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## A POLISH ADAPTATION OF MONIKA ARDELT'S THREE-DIMENSIONAL WISDOM SCALE (3D-WS)

The article outlines the results of academic endeavors to develop a Polish adaptation of Monika Ardel't's Three-Dimensional Wisdom Scale (3D-WS). The results obtained using the Polish version are comparable to those obtained using the original research instrument, which proves that the Polish 3D-WS can be successfully used for research purposes. The Polish adaptation consists of 39 items covering four dimensions: Cognitive, Affective, Self-Awareness, and Empathic. The scale testing procedure involved a research sample consisting of 475 people. The Cronbach's alpha coefficient was .83 for the entire scale and oscillated between .64 and .77 for the subscales. Over the course of the study, it turned out that some subscales of the Polish 3D-WS can be influenced by sociodemographic factors such as age, sex, and education.

**Keywords:** wisdom; Polish adaptation; Three-Dimensional Wisdom Scale.

### THEORETICAL INTRODUCTION

Over the last 30 years, researchers' interest in wisdom issues has considerably increased in social sciences. Yet, there is still no widespread agreement on the understanding of the very concept of "wisdom" (Dittmann-Kohli & Baltes 1990; Kramer, 2000; Bergsma & Ardel't, 2012). Although psychological research

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on wisdom has a relatively short history (Kunzmann & Baltes, 2005), it has given rise to numerous proposals of conceptualizing this construct (Olejniak & Niemczyński, 1993; Birren & Svensson, 2005; Osbeck & Robinson, 2005; Trowbridge, 2005; Brugman, 2006; Staudinger, 2008; Meeks & Jeste, 2009; Bangen, Meeks, & Jeste, 2013).

According to Yang (2008) four basic approaches to wisdom issues can be distinguished in psychology. The first one focuses on definitions in which wisdom is considered as a specific configuration of particular personality traits and personal competencies (see Clayton & Birren, 1980; Ardel, 1997, 2000a, 2000b, 2003, 2004, 2010, 2011b). The second approach comprises definitions explaining wisdom as one of the positive results of a person's development (see Erikson, 1982; Arlin, 1990; Kramer, 1990, 2000; Labouvie-Vief, 1990, 2000; Orwoll, & Perlmutter, 1990). Representatives of the third approach define wisdom in terms of a complex system of practical knowledge (Baltes, Dittmann-Kohli, & Dixon, 1984; Baltes & Smith, 1990; Baltes & Staudinger, 1993, 2000; Staudinger, 1999; Baltes & Kunzmann, 2003, 2004). Finally, the fourth approach encompasses those definitions in which wisdom is understood as a process manifesting itself in everyday life (see Sternberg, 1998, 2003, 2007; Yang, 2001, 2011, 2013).

A theory of wisdom that deserves to be noted is the one proposed by Monika Ardel (1997, 2000, 2003, 2011a, 2011b), which can be seen as representing the first of the above research approaches. Undertaking research on wisdom, Ardel (1997) chose her point of departure to be the results of pioneering studies by authors such as Clayton and Birren (1980), Holliday and Chandler (1986), and Sternberg (1990). In their studies, wisdom emerges as a complex construct in which it is possible to distinguish three main dimensions: cognitive, reflective, and affective. According to Ardel (2003, pp. 277-299), such an understanding of wisdom is consistent with a majority of both historical and contemporary descriptions of this construct. The operationalization of wisdom understood in this way is reflected in Ardel's (2003) *Three-Dimensional Wisdom Scale* (3D-WS). Similarly to Clayton and Birren (1980), she defined wisdom as a personality characteristic constituted by three dimensions: cognitive, reflective, and affective (included in her scale for measuring wisdom, 3D-WS).

The *cognitive* dimension reflects the individual's capacity for a comprehensive understanding of life. Its essence is the ability to discern the deeper meaning and sense of phenomena and events concerning both intrapersonal and interpersonal issues (Ardel, 2003, p. 278). The *reflective* dimension reflects having a clear view of reality, distance towards oneself, and the ability to judge events from different perspectives. Additionally, it indicates the individual's ability to

perceive life as it actually is rather than in terms of the fears, projections, impulses, or illusions one is experiencing (Ardelt, 2004, pp. 275-276). The third, *affective* dimension corresponds to the individual's capacity for sympathy and empathy; it is associated with striving to enhance well-being and overcome egocentric tendencies. It also indicates the presence of positive emotions and benevolence towards other people (Ardelt, 2003, p. 278).

According to Ardel (2011a, pp. 279-282), the proposal of understanding wisdom as a structure in which the cognitive, reflective, and affective dimensions can be distinguished remains consistent both with implicit wisdom theories and with explicit ones, which are an effect of empirical verification. What the author believes to be an advantage of such an account of wisdom is its economy, making it possible to distinguish accurately between a wise person and one who is merely altruistic or highly intelligent (Ardelt, 1997, 2000a, 2004). In her research on wisdom, Monika Ardel concentrated especially on elderly people and drew on numerous philosophical and theological reflections concerning wisdom.

#### **THE ORIGINAL VERSION OF THE THREE-DIMENSIONAL WISDOM SCALE (3D-WS)**

When undertaking the construction of 3D-WS, Ardel (2003; cf. Ardel, 2011) reviewed and systematized the definitions of wisdom present in the literature. Based on theoretical findings and the results of earlier experiments, the author assumed that a conceptualization of wisdom as a combination of cognitive, affective, and reflective personality characteristics is the most valid way of understanding this construct. In the scholar's opinion, such a conceptualization makes it possible to reveal the complexity of the construct and to integrate the key elements postulated by a majority of both contemporary and ancient authors (Blanchard-Fields & Norris 1995; Levitt, 1999; Manheimer, 1992; Sternberg, 1990b, 1998; as cited in Ardel, 2003).

In the next stage of the construction of 3D-WS – after defining the concept of “wisdom” – Ardel (2003) made a list 158 statements that constituted a description of the components of wisdom (64 statements related to the cognitive component; 38 concerned the reflective component; 56 reflected the affective component). A majority (140 statements) of items were taken from measures previously developed by authors such as: Goldman and Busch (1978, 1982), Goldman and Mitchell (1990, 1995), Goldman and Osborne (1985), Goldman

and Saunders (1974), Robinson and Shaver, (1973), or Shaw and Wright (1967). Eighteen items were created especially for the purpose of constructing 3D-WS.

The complete list of items in the alphabetical order was then independently evaluated by five competent judges. As a result of evaluation, 90 items that at least four judges saw as referring to a specific dimension of wisdom were qualified for further analyses. In the next step, the 68 items excluded in the first stage of evaluation were discussed in terms of which component of wisdom they related to. This resulted in the removal of 28 statements, while the remaining 45, which the team of researchers reached a consensus about, were included in the previously selected pool of items. In this way, an experimental version of 3D-WS came into being, consisting of 135 items divided into two groups (in the first group there were statements referring directly to the respondent and rated on a 5-point scale, where 1 meant *definitely true of myself* and 5 meant *not true of myself*; the second group comprised items that the participants responded to using one of five answers: 1 meant *strongly agree* and 5 meant *strongly disagree*). In this form, the scale was used in a pilot study with nine participants aged 55 years and above. As a result of that study, some of the items were modified (made more specific or simpler or converted from negative to affirmative sentences), four items were removed, and one new item was added. Thus, finally, the experimental version of 3D-WS consisted of 132 items (49 of them related to the cognitive component, 40 concerned the reflective component, and 43 reflected the affective component).

In order to determine the psychometric properties of the scale (reliability and validity), Ardel (2003) conducted a study on a sample of 180 elderly people ( $M_{age} = 71.00$ ,  $SD_{age} = 8.02$ ). Based on the obtained results, the author performed item selection first. She removed those items that: (1) obtained the rank of 3 or less; (2) reached high ( $> |2|$ ) values of skewness and kurtosis; (3) correlated with the social desirability variable at the level of .30 or higher; (4) correlated negatively or weakly with other items included in the same dimension of wisdom; (5) correlated negatively with items making up the other two components of wisdom. As a result, 39 out of 132 items were retained. Of these 39 items, 14 referred to the cognitive dimension, 13 concerned the affective component, and 12 related to the reflective dimension of wisdom.

The final version of 3D-WS consists of 39 statements (15 in the first part and 24 in the second part of the instrument) constituting the following three dimensions: Cognitive, Affective, and Reflective. Responses are given on a 5-point scale. In the case of some items, reverse-scoring is applied. By adding up the points scored for items belonging to specific dimensions, raw scores (RS) are

obtained for each component of wisdom. The overall score can be obtained by computing the mean for all the three dimensions of wisdom. A relatively high score on the wisdom scale is reported when the mean score on each of the three dimensions is 4 or higher (the strong criterion) or when the overall mean (for the three dimensions taken together) is 4 or higher (the weak criterion). By contrast, a relatively low wisdom score is reported when a person scores a mean of 3 or lower on each dimension (the strong criterion) or when the overall mean (for the three dimensions taken together) is below 3 (the weak criterion).

Cronbach's  $\alpha$  coefficients for the dimensions of the original version of 3D-WS are as follows:  $\alpha = .85$  for the Cognitive dimension,  $\alpha = .71$  for the Reflective dimension,  $\alpha = .72$  for the Affective dimension. Validity analyses demonstrated that the measure is positively correlated with self-control (.63), psychological well-being (.45), sense of purpose in life (.61), and subjective sense of health (0.30), as well as significantly negatively correlated with depressive symptoms (-.59) and death anxiety (-.56) (Ardelt, 2003). The Three-Dimensional Wisdom Scale is a valuable measure of wisdom and is used in numerous empirical studies, especially with subjects in their late adulthood (Ardelt, 2004, 2005, 2008, 2009, 2010, 2011; Bergsma & Ardel, 2012; Taylor, Bates, & Webster 2011; Asadi, Amiri, Molavi, & Noaparast, 2012).

## RESEARCH METHOD

Work on the adaptation of 3D-WS to the Polish conditions began in 2011, after obtaining the author's consent. In the process of translating and adapting 3D-WS into Polish, we followed the rules of translation of psychological tests (Drwal, 1995). The first stage in this process was the translation of the items constituting the scale from English into Polish, done by three professional translators (including one psychologist). Subsequently, after carefully analyzing the translations of the scale that were provided, we agreed upon a single preliminary version of the measure in Polish. This version was then sent to the fourth translator (an Englishwoman of Polish descent, proficient in both languages) to be back-translated into English. Next, we compared the two versions – Polish and English – and introduced linguistic corrections. Finally, with the assistance of an English-language specialist who was also a psychologist, we worked out the final Polish version of the scale, making sure that there was psychological correspondence between the English and Polish terms.

Based on the existing American (Ardelt, 1997, 2003, 2009), Dutch (Bergsma & Ardel, 2012), and Polish studies (Wilk, 2010; Sasiela, 2013; Wojciechowska, 2013; Falewicz, 2014; Niemczyk, 2014), we hypothesized a three-factor structure of wisdom as measured using 3D-WS by M. Ardel (2003).

Research on the adaptation of 3D-WS was conducted in 2012-2013 in different Polish cities, such as Poznań, Koszalin, Opole, Gliwice, Ostrołęka, Radom, Słupsk, Augustów, or Lublin, as well as in several smaller towns. Participation was anonymous and voluntary. A set of tools was prepared for the purposes of the study, consisting of: (1) a general instruction explaining the purpose of the study and providing guidelines about the way of completing the questionnaire; (2) Personal Sheet, containing questions relating to sex, age, education, place of residence, or the length of marriage; (3) an experimental version of the Three-Dimensional Wisdom Scale. Each participant received an envelope with a number on it and the whole set of tools inside it. The participants were also informed about the way of returning the test sheet. We distributed 624 sets of methods, and after careful scrutiny 475 of those that returned completed were eventually qualified for statistical analyses. These analyses made it possible to assess the psychometric properties of each item and dimension and to determine the reliability and validity of the scale. We subjected the obtained results to statistical analysis using SPSS 22.0 and AMOS 22.0 statistical packages.

In order to determine the psychometric properties of the Polish version of 3D-WS, we performed a confirmatory factor analysis (CFA) with parceling (cf. Ciecuch, 2010a, 2010b). The adopted mode of performing statistical operations consists in constructing such a measurement model in which the observed variables are not specific items but the values of mean or sum of the scores for a given parcel of items. Item parceling can be performed on the basis of a content-related criterion or via random choice. In the analyses presented below, in the process of generating specific parcels of items, we applied exploratory factor analysis (EFA) separately for each dimension of wisdom. As the criterion of assigning items to particular groups, we adopted the eigenvalues of factor loadings of the items included in a given component of wisdom. The highest-loading items became the beginnings of the parcels distinguished. In the literature, this kind of statistical procedure is referred to as item-to-construct balance (Little, Cunningham, Shahar, & Widaman, 2002) or factorial algorithm (Rogers & Schmitt, 2004). This method has already been used, for instance, in studies on the Big Five (Allemand, Zimprich, & Hertzog, 2007; Allemand, Zimprich, & Hendriks, 2008; Ciecuch, 2010a).

The use of the item parceling procedure requires that the assumption about the unidimensionality of the measured factors is met. In the present research project, we tested this assumption using EFA (with a forced one-factor solution) for each factor (dimension) separately, entering those items in the analyses that, according to Monika Ardel's (2003) proposal, measure a given factor (dimension). The positive verification of the unidimensionality assumption for the factors examined, based on a scree plot, constituted the basis for distinguishing parcels of items. However, in order to meet the requirements for cross-validation, we divided the study sample ( $N = 475$ ) into two subgroups. In one group ( $n = 135$ ) we performed an EFA (the item-to-participant ratio in the group was 1:10, since analyses were performed for each factor separately, and the number of items in the respective factors was the following: the Cognitive dimension: 14; the Affective dimension: 13; the Reflective dimension: 12), whereas in the second group ( $n = 340$ ) we performed a CFA. The structure of sex, age, and place of residence was similar in the two groups. In the exploratory group, 38.5% of the participants were men and 61.5% were women; in the confirmatory group, 40% were men and 60% were women. The mean age in the exploratory sample was  $M = 44.95$  ( $SD = 16.93$ ). In the confirmatory group the situation was similar ( $M = 47.38$ ,  $SD = 18.00$ ). As regards the place of residence, the largest number of respondents both in the exploratory group (32.6%) and in the confirmatory group (30.6%) lived in medium-sized towns.

### THE RESULTS OF EXPLORATORY ANALYSES (THE FIRST GROUP)

The statistical operations positively verified the assumption concerning the unidimensionality of the factors only in the case of two components of wisdom – Cognitive and Affective (see Fig. 1 and 2). In the case of the Reflective component, we observed a departure from this assumption: the scree plot revealed that it had a two-factor structure (see Fig. 3). We therefore performed exploratory analyses again for this factor, this time adopting a two-factor solution. As a result, the Reflective factor was split into two components, which – after the content analysis of their items – we recognized to be separate aspects of the Reflective component of wisdom: Self-Awareness and Empathic.

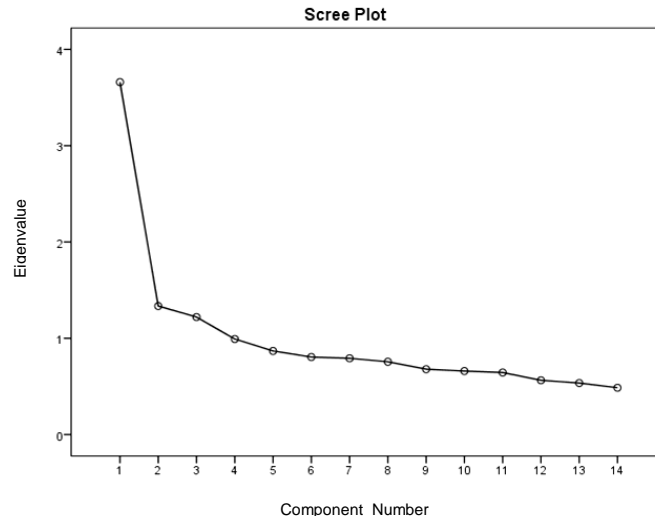


Figure 1. Scree plot for the exploratory factor analysis of the Cognitive dimension of wisdom.

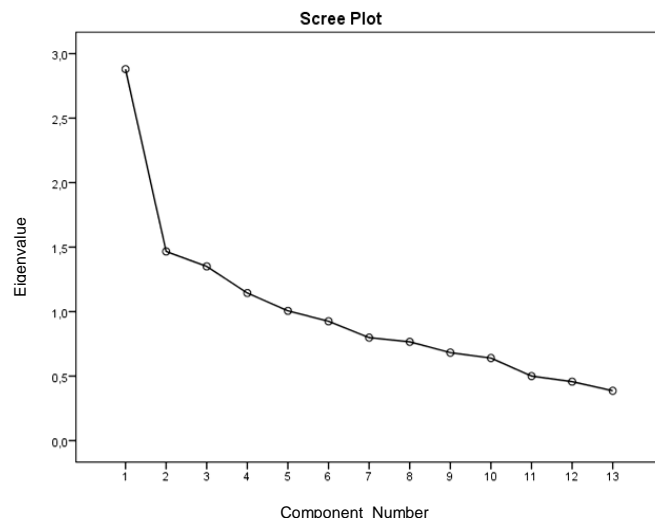


Figure 2. Scree plot for the exploratory factor analysis of the Affective dimension of wisdom.



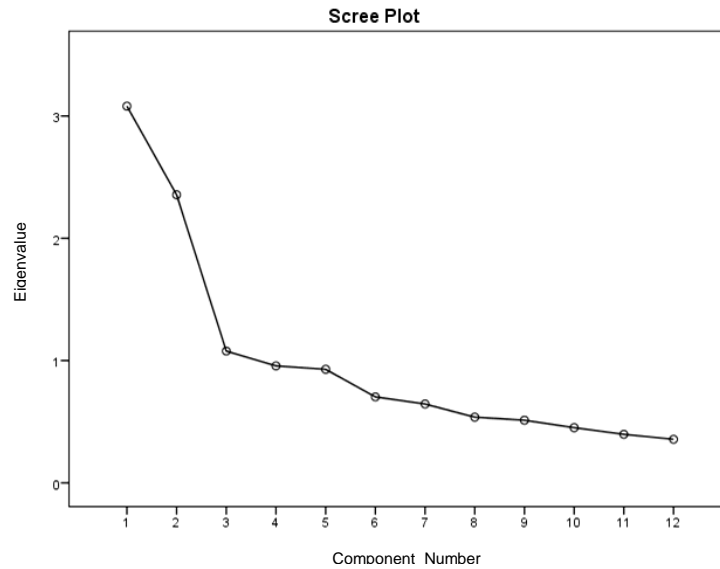


Figure 3. Scree plot for the exploratory factor analysis of the Reflective dimension of wisdom.

Next, we tested the unidimensionality assumption with regard to the two newly distinguished factors. Based on the scree plot criterion (see Fig. 4 and Fig. 5), they were qualified for further analyses. Table 1 presents the percentages of variance explained by each factor, the reliability of each dimension of wisdom (Cronbach's  $\alpha$ ), the factor loadings of the items constituting a given factor, and the classification of each item into a particular parcel within a specific factor.

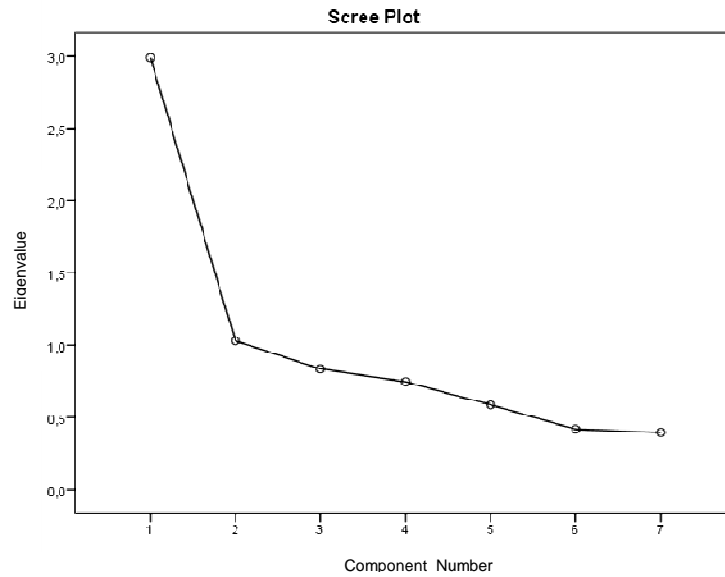


Figure 4. Scree plot for the exploratory factor analysis of the Self-Awareness dimension of wisdom.

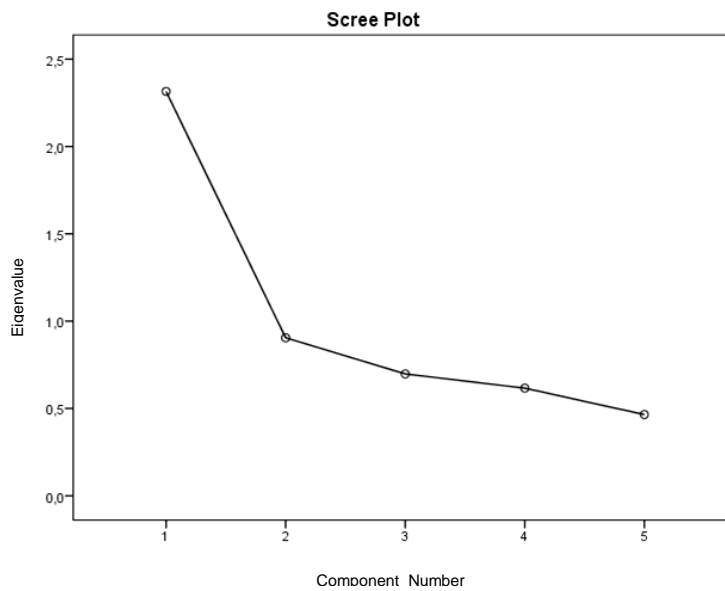


Figure 5. Scree plot for the exploratory factor analysis of the Empathic dimension of wisdom.

Table 1

Results of Exploratory Factor Analysis (Principal Component Axes Method) for Each Factor Separately (the Percentage of Explained Variance and the Factor Loadings of Items), Cronbach's  $\alpha$ , and the Classification of Items into Parcels in Confirmatory Factor Analysis

Cognitive dimension <i>expl. v.</i> = 30.61% $\alpha$ = .77			Affective dimension <i>expl. v.</i> = 22.15% $\alpha$ = .64			Self-Awareness dimension <i>expl. v.</i> = 38.63% $\alpha$ = .73			Empathic dimension <i>expl. v.</i> = 48.01% $\alpha$ = .72		
k	f.l.	p.i.	k	f.l.	p.i.	k	f.l.	p.i.	k	f.l.	p.i.
1 (Pt I)	.44	2	2 (Pt I)	.32	4	6 (Pt I)	.62	1	1 (Pt II)	.71	2
3 (Pt I)	.69	1	4 (Pt I)	.21	2	10 (Pt I)	.62	3	3 (Pt II)	.65	1
5 (Pt I)	.67	2	8 (Pt I)	.65	1	8 (Pt II)	.72	3	5 (Pt II)	.76	1
7 (Pt I)	.47	1	12 (Pt I)	.28	5	11 (Pt II)	.60	2	17 (Pt II)	.63	1
9 (Pt I)	.66	3	14 (Pt I)	.53	1	14 (Pt II)	.70	1	20 (Pt II)	.72	2
11 (Pt I)	.65	5	2 (Pt II)	.40	3	22 (Pt II)	.67	2	–	–	–
13 (Pt I)	.20	4	4 (Pt II)	.62	3	24 (Pt II)	.37	1	–	–	–
15 (Pt I)	.56	2	6 (Pt II)	.21	3	–	–	–	–	–	–
7 (Pt II)	.65	4	9 (Pt II)	.26	1	–	–	–	–	–	–
10 (Pt II)	.62	1	12 (Pt II)	.56	5	–	–	–	–	–	–
13 (Pt II)	.49	5	15 (Pt II)	.63	2	–	–	–	–	–	–
16 (Pt II)	.50	4	18 (Pt II)	.45	2	–	–	–	–	–	–
19 (Pt II)	.39	3	21 (Pt II)	.61	4	–	–	–	–	–	–
23 (Pt II)	.52	3	–	–	–	–	–	–	–	–	–

Note. *Expl. v.* – the percentage of explained variance; k – item number according to scale; f.l. – the value of factor loading;  $\alpha$  – the reliability of the scale (Cronbach's  $\alpha$ ); p.i. – parcel of items in CFA; Pt I – the first part of the scale; Pt II – the second part of the scale.

Based on the scree plot criterion, it can be concluded that the assumption about the unidimensionality of the factors distinguished in the above analyses was met. This is also confirmed by the values of Cronbach's  $\alpha$ , which range from .64 to .77 (Cronbach's  $\alpha$  for the entire scale was .86) and by the strong factor saturation of most items (loadings above .40). The noticeable exceptions include items 2, 4, 12 (the Affective dimension), and 13 (the Cognitive dimension) from the first part of the scale as well as items 6, 9 (the Affective dimension), and 24 (the Self-Awareness dimension) from the second part of the scale. In future research on the psychometric properties of the measure, these items should be analyzed more thoroughly. However, due to the fact that the main aim of the presented exploratory analyses was to verify the unidimensionality of the factors, we entered all the items in CFA.

The values of factor loadings obtained for particular 3D-WS items in EFA constituted the basis for distinguishing the parcels of items entered in CFA in accordance with the factorial algorithm procedure described above. Within the Cognitive and Affective factors, five parcels of three or two items were distinguished. Within the Self-Awareness factor there emerged three parcels of items, and the Empathic factor was constituted by two parcels. The numbers of the parcels to which particular items were assigned are given in Table 1.

### THE RESULTS OF CONFIRMATORY ANALYSES (THE SECOND GROUP)

The model tested in CFA with an item parceling procedure is presented in Fig. 6. Model fit assessment was based on indices recommended in the methodological literature concerning structural equations, namely: CMIN/*df*, RMSEA, Pclose, GFI, CFI, and TLI (Bedyńska & Książek, 2012; Sagan, 2003; cf. Ciecuch, 2010a, 2010b).

The analysis of the distribution of particular groups of items of 3D-WS based on the Kolmogorov-Smirnov test revealed their significant departures from the normal distribution ( $Z \leq .183$ ,  $p < .001$ ). However, the values of skewness and kurtosis range between  $-1$  and  $+1$ , which – according to Bedyńska and Książek (2012) – suggests that these departures are small and acceptable. Consequently, we decided to perform CFA with a bootstrap procedure and an estimation of parameters using the maximum likelihood method. Due to the high number of observed variables in proportion to latent variables, we supposed that some fit indices would not have values indicating a good fit (CMIN/*df* < 2, RMSEA < .05, GFI > .9, CFI > .9, TLI > .9). We assumed, however that they would reach a level indicating a moderate fit of the model to the data (CMIN/*df* < 5, RMSEA < .08, GFI > .8, CFI > .8, TLI > .8) (Sharma, 1996; cf. Szewczuk-Bogusławska et al., 2015).

All the fit indices were at an acceptable level, making it possible to regard the model as sufficiently fitted to the data (CMIN/*df* = 2.708, RMSEA = .071, GFI = .920, CFI = .893, TLI = .866). Thus, the analyses argue for rejecting the hypothesized three-factor (three-dimensional) structure of wisdom and suggest that wisdom is a construct constituted by four factors.

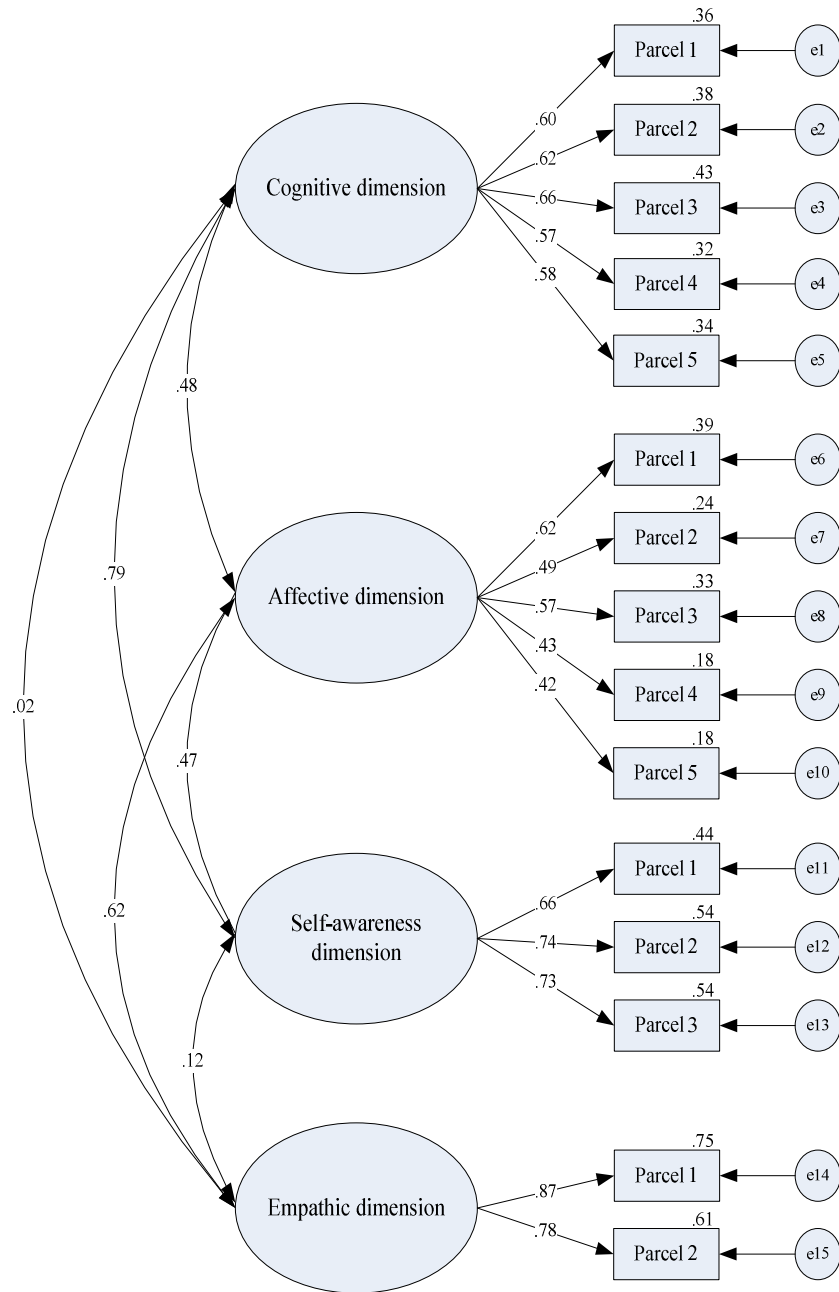


Figure 6. The factor structure of the Polish version of M. Ardel's Wisdom Scale 3D-WS (in the item parceling procedure).

### THE RELATIONSHIP BETWEEN 3D-WS SCORES AND SOCIODEMOGRAPHIC VARIABLES

Next, we analyzed the relations between the scores in 3D-WS and sociodemographic variables, namely: sex, age, and education. When comparing the means between two groups, we used the Mann-Whitney  $U$  test – due to statistically significant differences in the number of men ( $n = 136$ ) and women ( $n = 204$ ),  $\chi^2=13.60$ ,  $df = 1$ ,  $p < .001$ ).

When making comparisons between more than two groups, with the assumptions not met, we used the Kruskal-Wallis ANOVA rank test (Brzeziński, 1999, p. 268).

#### Scores on 3D-WS subscales according to sex

Table 2 presents differences between the scores obtained by women and by men on each dimension of 3D-WS and at the overall score level.

Table 2  
*Wisdom – Comparison in the Male (n = 136) and Female Groups (n = 204) Using the Mann-Whitney U Test*

VARIABLES	Men	Women	Mann-Whitney $U$ test	
	Mean rank	Mean rank		
3D-WS Wisdom Scale	Cognitive dimension	165.87	173.59	13.242.00; <i>ns.</i>
	Affective dimension	157.38	179.25	12.087.00*
	Self-Awareness dimension	174.10	168.10	13.382.50; <i>ns.</i>
	Empathic dimension	171.76	169.66	13.700.50; <i>ns.</i>
	Overall score	167.46	172.52	13.459.00; <i>ns.</i>

Note. \*  $p \leq .05$ .

In most dimensions and in the global index of wisdom there are no statistically significant differences between the scores obtained by women and by men. The only dimension in which such a difference is found is the Affective dimension. This suggests that women exhibit a significantly greater capacity for sympathy and empathy than men do.

### Scores on 3D-WS subscales according to age

We computed the statistical significance of differences in scores on each subscale between individuals from different age groups. The participants were divided into seven age groups: (1) 20 years old or younger; (2) 21-30; (3) 31-40; (4) 41-50; (5) 51-60; (6) 61-70, and (7) above 70. Due to the different sizes of the compared groups ( $\chi^2 = 19.10$ ,  $df = 6$ ,  $p = .004$ ), we used the nonparametric Kruskal-Wallis ANOVA rank test. The results of the analysis of variance revealed significant differences between the compared groups both in the global index of wisdom and in each of its dimensions except the Self-Awareness component. This suggests that age is the variable that can explain differences in wisdom to a significant degree. The Mann-Whitney  $U$  test showed that statistically significant differences ( $p \leq .05$ ) occur, above all, between the extreme age groups. It is also worth noting that the association between wisdom (globally defined) and age takes the form of a curvilinear relationship (inverted U-shape). More detailed data are presented in Table 3.

Table 3  
*The Kruskal-Wallis ANOVA Rank Test for Seven Age Groups*

3D-WS dimension	Age group	<i>N</i>	<i>M</i>	<i>H</i>	<i>U</i>
Cognitive	Gr. 1 (20 y.o. or younger)	35	197.13	34.223***	1:6**
	Gr. 2 (21-30)	49	170.66		1:7***
	Gr. 3 (31-40)	39	207.42		2:7**
	Gr. 4 (41-50)	71	196.70		3:6***
	Gr. 5 (51-60)	47	170.46		3:7***
	Gr. 6 (61-70)	58	140.22		4:6**
	Gr. 7 (71 or older)	41	109.95		4:7***
Affective	Gr. 1 (20 y.o. or younger)	35	128.44	14.639*	1:4*
	Gr. 2 (21-30)	49	155.33		1:5**
	Gr. 3 (31-40)	39	150.35		1:6**
	Gr. 4 (41-50)	71	176.11		1:7*
	Gr. 5 (51-60)	47	187.76		2:6*
	Gr. 6 (61-70)	58	193.55		3:6*
	Gr. 7 (71 or older)	41	181.60		
Self-Awareness	Gr. 1 (20 y.o. or younger)	35	159.80	7.714; <i>ns.</i>	---
	Gr. 2 (21-30)	49	178.15		
	Gr. 3 (31-40)	39	186.58		

	Gr. 4 (41-50)	71	183.35	
	Gr. 5 (51-60)	47	169.88	
	Gr. 6 (61-70)	58	167.91	
	Gr. 7 (71 or older)	41	137.30	
Empathic	Gr. 1 (20 y.o. or younger)	35	95.20	1:2*** 1:3*
	Gr. 2 (21-30)	49	168.59	1:4***
	Gr. 3 (31-40)	39	145.27	32.996*** 1:5***
	Gr. 4 (41-50)	71	179.03	1:6***
	Gr. 5 (51-60)	47	181.71	1:7***
	Gr. 6 (61-70)	58	206.79	2:6*
	Gr. 7 (71 or older)	41	182.10	3:6**
Overall score	Gr. 1 (20 y.o. or younger)	35	131.34	
	Gr. 2 (21-30)	49	169.60	1:4**
	Gr. 3 (31-40)	39	174.69	12.828* 1:5*
	Gr. 4 (41-50)	71	189.42	1:6*
	Gr. 5 (51-60)	47	182.32	4:7*
	Gr. 6 (61-70)	58	179.38	
	Gr. 7 (71 or older)	41	142.13	

Note. *N* – group size; *M* – mean rank; *H* – the value of the Kruskal-Wallis rank test; *U* – the value of the Mann-Whitney test; \*\*\*  $p \leq .001$ ; \*\*  $p \leq .01$ ; \*  $p \leq .05$ .

### Scores on 3D-WS subscales according to education

We computed the differences in 3D-WS scores between people with different levels of education. The participants were divided into four groups according to education level: people with (1) elementary, (2) vocational, (3) secondary, and (4) higher education. Table 4 presents the obtained results.

The results of the analysis of variance indicate that education is a significant source of variance in scores on the Cognitive and Self-Awareness dimensions and in the overall wisdom index. The Mann-Whitney test revealed that individuals with higher education scored significantly higher ( $p \leq .01$ ) on the Cognitive dimension than people with elementary, vocational, and secondary education. As regards the Self-Awareness dimension, a statistically significant difference was found, for instance, between the group of people with elementary, vocational,



and secondary education and the group with higher education ( $p \leq .01$ ). Also at the overall score level statistically significant differences manifested themselves ( $p \leq .05$ ) between people with higher education and those with elementary, vocational, or secondary education.

Table 4  
The Kruskal-Wallis ANOVA Rank Test for Education Level

Dimension of 3D-WS	Education	<i>N</i>	<i>M</i>	<i>H</i>	<i>U</i>
Cognitive	Elementary (E)	22	136.43	35.029***	E:H** V:S** V:H*** S:H***
	Vocational (V)	49	113.52		
	Secondary (S)	125	162.28		
	Higher (H)	144	202.23		
Affective	Elementary (E)	22	130.30	5.357; <i>ns.</i>	–
	Vocational (V)	49	158.74		
	Secondary (S)	125	173.50		
	Higher (H)	144	178.04		
Self-Awareness	Elementary (E)	22	129.18	23.475***	E:H** V:S** V:H*** S:H**
	Vocational (V)	49	129.62		
	Secondary (S)	125	163.40		
	Higher (H)	144	196.89		
Empathic	Elementary (E)	22	152.95	1.979; <i>ns.</i>	–
	Vocational (V)	49	185.79		
	Secondary (S)	125	168.07		
	Higher (H)	144	170.09		
Overall score	Elementary (E)	22	120.86	21.263***	E:H* V:H*** S:H*
	Vocational (V)	49	135.24		
	Secondary (S)	125	164.85		
	Higher (H)	144	194.99		

Note. *N* – group size; *M* – mean rank; *H* – the value of the Kruskal-Wallis test; *U* – the value of the Mann-Whitney test; \*\*\*  $p \leq .001$ ; \*\*  $p \leq .01$ ; \*  $p \leq .05$ .

The obtained data suggest that education level affects the scores on some subscales of 3D-WS. The tendencies revealed indicate that people with secondary or higher education are characterized by a higher level of wisdom on the Cognitive and Self-Awareness dimensions and by a higher overall level of wisdom.

## CONCLUSION

The theory of wisdom proposed by Ardel (2003) – according to which wisdom is a construct comprising three components: cognitive, affective, and reflective – is the basis for many contemporary studies on wisdom, conducted mainly in the United States and concerning, above all, elderly people (cf. Ardel, 2000; 2008, 2010; Neff, Rude, & Kirkpatrick, 2007; Benedikovicova & Ardel, 2008; Le, 2011; Redzanowski & Glück, 2012; Steuden, 2014). In these studies, the instrument used for characterizing wisdom is the Three-Dimensional Wisdom Scale (3D-WS) developed by Ardel (2003). In Poland, psychological measurement instruments of this kind are lacking. This fact became the main motive for the translation and Polish adaptation of the scale developed by the American scientist.

Consequently, in the presented study we tested M. Ardel's (2003) model of wisdom and the measure of wisdom based on it. For that purpose, we applied CFA with an item paring procedure. Due to the fact that this procedure requires the fulfillment of certain assumptions (see Little et al., 2002), first we performed EFA to test the unidimensionality of the analyzed factors (for each factor separately) in accordance with the principles of cross-validation. The analyses revealed a four-structure of wisdom. The results are consistent with those obtained by Ardel (2003). It should be stressed at this point that the falsification of the hypothesis concerning the three-factor structure of wisdom in no way undermines the quality of the theoretical model proposed by Ardel (2003) or the accuracy and usefulness of her 3D-WS scale. This is because the suggested splitting of the reflective dimension into two independent factors – Self-Awareness and Empathic – is consistent with the theoretical assumptions of the model of wisdom presented here and constitutes only a proposal of its refinement, similar to that suggested by Ciecuch (2010b), who analyzed identity styles in Berzonsky's model (cf. Strelau, Jaworowska, Wrześniewski, & Szczepaniak, 2005).

According to Ardel's (2003) proposal, the components of wisdom – Cognitive, Affective, and Reflective – are constitutive elements of the global construct of wisdom. The results of the research presented in this paper, conducted on a Polish sample, remain consistent with the American author's baseline assumptions. This is shown by the analysis of intercorrelations among the (four) distinguished factors of wisdom (see Fig. 6) and their relations to the overall score (the values of correlation coefficients between the overall score and the Cognitive, Affective, Self-Awareness, and Empathic dimensions were .70, .73, .76, .57, respectively, at the significance level of  $p \leq .01$ ). The obtained correlations

(between the four factors and the global wisdom index) turned out to be high enough to make it legitimate to regard the factors distinguished as dimensions of the same construct – wisdom. At the same time, the configuration of correlations among the components of wisdom points to interrelations between them.

The analyses performed also confirm the good psychometric properties of the Polish adaptation of 3D-WS. Both Cronbach's  $\alpha$  (as reliability coefficients) and model fit indices in CFA (indicating construct validity) turned out to be high enough for the measure to be successfully used in scientific research.

What deserves attention during the psychological interpretation of the results of our study is the curvilinear relationship (inverted U-shape) between wisdom and age (particularly its global index). The pattern that was revealed – strange and surprising as it may seem at first glance – is consistent with the findings of other authors (see Baltes & Staudinger, 1993, 1996; Baltes, Staudinger, & Lindenberger, 1999; Baltes, Glück, & Kunzmann, 2002, 2004; Webster, Westerhof, & Bohlmeijer, 2012; Brudek & Lenda, 2014; Brudek & Woźny, 2014). Baltes, Glück, and Kunzmann (2004) suggest that the wisdom curve over the life span strictly depends on the specificity of the individual's cognitive functioning. Steuden (2011a, 2011b, 2014), by contrast, claims that the curvilinear relationship between wisdom and age is understandable in the context of the distinction proposed by Ardel (2000) between intellectual knowledge and wisdom-related knowledge.

Nevertheless, the presented study has certain limitations, whose elimination may be the object of future studies and analyses. First, it would be worthwhile to perform an empirical verification of the four-factor structure of wisdom in various age groups (adolescence, early adulthood, middle adulthood, late adulthood). Second, what would also be cognitively valuable is a research project devoted to the changes in the structure of wisdom during the lifespan. Such a project would require conducting longitudinal research using an instrument with verified psychometric properties, which the Polish version of 3D-WS described in the present article can undoubtedly be considered to be. Third, cross-cultural research would be an interesting project. Fourth, an empirical answer should be given to the question of whether or not the wisdom manifesting itself in the period of late adulthood has real psychological consequences to the functioning of elderly people in different life domains.

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