, tolerance, courage, humor, optimism, creati-

ity, accommodation, dominance and innovation. Of them, as they are not concordant with other studies, the following especially caught our attention: religiosity, calm/tranquility, cheerful and optimism. Different studies (Puga, 2007; Poulain & Herm, 2021; Scelzo et al., 2018) confirm that faith is one of the key points of centenarians. However, we find that religiosity and faith form part of individual differences. We find that there are centenarians who claim to have deep faith and be very religious, while others state they are agnostic or atheist. We consider religiosity to have a cultural component, a product of the era in which centenarians have lived. Thus, we found that those who declare themselves ideologically right-wing and who during the Spanish Civil War supported, directly or indirectly, the Nationalists are practicing Catholics. But those ideologically more left-wing, and who directly or indirectly supported the Republicans, claim to be agnostic or atheist. With regard to calm or tranquility, surprisingly some centenarians declare themselves very tranquil, textually “nothing upsets me,” while others claim they are and have always been very nervous. These results contradict what you would expect, and in fact emotional stability, measured through the Big Five model, appears as a typical characteristic of healthy centenarians (Martin et al., 2006; Masui et al., 2006; Givens et al., 2010; Baek et al., 2016). However, it is interesting to note that, according to our data, there is no clear pattern in this respect. Nor do we find that the centenarians are necessarily optimistic or cheerful, as stated in other studies (Puga, 2007; Scelzo et al., 2018; Poulain & Herm, 2021). However, they are indeed positive, but in the sense of grateful and with the ability to enjoy the little things that life offers every day. In addition, it is generally true they are satisfied with their lives, and this characteristic is in fact shown in other studies (Puga, 2007; Scelzo et al., 2018; Poulain & Herm, 2021).

## 4 Control Study 2: Quantitative

Its purpose was to triangulate the qualitative results obtained in Study1 (Pla, 1999; Guba, 1981; Flick, 2009).

### 4.1 Methodology

#### 4.1.1 Participants

We identified 15 proxies who agreed to participate (usually a son/daughter) and who had consulted the centenarian about whether they wanted to participate in Study 1. Four proxies were lost. It should be noted that the use of proxies to describe the personality of centenarians is not new (Martin et al., 2006; Araújo et al., 2016).

#### 4.1.2 Instrument

A 5-point Likert-type scale was used that collected the name and definition of each one of the 35 psychological resources identified in Study 1 (1 = completely disagree; 5 = completely agree). To consult the questionnaire, see Appendix B.

### 4.1.3 Procedure for Data Collection

The proxy was contacted through the WhatsApp application, the purpose of Study 2 was explained to them, and their participation was requested. A day was arranged to conduct the 5-point Likert scale by telephone. During this interview, the informed consent was read and their approval of it was requested, then the Likert scale was taken, which lasted approximately 20 min.

### 4.1.4 Data Analysis

An independent researcher, who was not yet aware of the results of the study, performed the statistical analysis.

For triangulation of what were the most central psychological resources, calculation of central tendency has been combined with calculation of dispersion, in accordance with some very restrictive criteria: (1) have a mean greater than 4.5; (2) a range of 2 or less; (3) a coefficient of variation equal to or less than 20%; (4) the 10th percentile was at 4 (that is, 90% of cases scored above 4 in this resource).

Based on the above calculations, the psychological resources were classified according to the degree to which they met: (a) none of the above criteria; (b) one criterion; (c) two criteria; (d) three or more of the above criteria.

## 4.2 Results: Quantitative Study to Triangulate

Table 1 presents the central descriptive measures and dispersion used for each resource. The number of criteria met by each psychological resource is also shown.

Those resources that do not meet any criteria are considered peripheral, while those that meet one or more criteria are considered central even though the degree of centrality varies depending on the number of criteria met. According to the results found, the following resources show a very high centrality because they meet three or more criteria: activity, resilience, gratitude, persistence, honesty, responsibility, sociability and intelligence. Resources that meet two criteria are: competent, having warm bonds, altruistic, practical, enjoyment, a love of learning and participative. And, finally, the following resources meet one criterion: autonomy, environmental mastery, curiosity and self-taught. Ultimately, 16 resources were identified as peripheral because they did not meet any of the previous criteria. These were: confidence, openness/clarity, calm/tranquil, self-esteem, cheerful, religiosity/faith, assertiveness, flexibility, tolerance, courage, humor, optimism, creativity, accommodation, dominance, and innovation.

## 4.3 Discussion

The results of Study 2 using “triangulation” quantitative analysis reveal total agreement with the results obtained in Study 1. We can confirm, then, that the qualitative analysis presents a high degree of reliability and validity according to the criteria applied in qualitative research (Pla, 1999; Guba, 1981; Flick, 2009), as there are no contradictions between the two studies even though they have used different samples and distinct methodologies. On the other hand, the fact that there is so much homogeneity, or absence of dispersion, for the

**Table 1** Descriptive statistics and level of compliance of “relevant” criteria and “centrality/dispersion” of resource

Resource	N <sup>a</sup>	Range	Geo- metric Mean	SD <sup>b</sup>	Per 10 <sup>c</sup>	CV <sup>d</sup>	3 or more criteria	2 criteria	1 criteria	No cri- te- ria
Active	15	1	4,93	0,277	4,6	6%				
Resilient	15	2	4,83	0,555	4,2	11%				
Gratitude	11	1	4,8	0,441	4	9%				
Responsible	15	2	4,76	0,599	3,6	13%				
Perseverance	15	2	4,69	0,376	3,6	8%				
Honest	15	2	4,6	0,768	3	17%				
Sociable	15	2	4,6	0,768	3	17%				
Intelligence	10	2	4,54	0,463	3,1	10%				
Altruistic	15	2	4,42	0,66	3,6	15%				
Warm bonds	15	2	4,38	0,877	3	20%				
Practical	11	2	4,38	0,726	3	17%				
Love of learning	11	2	4,38	0,707	3	16%				
Enjoyment	11	2	4,31	0,667	3,2	15%				
Competent	15	2	4,27	0,725	3	17%				
Participative	11	2	3,93	0,782	3	20%				
Mastery	15	3	4,2	0,776	2,6	18%				
Autonomous	15	3	4,14	0,768	2,6	19%				
Self-taught	11	3	4,05	0,707	2,2	17%				
Curious	15	2	4,03	0,927	3	23%				
Frank /Clear	15	3	4	1	2,6	25%				
Self-esteem	15	3	3,75	1,08	2	29%				
Tolerant	14	3	3,74	0,937	2,5	25%				
Assertive	14	3	3,69	0,996	2	27%				
Accommodating	10	3	3,68	0,916	2,1	25%				
Confident	15	3	3,67	0,899	2,6	24%				
Cheerful	15	4	3,65	1,068	2,2	29%				
Religious	15	4	3,6	1,423	1,6	40%				
Creative	12	3	3,49	1,059	2	30%				
Courageous	14	3	3,38	1,357	2	40%				
Calm	15	3	3,37	1,044	2	31%				
Optimistic	14	3	3,25	1,138	2	35%				
Sense of Humor	14	3	3,12	1,138	2	36%				
Flexible	14	4	2,99	1,084	1,5	36%				
Dominance	11	4	2,79	1,302	1	47%				
Innovative	11	3	2,78	0,928	2	33%				

<sup>a</sup>Number<sup>b</sup>SD: Standard deviation. <sup>c</sup>Per10: 10th percentile; <sup>d</sup>CV: Coefficient of variation

central resources in such a small sample of proxies, far from undermining the relevance and validity of the results, instead provides it, as homogeneity would have been impossible if chance had been present with so few subjects.

It should also be noted that the results confirm what was found in the first study regarding peripheral resources that contradicted previous literature. This is the case of religiosity, which obtained a mean of 3.93 in this second study and some measures of dispersion that

indicate a clear variability in this resource: a coefficient of variation of 36%, a range of 4 and a 10th percentile at 1.6. In regard to calm/tranquility, we found a mean of 3.5, a coefficient of variation of 30%, a range of 3 and a 10th percentile at 2. Similar results are obtained for optimism and cheerful, which can be consulted in Table 1. All this confirms the peripheral nature of these resources.

## 5 Conclusions

This is one of the few studies that specifically investigates psychological resources in centenarians from a mixed, qualitative and quantitative methodology, which gives validity to the results found. Our results identify six large global constructs, added to which are resilience and intelligence, as being typical of centenarians. All of them are related to physical and mental health, so it is consistent that they are typical of healthy centenarians. The first dimension identified has been vitality, which makes it possible for us to be more active and productive (Deniz & Satici, 2017). Lack of vitality is clearly an indicator of either physical or psychological illness (Deniz & Satici, 2017; Ryan & Frederick, 1997). Taking pleasure in interaction is the second dimension identified. This fosters sociability and the establishment of warm bonds with others, which are predictors of psychological well-being (Ryff, 1989) and a guarantee of social support in the face of adversity. Both factors, along with altruism, could influence physical health, as they would favor asking for help (sociability) and receiving it from others in case of need, based on the principle of reciprocity, through altruism, and of course also through social support by means of warm bonds with others. This help could be a key aspect when it comes to receiving the proper treatment in a timely fashion and having a suitable recovery in the case of being sick. In fact, research points to a clear connection between altruism, well-being, health and longevity (Post, 2005).

The third dimension was commitment (competence, responsibility, perseverance and honesty), which we understand as being related to well-being from the satisfaction of having fulfilled your duties. It could also have consequences for health, as competence makes it more likely that, in the case of illness, the right decisions regarding treatments will be made, there will be the perseverance to stick with them and follow medical instructions, and honesty, that these will not be abandoned with pointless justifications. In addition, it should be noted that responsibility makes it less likely that the person will engage in behaviors that are potentially dangerous to their health (Pocnet et al., 2021).

Regarding the fourth dimension (control), autonomy and environmental mastery are predictors of psychological well-being (Ryff, 1989; Merino & Privado, 2015). Also, in terms of health, environmental mastery and practicality can help in identifying healthy environments that help people of this age to maintain their physical and mental condition, which connects with the fifth dimension, being intellectually motivated, as this makes it easy to stay up-to-date on what to do, and not do, to keep the mind and body healthy. In fact, we have seen how many of the centenarians keep their mind agile by performing cognitive activities that challenge them. In addition to being voracious readers, which also prevents cognitive decline. Positivity, on the other hand, from the perspective of gratitude and enjoyment, is related to subjective well-being and health (Diener & Chan, 2011). In fact, there are programs based on gratitude (Killen & Macaskill, 2015) and on savoring or enjoyment (Park et al., 2013)



aimed at increasing well-being. Research also indicates that enjoyment is related to longevity (Zaninotto et al., 2016).

In terms of resilience is a clear protector from stressful events and, thus, a promoter of well-being in adverse situations and, in this sense, also protects health (Babić et al., 2020).

Finally, in regard to intelligence, research indicates that more intelligent people suffer fewer accidents and health problems, understand medical inserts and instructions and follow treatments better, and make sounder life decisions, which can obviously influence their health (Gordon, 1997). All of this means it makes sense that intelligence is one of the best predictors of longevity (Gottfredson & Deary, 2004).

## 6 Recommendations: What can we Learn from Centenarians?

Aging is a process that is present throughout the life cycle. The WHO (2012) defines healthy aging as a process that happens throughout life. That is, factors operating throughout life determine health and autonomy in advanced ages. These factors, to a large extent, have to do with living and work conditions, as well as with exposure to stressful life events and the ability to have the resources to cope with these difficult situations and create opportunities from them. Analysis of the life of healthy centenarians provides us with certain lessons that, in all probability, could help in achieving a healthy old age, although they should be practiced from youth and not started in old age. The main ones are the following:

### Vitality

1. Maintain a Lively Attitude, Being Active and Participative
2. Stay Active, Physically and Intellectually

### Taking pleasure in interaction

1. Take care of social relationships.
2. Be willing to help others.
3. Let your loved ones know that you love them.

### Commitment

1. Promote Attitudes of Commitment, Responsibility, Honesty and Perseverance throughout life

### Control

1. Try to be the owner of our own life, feeling ourselves responsible for our actions and their consequences, as active agents.
2. Have realistic short/medium-term objectives and persevere in achieving them.
3. Have a broad outlook, being able to find opportunities beyond our nearby surroundings or our comfort zone.
4. Establish order and certain habits in daily life, so that everyday demands do not overwhelm us.

Intellectually motivated:

1. Stay intellectually active, even finding new areas of knowledge and learning (such as painting, writing, so on).
2. Be Curious, for Example Learning about new Cultures, Traveling, Reading

Positivity:

1. Practicing Gratitude, Being Aware of all the good that there is in your life
2. Practicing Enjoyment, Learning to Identify and Exploit Daily Positive Experiences

Resilience:

1. Develop skills that allow us to accept negative and stressful events as a part of life and, as far as possible, to extract the positive essence from an adverse event.

Intelligence:

1. Challenge your mind; try to Solve Problems that Become Progressively more Demanding

Finally, note that although recent meta-analyses (White et al., 2019; Folk & Dunn, 2023) have questioned the effectiveness of certain interventions aimed at increasing well-being, for example, in the case of gratitude or the identification of positive experiences. The recommendations provided are based on the life experience of a group of 19 centenarians who have reached that age free of cognitive impairment and maintaining reasonable physical autonomy. Obviously, future research should test to what extent practicing these recommendations throughout life represents a true advantage in achieving extremely healthy longevity.

## 6.1 Limitations of the Study and Future Lines of Research

In our view, the main limitation of the study is not being able to ensure that the psychological resources found are characteristic of the historical and social moment they lived through generational. Thus, we see the need to do a second research project in which we contrast the resources identified (both central and peripheral) with other age groups. Of particular interest is the comparison of people from the same generation as our centenarians, that is, born in 1921 or earlier, but who had died before the age of 100. The result of this research would allow us to conclude whether the resources are generational or characteristic of centenarians.

A second research project would lead us to look for communality in other countries. That is, if these psychological resources are present in centenarians from other countries, albeit from the same cultural orbit.

A third research project is related to the biological bases of healthy longevity in centenarians and how this is related to psychological resources. One of the gaps in this research is to understand this question in depth. Psychological resources are the nutrients of psychological well-being, so the accumulation of psychological resources throughout life could be some of the basis of the psychological and physical strength in healthy elderly people

(Ryff, 2013; Ryff et al., 2004). Nevertheless, specific research is needed to understand why and how this can happen in the case of centenarians. Old age is accompanied by, among others, telomere shortening, cortical thinning, and inflammation (López-Otin et al., 2023). Furthermore, there are studies that connect stress with telomere shortening or inflammation (Lin, et al. 2022). In this sense, future research would be useful where not only biological mechanisms that explain the impact of stress on aging are analyzed, but also studies analyzing whether psychological resources have a protective effect on aging by means of these or similar biological mechanisms. This future research would need the cooperation of multi-disciplinary researchers to be able to provide not only the psychological perspective but also the biological one.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s10902-023-00700-z>.

**Acknowledgements** We would like to thank all the centenarians who participated in this study, as well as their families, for their selfless collaboration. Also, DomusVi, the Sierra del Cuera retirement home, and all the social workers who have helped us.

## Declarations

**Conflicts of Interest** The authors declare that there is no conflict of interest.

**Ethics Approval** This research has already been approved by the Ethics Committee of the Faculty of Psychology of the UCM (ref 2018/19-004).

**Consent to Participate** Informed consent was obtained from all individual adult participants included in the study.

**Consent for Publication** All authors agree with the current manuscript and publications in Journal of Happiness Studies.

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