PSICOLOGIA

Revista da Associação Portuguesa de Psicologia
ISSN 2183-2471

Revista PSICOLOGIA, Vol. 39(2), 2025, 26-39, https://doi.org/10.17575/psicologia.1992

# Wisdom and divergent problem solving as resources for eudaimonic psychological well-being in old age

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**Abstract:** Theoretical perspectives on positive ageing highlight the centrality of personal resources for reaching and maintaining a high level of overall functioning in this stage of life. Personal resources such as wisdom, creativity and eudaimonic psychological well-being can give a substantial contribution to this desirable condition. The study investigated the relationships between wisdom, eudaimonic well-being and perceived efficacy on divergent problem solving in old age. It also explored the presence of differences for structural variables gender and school education on these factors. 105 Italian participants filled in the Psychological Well-being Questionnaire (PWB), the Wise Thinking and Acting Questionnaire (WITHAQ) and the Perceived Efficacy Questionnaire on Divergent Problem solving (APSP). Positive associations emerged between wisdom as pragmatic knowledge and divergent problem-solving, between wisdom as dialectical post-formal thinking and divergent problem solving. Positive associations emerged between wisdom as pragmatic knowledge and PWB, wisdom as dialectical post-formal thinking and PWB. A Hierarchical Regression Model highlighted divergent problem solving as the most powerful contributor to eudaimonic well-being (PWB), together with wisdom as pragmatic competence. Not significant statistical values for grouping variables gender and school education emerged.

***Keywords:*** *Wisdom; Divergent problem-solving; Eudaimonic well-being; Positive ageing.*

## Eudaimonic psychological well-being as a feature of positive ageing

The issue of positive ageing constitutes nowadays an emergent area of inquiry due to the increasing in ageing population across the world (WHO, 2025). Rowe & Khan (2015) elaborated a systemic model of successful ageing where high levels of physical resources, high level of cognitive and personal functioning converge in the active participation to the society, that is the "core" of this model. Kahana and colleagues (2014) in their "proactive complex model of successful ageing" identified several resources enabling the old person to reach a set of positive outcomes. These positive outcomes are defined as the presence of positive mood states, the presence of meaningful experiences, the maintenance of valued activities and social relationships. These models and definitions contain several common denominators, albeit expressed in different ways: the growth as a person, the presence of meaningful experiences, and the contribution to society.

These definitions and theoretical perspectives are included in the recent definition of healthy ageing proposed by World Health Organization (WHO, 2022). It elaborated a definition of healthy ageing defined as the process of developing and maintaining the functional ability that enables well-being in older age. Functional ability is having the capabilities to enable people to be and do what they value. It refers to the following ability: to meet their basic needs, to learn, grow and make decisions, to be mobile, to build and maintain relationships and to contribute to society.

The well-being perspective that can encounter the ability to grow as a person and give a contribution to society can be identified in the Ryff Model of Eudaimonia (1989; 2014; 2023).

Ryff defined this perspective as rooted into the Aristotle philosophical thought, and in his concept of "eu-daimon", that is the "true-self" of a person, his/her talents, abilities and realisation in favour of the society Ryff (1989; 2014; 2023). Her conception of Eudaimonic well-being comprises six dimensions:1) Autonomy: being able to resist to social pressures; evaluate self by personal standards; 2) Environmental Mastery: having a sense of competence in managing the environment; being able to create or choose contexts suitable to personal needs and values; 3) Positive relations with others: having warm, trusting relations; being capable of empathy; 4) Purpose in Life: having goals in life; feeling that there is meaning to present and past life; 5) Self-acceptance: acknowledging and accepting multiple aspects of self, including good and bad qualities; 6) Personal Growth: having a feeling of continued development; having a sense of realising his or her potentials. Longitudinal studies about Eudaimonic well-being evidenced

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the decline of Personal Growth and Purpose in Life as people become older (Springer et al., 2011), while dimensions such as Environmental Mastery and Autonomy show an inverse tendency, growing as people become older (Ryff & Singer, 2008; Schilling, 2022).

Eudaimonic well-being shows interesting and positive relations with biological markers in old age, such as lower levels of daily salivary cortisol, lower proinflammatory cytokines, lower cardiovascular risk and longer-duration REM sleep compared to those with lower well-being (Ryff, 2014). Purpose in Life, that is considered a "core dimension" of eudaimonia, is linked with patterns of gene expression known as the conserved transcriptional response to adversity (CTRA). Analyses from the MIDUS study (Hill & Turiano, 2014) found that those with high Purpose in Life lived longer over a 14-year period. Considering the amount of research on eudaimonic well-being and its role in promoting positive functioning across life-span, it is essential to identify the factors that support its enhancement or promotion in old age. Alfonso-Benlliure et al., (2021) explored the relationships between two facets of well-being, namely the hedonic well-being and the eudaimonic well-being and divergent thinking. They hypothesized a connection between the ability to think in divergent manner, a component of creativity, and the dimensions of well-being in old age, also evidencing a scarcity of studies on this topic. They found a significant, positive connection between divergent thinking and eudaimonic well-being. For this reason, we can hypothesise that perceived efficacy on divergent problem solving gives a positive contribution to this type of well-being since it is conceptualised as the striving to realise personal potential (Ryff, 2023).

**Creativity in old age and its role for positive ageing and psychological well-being. The divergent problem solving as a relevant resource at this stage of life**

Creativity represents an issue that has deepened as an object of academic discussion since the last century. It has been defined by Guilford (1950) in terms of two main criteria: originality, or novelty, and appropriateness, or adaptiveness. Creativity has also been defined as a complex system of thought and act that include such cognitive and personality characteristics as problem sensitivity, flexibility, the ability to analyse, synthesise, evaluate and reorganise information, engage in divergent thinking or deal with complexity (Gabora, 2013). So far, some studies (Antonietti et al., 2013; Colombo et al., 2018) have proposed that creativity can be defined as being composed of three mental operations: widening (the tendency to keep an open mind and be able to deal with a high number of elements); connecting (the capacity to establish relationships among different elements and to combine them in unusual ways); reorganising (being able to change perspective and invert relationships among elements).

Divergent thinking, one of the processes that are part of creativity, concerns the ability to generate ideas, solutions, products that are unexpected, unusual and useful and appropriate to the context (Colautti et al., 2023; Runco, 2004). It is considered a key factor of creativity, involving an open-ended mental process oriented to find many new, appropriate and different answers to open problems (Guilford, 1967). It involves associative and executive processes, such as broad retrieval ability and fluid intelligence (Beaty et al., 2014) and is considered an indicator of creative potential (Runco & Acar, 2012). Divergent thinking possesses different components: fluency (generation of different responses to fulfil specific requirements); flexibility (generation of responses belonging to different categories); originality (generation of infrequent responses); elaboration (generation of details along with basic ideas). Being able to find new solutions to everyday problems can be seen as a relevant resource at every stage of life, including old ones.

The scientific community believes that age affects the level of divergent thinking (Alpaugh & Birren, 1977; Ruth & Birren, 1985; Palmiero, 2015). However, a study by Palmiero et al., (2017) supports the idea that divergent thinking can be preserved in older people and suggests appropriate interventions for improving it.

The majority of studies have taken into consideration the objective evaluation of divergent thinking, through experimental tasks and tests. Perhaps, another measure can be useful at completion of the studies on divergent thinking in old age: the perceived efficacy in divergent problem solving. As Bandura (1997) and Caprara (2001) highlighted indeed, perceived self-efficacy can be considered a core personal construct for the comprehension of human behaviour and for positive functioning. It designates an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments (Bandura, 1997). Zambianchi (2019), in a study on young people, confirmed the associations between eudaimonic well-being in the conception of Ryff and perceived efficacy on divergent problem solving, both as global score and for its subcomponents, with the exception of Positive Relations with Others. To date, few studies (Galassi et al., 2022), have explored the level of creativity and the links between creative thinking and psychological functioning in older people. Existing studies highlight show, at the level of cognitive processes involved in divergent thinking, an important role is played in the elderly by the cognitive reserve, which represents the set of resources accumulated over the course of life

through schooling in developmental age, the level of complexity required by the work performed, participation in stimulating recreational activities such as visiting museums, cultural events, and represents a protective factor against the declines inherent to ageing (Colombo et al., 2018; Tymoszuk et al., 2020).

The creativity expressed in the divergent problem solving, understood as the ability to solve problems inherent in everyday life, can be relevant for eudaimonic well-being as it promotes and encourages the search for novelty, for creative, innovative solutions to possible problems, also linked to this specific life phase (such as, for example, looking for new activities, solutions to present or future conditions of fragility, life plans after the working phase or looking for volunteering or new activities of paid work).

The link that has been highlighted between divergent problem solving and crystallized intelligence could lead to reflections on how these connect to other forms of thought, including wisdom, which has been identified for centuries as a characteristic of old age and about which little is still known about its links with the creative processes of human thought. It is in fact conceivable, considering emerging studies (Candeias et al., 2021) that creativity might be linked with crystallized intelligence, that wisdom, due to its roots in experience and knowledge developed over the course of life, may have connections with creativity, yet to be explored.

**Wisdom and positive ageing**

Wisdom, in psychological research, constitutes a growing area of studies, from different angles and perspectives. One of the most common distinction in international literature is between wisdom as personality construct (personal wisdom, including tendencies in cognition, motivation, emotion, and behaviour, personality qualities and characteristics, (Ardelt, 2004a, 2004b; Ardelt et al., 2019; Webster, 2019) and general wisdom defined in terms of the knowledge, insight and judgement a person has about life in general, conceptualised mostly in cognitive terms (Dong et al., 2023).

One of the first and important general cognitive conceptualizations of wisdom pertains to the "Berlin group" (Baltes & Smith, 2008; Baltes & Staudiger, 2000), who defined wisdom as expertise in the fundamental pragmatics of life. This group gave life to the well-known "Berlin wisdom paradigm", that defined wisdom on the basis of five criteria: rich factual knowledge (declarative knowledge about topics such as human nature, interpersonal relationships); rich procedural knowledge (how to give advice and handle life decisions); life-span contextualism (knowledge of the many contexts of life); value relativism (tolerance for different values held by other people and societies); recognition and management of uncertainty (dealing with the uncertainty that arises from human limits).

Another perspective, that integrates the pragmatic competence highlighted by the Berlin researchers with intellectual development pertains to the Post-piagetian school (Pasqual-Leone, 1987; Labouvie-vief, 1990; 2015).This approach takes into consideration, for the development of wisdom, the mature intelligence, that corresponds to the overcoming of the Piagetian stage of formal operations to reach the post formal dialectical thinking. For the post-Piagetian school indeed the stage of post formal thinking represents the ability, reached in advanced age, to integrate in a complex and innovative view, information, and dilemmatic horns (the necessity to choose between two undesirable options or solutions) about ethical questions (Zambianchi, 2020). The post-Piagetian cognitive theoretical perspective was adopted by Moraitou and Efklides (2012), which define wisdom as a specific form of thought characterised by three interconnected dimensions: the pragmatics of life, that is close to the definition of wisdom elaborated by Baltes and colleagues (2000; 2008); the post-formal dialectical thinking (the ability to deal with complex questions, often with ethical or bioethical quality and to find innovative integrated solutions that goes beyond choosing between two dilemmatic horns) and the management of future uncertainty (that corresponds to the deep awareness of uncertainty about future together with the awareness of human finitude). Kallio (2011; 2015; 2020) sustains that the so called "integrative thinking" constitutes the key of the adult reasoning, that is based not only on the ability of considering simultaneously the antinomic solutions of a dilemma, but instead of integrating them into a new, different and more complex interpretation of a certain issue. In their new holistic model of wisdom, Kallio & Tynjälä (2025) support the need to approach wisdom from multiple disciplines, including the ethical-moral perspective and research. Moral dilemmas, bioethical dilemmas often request to choose between two opposite solutions; wisdom can help approaching these dilemmas from an integrative perspective, escaping the forced choice, visualizing innovative solutions to complex issues.

Wisdom has been approached also from another perspective of study and conceptualization, the wisdom performance, related to concrete wise actions, eg. to the ability to give wise advice and take the right decisions. From this perspective, a model of wisdom defines it as a morally grounded reasoning and

problem-solving in situational domains that have the potential to affect other people (Aldwin, 2009; Grossmann et.al., 2020; Jeste et al., 2010).
Wisdom has been, through centuries, associated with age (Dong et al., 2023). But, as Ardelt & Edwards (2016) claim, ageing does not necessarily lead to wisdom; wisdom represents a possible outcome of age, but there isn't a linear, deterministic path to it, with growing older.

An area of study on wisdom tries to investigate the association of wisdom with the perceived well-being of people. This research has shown that wisdom was conducive to well-being including life satisfaction, mastery, positive affect, cheerfulness, and health (Ardelt 2003; Ardelt, 2024; Ardelt & Edwards 2016; Etezadi & Pushkar 2013; Hultsch et al. 2002). Wisdom seems to reduce depression, fear, and negative affect (Ardelt 2003; Hultsch et al. 2002).
Dong et al., (2023), in their review on wisdom, took into consideration two different conceptualizations of well-being: the Hedonic well-being (Deci & Ryan, 2008), and the Eudaimonic well-being (Ryff & Singer, 2008). They found a large positive correlation between wisdom and eudaimonic well-being, especially for the growth aspects of eudaimonic well-being (the components of Personal Growth and Purpose in life).

Law & Staudiger (2016), connecting the issue of wisdom with the conceptions of well-being, understand eudaimonia as the kind of well-being that can emerge when practising wisdom (as phronesis) to solve existential conflict and dilemmas that occur in everyday life. Referring to the conceptualization of eudaimonic well-being elaborated by Ryff & Singer (2008), Staudiger & Gluck (2011) maintained that the essence of eudaimonia is balancing individual goals with a concern for greater social and common good and especially for the good of others. For them, this vision is closely related to eudaimonia.

Crystallized intelligence, in the model developed by Baltes & Staudiger (2000), is linked, and it constitutes the prerequisite, to wisdom as expert competence in life (the pragmatics of life), as the capacity for ethical-moral judgement and expert navigation in complex, ill structured situations. In fact, the research results highlight a significant relationship between cognitive reserve and crystallized intelligence, being considered close and intrinsically interwoven. Staudiger & Baltes (1996) furthermore hypothesised wisdom as the ability to identify constructive solutions in the conditions of ill-structured problems, i.e. where it is necessary to reorganise the elements of knowledge. So, wisdom could be implied in the divergent problem-solving. Research using the Berlin Wisdom Interview has found an advanced integration of cognitive and personality characteristics at their interface that play a fundamental role for wisdom performance (Dong et al., 2022). Traits and processes such as openness to experience, social intelligence, thinking style and creativity as well as life experiences contribute uniquely to the overall variance in Wisdom Related performance (Pasupathi & Staudiger, 2001). In this case, however, the intervention of another component of wisdom, foreseen by the post-Piagetian school (Moraitou & Efklides, 2012), the post-formal dialectical thinking ability, can be hypothesised. Colautti et al. (2023) have in fact highlighted a significant and positive relationship between divergent problem solving, crystallized intelligence and cognitive reserve. The cognitive reserve dimensions, as already hypothesised by Baltes & Lindenberger, (1988) would constitute some fundamental bases for the expression of wisdom, understood as the ability to navigate expertly in the dilemmas of life, in turn linked to the presence of a solid knowledge stratified over the course of experience, the latter clearly implicated in crystallized intelligence. So, we could hypothesise that wisdom, as dialectical post-formal thinking, wisdom as pragmatic knowledge show significant associations with divergent problem-solving, a type of creative processes that is thought to be at the basis of creative performance and, for its features, useful in solving daily life problems. As highlighted above, both wisdom and creativity have been explored in its relationships with psychological well-being. However, to this date, no studies have explored the interconnected impact of both wisdom and creativity on eudaimonic well-being, namely the interaction between these two dimensions and the interaction while affecting well-being.

**Aims and hypotheses**

The study had the following aims and tested the following hypotheses:
- Evaluate the level of psychological eudaimonic well-being, the level of perceived efficacy on divergent problem-solving and the level of wisdom in a sample of Italian old people.
- Evaluate the correlations between psychological eudaimonic well-being, wisdom and perceived efficacy on divergent problem-solving. Based on international literature (e.g., Alfonso-Benlliure et al., 2021), the presence of positive correlations between the dimensions of PWB and the dimensions of wisdom are expected. (H1)
- The presence of positive correlations between PWB and perceived efficacy on divergent problem-solving has been hypothesized. (H2)
- The presence of positive correlations between wisdom as post-formal dialectical thinking and perceived efficacy on divergent problem solving are expected. (H3)

- Evaluate the relevance of grouping variables gender and school education for PWB, wisdom and divergent problem-solving. Based on existing literature (Ryff & Singer, 2008; Boylan et al., 2025) it was hypothesised that PWB increases as school education increases. (H4)
- Age is expected to influence PWB and divergent problem-solving. It is expected that as age increases PWB declines in some components such as Purpose in Life and Personal Growth. It is expected that as age increases, divergent problem-solving decreases. (H5)
- Evaluate the contribution offered by wisdom, divergent problem solving for Eudaimonic well-being (as global score and as specific sub-components), after controlling for age, gender and school education as structural variables. As highlighted in the literature (Gluck et al., 2022), it was expected that wisdom would make a significant contribution to eudaimonic well-being. (H6).
- Divergent problem solving, for the conceptualisation of eudaimonic well-being (Ryff, 2023) is expected to give a positive contribution to it (H7).

## METHOD

### Participants and procedure

The present study comprised 105 Italian subjects (*M*age 70.58, *SD* = 4.67; 19 males and 85 females; 4 with Elementary School; 16 with Middle School Diploma; 56 with High School Diploma and 28 with Degree) took part in the study. The data collection plan contemplated a mixed method, using both online platform and paper and pencil questionnaires. Participants were recruited through Cultural associations such as Universities of the Third age, Senior centres, personal contacts. The online questionnaires were created through Google Moduli online Platform. It created a specific online questionnaire and a specific link generated, by clicking on which people could open the application. At the beginning of it, a brief explanation of the main objectives of the study and the complete anonymity of it was inserted. No sensitive data were collected, but only demographic data. The participants gave their informed consent to the treatment of data for scientific purposes. At the end of the online questionnaire the participants could chose yes or not to the following statement: "I give my consent for the treatment of data for scientific research and publication". For the paper and pencil questionnaire, this sentence was included in the last part of the questionnaire, after the demographic data. No personal data (such as city of birth, previous work, medical problems) were collected so that it was not possible to identify the authors of the questionnaires.

### Instruments

For this research the following self-report questionnaires were chosen:

*Psychological Well-being Questionnaire* (Ryff & Keyes, 1995; Italian validation, Ruini et al., 2003). This self-report instrument contains 60 items that evaluated six dimensions: Autonomy (the capacity to evaluate oneself by personal standards and acquire a strong sense of independence, e.g., "I have confidence in my opinions, even if they are contrary to the general consensus") $\alpha$ = .65; Environmental Mastery (the individual's ability to choose or create environments suitable to her/his qualities, e.g., "In general, I feel I am in charge of my situation in which I live), $\alpha$ = .60; Positive Relations with Others (the ability to construct warm, trusting interpersonal relationships, e.g., "People would describe me as a giving person, willing to share my time with others''), $\alpha$ = .81; Purpose in Life (have a clear comprehension of life purpose, a sense of directedness and intentionality, e.g., "Some people wander aimlessly through life, but I am not one of them"), $\alpha$ = .82; Personal Growth (the individual's perception of being a growing and expanding person, e.g., "I think it is important to have new experiences that challenge how you think about yourself and the world"), $\alpha$ = .81; Self-Acceptance (the possession of a positive attitude toward the self and the acceptance of good and bad qualities, e.g., I like most aspects of my personality"), $\alpha$ = .79. The $\alpha$ coefficient for the overall Psychological Well-being scale is .83. The score may range from 1 to 6 (1= is not my case; 6 = is exactly so). All the Cronbach Alpha ($\alpha$) are referred to the present study.

*The Wise Thinking and Acting Questionnaire* (WITHAQ; Moraitou & Efklides, 2012; Italian translation, Zambianchi, 2022). It contains 13 item and is composed by three dimensions: Wisdom as pragmatic competence (4 items e.g., of item: "Through the experience and the knowledge I have obtained so far, I have built well-formulated views and attitudes as far as important moral matters of modern life are concerned", $\alpha$ = .55); Wisdom as integrated post-formal dialectical thinking (6 items; e.g., "When I discuss with other people or with myself about life issues, I can usually distinguish different arguments, e.g., which are the strongest in terms of reason or the strongest from a more subjective, experiential point of view"; $\alpha$ = .74); Wisdom as awareness of future uncertainty (e.g., "I often think about death. This makes

me get cold feet and on the other hand, it teaches me not to pay much attention to transient glory, wealth and the small daily problems", $\alpha$ = .75). The score was computed on a 5-point Likert scale (1 = completely untrue; 5 = completely true). All the Cronbach Alpha ($\alpha$) are referred to the present study.

*Questionnaire on Perceived Efficacy in Creative Divergent Problem Solving* (APSP; Italian validation, Pastorelli et al., 2001). This questionnaire evaluates the ability to generate new and creative solutions to solve problems or to generate new ideas and consists of 14 items (e.g., "I can identify alternative, positive solutions to deal with problems"; "I am a volcano of ideas"; I am able to invent new procedures instead of simply following those established by others") with a score ranging from 1 (not well at all) to 4 (very well). The Cronbach'$\alpha$ of the overall scale is .84. All the Cronbach Alpha ($\alpha$) are referred to the present study.

**Statistical analyses**

The statistical analyses were run in four steps with Statistica Package (Statsoft, 2005). Firstly, means, standard deviations, skewness and kurtosis of all variables have been calculated. After, Pearson's correlation matrices were calculated, in order to evaluate the correlations among the variables. Then, MANOVAs Models evaluated the influence of grouping variables gender and school education on the study variables wisdom Eudaimonic well-being and perceived efficacy on divergent problem-solving. Only three levels of school education (Middle school diploma; High school Diploma; Degree) were considered for into the models, due to the low number of participants with the Elementary Schools (n.4). Age was evaluated as a single continuous variable for PWB, wisdom and perceived efficacy on divergent problem-solving through Linear Regression Models. Finally, a set of Hierarchical Regression Models evaluated the contribution offered by wisdom and creative divergent problem solving on PWB as global score and on each specific its sub-components, after controlling for structural variables age (as continuous variable), gender and school education. The Hierarchical Regression Analysis was conducted in three sequential steps. First, structural variables -age, gender, and level of education - were entered. In the second step, the three dimensions of wisdom were included. Finally, in the third step, divergent problem-solving was added to the model.

**RESULTS**

**Description of the sample for the study factors**

The higher score for the wisdom questionnaire is reached in the dimension of pragmatic competence, while the lower pertains to the ability to manage future uncertainty. Divergent problem solving possesses a medium-high score. The overall level of Psychological Eudaimonic well-being (PWB) is high, and it appears to be high also for its subcomponents. Personal Growth is the dimension with the highest score, followed by Purpose in life, while the lowest score pertains to the dimension Autonomy (see Table 1).

**Table 1.** Descriptives of the sample

| Variable | *M* | *SD* | Min | Max | Skewness | Kurtosis | Shapiro W. |
|---|---|---|---|---|---|---|---|
| Wisdom pragmatic | 3.56 | .46 | 2.25 | 4.50 | -.09 | .32 | .95 |
| Wisdom dialectical post formal | 3.51 | .53 | 2.00 | 4.66 | -.18 | -.14 | .98 |
| Wisdom future uncertainty | 2.90 | .97 | 1.00 | 5.00 | .11 | -.53 | .97 |
| Divergent problem solving | 3.02 | .34 | 2.21 | 3.85 | - .07 | .16 | .98 |
| PWB Self-acceptance | 4.50 | .77 | 2.00 | 6.00 | -.74 | .96 | .96 |
| PWB Autonomy | 4.23 | .63 | 2.90 | 5.50 | .10 | -.86 | .97 |
| PWB Environmental Mastery | 4.33 | .59 | 2.40 | 5.40 | .59 | -.49 | .97 |
| PWB Purpose in Life | 4.75 | .75 | 2.30 | 6.00 | -.84 | .47 | .94 |
| PWB Positive Relations | 4.49 | .92 | 1.80 | 6.00 | -.34 | -.34 | .97 |
| PWB Personal Growth | 4.88 | .76 | 2.80 | 6.00 | -.80 | .16 | .94 |
| PWB overall score | 4.55 | .54 | 2.75 | 5.55 | -.62 | .35 | .97 |

**Zero-order Correlations among study factors**

Psychological Eudaimonic well-being appears to be positively correlated with wisdom as pragmatic knowledge and wisdom as dialectical post-formal thinking; it appears to also positively correlated with

divergent problem solving. wisdom as dialectical post-formal thinking, as pragmatic competence and uncertainty management appear to be positively correlated with divergent problem solving (see Table 2).

**Table 2**. Zero-order Correlations among Eudaimonic well-being, wisdom and divergent problem solving

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Wisdom as pragm. | ---- | | | | | | | | | |
| 2. Wisdom as dialectical | .53*** | ----- | | | | | | | | |
| 3. Wisdom future unc. | .11 | .33*** | ---- | | | | | | | |
| 4. Divergent probl. | .28** | .42*** | .24* | ---- | | | | | | |
| 5. Self-accept. | .13 | .02 | -.07 | .47*** | ---- | | | | | |
| 6. Autonomy | .40*** | .35*** | -.13 | .32** | .24* | ------ | | | | |
| 7. Env. mastery | .36*** | .29** | -.02 | .47*** | .67*** | .31*** | ------ | | | |
| 8. Life projects | .17 | .19+ | .11 | .65*** | .77*** | .25* | .68*** | ------- | | |
| 9. Positive relations | .36** | .18 | -.02 | .37*** | .64*** | .28** | .63*** | .55*** | ------ | |
| 1. P. Growth | .27** | .37*** | .21* | .65*** | .48*** | .20+ | .56*** | .66*** | .40*** | ----- |
| 11. PWB overall score | .37*** | .30** | .02 | .64*** | .84*** | .48*** | .83*** | .86*** | .80*** | .73*** |

*Note. p < .06; * p < .05; **p < .01; ***p < .001*

**Age effects on study variables. The Linear Regression Models**

**Age and perceived efficacy on divergent problem solving.** Linear regression model highlights a decrease in the perceived efficacy on divergent problem solving (Multiple R = .30; $R^2$ = .09; Adj. $R^2$ = .08); Beta = -.303; st. error of Beta = .09; $p$ < .01. (Anova overall goodness of fit index: MS = 1.02; F = 9.21; $p$ < .01).

**Age and wisdom as dialectical post-formal thinking.** Linear Regression model highlights a decrease in post formal dialectical thinking as age increases (Multiple R = .23; R2 = .05; Adj. R2 = .04); Beta = -.230; st. error of Beta = .09; $p$ < .05. (Anova overall of fit index: MS = 1.52; F = 5.42; $p$ < .05)

**Age and Personal Growth.** Linear Regression model highlights a decrease in the personal growth as age increases (Multiple R = .20; $R^2$ = .04; Adj. $R^2$ = .03); Beta = -.204; st. error of Beta = .09; p <.05. (Anova overall of fit index: MS = 2.48; F = 4.29; $p$ < .05)

**Gender and school education as grouping variables for PWB, wisdom and perceived efficacy on divergent problem solving**

A Manova Model highlighted that gender as grouping variable was not significant for PWB as overall score (F = .157; $p$ = .69), and for the six its components (F= 1.32; $p$ =.21). For gender as grouping variable for wisdom Manova model highlighted not significant value (Wilk's Lambda = .97; F (3,.79); $p$ = .5. For gender as grouping variable Manova Model highlighted not significant value for perceived efficacy on divergent problem solving (F = .00). The Manova Model for school education highlighted not significant value for wisdom (Wilk's Lambda = .96; F(6, .47); $p$ = .85. School education as grouping variable highlighted a not significant value for PWB as overall score (Anova Model: F = 1.09; $p$ =.33) and for its six components (Anova Model: F = 1.32; $p$ = .21).

**The contributions of wisdom and of the perceived efficacy on divergent problem solving on the Eudaimonic well-being: the Hierarchical Regression Models**

**The contributors to overall psychological Eudaimonic well-being.** In the first step the structural variables age, gender and school education were added to the equation. The model resulted in not significant (Multiple $R$ = .16; $R^2$ = .02; Adj. $R^2$ =----; $F$ (3,84) = .79; $p$ = .49. In the second step, wisdom dimensions were added. The model resulted as significant with wisdom as pragmatic competence as statistically significant (Beta = .282; st. err. of Beta = .12; $p$ < .05). Multiple $R$ = .43; $R^2$ = .18; Adj. $R^2$= .12. $F$ = (6,81) = 3.13; $p$ < .01. In the third step, divergent problem solving was added to the equation. Wisdom as pragmatic competence retained the significance (Beta = .205; st. error of Beta = .09; p < .05). wisdom as uncertainty management becomes as significant (Beta = -.190; st. error of Beta = .05), while divergent problem solving give a significant contribution to the model (Beta = .642; st. error of Beta = .16; $p$ < .001).

The whole final model resulted as significant, with 43% of explained variance (Multiple R = .69; R2 = .48; Adj. $R^2$ = .43). $F$ = (7,76) = 1.27; $p$ < .001. (Anova overall of fit index: MS = 1.48; $F$ = 9.34; $p$ < .01; see Table 3).

**Table 3**. The contributors to overall Eudaimonic well-being

| **Variable** | ***Beta*** | ***St. error* of *beta*** | ***p level*** | |
|---|---|---|---|---|
| *First step* | | | | |
| Age | -.07 | .11 | < .49 | |
| Gender | .03 | .11 | < .76 | |
| School education | 131 | .11 | < .23 | |
| | | | | Multiple $R$ = .16; $R^2$ = .402; adj. $R^2$ = ---; $F$ (3,84) = 79; $p$ < .49 |
| *Second step* | | | | |
| Age | .02 | .11 | < .84 | |
| gender | .03 | .10 | < .75 | |
| School education | 149 | .10 | < .15 | |
| Wisdom as pragmatic | 282 | .12 | < .05 | |
| Wisdom as dialectical post-formal thinking | 196 | .13 | < .14 | |
| Wisdom as future uncertainty management | -.08 | .11 | < .42 | |
| | | | | Multiple $R$ = .43; $R^2$ = .18; adj. $R^2$ = .12; $F$ (6,81) = 3.14; $p$ < .01 |
| *Third step* | | | | |
| Age | .11 | .01 | < .21 | |
| gender | .00 | .12 | < .99 | |
| School education | .06 | .06 | < .43 | |
| Wisdom as pragmatic competence | .205 | .12 | < .05 | |
| Wisdom as dialectical | .002 | . 11 | < .98 | |
| Wisdom as future uncertainty management | -.190 | . 05 | < .05 | |
| Divergent problem solving | . 642 | .16 | < .001 | |
| | | | | Multiple $R$ = .69; $R^2$ = .48; adj. $R^2$ = .44; $F$ (7,76) = 1.27; $p$ < .001 |

**The contributors to Purpose in Life component of eudaimonic well-being.** In the first step structural variables age, gender and school education were added to the equation. School education approached significance (Beta = .205; st. error of Beta = .10; $p$ = .06. the model resulted as not significant (Multiple $R$ = .21, $R^2$ = .04; Adj. $R^2$ = .01; $F$ (3,91) = 1.48; $p$ = .22. In the second step, wisdom dimensions were added. School education approached significance (Beta = .187; st. error of Beta = .10; $p$ = .08). The model resulted as not significant (Multiple $R$ = .30; $R^2$ = .09; Adj. $R^2$ = .02; F = (6,84) 1.44; $p$ = .2. In the third step divergent problem solving was added. Age become significant (Beta = .193; st. error of Beta = .01; $p$ < .05). Divergent thinking resulted as significant (Beta = .695; st. error of Beta = .22; $p$ < .001). The whole model resulted as significant, with 39% of explained variance. (Multiple $R$ = .66; $R^2$ = .44; Adj. $R^2$ = .39. $F$ (7,79) = 8.99; $p$ < .001). Anova overall goodness of fit index: MS = 3.09; $F$ = 8.99; $p$ < .01.

**The contributors to the Self-Acceptance component of eudaimonic well-being.** In the first step structural variables age, gender and school education were added to the equation. The model resulted as not significant (Multiple $R$ = .15; $R$2 = .02; Adj. $R$2 = .00; $F$ (3,94) = .80; $p$ = .80). In the second step, wisdom dimensions were added, resulting in the model as not significant (Multiple $R$ = .24; $R^2$ = .05; Adj. $R^2$ =.00; $F$ (6,88) = .90; $p$ = .49). In the third step divergent problem solving was added to the equation. Wisdom as future uncertainty management resulted as significant but with negative value (Beta = -.255; st. error of Beta = .08; $p$ < .01), together with creative divergent problem solving (Beta = .577; st. error of Beta = .10; p < .001). The whole model resulted as significant (Multiple $R$ = .55; R$^2$ = .30; Adj. $R^2$ = .25; $F$ (7, 82) = 5.25,

p < .001), with 25% of explained variance. (Anova overall goodness of fit index: MS= 2.41; $F$ = 5.25; $p$ < .001)

**The contributors to the Positive Relations with others component of eudaimonic well-being.** In the first step, the structural variables age, gender and school education were added to the equation, resulting in the model as not significant (Multiple R = .20; $R^2$ = .04; Adj. $R^2$ = .01; F (3,91) = 1.37; $p$ = .25). In the second step, wisdom dimensions were added. Wisdom as pragmatic knowledge resulted as significant (Beta = .324; st. error of Beta = .12; p <.01). The model resulted as significant (Multiple R = .40; $R^2$ = .16; Adj. $R^2$ = .10; $F$ (6,87) = 2.90; p <.01. In the third step, divergent problem solving was added to the equation. Wisdom as pragmatic knowledge remained as significant (Beta = .291; st. error of Beta = .11; $p$ < .01). Divergent problem solving resulted as significant (Beta = .364; st. error of Beta = .10; p <.001). The whole model resulted as significant (Multiple R = .50; $R^2$ = .25; Adj. $R^2$ = .18; (F = 7, 82) = 3.94; $p$ < .001), with 18% of explained variance. Anova overall goodness of fit index: MS= 2.91; F = 4.49; $p$ < .001.

**The contributors to the component Personal Growth of eudaimonic well-being.** In the first step, the structural variables were added to the equation. School education approached the significance (Beta = .160; st. error of Beta =.10; $p$ = .11). The whole model resulted as significant (Multiple R = .26; $R^2$ = .07; Adj. $R^2$ = .04; F(3,100), $p$ = .05). In the second step, wisdom dimensions were added. Wisdom as dialectical post formal thinking resulted as significant (Beta = .276; st. error of Beta = .12; $p$ < .03). The model resulted as significant (Multiple $R$ = .46; $R^2$ = .21; Adj. $R^2$ = .16; $F$(6, 89) = 4.06; $p$ = .001. In the third step, creative divergent problem solving was added to the equation. Divergent problem solving resulted as significant (Beta = .583; st. error of Beta = .09; $p$ =.001), while wisdom as dialectical post-formal thinking become not significant. The whole model resulted as significant (Multiple R= .66; $R^2$= .44; Adj. $R^2$ = .40; $F$(7, 96) = 1.88; $p$ =.001). Anova overall goodness of fit index: MS = 3.76; $F$ = 11.33; $p$ = .01.

**The contributors to the component Environmental Mastery of eudaimonic well-being.** In the first step, structural variables age, gender and school education were added to the equation. The model resulted as not significant (Multiple $R$ = .17; $R^2$ = .03; Adj. $R^2$ = .00; $F$ (3.95) = .98; $p$ = .4. In the second step, wisdom dimensions were added. Wisdom as dialectical post-formal thinking resulted as significant (Beta = .266; st .error of Beta = .13; $p$ = .05), and also wisdom as future uncertainty management, but with negative value (Beta = -.235, st. error of Beta = .11; $p$ = .05). The model resulted as significant (Multiple R = .39; $R^2$ = .15; Adj. $R^2$ = .10; $F$(6,89) = 2.81; $p$ = .01. In the third step, divergent problem solving was added. The significance of wisdom as post-formal thinking was suppressed, becoming not significant (Beta = .137; $p$ = .17). Wisdom as future uncertainty management remained as significant (Beta = -.283; st. error of Beta = .10; $p$ = .01). Divergent problem solving resulted as significant (Beta = .481; st. error of Beta = .10; $p$ = .001). The whole model resulted as significant (Multiple $R$ = .57; $R^2$ = .33; Adj. $R^2$ = .27; $F$ (7,83) = 5.91; $p$ = .001, with 27% of explained variance. Anova overall goodness of fit index: MS = 1.55; $F$ = 5.91; $p$ = .01.

**The contributors to the component Autonomy of eudaimonic well-being.** In the first step, structural variables age, gender and school education were added to the equation. The model resulted as not significant (Multiple $R$ = .20; $R^2$ = .04; Adj. $R^2$ = .01; $F$ (3,92) = 1.40; $p$ = .24). In the second step, wisdom dimensions were added. School education became as significant (Beta = .027; st. error of Beta = .09; $p$ = .05). Wisdom as practical competence resulted as significant (Beta = .249; st. error of Beta = .10; $p$ = .05). Wisdom as post-formal dialectical thinking resulted as significant (Beta = .335; st. error of Beta = .12; $p$ = .01). Wisdom as future uncertainty management resulted as significant, with negative value (Beta = -.315; st. error of Beta = .10; $p$ = .01). The model resulted as significant (Multiple $R$ = .52; $R^2$ = .27; Adj. $R^2$ = .22; $F$ (6,86) = 5.55; $p$ = .001. In the third step, divergent problem solving was added. School education approached significance, reducing its value (Beta = .180; st. error of Beta = .09; $p$ =.06). Wisdom as practical competence remained as significant (Beta = .243; st. error of Beta = .10; $p$ = .05). Wisdom as dialectical post-formal thinking remained as significant (Beta = .248; st. error of Beta = .12; $p$ = .05). Wisdom as future uncertainty management remained as significant (Beta = -.363; st. error of Beta = .10; $p$ = .001). Divergent problem solving resulted as significant (Beta = .296; st. error of Beta = .10; $p$ = .01). The whole model resulted as significant (Multiple $R$ = .60; $R^2$ = .36; Adj. $R^2$ = .30; $F$(7, 80) = 6.54; $p$ = .001. Anova overall goodness of fit index: MS = 1.92; $F$ = 6.54; $p$ = .001.

## DISCUSSION

The present study regarded the issue of ageing well from the perspective of eudaimonic psychological well-being. Recognizing its relevance for reaching a satisfactory life also in the last stage of life (Ryff &

Singer, 2008; Ryff, 2014; Ryff, 2023) and the necessity for this reason to identify the factors that can improve it, the study evaluated the contribution of two factors, namely wisdom and divergent problem solving for its improvement. For this study the construct of wisdom elaborated by Moraitou & Efklides (2012) has been adopted. Results confirm the positive associations between wisdom, divergent problem solving and eudaimonic well-being.

The sample shows different levels of wisdom according to specific dimensions: the highest scores has been obtained on wisdom as pragmatic competence, while the lowest on wisdom as future uncertainty. The sample shows a high level of eudaimonic well-being, also on dimensions such as Purpose in Life and Personal Growth that are unusual for old age at this high level (Ryff & Singer, 2008; Schilling, 2022).

Age affects the divergent problem solving, in line with other studies (Colautti et al., 2023; Palmiero et al., 2017), as hypothesized. Indeed, as age increases, it linearly decreased. This data, considering the emergent studies on the relevance of creativity in its broad theoretical spectrum for positive ageing (Palmiero et al., 2017; Colombo et al., 2018), requests special attention and future planning for activities, interventions aimed at improving this ability in the old population.

Wisdom shows a robust association with overall eudaimonic well-being in its components of pragmatic competences and future uncertainty management, as hypothesized. The pragmatic competencies (ability in navigating daily situations, complexity and giving good advice to others) improve the well-being of old people, who can receive positive feedback, improving the quality of their relationships, as evidenced by the connection with the dimension of Positive Relations with Others.

The correlations that emerged between wisdom in its three components and divergent problem solving may open the door to suggestive reflection. The most robust association has been found between wisdom as dialectical post-formal thinking and divergent problem solving, as hypothesized (H3), suggesting the presence of underlying cognitive processes, such as the ability of restructuring of the informations by which a problem is composed giving life to a new gestalt, and /or the ability to recognize underlying common factors that pertains to two or more issues, such as in presence of dilemmatic horns. The ability to identify new, creative solutions could therefore belong both to divergent problem solving and to wisdom as dialectical post-formal thinking, escaping the forced choice of a dilemma and restructuring the situation in a new way or new interpretation of it. Wisdom conceived as pragmatic competence and as management of future uncertainty appears also significantly connected, albeit with less correlational strength, with divergent problem solving, an unexpected result. With being faced with complex situations, dilemmas and issues in which it is difficult to identify a fairly defined future outcome, it requires the ability to think innovatively. The ability to restructure problems, identify answers, and ways of coping that are not obvious and determined by tradition passed can be of emerging relevance in our society. For this reason, creative competence in problem solving can be integrated with wisdom for effective responses, especially in contemporary, flexible, rapidly evolving society (Bauman, 2013), and reevaluating the role of old age for the evolution of society.

Divergent problem solving emerges as the most powerful contributor for eudaimonic well-being as a global score and for most of its subcomponents, as hypothesized (H7). Wisdom also gives a significant contribution to overall eudaimonic well-being, with positive value for pragmatic competence, and with negative value for future uncertainty management, confirming the hypothesis H6. These data seem to confirm the role of wisdom as pragmatic competence and as post-formal divergent thinking for positive development in the third age. Future uncertainty management and the awareness of human finitude dimension represent, on the contrary, a threatening factor, that, in this study, compromise, instead improving, the well-being as emerged in the Hierarchical Regression Models. The awareness of personal mortality, the awareness of unpredictability of the future give rise to anxiety, perhaps, and can be perceived as a block, a detrimental factor for this type of well-being, based on the future tension toward self-realisation. It may be that other constructs related to positive functioning can be positively associated with this awareness, such as sustainable behaviours, more oriented toward the common good of the society (Zambianchi, 2024).

A relevant methodological question emerged in this study: which is the relationship between wisdom as dialectical post-formal thinking and divergent problem solving? Are they distinct constructs or overlapping constructs? Both are perceived measures, so they belong to the same type of self-report measures. Looking at the results of Hierarchical Regression Models, it seems that divergent problem solving suppresses the contribution of wisdom as dialectical post-formal thinking in all of the components of PWB, but with the exception of Autonomy (a sub-component of PWB), where they give both autonomous contributions to it. In fact, in the second step, wisdom as dialectical post formal thinking appears to be a significant contributor to the components of psychological well-being and to the PWB as global score. Only for Autonomy, both dialectical post formal thinking and divergent thinking remain as

significant. So, the question is far from a clear understanding. While wisdom and creativity share certain cognitive processes, creativity may have a more direct role in enhancing well-being across multiple dimensions. The correlations between them are of medium level, $p < .40$, not enough to clearly support the overlapping hypothesis. And then, giving a closer look to the items of the two scales, several items of the perceived efficacy on divergent problem solving such as "to be a volcano of ideas"; "to find new way to do the same things in order to avoid boredom"; "go against the grain and think differently from others" are not included in the wisdom scale. They appear to measure partially different dimensions of creativity, namely widening (deal with a high number of elements) and connecting (establish relationships among different elements and combining them in unusual ways, Antonietti et al., 2023; Colombo et al., 2018). But, only future research could disentangle this question.

**Limits of the study, future directions and practical implications**

The study has important limits that must be taken into account. The first limit is the small sample of participants. Broader samples are requested for disentangling the question of the relations between post formal dialectical thinking and divergent problem solving, as discussed above.

Another limit is the imbalance for school education: high levels of schooling are overrepresented. The study is cross-sectional, for this reason, only longitudinal studies could identify the causal connection between eudaimonic well-being, wisdom and divergent problem solving, important for future concrete programs and interventions. Despite these relevant limits, the study seems to indicate that cultivating both wisdom and divergent problem solving can help old people to live successfully realising their potential, for themselves and for society, requesting programs and projects aimed at improving them.

Gannì et al., (2023) proposed a set on creative exercises for enhancing creativity in old age. A further possibility for enhancing both divergent thinking, that has been demonstrated as relevant for psychological well-being and cognitive functioning in everyday life with an unexpected force, and wisdom, could be represented by the Life Skills Education Model adapted for the old age (Zambianchi, 2016; Zambianchi, 2025). This Model, elaborated by WHO (1994) for the childhood and the adolescence, could be an interesting theoretical frame for developing projects aimed at improving both divergent thinking (that is a specific Life Skill of this Model) and wisdom, pertaining the latter to the Critical Thinking, another Life Skill included in this Model. This Model can be utilized by psychologists and education professionals for improving these resources that emergent research is highlighting as key determinants for positive ageing.

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**Manuela Zambianchi:** Conceptualization; Data Curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing - Original Draft; Writing - Review & Editing. Conceptualization; Data Curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing - Original Draft; Writing - Review & Editing. Conceptualization; Data Curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing - Original Draft; Writing - Review & Editing.

*Historial do artigo*

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|---|---|
| Recebido | 06/09/2024 |
| Aceite | 21/07/2025 |
| Publicado online | - |
| Publicado | 31/12/2025 |