

The Wise Thinking and Acting Questionnaire: The Cognitive Facet of Wisdom and its Relation with Memory, Affect, and Hope

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Abstract Wisdom is a topic that holds much promise as geropsychologists turn their attention to the positive facets of aging. This study aimed at (a) examining the construct validity of a new scale for measuring the cognitive facet of wisdom, and (b) analyzing the relations between wisdom and demographic factors, hope, affect, and memory. The participants of the main sample were 446 adults, aged 20–80 years. For the validation of the scale, a second sample ($N = 89$) was used; it comprised two subsamples of 37 older adults and 52 young adults. The Wise Thinking and Acting Questionnaire (WITHAQ) was used along with measures of hope, state affect and memory abilities. Ardelt's 3D-WS was used for validation purposes. A three-factor structure of the WITHAQ with interrelations between the factors was confirmed, reflecting practical wisdom, integrated dialectical thinking, and awareness of life uncertainty, respectively. The relations between the WITHAQ, 3D-WS, and the measure of hope were in the predicted direction. The interaction of age and education predicted the three factors of the WITHAQ positively. Pearson correlations showed that the three factors were differentially associated with affect and memory.

Keywords Integrated dialectical thinking · Expert knowledge · Lifespan development · Values · Uncertainty

1 Introduction

In a positive-psychology spirit, many aging researchers value the investigation of individual characteristics and processes that have the potential to support positive growth during lifespan development and aging (Baltes and Staudinger 2000; Jopp and Smith 2006; Peterson and Seligman 2004). Based on historico-philosophical views, wisdom can be considered the leading of such 'human strengths', since at the core of this concept is the notion of a perfect integration of mind and virtue that presupposes many years of life among other things (Baltes and Smith 2008; Schwartz and Sharpe 2006). But how such an

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ideal endpoint of human development can be measured when there is no consensus on the conceptualization of wisdom? The study reported below tested a new instrument for measuring various aspects of the cognitive facet of adult wisdom as conceptualized by major theories in psychology. First, the construct validity of the new instrument was tested; second, the relations of the questionnaire's factors with demographic variables, memory, and affect were investigated in an effort to show that the various aspects of the cognitive facet of wisdom are differentially associated with affect and memory.

1.1 Psychological Theories of Wisdom

Several definitions of wisdom have been developed in the field of psychology during the past two decades (Baltes and Staudinger 2000; Sternberg 1990). Most of them can be categorized into two broad groups: (a) wisdom being primarily a synthetic skill and (b) wisdom being primarily an analytical skill (Takahashi and Overton 2002).

1.1.1 *Wisdom as a Synthetic Skill*

According to Takahashi and Overton (2002), the synthetic mode of wisdom refers to some underlying psychological organisation of dialectical nature, that moves towards states of increased integration (see also Basseches 1984). In this framework, wise action is understood as an 'expression' of an underlying psychological structure that reflects the integrated functioning of multiple psychological processes in a given context (Takahashi and Overton 2002). This implies that wisdom is the outcome of a dynamic interplay of cognitive, affective, and reflective personality characteristics (Ardelt 2003; Birren and Fisher 1990; Erikson 1982; Holliday and Chandler 1986; Le and Levenson 2005; Orwoll and Perlmutter 1990; Pascual-Leone 2000; Webster 2003, 2007).

From a cognitive point of view, the conceptualization of wisdom as a synthetic skill is found in theories positing that wisdom is reflected in a higher level of cognitive organization (e.g., post-formal thinking; see Arlin 1990; Kramer 2000; Labouvie-Vief 2000; Sternberg 1990). Arlin (1990) suggests that wisdom presupposes a kind of thinking that evolves from the mere resolution of problems to the identification of ill-defined problems involving uncertainty, and answering questions that arise around them. Problem identification in conditions of uncertainty and wisdom share processes such as discovery of deeper similarities and relations in situations appearing to be unrelated or even contradictory, noticing of subtle features and detection of asymmetry in what appears to be symmetrical and well-explained from a conventional explanatory point of view, willingness to remain open to new information and change of one's views, etc. (Arlin 1990).

In a similar vein, Labouvie-Vief (1990, 2000) defines wisdom as the grounding of intellectual operations usually associated with 'logos' (reason) in 'mythos' (an organismic core of inter- and intra-personal processes). According to Labouvie-Vief (1990, 2000), the integration of these two modes of thinking leads to the development of dialectical modes of thinking, greater awareness of complexity and tolerance of ambiguity inherent in life dilemmas, and a better combination of free emotional expression with conscious emotion regulation.

Adopting a similar cognitive-developmental perspective, Kramer (1990, 2000) argues that wisdom is based on relativistic and dialectical reasoning, the development of which is linked to the development of affect regulation. Relativistic thinking involves awareness of the subjective and arbitrary nature of knowledge, and therefore, it is the mode of thinking that would foster an awareness of the unpredictable nature of life events (Kramer 1990,

2000). Dialectical thinking, on the other hand, involves an awareness of the integratability of knowledge through conflict resolution.

To sum up, wisdom from a cognitive-developmental perspective has been associated with integrated dialectical thinking that enables a person to adapt to life situations mainly through the acknowledgment of their unpredictable (uncertain) and interactive nature.

1.1.2 Wisdom as an Analytic Skill

According to Takahashi and Overton (2002), the conceptualization of wisdom as analytic skill stresses the ‘instrumental’ or ‘adaptive’ value of wise behavior. Hence, wisdom is manifested in situations involving practical goals (e.g., solving everyday problems, evaluation, judgment). In other words, the core of wisdom consists of knowledge a person accumulates through experience and functioning in specific domains, and especially, in domains dealing with socio-moral dilemmas. From this point of view, wisdom can be conceptualized as an expert system of knowledge about the meaning and conduct of life (Baltes and Staudinger 2000). Specifically, Baltes and Staudinger (2000) identify five components/criteria of wisdom: (a) rich factual knowledge about life; (b) rich procedural (strategic) knowledge on how to deal with life-dilemmas; (c) rich knowledge about life contexts and their dynamics; (d) rich knowledge about relativism of values and life priorities; and (e) recognition and management of life uncertainty. However, according to Baltes and Staudinger (2000), wisdom-related knowledge has a lower level of quality when there is no overall life orientation towards human excellence and the common good.

In the same direction, Sternberg (1998) defines wisdom as the application of intelligence, creativity, and tacit knowledge, as mediated by values, toward the achievement of common good through a balance of multiple, intra-, inter-, and extra-personal interests.

Schwartz and Sharpe (2006), in an effort to find common places in the Aristotelian and positive psychology’s perspectives of wisdom, argue that practical wisdom is the ‘executive decision maker’ that keeps the balance among all human strengths. Besides cognition, the main prerequisites for practical wisdom are right goals, right motives, and relevant experience.

Summing up, wisdom from an analytic point of view is mainly related to utilization of knowledge accumulated through life experiences in order to solve specific, difficult and ambiguous life dilemmas. In the utilization of this kind of knowledge cognitive, affective and socio-moral processes, and especially, the capability to judge and decide in face of life uncertainty are also involved.

Extant measures of wisdom focus either on synthetic or analytic skills and do not seem to conceptualize awareness of life uncertainty as a distinct aspect of wisdom, although it is a critical feature of it. Considering that the synthetic (e.g., integrated dialectical thinking) and the analytic skills (e.g., practical along with values thinking) of wisdom are, in fact, “two moments of the same process” (Takahashi and Overton 2002, p. 269), the aim of the present study was to develop a self-report questionnaire that would capture both of them. The focus was on the assessment of aspects of the cognitive facet of wisdom rather than the affective or other personality manifestations of it. Moreover, since a critical aspect of wisdom is awareness of life uncertainty, this was explicitly included in the questionnaire.

1.2 Measures of Wisdom

Despite differences in the conceptualization of wisdom, there seems to be consensus among psychologists as regards the multidimensional and dynamic character of it (Ardelt

2003; Webster 2003; Yang 2008). Assessment of wisdom as a cognitive characteristic is usually based on performance in problem-solving and decision-making tasks that call for expert knowledge about life (Baltes and Staudinger 2000; Kunzmann 2007). Questionnaires addressing wisdom, on the other hand, mainly tap lay people's implicit theories of wisdom (Sternberg 1990) rather than behaviors which are indicative of a 'wise' approach to life dilemmas. Moreover, the very few questionnaires that have been developed to measure personal wisdom tap different facets of it (Ardelt 2003; Webster 2003). Specifically, Webster's (2003, 2007) Self-Assessed Wisdom Scale (SAWS) consists of 40 items organized around five interrelated dimensions. These dimensions are: experience, emotional regulation, sense of humor, reminiscence and reflection, and openness to new or alternative views. According to Webster (2003, 2007), the coexistence of all these dimensions at a high level in a person, renders this person worth being recognized as wise. It should be noted, however, that in contrast to the questionnaire presented in this study, the SAWS mainly aims at measuring non-cognitive dimensions of wisdom.

Ardelt's (2003) Three-Dimensional Wisdom Scale (3D-WS) aims at measuring wisdom mainly in older adults (>50 years old). The 3D-WS stresses the interplay of three dimensions of wisdom, namely the cognitive, the affective, and the reflective one. According to Ardel (2003), the reflective dimension of wisdom is the most crucial constituent of it, because it is a prerequisite for the development of the other two. Specifically, the cognitive dimension of wisdom is defined as the person's ability for a deeper understanding of life. It is measured in terms of avoidance of cognitive simplicity. The affective dimension of wisdom refers to positive emotions towards others, whereas the reflective dimension refers to the consideration of different aspects of a situation and of different viewpoints that allows for overcoming one's self-centeredness. The reflective dimension of wisdom resembles the integrated dialectical thinking as described above, but is not identical to it. Integrated dialectical thinking is applied to everyday situations and involves not only perspective taking and multiple-sided view of things but also recognition of life uncertainty and unpredictability, thinking related to problem finding, as well as thinking that reflects the integration of hypothetico-deductive and experiential reasoning (Arlin 1990; Kramer 2000; Labouvie-Vief 2000).

Clearly, the two most well-known questionnaires assessing wisdom differ in the facets of wisdom they focus on. Moreover, the 3D-WS emphasizes deeper understanding of life, affect, and reflection but does not explicitly refer to integrated dialectical thinking and to practical wisdom, although they are both cognitive in nature. Also, awareness of life uncertainty is not included as an aspect of the cognitive facet of wisdom.

1.2.1 *The WITHAQ*

The questionnaire presented in what follows is called the Wise Thinking and Acting Questionnaire (WITHAQ). The aim was to specifically address practical wisdom, integrated dialectical thinking, and awareness of uncertainty in life. The development of the individual items of the WITHAQ was based on previous research findings as well as the respective theories (see Sect. 1). Specifically, a first study was conducted to investigate laymen's implicit theories of wisdom (Moraitou et al. 2004). Participants aged from 13 to 83 years old ($n = 417$), answered four open-ended questions on the concepts of 'wisdom' and the 'wise person'. The application of factorial correspondence analysis and hierarchical cluster analysis revealed three types of implicit theories of wisdom: (1) the 'theory' of wisdom as expert and deep knowledge about life and the world, with this kind of knowledge being primarily based on experience, complex thinking, and openness to

change; (2) the ‘theory’ of wisdom as practical wisdom that is evident in the management of life dilemmas. Practical wisdom mainly consists of the interplay of reasoning with universal values and morality to serve common good; (3) the ‘theory’ of wisdom as a mix of personal characteristics, which, however, is qualitatively different for every person acknowledged as wise. Thus, it was difficult to operationalize this ‘theory’.

At a second phase of the above study, the prototype of the wise person as compared to other related prototypes (Moraitou and Efklides 2005) was investigated. The same sample answered to the ‘Cognitive Characteristics Questionnaire–CCQ’ for the wise person, the clever person, the creative person, and the humanist. This questionnaire consisted of 61 items tapping cognitive characteristics; its development was based on psychological definitions of wisdom. The two critical characteristics that differentiated the wise person from the other three prototypes were “complex–dialectical thinking” and “crystallized intelligence–contribution to knowledge”. This characteristic reminds of practical wisdom.

Given the aforementioned findings, we tried to include in the construction of the WITHAQ items that reflect both the two main types of laymen’s implicit theories of wisdom (as expert knowledge about life and as practical wisdom) and items that reflect the dimensions of the wise person prototype (“complex–dialectical thinking” and “crystallized intelligence–contribution to knowledge”). A basic criterion for item selection was that the cognitive quality depicted in the selected item refers to a characteristic that is possible to characterize common persons and not only special categories of persons such as philosophers and scientists. We also made sure that there would be items reflecting life uncertainty in everyday life, such as unexpected events or death.

1.3 Wisdom and Demographic Characteristics

Wisdom in people’s minds is associated with older age. Although the association of wisdom with old age remains a societal conception (Naschenweng and Koenig 2009), empirical evidence suggests lifespan stability of wisdom (Baltes and Smith 2008; Kunzmann 2007; Mickler and Staudinger 2008): in other words, few age effects have been observed in adulthood in the average level of wisdom, mainly measured as expert knowledge about life and subsequent action. On the other hand, if wisdom is defined as integrated dialectical thinking, then the respective evidence is suggesting a decrease, at least of integrated dialectical thinking, in older as compared to middle-aged adults (see Sternberg 1990; Yang 2008). There is no evidence on age effects on awareness of uncertainty in life. One could assume, however, an increase in older age when people become aware of their physical and mental limitations.

With respect to gender, stereotypical conceptions of how women’s wisdom might differ from men’s (see Sternberg 1990) are also not supported empirically, even by studies examining wisdom in the form of empathy and social support, which theoretically has been associated with females (Ardelt 2009; Glueck et al. 2005). However, one could argue that women are more anxious than men (Kessler et al. 1994) and this could reflect a greater awareness of life uncertainty by women. Moreover, there is no evidence as regards gender and its association with integrated dialectical thinking and practical wisdom. Therefore one could assume that there are no gender differences in integrated dialectical thinking and practical wisdom but there is gender effect on awareness of life uncertainty.

Inconclusive evidence also exists with respect to the association of wisdom with educational level. Although there has been evidence that the educational background affects the content of implicit theories of wisdom (Moraitou and Efklides 2005; see also Yang 2008), the findings of studies on wisdom as expert knowledge about life, including

recognition and management of life uncertainty, have not supported a strong relationship between education and wisdom (Glueck et al. 2005; see also Yang 2008). Nevertheless, formal education has been found to be a decisive factor for the development of complex thought that is based on abstract thinking (see Sternberg 1990). Therefore, one could argue that there is education effect on integrated dialectical thinking but there are no education effects on practical wisdom and awareness of life uncertainty. Consequently, it is an open question if demographic characteristics are associated with the three aspects of wisdom measured by the WITHAQ such as practical and integrated dialectical thinking as well as awareness of life uncertainty.

1.4 Wisdom, Memory, and Affect

Besides the possible effects of demographic factors on wisdom, it is important to know if personal resources, defined broadly as potential to adapt to everyday challenges (Jopp and Smith 2006), are associated with wisdom as practical and integrated dialectical thinking. Personal resources can be cognitive, such as fluid intelligence and memory capacity, or affective, such as positive affect (Jopp and Smith 2006).

As regards the relationship between wisdom and cognitive ability, many studies have shown that, during adulthood, the relationship between wisdom and fluid intelligence is not very strong (Baltes and Smith 2008; Mickler and Staudinger 2008; Sternberg 1998). On the other hand, it is well known that although working memory capacity is decreasing with age, declarative (semantic) and procedural memory do not decline with age (Cohen and Conway 2008). This implies that expert knowledge about life (i.e., the practical aspect of wisdom) will remain strong even if there is memory decline in older age. On the contrary, the limited resources of working memory may impair integrated dialectical thinking. This implies that integrated dialectical thinking will be manifested when there is good memory functioning. Awareness of life uncertainty, however, should not be associated with memory capacity because uncertainty is more affective in nature.

Wisdom either as expert system of knowledge (practical thinking) or as integrated dialectical thinking has been closely associated to affect (see Kunzmann 2007; Sternberg 1990). Integrated dialectical thinking includes positive affect and emotional regulation as inherent constituents of it (Kramer 2000; Labouvie-Vief 2000). Recently, there has been evidence suggesting that wisdom as expert system of knowledge about life (i.e., the practical aspect of it) helps people down-regulate their first emotional response to life problems and is associated with process-oriented positive affect (e.g., interest, activation) (see Kunzmann 2007). On the contrary, awareness of life uncertainty which is a critical condition for the evincing of wisdom, would be related to negative affect, since stress and anxiety have been associated to the experience of uncertainty (Alaszewski and Coxon 2009; Gordon 2003). Therefore, both the practical and the integrated dialectical thinking aspects of the cognitive facet of wisdom will be positively related to positive affect and not related to negative affect, whereas awareness of life uncertainty will be positively related to negative affect.

1.5 Wisdom and Hope

In the context of the positive psychology movement, both wisdom and hope are considered constituents of the broader construct of “character strengths” that has been defined psychologically as a family of positive traits manifested in an individual’s thoughts, emotions and behaviors (Peterson and Seligman 2004). There are twenty-four strengths of character

which presumably aggregate on six overarching virtues, one of them being “wisdom and knowledge”. In this line of research, hope is thought to be closely related to specific, theoretically proposed (Peterson and Seligman 2004) wisdom-related strengths such as creativity, curiosity, open-mindedness, and love of learning.

The conceptualization of hope as wisdom-related strength of character is also compatible with the cognitive model of hope proposed by Snyder et al. (1991; see Bai 2011). For Snyder (2000) hope represents a characteristic way of thinking. Hopeful thinking requires both identified goals and awareness of a method of achieving those goals. Specifically, according to Snyder’s model (2000), hope consists of two operationally defined components, that is, “agency thinking” and “pathways thought”. *Agency thinking* refers to a person’s motivation to initiate and sustain movement toward goal achievement, and it is based on learning from past experiences to think about the future in terms of agency. From this point of view, agency thinking should be positively related to practical wisdom as accumulated knowledge about life derived from everyday experience. Moreover, it should be related to awareness of life uncertainty. A guiding assumption of Snyder’s hope model (2000) is that human actions are goal-directed and goals typically contain some degree of uncertainty. Thus, accumulated expert knowledge about life, values, and the ability to take into account and manage life uncertainty could sustain and facilitate movement toward goal achievement in everyday life, mainly by decreasing goal-related uncertainty. *Pathways thought* is defined as the perceived ability to produce alternative paths, that is, cognitive strategies toward valued goals, and to differentiate them in order to be viable in a specific situation. Such ability requires multi-sided thinking and consideration of alternatives, which reminds of the integrated dialectical thinking. Therefore, there is theoretical basis for associating hope with wisdom. However, this assumption has not been tested up to now.

1.6 The Present Study: Hypotheses

Following the above theoretical overview, the cognitive facet of wisdom is conceptualized in the present study as higher-order thinking that takes the form of integrated dialectical thinking as well as accumulated expert knowledge about life (i.e., practical thinking) that are applied to everyday problem solving under conditions of uncertainty. Therefore, awareness of life uncertainty is also a critical aspect of wisdom. Of course, the above aspects of the cognitive facet of wisdom are also assumed to be acting within a well formulated prosocial system of values.

The primary aim of the present study was to investigate the factor structure of the newly developed self-report questionnaire on the cognitive facet of wisdom, the Wise Thinking and Acting Questionnaire (WITHAQ). It was expected that the WITHAQ consists of three factors tapping (a) practical wisdom, based on accumulated expert knowledge about life and values, (b) integrated dialectical thinking, and (c) awareness of life uncertainty, as they are applied to everyday life situations. The prediction was that awareness of life uncertainty will be positively related to both of the other two factors. Furthermore, the other two factors should be positively interrelated (Hypothesis 1).

The second aim of the study was to test the validity of the WITHAQ. As regards criterion validity the relation of WITHAQ with Ardel’s Three-Dimensional Wisdom Scale (3D-WS) was tested. The prediction was that the factor Practical Wisdom of the WITHAQ will be negatively related to the cognitive dimension of the 3D-WS that reflects avoidance of cognitive simplicity, because practical wisdom involves well-formulated life-management strategies that have been developed as a result of accumulated experiences and

values; therefore, it functions as fast heuristic strategies rather than as complex analytical thinking of life problems. The reflective dimension of the 3D-WS, on the other hand, that mainly represents multiple-sided view of things should be positively related to the factor Integrated Dialectical Thinking (Hypothesis 2a). No hypothesis was formulated for the relationship of the factor Awareness of Life Uncertainty with the dimensions of the 3D-WS. With respect to convergent validity, the relations of the WITHAQ factors with the two components of hope were tested. Agency thinking was expected to be positively related to the factors Practical Wisdom and Awareness of Life Uncertainty, whereas pathways thought to be positively related to the factor Integrated Dialectical Thinking (Hypothesis 2b).

The third aim was to examine the effects of demographic factors on the three hypothesized aspects of the cognitive facet of wisdom. The hypotheses were that (a) age, gender, and educational level would not be differentially associated with practical wisdom (Hypothesis 3a). On the contrary, age would be negatively related to the integrated dialectical thinking due to the negative effect of advancing age on cognitive resources such as working memory (Hypothesis 3b). Educational level, on the other hand, would be positively related to the integrated dialectical thinking, because education facilitates the development of it (Hypothesis 3c). No effect of gender on integrated dialectical thinking was expected (Hypothesis 3d). Finally, educational level was not expected to be related to awareness of life uncertainty (Hypothesis 3e). On the contrary, age and gender would be related to awareness of life uncertainty (Hypothesis 3f).

The fourth aim of the study was to investigate if the three aspects of wisdom are differentially related to memory as manifested in everyday memory functioning and to state affect. The following hypotheses were formulated: Practical wisdom presumably involves good semantic and procedural memory that can function well, even with less working memory resources. Therefore, practical wisdom in everyday life will prevail when working memory resources are declining. Hence, the relationship of practical wisdom with memory would be negative (Hypothesis 4a). Integrated dialectical thinking also presupposes good semantic memory since it requires viewing things from various perspectives. However, it presupposes strong working memory capacity that can support its more abstract and integrative nature that brings together opposing or contradictory data. Therefore, strong memory is required for integrated dialectical thinking, and the relation between them would be positive (Hypothesis 4b). Finally, no association of awareness of life uncertainty with memory was expected (Hypothesis 4c).

In the case of state affect (positive and negative), practical wisdom and integrated dialectical thinking were expected to be positively related to state positive affect but no relations of these aspects of the cognitive facet of wisdom were expected with negative affect (Hypothesis 5a). Awareness of life uncertainty, however, was expected to be positively related to state negative affect (Hypothesis 5b).

2 Method

2.1 Design

The study was designed to investigate (a) whether the hypothesized 3-factor structure of the WITHAQ is confirmed; (b) the relations of the three hypothesized factors of the WITHAQ with measures of hope, memory, and affect; and (c) the effects of demographic

factors on the three hypothesized factors of the WITHAQ. For validation reasons, a second independent sample was tested with the WITHAQ and Ardel's (2003) 3D-WS.

2.2 Participants and Procedure

The main sample comprised a total of 446 adults (217 males, 229 females) from Greece. Their age ranged from 20 to 80 years. They participated voluntarily in the study. They were recruited by third and fourth-year psychology students, who participated in a research project on cognitive geropsychology. Young and middle-aged participants came from Thessaloniki and other areas of Greece. No exclusion criteria were used. As regards the older adults in particular, they were volunteers recruited mainly through seniors' centers. In this case, the exclusion criteria were mental or physical illness or inability to follow instructions. No other exclusion criteria were used. The participants were examined on an individual basis at a place of their own choosing. The questionnaires and the memory test used in the study were presented in random order.

There were three age-groups: young adults ($N = 162$, age-range: 20–39 years, $M = 26.8$, $SD = 6.1$); middle-aged adults ($N = 158$, age-range: 40–64 years, $M = 49.9$, $SD = 6.7$); older adults ($N = 126$, age-range: 65–80 years, $M = 72.3$, $SD = 4.8$). The participants' educational level varied. Hence, three groups of educational level were defined according to the number of years of education: low educational level (range: 0–6 years of education, $N = 101$; 22.6%); middle educational level (range: 7–12 years of education, $N = 168$; 37.7%); high educational level (years of education ≥ 13 , $N = 177$; 39.7%). It should be noted, however, that there was a confounding of age with educational level. Specifically, of the 162 young adult participants, only 4.3% ($N = 7$) had low educational level, while 32.7% ($N = 53$) had middle and 63% ($N = 102$) high educational level. Of the 158 middle-aged participants, 15.2% ($N = 24$) had completed 0–6 years of education, 50% ($N = 79$) had completed 7–12 years and 34.8% ($N = 55$) 13 years of education and over. On the contrary, of the 126 older participants, 55.6% ($N = 70$) were of low educational level, 28.6% ($N = 36$) of middle and only 15.9% ($N = 20$) of high educational level. In other words, there was a tendency of advancing age to be associated with lower educational level.

The validation sample ($N = 89$) consisted of two subsamples the data sets of which were combined for the purposes of the present study. The first subsample (Group 1) consisted of 37 participants (males = 16 and females = 21) 50–90 years old, with a mean age of 67.3 years ($SD = 11.6$). The participants of Group 1 were recruited in the same way as in the main study. As regards their educational level, 56.8% ($N = 21$) had low educational level, 13.5% ($N = 5$) had middle and 29.7% ($N = 11$) had high educational level. The other subsample (Group 2) consisted of 52 participants (male = 1 and females = 51) 19–28 years old, with a mean age of 20.5 years ($SD = 1.6$). All of them were undergraduate students attending a School of Education and had completed 13 years of education.

2.3 Instruments

2.3.1 *The Wise Thinking and Acting Questionnaire (WITHAQ)*

The WITHAQ is a 13-item self-report instrument developed to measure practical wisdom (4 items; example item is: "Owing to my various experiences in life, I feel competent enough to handle different situations or—when asked—to advise people who face similar

situations”), integrated dialectical thinking (6 items; example item is: “When I hear different or opposing views on a matter or a person, I usually search for common ground that underlies these views”), and awareness of life uncertainty (3 items; example item is: “The saying ‘it changes in an hour what happens not in 7 years’ is almost always true for me when I plan my future”¹). The items of the WITHAQ as well as the theory on which the development of each one of them was based are presented in Table 2. The participants had to indicate how much their thinking fits with what is depicted by each item when they are faced with a situation such as the one described in the item. Responses were on a 4-point scale from 1 (not at all) to 4 (a great deal).

2.3.2 *Affect*

The Positive Affect and Negative Affect Schedule (PANAS; Watson et al. 1988) was chosen to examine the affective state of the participants. The PANAS is a self-report questionnaire that consists of two 10-item scales, one for positive affect and one for negative affect. For the purposes of this study we used the PANAS as it was translated into Greek by Moraitou and Efklides (2009) who confirmed the two-factor structure of the instrument proposed by Watson et al. (1988). Participants answered to what extent they felt what was described by each item during the past 2 weeks. Responses were on a Likert-type scale from 1 (very few times or not at all) to 5 (too many times). The internal consistency for the two PANAS factors was satisfactory, namely Cronbach’s $\alpha = .86$ for state positive affect and and .84 for state negative affect.

2.3.3 *Memory Ability*

To examine memory ability the Rivermead Behavioral Memory Test (RBMT; Wilson et al. 1991) was administered as adapted to Greek by Efklides et al. (2002). The RBMT is designed to detect everyday memory functioning. There are 11 subtests of the RBMT, assessing paired associate learning (remembering a person’s first and last name); prospective memory (e.g., remembering to collect a hidden belonging, delivering a message, and arranging an appointment); object recognition; remembering a story (one score for immediate and one for delayed recall of a short prose passage); face recognition; spatial memory (e.g., remembering a new route: a. immediately/b. after a delay of a few minutes); orientation in time and place; and remembering the date. The pass/fail or screening score was used. The screening score for the total test ranges from 0 to 12. The higher score corresponds to better memory ability.

2.3.4 *Hope*

Snyder et al.’s (1991) Adult Dispositional Hope Scale (ADHS) was used. It is a 12-item scale designed to tap dispositional hope in adults. The ADHS was translated into Greek by Moraitou et al. (2006) and tested for its construct validity (Papantoniou et al. 2010). Participants had to answer whether each of the 12 items was true for themselves, on a 5-point Likert-type scale from 1 (not true at all) to 5 (very true) (see Moraitou et al. 2006). The internal consistency for the two factors of ADHS was acceptable, namely Cronbach’s $\alpha = .75$ for pathways thought and .69 for agency thinking.

¹ This is a Greek saying that emphasizes the sudden and unpredicted nature of everyday life events.

2.3.5 The Three-Dimensional Wisdom Scale (3D-WS)

The 3D-WS has been developed by Ardelt (2003). It was translated into Greek for the purposes of the present study. Due to the small number of participants in the validation sample it was not tested for its construct validity and only two of the three subscales of it, namely the subscales referring to the cognitive and the reflective dimension of wisdom (see Sect. 1) were used. All items were assessed using one of two 5-point scales, ranging either from 1 (strongly agree) to 5 (strongly disagree) or from 1 (definitely true of myself) to 5 (not true of myself). The higher score corresponds to higher level of avoidance of cognitive simplicity or dogmatism and higher level of multiple-sided view of things. The internal consistency for the cognitive dimension of the 3D-WS was satisfactory, Cronbach's $\alpha = .83$, while for the reflective dimension was relatively low, Cronbach's $\alpha = .65$, for the validation sample.

2.4 Statistical Analyses

Analyses were conducted in six stages. The first three stages were dedicated to determining the structure of the newly developed WITHAQ. Specifically, the WITHAQ data from the main sample were firstly subjected to exploratory factor analysis (EFA); then, the factorial structure was tested using confirmatory factor analysis (CFA; Brown 2006; Kline 2005). To cross-validate the factorial structure of the WITHAQ, CFA was also performed as regards the WITHAQ data from the validation sample. Due to the small number of participants in this sample and to the constitution of it (two different subsamples—groups), we decided to proceed to the CFA after item parceling (see Brown 2006), and to add to the structural model the variable of group as covariate, because there was no continuity in the age of the two samples.

To test the effects of demographic factors on the factors of WITHAQ, the Multiple Indicators Multiple Causes (MIMIC) modeling—a specification of structural equation modeling (SEM)—was used after the initial CFAs. In MIMIC models, both the latent factors and indicators (items) are regressed onto covariates (exogenous variables added to the CFA model established previously). Thus, besides indicating population heterogeneity MIMIC models can detect differential item functioning (DIF: when the latent factor is held constant, the means of the indicator are different at different levels of a covariate). Moreover, the MIMIC modeling allows between-group comparisons on latent means in the context of a measurement model (see Brown 2006). With regard to the present study, the MIMIC modeling was applied to test the effects of age, educational level, age by educational level interaction, and gender on the factors of the WITHAQ as well as on the items loading on each factor. The interaction term was created both for theoretical reasons and in order to handle the confounding of age with educational level. The MIMIC modeling was also used to examine the relations of the two aspects of hope with the three factors of the WITHAQ in the main sample, as well as of the two dimensions of the 3D-WS with the three factors of the WITHAQ in the validation sample. Pearson correlations were computed to investigate the relations of the three aspects of the cognitive facet of wisdom with affect and memory capacity.

The SEM analyses were conducted in EQS Version 6.1 and performed on covariance matrices using the Maximum Likelihood estimation procedure (Bentler 2005). Model fit was evaluated based on the chi-square statistic (it should be nonsignificant but it is sensitive to sample size) as well as on the root mean squared error of approximation (RMSEA). The RMSEA index shows how well the model would fit the population covariance matrix. A rule of thumb is that $RMSEA \leq .05$ indicates close approximate fit and values between .05 and .08 suggest reasonable error of approximation (Kline 2005). The Comparative Fit Index (CFI), which is one of the indexes assessing the relative improvement in fit of the researcher's model

compared to a baseline model, was also used; CFI values greater than .90 indicate reasonably good fit of the researcher's model (Kline 2005). In addition, model fit was evaluated based on the standardized root mean squared residual (SRMR). The SRMR is a measure of the mean absolute correlation residual, the overall difference between the observed and the predicted correlations; values of the SRMR less than .10 are generally considered favourable (Kline 2005).

3 Results

3.1 The Factorial Structure of the WITHAQ: Exploratory Factor Analysis

Initially, the WITHAQ consisted of 15 items. Principal axis factoring was used to extract the factors. Eigenvalue ≥ 1 and scree plot were used to determine the number of factors extracted. The initial factor analysis revealed a four-factor solution, which accounted for 55.15% of the total variance. However, a close examination of factor loadings revealed that one item didn't load (with loading $\geq .40$) on any of the three factors. Thus, we removed this item and re-ran the analysis. The second factor analysis resulted in a three-factor solution, which accounted for 50.17% of the variance. This time, an examination of factor loadings revealed that one item had high ($> .40$) loadings on two factors. Once more, we removed this item and re-ran the analysis. The Bartlett's Test of Sphericity (1100.99 at $p < .001$) and the Kaiser–Meyer–Olkin Measure of Sampling Adequacy ($KMO = .789$) indicated that there were sufficient inter-item correlations within the data for performing the last analysis. A three-factor solution emerged after the last item removal. The three factors, which explained 50.42% of the total variance, were submitted to oblique rotation by the direct oblimin method. Each one of the 13 remaining items had clear loading ($> .40$) on one of the three factors. Factor intercorrelations were .21 for the first and the second factor, .31 for the first and the third factor, and .32 for the second and the third factor.

Specifically, the first factor had loadings from four items referring to practical wisdom. The second factor had loadings from six items related to wisdom as integrated dialectical thinking. The last factor was loaded by three items related to awareness of life uncertainty. The internal consistency of the first two factors was acceptable: Cronbach's $\alpha = .75$, and .70 for the first and the second factor, respectively. The internal consistency of the last factor was relatively low: Cronbach's $\alpha = .60$. Given this factor's theoretical importance and that it was loaded only by three items, the internal consistency was considered adequate and the factor was retained in further analyses.

3.2 The Factorial Structure of the WITHAQ: Confirmatory Factor Analyses

To confirm the factor structure identified, we conducted CFA on the same data. Given that the WITHAQ was a new instrument (Brown 2006), first, we tested a three-factor model in which the three hypothesized factors were defined without any covariance between them (3-Fa model). This was the measurement model. Then, a model in which the three latent factors were allowed to correlate with each other (3-Fb model) was tested. This is the structural model. Then, we tested a one-factor model (1-F model) and two models of two factors including possible combinations of the initial factors (2a models: the first factor was practical wisdom and the other one was dialectical thinking and awareness of life uncertainty combined; 2b models: the first factor was dialectical thinking and the second one was practical wisdom and awareness of life uncertainty in combination) without and with covariances between the factors (2a-Fa model; 2a-Fb model; 2b-Fa model; 2b-Fb model);

Table 1 Comparisons of fit indices of various models of the factor structure of the WITHAQ

Model (factor)	χ^2	<i>p</i>	CFI ^c	SRMR	RMSEA
1-F ^a (PW ^b + DT + AU)	$\chi^2(65, N = 444) = 500.55$	<.001	.58	.10	.12 (90% CI: .11–.13)
2a-Fa (PW vs. DT + AU: measurement model)	$\chi^2(65, N = 444) = 318.72$	<.001	.75	.11	.09 (90% CI: .08–.10)
2a-Fb (PW vs. DT + AU: structural model)	$\chi^2(64, N = 444) = 286.84$	<.001	.78	.08	.08 (90% CI: .07–.09)
2b-Fa (DT vs. PW + AU: measurement model)	$\chi^2(65, N = 444) = 279.44$	<.001	.79	.10	.08 (90% CI: .07–.09)
2b-Fb (DT vs. PW + AU: structural model)	$\chi^2(64, N = 444) = 253.73$	<.001	.81	.07	.08 (90% CI: .07–.09)
3-Fa (PW, DT, AU: measurement model)	$\chi^2(65, N = 444) = 225.84$	<.001	.84	.11	.07 (90% CI: .06–.08)
3-Fb (PW, DT, AU: structural model)	$\chi^2(62, N = 444) = 149.51$	<.001	.91	.05	.05 (90% CI: .04–.06)
S–O–F (W + PW, DT, AU)	$\chi^2(62, N = 444) = 149.51$	<.001	.91	.05	.05 (90% CI: .04–.06)

^a 1-F model: one-factor model; 2a-Fa to 2b-Fb model: two-factor models; 3-Fa & 3-Fb model: three-factor models; S–O–F model: second-order-factor model with three first-order factors. Measurement model: the factors were defined without any covariance between them; structural model: the factors were allowed to freely covary

^b PW Practical wisdom based on experience and values, DT Integrated dialectical thinking, AU Awareness of life uncertainty

^c Fit indices values indicating acceptable fit of a model must be as follows: Comparative Fit Index (CFI) values > .90; Standardized Root Mean squared Residual (SRMR) values < .10; Root Mean Squared Error of Approximation (RMSEA) values ≤ .08

finally, we tested a higher-order model in which the three first-order factors were defined to load on a single second-order factor of wisdom (S–O–F model).

As shown in Table 1, the fit indices of the models with one and two factors (1-F model to 2b-Fb model) were low. The model with the three latent factors (3-Fa model) had generally better fit than the previous models. However, the addition of the interrelations between the latent factors increased the model’s (3-Fb model) fit to an acceptable level. The same was also true for the second-order model (S–O–F model), which was found to produce the same goodness of fit as the first-order model in which the three factors were allowed to freely covary (3-Fb model). Furthermore, we compared all the models (except for the S–O–F model) with the 3-Fb model for the significance of the difference of χ^2 . The results showed that the $\Delta\chi^2$ was significant in all cases: ‘1-F model’ & ‘3-Fb model’: $\Delta\chi^2 (\Delta df = 3) = 351.04, p < .001$; ‘2a-Fa model’ & ‘3-Fb model’: $\Delta\chi^2 (\Delta df = 3) = 169.21, p < .001$; ‘2a-Fb model’ & ‘3-Fb model’: $\Delta\chi^2 (\Delta df = 2) = 137.33, p < .001$; ‘2b-Fa model’ & ‘3-Fb model’: $\Delta\chi^2 (\Delta df = 3) = 129.93, p < .001$; ‘2b-Fb model’ & ‘3-Fb model’: $\Delta\chi^2 (\Delta df = 2) = 104.22, p < .001$; ‘3-Fa model’ & ‘3-Fb model’: $\Delta\chi^2 (\Delta df = 3) = 76.33, p < .001$.

With regard to the second-order model of the WITHAQ (S–O–F model), it must be noted that the second-order factor loadings were of a relatively high magnitude (.61, .45, and .73 for first-order factor 1, 2, and 3, respectively) and there was acceptable internal consistency for the total WITHAQ (Cronbach’s $\alpha = .74$). However, considering the ‘just-identified’ nature of the S–O–F model (see Brown 2006) and the need to investigate the possibly differential relationships between the three facets of wisdom with demographic factors, memory, and affect, we decided to proceed with the three interrelated factor model (see Table 2).

Table 2 The structure of the WITHAQ: standardized solution (3-Fb model), for the main sample

Items (and the main theory on which the development of every item is based)	Factors				
	PW ^a (F1)	DT (F2)	AU (F3)	E ^c	R ²
<i>PW1</i> : 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 (Wisdom as an expert system of knowledge about life, Baltes and Staudinger 2000)	.65 ^b			.75	.43
<i>PW2</i> : Owing to my various experiences in life, I feel competent enough to handle different situations or -when asked- advise people who face similar situations (Wisdom as an expert system of knowledge about life, Baltes and Staudinger 2000; Practical wisdom as an executive decision maker, Schwartz and Sharpe 2006)	.60			.79	.36
<i>PW3</i> : The way I act in everyday life is not only defined by what my sense, experience or heart says, but mainly by what my principles dictate to me (A balance theory of wisdom, Sternberg 1998)	.62			.78	.38
<i>PW4</i> : When people ask for my advice regarding a dilemma, I usually try my advice to serve, first of all, the values that rule life (e.g., the value of life, of family) (A balance theory of wisdom, Sternberg 1998)	.71			.70	.51
<i>DT1</i> : When I want to fully understand an important event that has happened to me, I usually try to look at it from different angles. That is, look at it not only from my point of view but also from the perspective of those who were involved in this event or of a third party who views event from a distance (Conceptualizing wisdom: the primacy of affect-cognition relations, Kramer 1990, 2000)		.55		.83	.30
<i>DT2</i> : When I have to reach an important decision, I take into account as many aspects as possible. That is, I take into consideration what my sense, my heart, my experiences, my principles, etc. say (Conceptualizing wisdom: the primacy of affect-cognition relations, Kramer 1990, 2000)		.48		.87	.23
<i>DT3</i> : When I come up across a difficult situation, I usually try to consider various factors which may have affected the formation of this situation (e.g., from luck to intentional action, from my affect to external circumstances) (Conceptualizing wisdom: the primacy of affect-cognition relations, Kramer 1990, 2000)		.57		.81	.33
<i>DT4</i> : I am usually open to and interested in different viewpoints, because this way I can form a more complete and clear opinion about an issue (Wisdom and the art of problem finding, Arlin 1990)		.56		.82	.31
<i>DT5</i> : When I hear different or opposing views on a matter or a person, I usually search for common ground that may underlie these views (Wisdom and the art of problem finding, Arlin 1990)		.49		.86	.24
<i>DT6</i> : 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 (Wisdom as integrated thought, Labouvie-Vief 1990, 2000)		.52		.85	.27
<i>AU1</i> : When I plan tomorrow's schedule, I usually think about the possibility that something happens and as a result my plans would be reversed (many theories: see Sect. 1)			.52	.84	.27
<i>AU2</i> : The saying "it changes in an hour what happens not in 7 years" is almost always true for me when I plan my future (many theories: see Sect. 1)			.79	.60	.63

Table 2 continued

Items (and the main theory on which the development of every item is based)	Factors				
	PW ^a (F1)	DT (F2)	AU (F3)	E ^c	R ²
AU3: 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 (many theories: see Sect. 1)			.47	.87	.22
Factor correlations					
F2 (DT)–F1 (PW)		.27			
F3 (AU)–F1 (PW)		.44			
F3 (AU)–F2 (DT)		.32			

^a PW Practical wisdom, DT Integrated dialectical thinking, AU Awareness of life uncertainty

^b Loadings and correlations between the factors are statistically significant ($p < .05$)

^c E = Measurement error; R² = The proportion of explained indicator (item) variance

3.3 Validation of the Factorial Structure of the WITHAQ

Due to the low internal consistency of the factor labeled Awareness of Life Uncertainty, a new item (see Fig. 1), which was expected to load on this factor, was added to the WITHAQ administered to the validation sample. Before the application of CFA to the data, we constructed seven parcels of the 14 items constituting the WITHAQ, with each parcel to be the sum of two items that had been found to load on the same factor based on the model (3-Fb) that was confirmed for the main sample (see Fig. 1); then, we tested a three-factor (PW, DT, AU) model in which each parcel loaded on the factor on which its constituent items had been found to load, and the three latent factors were allowed to correlate with each

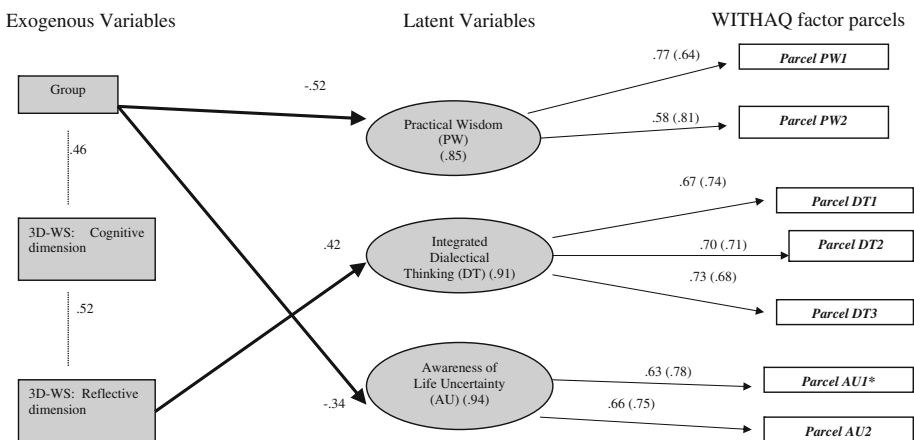


Fig. 1 Multiple Indicators Multiple Causes model examining the impact of group, and the cognitive and reflective dimension of the 3D-WS on the three factors of the WITHAQ, for the validation sample: standardized solution. ‘Errors/E’ and ‘Disturbances/D’ are given in parenthesis. Factor correlations: PW–DT: .25; PW–AU: .41; DT–AU: .59. PW Practical wisdom, DT Integrated dialectical thinking, AU Awareness of life uncertainty. *Parcel AU1 includes Item AU4 (new item): When I plan to do something, I am usually prepared for unexpected events too, because “who knows what tomorrow will bring?”

other (4-Fa model). This model was confirmed, $\chi^2(11, N = 88) = 17.66, p = .09$; CFI = .94; SRMR = .06; RMSEA = .08 (90% CI: .00–.15). After entering the variable of group (group 1 = older subsample, group 2 = younger subsample) as covariate, a new model (4-Fb model) was verified, $\chi^2(16, N = 88) = 20.20, p = .21$; CFI = .97; SRMR = .06; RMSEA = .06 (90% CI: .00–.12). This model showed that group had significant negative effects on the PW and the AU factors (see Fig. 1). The younger the participants were the lower the practical wisdom and the awareness of life uncertainty was. As regards the internal consistency of the WITHAQ, Cronbach's α was .70.

3.4 Criterion Validity of WITHAQ

To investigate the relations between the three factors of the WITHAQ, on the one hand, and the cognitive and reflective dimension of the 3D-WS, in the validation sample, the best-fitting model of the WITHAQ (4-Fb model) was maintained as a base, and the 3D-WS dimensions were tested as predictors of the WITHAQ factors. The MIMIC model was verified, $\chi^2(30, N = 87) = 31.04, p = .41$; CFI = .99; SRMR = .06; RMSEA = .02 (90% CI: .00–.08), and revealed that the factor Practical Wisdom was not predicted by the cognitive dimension of the 3D-WS. On the other hand, the factor Integrated Dialectical Thinking was positively predicted by the reflective dimension of the 3D-WS, as expected (see Fig. 1).

3.5 Convergent Validity of WITHAQ and ADHS

To examine the relations of the three factors of WITHAQ with the hope dimensions, the best-fitting structural model of the WITHAQ (3-Fb model) was maintained as a base, and the ADHS subscales were tested as predictors of the WITHAQ factors in the main sample. The MIMIC model was confirmed, $\chi^2(85, N = 443) = 218.27, p < .001$; CFI = .90; SRMR = .06; RMSEA = .06 (90% CI: .05–.07), and revealed that, as predicted, the paths from agency thinking to practical thinking and awareness of life uncertainty were statistically significant, standardized estimate (Std) = .44 and .14 respectively, $p < .05$. However, the effect size of agency thinking on the latent factor Awareness of Life Uncertainty in terms of Cohen's d (see Brown 2006; Kline 2005) can be interpreted as very small ($d < .20$). Also, the path from pathways thought to integrated dialectical thinking was statistically significant, Std = .46, $p < .05$.

3.6 The Effects of Age, Education, and Gender on Wisdom

Initially, all the background factors incorporated in the MIMIC model [age: 1 = young adults, 2 = middle-aged adults, 3 = older adults; educational level/EL: 1 = low, 2 = middle, 3 = high; age x educational level interaction (age x EL): from 1(1 × 1) to 9(3 × 3); gender: 1 = male, 2 = female] were allowed to correlate with the three latent variables (PW, DT, AU) in the structural model. The Wald test was used to test the need for the regressions and to suggest a more restricted model. Actually, the Wald test suggested retaining, except for one, all the correlations between the exogenous factors and seven MIMIC regressions at the .05 probability level. The MIMIC model in this form, with no direct paths from the background variables to the factor indicators, fitted the data well, $\chi^2(108, N = 444) = 194.00, p < .001$; CFI = .96; SRMR = .05; RMSEA = .04 (90% CI: .03–.05).

To assess direct associations between the covariates and the factor indicators a stepwise forward model was used (Brown 2006). For each covariate a model with all paths towards

the indicators of the three factors of the WITHAQ constrained to zero was computed. The modification indices were then examined since they provide indication of how much the fit of the model would be improved if the paths were freely estimated. Based on the examination of the modification indices, only a path from ‘gender’ to ‘PW4—an indicator of the factor PW’ (see Table 2), was freely estimated. The process was not repeated because no other indicators were directly associated with the covariates. The model including the path from the covariate to the indicator had also a good fit to the data, $\chi^2 (107, N = 444) = 187.72, p < .001$; CFI = .96; SRMR = .05; RMSEA = .04 (90% CI: .03–.05). Actually, it gave a slightly better fit than the previous one: The chi square difference test comparing this model with the previous one demonstrated that the latter had a significantly worse fit: $\Delta\chi^2 (\Delta df = 1) = 6.28, p < .05$. Given this result, the parameter estimates reported in Fig. 2 are based on the final MIMIC model.

As shown in Fig. 2, the Age x Education interaction term was a significant predictor of all the factors of WITHAQ. The factor reflecting practical wisdom (PW) was negatively predicted by education. The factor representing integrated dialectical thinking (DT) was the only one that was negatively impacted by age. Finally, the factor of awareness of life uncertainty (AU) was negatively predicted by education and positively by gender. The effect size of gender on the latent factor ‘AU’ in terms of Cohen’s *d* (see Brown 2006; Kline 2005) can be interpreted as very small ($d < .20$).

Besides the associations between covariates and latent factors, the results of the MIMIC model showed that the PW4 indicator was not invariant for males and females. In fact, it was biased against males. However, after the estimation of the respective effect size ($d = -.11$), it is clear that the gender difference for the ‘PW4’ item had a very small effect size ($d < .20$) as well. The background correlations between the demographic factors reflected to a large extent sample composition.

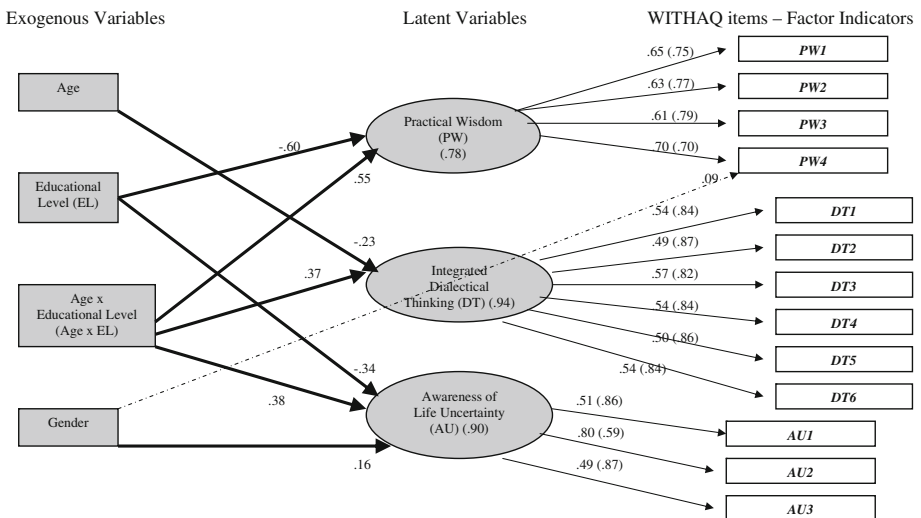


Fig. 2 Multiple Indicators Multiple Causes model examining the impact of age, education, ‘age × education’ interaction, and gender on the three factors of the WITHAQ and their indicators: standardized solution. All paths drawn indicate significant associations ($p < .05$). ‘Errors/E’ and ‘Disturbances/D’ are given in parenthesis. Factor correlations: Age–EL: $-.50$; Age–Age × EL: $.51$; EL–Age × EL: $.42$; Gender–EL: $-.08$; Gender–Age × EL: $-.11$; PW–DT: $.40$; PW–AU: $.29$; DT–AU: $.37$. PW Practical wisdom, DT Integrated dialectical thinking, AU Awareness of life uncertainty

3.7 The Relations of Wisdom with Memory and Affect

To investigate the relations of wisdom with memory and affect, we computed the correlations of the total score of the items loading on each of the three factors of the WITHAQ with the total score for the RBMT, indicative of memory capacity, and the total score of the items loading the state positive affect and the state negative affect factors of the PANAS.

The relation of practical wisdom (PW) with memory capacity was negative ($r = -.23$; $p < .01$), whereas, integrated dialectical thinking (DT) was positively related to it ($r = .16$; $p < .01$). There was no significant correlation between memory capacity and awareness of life uncertainty (AU). With respect to affect, practical wisdom (PW) and integrated dialectical thinking (DT) were significantly and positively related to state positive affect ($r = .19$ and $.20$, respectively; $p < .01$) and not to negative affect. On the other hand, awareness of life uncertainty (AU) had a low but significant positive relation with negative affect ($r = .10$; $p < .05$).

4 Discussion

In this study, we were interested in identifying aspects of the cognitive facet of wisdom, and their relationships with demographic factors as well as with measures of hope, memory, and affect. To achieve these goals, first, we developed a new questionnaire for wisdom (WITHAQ) and tested its structural, criterion and convergent validity. Second, we examined age, educational level, and gender effects on the three aspects of the cognitive facet of wisdom as measured by the WITHAQ. Third, we investigated the correlations of the three aspects of the cognitive facet of wisdom with personal resources such as memory capacity and affective functioning.

4.1 Validity of the WITHAQ

4.1.1 Structural Validity of the WITHAQ

In corroboration of Hypothesis 1, the structural validity of the new measure was satisfactory, for both the main and the validation sample. The WITHAQ consisted of three interrelated factors, one referring to practical wisdom based on accumulated knowledge about life and values, one representing integrated dialectical thinking, and a third one reflecting awareness of life uncertainty. This finding is in line with the theoretical differentiation between synthetic (dialectical thinking) and analytic (practical wisdom) conceptualizations of wisdom. However, the correlation between practical wisdom and integrated dialectical thinking suggests that approaching life situations by means of dialectical thinking can facilitate deeper knowledge (and understanding) of life experiences. On the other hand, accumulating new and various experiences during the lifespan can foster the development of complex forms of thinking (Baltes and Staudinger 2000; Pascual-Leone 2000). Moreover, as regards the substantial correlates between awareness of life uncertainty and the other two aspects of the cognitive facet of wisdom, it is evident that taking into account the ‘unpredictable’ and trying to think of ways to manage it, when everything appears to be under control, presupposes an ability to think in integrated dialectical ways. Furthermore, having accumulated life experiences and values that are used as guiding principles of one’s actions can function as internal guidelines in uncertain life situations, where external norms do not exist or do not apply (Pushkar et al. 2003). Hence,

based on the factor interrelations, it seems that the three aspects of the cognitive facet of wisdom are complementary to one other.

4.1.2 Internal Consistency, Measurement Invariance and Structural Invariance of the WITHAQ

As for the reliability of the three factors of the WITHAQ, with the exception of the factor representing awareness of life uncertainty, whose internal consistency was relatively low ($\alpha = .60$) in the main sample, internal consistency of the other two factors as well as of the total WITHAQ was acceptable ($\alpha \geq .70$). Indeed, the cognitive facet of wisdom can also be measured as a total WITHAQ score, since a second-order model of the factor structure of the WITHAQ, with wisdom as a second-order factor, was confirmed. Moreover, the WITHAQ was found to have measurement invariance (Brown 2006), since there were no items displaying differential functioning across different age groups, gender, and educational level, except for one item (i.e., 'PW4').

As for the validation sample, internal consistency of the total WITHAQ was also acceptable ($\alpha = .70$). However, because of item parceling and of defining only two parcels to load on the factors of practical wisdom and awareness of life uncertainty, we did not examine internal consistency of the factors. Besides this, an interesting finding, as regards the validation sample, is the heterogeneity in the two subsamples (groups), in terms of latent factor means of the Practical Wisdom and Awareness of life Uncertainty factors. The subsample of older adults (group 1) reported more practical wisdom and awareness of uncertainty than the subsample of younger adults (group 2). Young age and high educational level makes young people confident and less aware of uncertainty in life, with fewer experiences that allow a deeper knowledge about life and the formation of a well-defined value system that could function as guidelines in life. This finding is in line with lay theories supporting the association of wisdom with older age and experience (Naschenweng and Koenig 2009). However, from the point of view of the WITHAQ's validity, this finding suggests that the questionnaire may not be an appropriate instrument for measuring wisdom in very young adults (about 20 years old).

4.1.3 Criterion Validity and Convergent Validity of the WITHAQ

In any case, disconfirmation of Hypothesis 2a as regards the association of the cognitive dimension of the 3D-WS with practical wisdom suggests that practical wisdom may be used as fast and explicit guidelines in order to handle difficult life problems but this does not mean that it represents a naive and cognitively simple aspect of the cognitive facet of wisdom. Finally, the positive association of the reflective dimension of the 3D-WS and integrated dialectical thinking suggests that the two dimensions share the multiple-sided view of things (Hypothesis 2a).

Hypothesis 2b regarded the convergent validity of the WITHAQ. The results were in the predicted direction. The relations of the Agency Thinking dimension of hope with practical wisdom and awareness of uncertainty in life suggest that wisdom and hope are two human strengths that support goal attainment in face of uncertainty or adversity. The positive association of the Pathways Thought dimension of hope with integrated dialectical thinking suggests that complex thinking renders people able to view their goals from multiple perspectives and generate alternative strategies.

4.2 The Effects of Demographic Factors

4.2.1 *The Effects of Age*

As expected (Hypothesis 3a), age did not influence responses to the items measuring practical wisdom. Age did not affect responses to the items regarding awareness of life uncertainty too, disconfirming in this way Hypothesis 3f. In any case, these findings are in agreement with previous evidence suggesting that simply getting older is neither a sufficient condition for development of wisdom (Baltes and Staudinger 2000) nor a ‘handicap’. However, age negatively affected dialectical thinking, confirming Hypothesis 3b. This can be due to decrease of cognitive resources with age, because a good cognitive functioning (including memory) is needed as a substratum for the development and application of complex thought in life situations (see also Mickler and Staudinger 2008; Moraitou and Efklides 2005).c

4.2.2 *The Effects of Education*

Contrary to what was expected for the relations of education with the three aspects of the cognitive facet of wisdom (Hypotheses 3a, 3c, 3e), it was found that education did not affect integrated dialectical thinking but the other two aspects of the cognitive facet of wisdom, and the effects were negative. In other words, the lower the educational level, the higher the practical wisdom and the awareness of life uncertainty. These findings may indicate that education per se is not sufficient for integrated dialectical thinking, but when education is low then people face more uncertainty in life and resort to practical wisdom as readymade knowledge and guidelines derived from experiences and values, in order to manage everyday life situations.

On the other hand, the results show that when advancing age and increasing education go together (*the interaction of age with education*), all the aspects of the cognitive facet of wisdom are affected positively, and particularly practical wisdom. This means that practical wisdom is not a simple accumulation of life experiences; it is education that gives it its analytic nature and turns it to ‘real’ wisdom rather than use of heuristic ways of dealing with life uncertainty.

4.2.3 *The Effects of Gender*

Females were found to report increased awareness of life uncertainty as compared to males; no other gender effects were found, confirming Hypotheses 3a, 3d, and 3f. Common ground between female gender and awareness of uncertainty might be the anxiety inherent in the experience of uncertainty (Alaszewski and Coxon 2009; Gordon 2003). However, the gender effect was not strong (see Sect. 3).

In relation to the specific item of practical wisdom (PW4) found to be affected by gender, we have to be careful with the possible gender differences. This item is worded as follows: “When people ask for my advice regarding a life dilemma, I usually try my advice to serve, first of all, the values that rule life (e.g., the value of life, the value of family)”. Actually, the gender effect size was small ($d < .20$), and might reflect idiosyncratic characteristics of the sample (see Brown 2006). Nevertheless, there is evidence supporting that women manifest more value-laden thinking generally as a result of their socialization that places more emphasis on maintenance of kin relations (Pushkar et al. 2003).

4.3 The Relationships of Wisdom with Memory and Affect

4.3.1 *The Relationship of Memory with Practical Wisdom*

As predicted in Hypothesis 4a, the relationship of practical wisdom with memory capacity was negative. In other words, the lower the memory capacity, the higher the practical wisdom reported. This finding suggests that when people experience everyday memory problems, they seem to compensate for this deficiency by turning to the application of knowledge from accumulated experiences, in order to manage everyday life situations. Semantic and procedural memory that is associated with accumulated life experiences (Baltes and Staudinger 2000), and adopting explicit values as guidelines in life (Pushkar et al. 2003; Sternberg 1998) seems to be reflected in well-practiced patterns of behavior and a stable life orientation that are used as heuristic methods through which one can handle life dilemmas without spending working memory resources. This may happen because highly practiced behaviors become automatized and can then be carried out according to pre-set instructions, with little conscious monitoring (Cohen and Conway 2008).

4.3.2 *The Relationship of Memory with Integrated Dialectical Thinking and Awareness of Life Uncertainty*

On the other hand, there were positive relations of memory capacity with integrated dialectical thinking, as predicted in Hypothesis 4b, but no relation with awareness of life uncertainty, in corroboration of Hypothesis 4c. Integrated dialectical thinking seems to presuppose strong memory capacity to support the integration of multiple sources of information. However, awareness of life uncertainty does not seem to make particular demands on memory.

4.3.3 *The Relationships of State Positive Affect with Practical Wisdom and Integrated Dialectical Thinking*

With respect to the relations of the three aspects of the cognitive facet of wisdom with state affect, our findings confirmed Hypotheses 5a and 5b. A plausible explanation of the positive relations of state positive affect with practical wisdom as well as with integrated dialectical thinking (Hypothesis 5a) may be that state positive affect increases when the person can reach solutions to difficult life problems by means of knowledge based on experiences and values, and by applying dialectical forms of thinking. The relationship between practical wisdom and positive affect is also in accordance with theoretical frameworks claiming that people adapt successfully and regulate their affect after reaching an understanding of an event through accumulated experiences of various situations or by invoking values to guide their behavior (Pushkar et al. 2003; Wilson and Gilbert 2008). Moreover, it has been suggested (see for review Moraitou and Efklides 2007) that positive affect provides resources for cognitive functioning—including thinking dialectically—mainly in older adults, when they face a cognitively demanding situation such as life dilemmas. Therefore, there seems to be a reciprocal relationship between positive affect and integrated dialectical thinking.

4.3.4 *The Relationships of State Negative Affect with Awareness of Life Uncertainty*

As regards the relations between awareness of life uncertainty and state affect, there was a low positive association of awareness of life uncertainty with negative affect, as predicted in Hypothesis 5b. This finding is in line with previous evidence supporting in general that wisdom may involve emotional costs (Kunzmann 2007). There is evidence that wise persons initially experience stronger negative emotions in some situations, because they may be more aware than the others of the meaning and the consequences of various events. Moreover, uncertainty is generally experienced as a negative state that must be minimized (Pushkar et al. 2003; Wilson and Gilbert 2008). Thus, awareness of life uncertainty may trigger regulatory cognitive and affective processes that allow resolution of uncertainty through behaviors informed by experiences and values or dialectical thinking.

To sum up, as regards the cognitive facet of wisdom in all its aspects, based on our findings it seems that the combination of advancing age with a higher education level provides the person not only with experience and values, but also with a stable life-orientation despite life uncertainty and with a good level of dialectical thinking. Considering that even automatized actions need some conscious monitoring to keep them on the right track (Cohen and Conway 2008), viewing life dilemmas dialectically, and not only in terms of experience and values, could protect people from slips such as strong habit intrusions and from inflexible use of values. Dialectical thinking ensures objective change in well-established routines when needed, permitting flexibility and better adaptation.

4.4 Limitations of the Study

A number of limitations of the study have to be pointed out. First, there were limitations related to the sample composition, that is, the confounding of age with education, and cohort effects in general. However, it should be noted that the tendency of age to be related to lower educational level is a characteristic of the general population in Greece, as well. Due to adverse socio-historical conditions, the majority of old (about 70 years old and older) people, both men and women, in Greece are of low educational level. Conversely, the majority of young people tend to be highly educated, since higher education is considered one of the most valuable aspirations in Greek society nowadays.

Second, the WITHAQ is a self-report instrument and is subject to reporting bias. Moreover, it was developed to measure certain aspects of the cognitive facet of wisdom as a person attribute. However, wisdom is considered a multifaceted construct involving affective, personality and spiritual facets that were not examined in the present study. Moreover, practical wisdom, integrated dialectical thinking, and awareness of life uncertainty are dynamic processes that take place in context; the WITHAQ captures only a limited number of situations/contexts and in static form. More observational and dynamic problem-solving situations are needed to fully understand the adaptability of wisdom. With respect to methodological issues related to WITHAQ's development, it is evident that our findings related to the reliability and structural validity of the WITHAQ need to be confirmed in further studies.

4.5 Conclusions: Implications of the Study

Despite the limitations, the evidence is that the new measure of wisdom shows structural, criterion and convergent validity, and acceptable reliability. By including practical wisdom, integrated dialectical thinking, and awareness of life uncertainty within one

instrument, it has become possible to investigate their interrelations and mutual dependencies. The relations of these aspects of the cognitive facet of wisdom with other measures of wisdom, besides the 3D-WS, need also to be investigated further. This will establish concurrent validity; it will also show the interrelations of cognitive, affective and personality facets of wisdom for the better understanding of the nature of wisdom.

Beyond that and in relation to demographic factors, this study succeeded in clearly showing that in order for wisdom to function as a personal resource for older adults, age and education must contribute jointly: age could give experiences and alter one's value system towards including more other-enhancing values (Kunzmann 2007), but it takes education to develop complex thought via which one could handle life dilemmas and gain wisdom from them.

Furthermore, as regards the relations between the three aspects of the cognitive facet of wisdom, memory and affect, the findings of this study lead to the promising conclusion that although the three aspects display differential patterns of relations with memory and affect, it seems that wisdom as a whole can function up to a point as a personal resource related to cognitive and affective functioning in the third age. For example, negative affect elicited by uncertain situations could be dampened via evoking values or prior experiences, and inflexible values or habit could be balanced by increased information processing via integrated dialectical thinking.

Taking into account that as human societies grow older wisdom emerges again as a valuable human strength it seems that future societies should invest in lifelong learning that can support wisdom in its various facets. Personal experiences, active exercising of both synthetic and analytic thinking and concern for the common good could enhance cognitive aspects of wisdom at the individual level and compensate for age-related losses, but also contribute to the welfare of the broader society.

Nevertheless, many issues still remain open. First, besides the addition of one new item, other items need to be added mainly in order to increase internal consistency of the third factor of the WITHAQ, namely awareness of life uncertainty. Also, it would be interesting to examine the development of wisdom as measured by the WITHAQ across time as well as possible differentiations of wisdom as measured by the WITHAQ across cultural contexts. Furthermore, we need to explore what happens with the three aspects of the cognitive facet of wisdom in the old-old people and in persons with cognitive impairment, and test whether it is possible to construct intervention programs that could help to compensate for wisdom-related losses.

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