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# The Psychometric Location of Wisdom-Related Performance: Intelligence, Personality, and More?

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*The present study aims at presenting evidence on the psychometric location of a measure of wisdom-related performance in relation to standard measures of intelligence, personality, and their interface. A sample of 125 men and women heterogeneous with regard to age, years of education, and professional status responded verbally to three wisdom-related dilemmas and completed a psychometric battery of 33 scales (12 tests) involving intelligence, personality, and the personality-intelligence interface. Findings were consistent with predictions. First, 40% of the variance in wisdom-related performance was predicted by measures of intelligence, personality, and their interface, although none of the individual predictors could be considered equivalent to the authors' measure of wisdom-related performance. Second, the personality-intelligence-interface measures provided the largest unique share (15%). Third, wisdom-related performance evinced a fair degree of measurement independence (uniqueness).*

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**D**uring the past decade, there have been repeated calls for a stronger consideration of psychological phenomena and processes located at the interface between personality, cognitive, and social functioning (e.g., Cantor & Kihlstrom, 1987; Carstensen, 1993; Markus & Nurius, 1986; Sternberg & Ruzgis, 1994). Wisdom and wisdom-related performance—when studied from a psychological perspective—have been identified as phenomena asking for such integrative scholarship (Baltes, Smith, & Staudinger, 1992; Clayton & Birren, 1980; Dittmann-Kohli & Baltes, 1990; Labouvie-Vief, 1990; Staudinger & Baltes, 1994; Sternberg, 1990b).

Psychological models of wisdom differ in the degree to which they emphasize personality, cognitive, and social functioning or a combination of all three domains of functioning as central to the study of wisdom. Psychological work on wisdom also differs in the degree to

which it is theoretical rather than empirical. So far, most of the empirical work has centered on subjective and everyday conceptions of what constitutes wisdom and the expected characteristics of a wise person (e.g., Clayton & Birren, 1980; Holliday & Chandler, 1986; Sternberg, 1990a). In contrast, the conceptual basis for the present study has been on the investigation of wisdom-related performance (Baltes & Smith, 1990; Baltes & Staudinger, 1993).

The present study aims at exploring the location of wisdom in the psychometric space defined by standard measures of personality and intelligence and measures indexing the interface between personality and intelligence such as social intelligence, creativity, and measures of cognitive style. Measures belonging to the personality-intelligence interface have been argued to be most similar to wisdom (e.g., Cantor & Harlow, 1994; Haslam & Baron, 1994; Mayer & Salovey, 1993; Sternberg, 1990a).

## *A Psychological Conception of Wisdom and Wisdom-Related Performance*

We proceed from a theoretical definition of wisdom as expert-level knowledge and judgment in the fundamental pragmatics of life. As described in more detail elsewhere (e.g., Baltes & Smith, 1990; Baltes & Staudinger,

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1993), the domain of fundamental pragmatics of life entails insights into the quintessential aspects of the human condition and human life including its biological finitude, cultural conditioning, and interindividual variations. At the center of this body of knowledge and its application are questions concerning the conduct, interpretation, and meaning of life. Furthermore, we argue that the combination of insight and virtue that characterizes wisdom is a prototypical example of the fine-tuned coordination of cognition, motivation, and emotion (Staudinger & Baltes, 1994). We propose that the specific configuration of cognitive, motivational, and emotional functioning captured by wisdom and wisdom-related performance is not completely covered by existing measures in the area of intelligence or personality or in measures of the personality-intelligence interface. This conceptualization is also reflected in the cultural-historical literature on wisdom (e.g., Baltes, 1994). In that literature, wisdom is described as representing the successful integration of the liberal arts (knowledge) and virtues (personality or character).

A framework of five criteria was outlined that can be used to evaluate the quantity and quality of wisdom-related knowledge and judgment contained in individuals' "thinking-aloud" or written responses to difficult and uncertain problems of life. The five criteria are rich factual and procedural knowledge about life, life-span contextualism, value relativism, and awareness and management of uncertainty.

This approach to the psychological study of wisdom as expert-level knowledge and judgment in the fundamental pragmatics of life received support in a series of performance-based studies and also demonstrated some predictive and construct validity (for an overview, see Baltes & Staudinger, 1993; Staudinger & Baltes, 1994). People nominated as wise, independently of our definition of wisdom, regularly performed in the highest range (Baltes, Staudinger, Maercker, & Smith, 1995). In a similar vein, wisdom-related performance assessed according to our five criteria correlated  $r = .79$  with lay wisdom ratings of response protocols (Smith & Baltes, 1990; Staudinger, Smith, & Baltes, 1992). In addition, we demonstrated the facilitative effect of specific experiential contexts such as training and practice in a human-service profession (Smith, Staudinger, & Baltes, 1994; Staudinger et al., 1992) and of preperformance participation in an interactive-minds condition (Staudinger & Baltes, 1996). In concert, these findings are in agreement with the predictions derived from a general developmental model of wisdom (Baltes & Smith, 1990; Staudinger & Baltes, 1994).

Another facet of our theoretical framework involves the role of person characteristics such as personality and intelligence as antecedents, correlates, and conse-

quences of wisdom. The main goal of the present study, therefore, was to gain insight into the location of wisdom-related performance in the psychometric space defined by existing measures of personality, intelligence, and the personality-intelligence interface. The hypotheses guiding this research were grounded, first, in our theoretical notions about correlates of wisdom-related performance (see, e.g., Staudinger & Baltes, 1994). Second, hypotheses were based on the psychological wisdom literature (see Sternberg, 1990b, for overview).

#### *Wisdom and Intelligence*

Empirical research on implicit or lay theories of wisdom suggests that there is some overlap with the construct of intelligence but that some features are also unique to the construct of wisdom (e.g., Clayton & Birren, 1980; Orwoll & Perlmutter, 1990; Sowarka, 1989; Staudinger & Baltes, 1994; Sternberg, 1990a). In addition to cognitive components, affective and reflective dimensions are also mentioned when people describe their understanding of wisdom (e.g., Clayton & Birren, 1980). Reasoning ability, practical problem-solving ability, or general competence characterizes the overlap between intelligence and wisdom, whereas sagacity, exceptional understanding, or communication skills points to the uniqueness of the wisdom construct in people's conceptions (e.g., Holliday & Chandler, 1986; Sternberg, 1990a).

Our conceptualization of wisdom places wisdom within a model of intellectual functioning that distinguishes between two different but interrelated aspects—the mechanics and the pragmatics of the mind (e.g., Baltes et al., 1992). Within that model, wisdom has been identified as a prototype of the pragmatics of the mind. Thus, we expected indicators of the pragmatics of the mind to be related more strongly to wisdom than indicators of the mechanics.

Taken together, the results from research on lay conceptions of wisdom are consistent with the conception that intelligence seems to be a necessary but not a sufficient condition for wisdom. In addition, differential relational patterns to the mechanics and the pragmatics of the mind are expected.

#### *Wisdom and Personality*

Empirical research on lay conceptions of wisdom also provides evidence for the relevance to wisdom of personality characteristics such as maturity, absence of emotional lability, open-mindedness, even-temperedness, and sociability (e.g., Clayton & Birren, 1980; Holliday & Chandler, 1986). In addition to traitlike personality dimensions, growth-oriented personality variables have received attention. In line with Erikson's eight-stage epigenetic theory of personality development (e.g., Erikson,

Erikson, & Kivnick, 1986), for instance, wisdom is identified with mature character and integrity (e.g., Orwoll & Perlmutter, 1990; Sowarka, 1989) and has been described as the highest form of personality functioning (cf. Staudinger & Baltes, 1994). In such studies, positive relationships between growth-related personality constructs and more traitlike personality dimensions such as openness to experience have been demonstrated (McCrae & Costa, 1980). These findings also square with work on ego development (e.g., Labouvie-Vief, 1993).

In sum, this research predicts a differentiated pattern of relationships between wisdom-related constructs and central personality dimensions such as neuroticism, extraversion, or openness to experience on one hand and growth-oriented personality features such as integrity or ego development on the other. This prediction is also in line with life-span theory, which emphasizes the synergism between general dispositions (traits as resources) and challenging conditions (tasks) of adult life (Baltes, Lindenberger, & Staudinger, in press).

#### *Wisdom and Measures Located at the Interface Between Personality and Intelligence*

Creativity, social intelligence, and cognitive styles are among the major constructs located at the interface between personality and intelligence (e.g., Eysenck, 1994). We propose that such measures may be the closest to the construct of wisdom. Indeed, including these interface measures seems especially critical when interested in testing the potential uniqueness of the psychological construct of wisdom-related knowledge and judgment (e.g., Sternberg, 1990a, 1994).

*Creativity.* From the literature, one can derive two different hypotheses concerning the relationship between creativity and wisdom. When proceeding from a notion of creativity as divergent thinking, small or no relationships with wisdom are found (e.g., Sternberg, 1990a). However, when conceptualizing creativity as the integration of innovation and playfulness with mature intellect and experience, strong positive relationships are expected (e.g., Csikszentmihalyi & Rathunde, 1990; Gardner, 1983). Along this line, the historical wisdom literature reports that wise solutions are often characterized by the transcendence of the given problem frame or the introduction of a new perspective (e.g., Solomonic solutions; Assmann, 1994). In a similar vein, Arlin (1990) speaks about problem finding—that is, the delineation of what constitutes the problem—as an important feature of wisdom.

In sum, we expect that when assessing creativity in a multifaceted, rather than a unidimensional, way focused on divergent thinking, a substantial positive relationship between wisdom-related performance and creativity will be found.

*Social intelligence.* Studies of implicit theories of wisdom also provided the basis for our hypotheses concerning the relationship between wisdom-related performance and social intelligence. It has been shown that intellectual abilities in the realm of social interactions are considered in lay theories to be among the most crucial resources of a wise person (e.g., Holliday & Chandler, 1986; Sternberg, 1990a). This becomes manifest, for example, in a wise person being characterized by very good communicative skills, a high degree of empathy, and the ability of advice giving. Further indication for the close relationship between social intelligence and wisdom comes from the work by Cantor and Kihlstrom (1987) on personality and social intelligence. On a theoretical level, these authors considered wisdom in the context of successful coping with one's life tasks and related this ability to social intelligence. Based on such research, we expected to find a positive relationship between social intelligence and wisdom-related performance, but as true for all other predictions, we did not expect social intelligence to preempt the construct of wisdom.

*Cognitive styles.* Cognitive styles, as preferences for using abilities in a certain way, seem to represent the prototypical interface between intelligence and personality. Two types of approaches can be distinguished. One type, characterized by a more cognitive orientation and the use of actual performance measures, includes the work by Kagan, Rosman, Day, and Phillips (1964) on impulsivity and reflexivity or Witkin's (1978) studies on field dependence and independence. The other type is more personality related and uses self-report questionnaires, such as the work by Myers (1980) or Sternberg (1988). Relationships with wisdom are expected for constructs deriving from both types of research.

Following Kagan et al.'s (1964) definition of an impulsive style, we expected that the tendency to be quick to say and do things without forethought should correlate negatively with wisdom-related knowledge and judgment. Conversely, the ability to withhold judgment and reflect about options seems crucial for the development of wisdom-related performance. In this vein, reflexivity has been identified as a component of lay theories of wisdom (Clayton & Birren, 1980).

With reference to the second line of research on cognitive style, Sternberg's theory of mental self-government (e.g., Sternberg, 1994, 1996) seems one promising recent measurement approach. Sternberg suggested that wise persons are characterized by a judicial style. This means that wise persons are more concerned with understanding why and what it means when people think, what they think, and why they do what they do, than with simply judging it as good or bad (Sternberg, 1990a, p. 151). With regard to some of the other dimensions of

mental self-government, we would expect—based on our definition of wisdom-related performance—that a wise person according to our definition should rather be progressive than conservative, should be in-between global and local, and should be in-between internal and external rather than one or the other or both.

### *Summary of Hypotheses*

The goal of the present article is to explore the location of our measure of wisdom-related performance in the psychometric space defined by standard measures of intelligence and of personality and measures of the personality-intelligence interface. To reach this goal, we considered the major categories that subjective (lay) theories of wisdom and previous wisdom scholarship, as well as our own ontogenetic model, suggested as important correlates of wisdom. In addition, we attempted to include measures that reflect different lines of scholarship.

First, we expected significant relationships between all three domains (intelligence, personality, intelligence-personality interface) and our measures of wisdom-related performance. However, based on our theoretical account, we assumed measures of personality and especially the personality-intelligence interface would show stronger associations with wisdom than measures of psychometric intelligence. Second, theoretical considerations informed hypotheses about the predictive power of individual indicators of intelligence, personality, and the personality-intelligence interface with regard to wisdom-related performance. Third, we predicted that none of the constructs selected, if considered separately, would cover the constellation of psychological functioning indexed by our measures of wisdom-related performance. Even when all measures or constructs are considered conjointly, we expected that our measures of wisdom-related performance would still demonstrate some measurement uniqueness.

## METHOD

### *Participants*

With the assistance of a German survey research company (INFAS), we recruited a heterogeneous pool of participants from the greater Berlin area. The company was instructed to obtain as broad and diverse a sample as possible with regard to educational level, occupation, and the adult age range. The survey company provided 125 participants (74 women, 51 men) who met the stated criteria and agreed to participate. Participants received DM 75 (approximately U.S.\$50) as compensation for their participation. Participants were tested in three 90-min sessions over the course of 2 months.

Participants ranged in age from 19 to 87 years, with a mean age of 45.4 years. On average, participants had 12 years of formal education, ranging from 8 to 16 years.<sup>1</sup> The sample included a wide cross section of people, including students, independent business owners, civil servants, farmers, housewives, part-time workers, retirees, blue- and white-collar workers, and the unemployed.

Of the sample, 90% rated themselves as being at least somewhat satisfied with their lives. Chi-square analyses revealed no significant differences between younger ( $M = 2.3$ ) and older ( $M = 2.3$ ) adults' subjective ratings of life satisfaction on five-point scales,  $\chi^2(4) = 2.85$ , *ns*. Similarly, 93% of the overall sample reported being in at least somewhat good physical health. Again, chi-square analyses revealed no significant differences between younger ( $M = 2.5$ ) versus older ( $M = 2.3$ ) adults' subjective ratings of their overall physical health,  $\chi^2(4) = 4.6$ , *ns*.

### *Measures and Procedure*

Participants were tested on three occasions. Each session lasted about 2 hrs. The first two of those were individual assessment sessions during which three wisdom-related tasks were given as well as some of the psychometric tests of intelligence and personality. The third was a group testing session at which we administered the remaining tests or questionnaires. Sessions were at least 4 days, and maximally 10 days, apart.<sup>2</sup>

### *The Assessment of Wisdom-Related Performance*

The Berlin wisdom paradigm is based on the collection of thinking-aloud protocols about difficult and uncertain life dilemmas involving life review, life planning, and life management. Following this paradigm (for technical details, see Staudinger, Smith, & Baltes, 1994), participants were interviewed individually by trained interviewers. As in previous work, participants were first trained in thinking aloud (Ericsson & Simon, 1984). Then, they were given warm-up tasks to prepare them to think about the life problems of a fictitious person. Following training, participants were given three wisdom-related tasks and were asked to respond by thinking aloud about the problem at hand. Four trained female interviewers ( $M$  age = 37.5, range = 27 to 55) conducted the sessions. Participants were randomly assigned to interviewers.

The appendix describes the three wisdom-related tasks that provided the core data for the measurement of wisdom-related performance in this study. They differed in the type of life dilemma facing the main character. The first task dealt with managing someone's friend's threat of committing suicide, the second problem dealt with the reconstruction of the meaning of life, and the third concerned managing a family problem.

### *Scoring of Verbal Response Protocols and Training of Raters*

*Protocol preparation and timing.* After transcription of the verbal responses, the interview protocols were proof-read and corrected against the original tape recording. The total duration of each response was noted, and the total number of words spoken were counted.

*Scoring criteria and training.* Using a training procedure developed in earlier studies and described in a manual for the assessment of wisdom-related knowledge and judgment (Staudinger et al., 1994), 10 raters were trained to each use one of the five wisdom-related criteria. Criterion-specific training sessions required approximately 6 hours each and included instruction in rating texts and verbal protocols against an ideal (in contrast to rank ordering). Raters practiced using selected protocols from previous empirical work. When consensus between rater and trainer was reached on these protocols, training ended. Raters were paid DM 1,800 (approximately U.S.\$1,400).

Each rater independently read the 375 protocols (3 tasks  $\times$  125 participants) and gave each protocol a score between 1 and 7, representing the degree to which it matched the ideal described by their assigned criterion. The score of 7 indicated a close match to the ideal. The order in which problems were evaluated by raters was randomized. For illustration purposes, the appendix lists short excerpts of top responses (across all five criteria) for the three wisdom-related tasks used in the study.

Interrater reliabilities were well in the acceptable range. Of the total of 45 coefficients, 37 were above .6 (Cronbach  $\alpha$ :  $M = .71$ ,  $SD = .10$ , range = .57 to .89). No systematic differences in interrater consistencies by task or criterion scale were identified. Based on factor analysis, the 15 scores (5 scales  $\times$  3 tasks) were averaged to form one overall score of wisdom-related performance. The Cronbach  $\alpha$  of the five wisdom-related scales across the three tasks was .93.

### *Intelligence Measures*

The distinction between fluid and crystallized intelligence (Horn & Cattell, 1966) or the mechanics and the pragmatics of the mind (e.g., Baltes, Dittmann-Kohli, & Dixon, 1984) served as the framework that guided the selection of measures of intellectual functioning in the present study.

*Fluid intelligence.* Two measures of fluid intelligence were administered: the shortened version of the Advanced Progressive Matrices (APM; Raven, 1971) as an indicator of logical and analogical reasoning, and a measure of digit symbol substitution as an indicator of speed of information processing (Wechsler, 1982). Analogical reasoning and speed can be considered as

central dimensions of broad fluid intelligence (Cattell, 1971; Horn, 1982), which are of special relevance in the context of life-span research. For the APM, the first 18 items of Set 2 were included in the test. This version of the APM takes 15 min to complete and has been used before in other studies (e.g., Baltes, Kliegl, & Dittmann-Kohli, 1988). For the digit symbol substitution task, the Wechsler (1982) version of the test was used. Participants had to write as many symbols as possible within 90 s (cf., Lindenberger, Mayr, & Kliegl, 1993).

*Crystallized intelligence.* Two measures of crystallized intelligence were administered: the commonly used measure of semantic knowledge, the vocabulary subtest of the HAWIE (Hamburg-Wechsler Intelligenztest für Erwachsene; Wechsler, 1982; German version of the Wechsler Adult Intelligence Scale [WAIS]), and a practical knowledge questionnaire developed along the lines of the HAWIE knowledge subtest (Lindenberger et al., 1993).

Although the HAWIE was not originally conceptualized for administration across the life span, it was later standardized for older adults (Doppelt & Wallace, 1955; Riegel & Riegel, 1959). Participants' responses were coded by two independent raters using a refined version of the coding instructions provided by Wechsler (1982). Each response received a score of 0 (wrong), 1 (partially correct), or 2 (correct). Interrater reliability was .84.

The practical knowledge questionnaire followed the format of the WAIS Information Test. It consisted of 12 items representing relevant everyday information (e.g., "What is a funnel?" "What is the phone number to call in case of emergency?" and "How much does it cost to send a letter by mail in Germany?"). Responses were scored for correctness by two independent raters on the basis of a scoring manual. Each response received a score of 0 (wrong), 1 (partially correct), or 2 (correct). Interrater reliability was .74.

### *Personality Measures*

For the present attempt to establish the location of our measure of wisdom-related performance with regard to basic personality dimensions, the key distinction between trait and growth models of personality was used as guidance. The NEO-PI (Costa & McCrae, 1985) was selected to provide a measure for the trait space of personality. The Ryff Inventory of Psychological Well-Being (Ryff, 1989) was selected to assess the possible developmental, growth-sensitive aspects of personality. In addition, the personality construct of psychological-mindedness was included for its conceptual closeness to wisdom (Gough, 1964).

*The NEO-PI.* The NEO (Costa & McCrae, 1985) measures five personality traits: neuroticism, extraversion,

openness to experience, agreeableness, and conscientiousness. It has been cross-culturally validated with German participants. The German version of the short form of the NEO-PI (NEOFFL) contains 60 items, 12 per dimension (Borkenau & Ostendorf, 1989). Participants indicated the degree to which each of the items described them on a five-point Likert-type scale (1 = *not true*, 5 = *very true*). In the present study, the five dimensions showed high internal consistencies (neuroticism:  $r = .82$ ; extraversion:  $r = .70$ ; openness to experience:  $r = .75$ ; agreeableness:  $r = .66$ ; and conscientiousness:  $r = .83$ ).

*The Ryff Inventory.* The Ryff Inventory was designed to assess six global dimensions of continued personality growth across the life span (e.g., Ryff, 1989, 1995): autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance. These dimensions are based on work of scholars such as Erikson, Bühler, Allport, Maslow, and Jung. For the present study, the official short version of the Ryff Inventory was used (Ryff & Keyes, 1995). Each of the six dimensions was assessed by 9 items. Participants indicated the degree to which each of the 54 items described them on a five-point Likert-type scale (1 = *not true*, 5 = *very true*). For this research, the Ryff Inventory was translated into German using a backward translation method. In the present study, the Ryff-PI dimensions showed moderate to high internal consistencies (autonomy:  $r = .71$ ; environmental mastery:  $r = .80$ ; personal growth:  $r = .64$ ; positive relations:  $r = .71$ ; purpose in life:  $r = .59$ ; and self-acceptance:  $r = .59$ ).

*Psychological-mindedness.* Psychological-mindedness is defined as the "degree to which an individual is interested in, and responsive to, the inner needs, motives, and experience of others" (Gough, 1964, p. 11). The construct of psychological-mindedness seems very similar to sagacity or intuition and exceptional understanding, which are major components in lay theories of wisdom (e.g., Holliday & Chandler, 1986; Sternberg, 1990a). Psychological-mindedness was assessed by a subscale of the California Personality Inventory (CPI; Gough, 1964). Participants responded with yes or no to the 22-item German version of the psychological-mindedness subscale (Weinert, Streufert, & Hall, 1982).

#### *Measures of the Interface Between Personality and Intelligence*

To mark this domain of psychological functioning, three areas were considered: (a) social intelligence, (b) creativity, and (c) cognitive style.

##### *SOCIAL INTELLIGENCE*

Two measures were selected to represent two distinct aspects of social intelligence: social-cognitive strategies and social behavior. The social-cognitive strategies di-

mension was assessed with the Sternberg Social Intelligence Scale (Barnes & Sternberg, 1989). The social behavioral aspect of social intelligence was assessed with the Amelang Social Intelligence Scale (Amelang, Schwarz, & Wegemund, 1989).

Sternberg's social intelligence scale was developed to assess the accuracy with which people decode social information (Barnes & Sternberg, 1989). The 13-item scale used in the present study was translated into German from the scale reported by Barnes and Sternberg (1989). The five-point Likert-type items (1 = *very seldom*, 5 = *very often*) were derived from previous studies of people's implicit theories of social intelligence.

The Amelang social intelligence measure was developed using the act frequency approach (Buss & Craik, 1983). Participants were asked to indicate on a five-point Likert-type scale (1 = *very seldom*, 5 = *very often*) how often they engaged in each of 40 behaviors. These behaviors had been nominated by participants of previous studies as being highly prototypical of social intelligence.

##### *CREATIVITY*

Creativity was assessed with three tests: Guilford's impossible figures test (Guilford, 1967), Torrance's plot titles, and Torrance's word ends tests (Torrance, 1974). For the word ends task, participants were given a word stem and asked to generate as many words ending in the stem as they could within 90 s. For the impossible figures test, participants were shown a picture in which strings tied clouds to the ground. They were asked to write down what would be the consequences of strings actually tying clouds to the earth. Participants had 4 min to complete the test. Finally, for the plot title test, participants read a brief paragraph and were then asked to generate as many plot headings and titles as they could within a 4-min time period. Each test was scored for fluency, flexibility, and originality according to Torrance's model of creativity, thus resulting in a total of nine creativity scores. Based on the results of factor analysis, these nine scores were reduced to one. The Cronbach  $\alpha$  of these nine scores was .84.

##### *COGNITIVE STYLE*

Two different measures were selected to capture the construct of cognitive style. The selection aimed at covering both the personality and the cognitive-behavioral side of the cognitive style construct (e.g., Sternberg, 1994).

*Sternberg thinking styles.* Sternberg's (1994, 1996) thinking styles represent a wide-ranging and flexible repertoire of intellectual styles that are seen as influencing adaptation, selection, and shaping of individual environments. In his theory of mental self-government, Sternberg defined 13 intellectual styles differing in (a) function

(legislative, executive, judicial), (b) form (monarchic, hierarchic, oligarchic, anarchic), (c) level (global, local), (d) scope (global, local), and (e) leaning (conservative, progressive). Sternberg's intellectual styles were assessed with a 104-item scale translated into German using a back-translation method for use in the present study. Each of the 13 intellectual styles was assessed by eight items. Responses were scored on a five-point Likert-type scale (1 = *very seldom*, 5 = *very often*). The intellectual styles had moderate to high internal consistencies, ranging from anarchic = .51 to conservative = .88, which are very similar to the reliabilities reported by Sternberg (1994, p. 184).

*Reflexivity/impulsivity.* Reflexivity/impulsivity was assessed with the adult form of Kagan's Matching Familiar Figures Test (MFF; Kagan et al., 1964). Participants were presented with a test picture. Their task was to choose which of 6 other pictures matched the test picture. Participants were shown 12 test pictures in all. The total number of correct identifications in relation to the average latency to their first response was used as the indicator of subject's reflexivity/impulsivity.

## RESULTS

To locate wisdom-related performance in the psychometric space between intelligence, personality, and their interface and to investigate its possible uniqueness, data were analyzed in four steps. To begin, we examined zero-order correlations. In a second step, we used backward regression models to determine the relationship between wisdom-related performance and the measures selected to mark the three domains of psychological functioning. Third, we used commonality analyses to isolate the unique and shared variance components of each domain of functioning (intelligence, personality, personality-intelligence interface) when considered simultaneously in their predictive relationship with wisdom-related performance. Fourth, we were interested in exploring to what degree wisdom-related performance exhibited measurement uniqueness.

### *Zero-Order Correlations Between Predictors and Wisdom-Related Performance*

After applying the Bonferroni correction for multiple testing, wisdom-related performance was significantly correlated ( $\alpha = 0.05$ ) with 11 of the possible 33 scales—specifically, (a) with 1 of 2 measures of fluid intelligence (APM,  $r = .29$ ) and both crystallized intelligence measures (vocabulary:  $r = .34$ ; practical knowledge:  $r = .24$ ), (b) with 3 of 12 measures of personality (personal growth:  $r = .29$ ; openness to experience:  $r = .42$ ; psychological-mindedness:  $r = .28$ ), and (c) with 6 of 17 measures of the interface between personality and intelli-

gence (cognitive styles: judicial,  $r = .25$ ; progressive,  $r = -.26$ ; conservative,  $r = -.36$ ; oligarchic,  $r = -.38$ ; and creativity,  $r = -.37$ ). For each of these 11 zero-order correlations, the direction of the correlation was in the direction suggested by our a priori theoretical analysis. Due to overlap in predictive variance, these zero-order correlations are less informative with respect to their absolute size than with regard to their pattern (see below).<sup>3</sup>

### *Multivariate Domain-Specific Relationships Between Wisdom-Related Performance and Predictor Variables*

The following analyses investigated the relationship between predictor variables and the overall wisdom-related performance score, separately for each of the three domains of predictor variables (i.e., intelligence, personality, personality-intelligence interface). This procedure permitted us to gain, first, multivariate information on the magnitude of the relationships as well as on the key variables involved in the production of these relationships. At the same time, the multiple regression models with backward elimination were used to identify for each domain of predictor variables the set of predictors with the least overlapping predictive variance.<sup>4</sup>

*Wisdom-related performance and intelligence.* Table 1 summarizes results for the intelligence-wisdom analysis. Results of this analysis indicated that all of the intelligence measures accounted for 16% of the variance in the aggregated wisdom-related score ( $R = .40$ ,  $p = .00$ ). Through the backward elimination procedure, the digit symbol substitution test and the practical knowledge test were dropped from the equation. Thereby, the multiple  $R$  was reduced to  $R = .39$  ( $p = .00$ ), and 15% of the variance in the wisdom-related performance score was still accounted for. This relationship was primarily due to performance in the APM ( $\beta = .19$ ,  $p = .03$ ) and the HAWIE vocabulary subtest ( $\beta = .29$ ,  $p = .00$ ). Participants with higher scores in the APM and the HAWIE vocabulary subtest tended to have higher wisdom-related scores.

*Wisdom-related performance and personality.* Similarly, the personality measures were entered into a multiple regression model with the overall wisdom-related score as the dependent variable. All personality measures explained a sizable 30% of the variance in the wisdom-related score ( $R = .55$ ,  $p = .00$ ). The backward elimination procedure showed that this relationship was primarily due to psychological-mindedness ( $\beta = .21$ ,  $p = .01$ ) and openness to experience ( $\beta = .37$ ,  $p = .00$ ). The more open and the more psychological-minded participants tended to have higher wisdom-related scores (see Table 1). After the other personality measures were dropped from the equation, the amount of variance



**TABLE 1: Backward Regression Models: Summary of Significant Predictors of Wisdom-Related Performance by Domain of Psychological Functioning**

Predictor Variable	Direction of Relationship	Zero-Order Correlation
<b>Intelligence</b>		
APM	+	.28
HAWIE vocabulary subtest	+	.34
<b>Personality</b>		
Openness to experience (NEO-PI)	+	.42
Psychological-mindedness (CPI)	+	.28
<b>Personality-intelligence interface</b>		
<b>Cognitive style</b>		
Judicial	+	.25
Conservative	-	-.36
Oligarchic	-	-.38
Monarchic	+	-.12
External	+	.10
Creativity	+	.37

NOTE: APM = Advanced Progressive Matrices; HAWIE = Hamburg-Wechsler Intelligenztest für Erwachsene; CPI = California Personality Inventory. Within each of the three domains, backward regression models were based on intelligence (4 tests, 4 measures), personality (3 tests, 13 measures), and the personality-intelligence interface (5 tests, 17 measures).

explained was nonsignificantly reduced from 30% to 23% ( $R = .48, p = .00$ ).

*Wisdom-related performance and the interface measures.* Finally, the interface measures were entered into a multiple regression model. In total, all 17 interface measures explained 40% of the variance in the wisdom-related performance score ( $R = .63, p = .00$ ). After applying backward elimination, 35% of the variance in the wisdom-related score ( $R = .59, p = .00$ ) were still accounted for by 6 of the interface measures ( $R = .59, p = .00$ ): external ( $\beta = .18, p = .03$ ), conservative ( $\beta = -.24, p = .02$ ), oligarchic ( $\beta = -.35, p = .00$ ), monarchic ( $\beta = .2, p = .05$ ), judicious ( $\beta = .16, p = .05$ ), and creativity ( $\beta = .27, p = .00$ ). Persons who tended to have higher wisdom-related performance scores were those who had reported a cognitive style that can be characterized by being oriented toward others and being sensitive toward their needs; by knowing about priorities rather than pursuing many things at once; by judging, evaluating, and comparing; and by being creative.

In sum, when examining the relationships between all 33 predictor variables and wisdom-related performance separately by domain (intelligence, personality, personality-intelligence interface) by means of separate regression models, the results demonstrated (a) the existence of significant relationships between each of the three domains and wisdom-related performance; (b) differences in the magnitude of these relationships, with the personality-intelligence-interface measures exhibiting the highest covariation; and (c) the presence of meaningful and theory-consistent predictor variables. Thus,

the size of overall relationships between wisdom-related performance and the three respective domains as well as the predictive directional pattern within each domain were consistent with our predictions.

*Locating Wisdom-Related Performance in the Psychometric Space of Intelligence, Personality, and Their Interface*

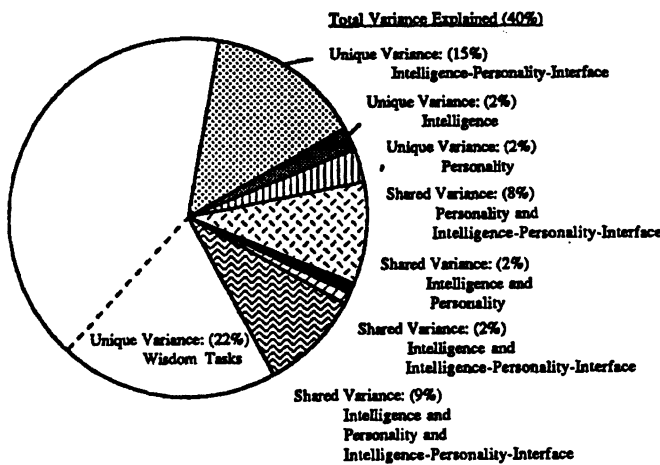
The last set of analyses was aimed at a more specific test of our hypotheses. For this purpose, we performed hierarchical regression to serve as a basis for commonality analyses including at the same time predictor variables from all three domains. We selected commonality analysis as an analytic technique because it permits conclusions about shared and unique predictions (e.g., Hertzog, 1989; Pedhazur, 1982). This is not possible when using partial correlations. Overlapping variance in the predicting variables was reduced by using the results of the regression models with backward elimination. To perform these analyses with a reasonably small set of predictors, 10 scales (2 intelligence measures: APM, HAWIE vocabulary subtest; 2 personality measures: openness to experience, psychological-mindedness; 6 interface measures: creativity, cognitive styles—judicious, conservative, monarchic, oligarchic, external; see also Table 1) of the 33 predictor variables were entered in the final analyses. Analyses with the complete set of predictors were also computed and are reported in Note 5.

The three sets of measures were always entered as a block, which resulted in six models of differing sequence to provide the information necessary for commonality analysis (e.g., Pedhazur, 1982). The results of these six models were used to compute the common and unique shares of predictive variance. The findings are summarized in Figure 1. Of the total variance in the wisdom-related performance score, 40% could be explained by the 10 predictors (derived from six instruments) selected from the three domains of functioning.

The personality-intelligence-interface measures accounted for the largest share of unique variance in wisdom-related performance—that is, 15%. The intelligence and personality measures uniquely accounted for 2% each. Both personality and intelligence did not uniquely account for a significant proportion of variance in wisdom-related performance. Further, there was substantial overlap between the three respective domains of functioning. All three domains of functioning shared 9%. The personality and the interface measures uniquely shared 8% of the variance, intelligence and interface measures uniquely shared 2%, and personality and intelligence measures uniquely shared 2% of the variance.<sup>5</sup>

These commonality analyses based on the 10 selected predictors from all domains defining the measurement





**Figure 1** The psychometric location of wisdom-related performance: Unique and shared portions of predictive variance of measures of intelligence, personality, and the personality-intelligence-interface (based on commonality analysis).

NOTE: The estimated unique variance component of wisdom-related tasks refers to the average of the three predictive equations presented in Table 2.

space of the present investigation demonstrated the following. The prediction of wisdom-related performance by measures of intelligence, personality, and the personality-intelligence interface covered about half of the variance in wisdom-related performance. Beyond the predictive variance carried by each of the domains when considered by themselves, we found (a) that intelligence and personality revealed no significant unique prediction when considered in concert with the other domains and (b) that the personality-intelligence-interface measures provided the only significant share of unique predictive variance.

*Measurement Uniqueness of Wisdom-Related Performance*

A further analysis concerned the relative uniqueness of our measure of wisdom-related performance. Pursuing this question was possible because about half of the reliable variance in wisdom-related performance remained unaccounted for. Thus, we asked whether an increase in accounted variance would be obtained if additional tests of wisdom-related performance were to be introduced into the prediction equation after all 33 predictor variables were considered. An approximation to this latter strategy of testing the relative uniqueness of wisdom-related performance was possible by decomposing the overall wisdom-related performance score into the three wisdom-related tasks (tests) used in this study.

Specifically, we conducted two additional analyses. The first served as a baseline of comparison. All 33

**TABLE 2: Relative Uniqueness of Wisdom-Related Performance: How Much Variance Is Uniquely Predicted by Different Wisdom-Related Tasks?**

Predictor Variable	Wisdom-Related Task 1	Wisdom-Related Task 2	Wisdom-Related Task 3
33 measures entered first	37%	50%	45%
Two wisdom-related tasks entered last	7%	24%	25%
10 measures entered first	23%	38%	33%
Two wisdom-related tasks entered last	12%	26%	27%

NOTE: The three wisdom tasks served separately as criterion, with the two remaining wisdom tasks being entered last in the prediction equation. Likely because of lesser reliability, the overall predictive power for separate wisdom-related tasks is smaller than when all wisdom tasks are used as an overall wisdom-related performance score. Prediction of the overall three-task wisdom score was 40% (10 predictors) and 51% (33 predictors).

measures were entered into a multiple regression equation with the overall wisdom-related score as the criterion variable. The results showed that 50% of the variance of the overall wisdom-related performance score was accounted for ( $R^2 = .71, p = .00$ ). A total of 50% of the variance of the wisdom-related performance score remained unexplained. When the analysis with 33 measures is performed separately for each of the three wisdom-related tasks, 23%, 38%, and 33% of the variance were accounted for, respectively. Table 2 summarizes these findings.

The second analysis examined measurement uniqueness separately for each of the three wisdom-related tasks. Specifically, we addressed the question whether, after all 33 measures were entered into the equation, the remaining two wisdom tasks would account for a significant, additional amount of variance. Thus, three additional stepwise regression models were performed. When wisdom-related performance in the first wisdom-related performance measure (suicide task) was predicted, the other two wisdom-related task scores added 7% predictive variance. When wisdom-related performance in the second wisdom-related task (meaning-of-life task) was predicted, 24% additional variance was explained by the other two wisdom-related tasks. And finally, when the third wisdom-related performance (family task) was predicted, the other two wisdom-related scores predicted an additional 25%. Note that this applied after all the other 33 measures had been considered (see also Table 2).

Table 2 also lists the results for the same analyses with only the 10 measures (from six tests) selected by the backward regression models. The findings show on one

hand that the amount of variance explained by the 10 measures is smaller (23%, 38%, and 33%, respectively) than the amount explained by the 33 measures (37%, 50%, and 45%, respectively). On the other hand, the unique shares of variance predicted by the two wisdom-related tasks entered last remained similar. This finding seems to indicate that the reduction in number of measures to 10—for reasons of statistical power—did not put the three domains of predictor variables at a disadvantage in terms of capturing wisdom-related variance.

## DISCUSSION

In the present study, we investigated the location of a measure of wisdom-related performance derived from a psychological theory of wisdom (e.g., Baltes & Smith, 1990; Staudinger & Baltes, 1994) in the psychometric space defined by standard measures of intelligence, personality, and the interface between intelligence and personality.

We pursued four main questions. First, we expected significant relationships between each of the three domains of psychological functioning (intelligence, personality, and personality-intelligence interface) and our measure of wisdom-related performance. However, second, based on theoretical and empirical evidence, we assumed that measures of personality and of the personality-intelligence interface should be more strongly related than measures of intelligence. Third, theory-guided specific predictions were made with regard to individual measures within each of these domains of psychological functioning. Fourth, we predicted that none of the constructs selected, if considered separately, would cover the constellation of psychological functioning indexed by our measure of wisdom-related performance. Even when all measures or constructs are considered jointly, we expected that our measures of wisdom-related performance would still demonstrate some degree of measurement uniqueness.

### *Overall Psychometric Location of Wisdom-Related Performance*

A substantial amount of the variance in our measure of wisdom-related performance (40% out of 100%) was explained by the combination of measures indexing the three domains of psychological functioning. All three domains of functioning contributed to that prediction. In general, results of the commonality analysis yielded a picture of much shared variance between the three domains when it came to predicting wisdom-related performance. For instance, 9% of variance were shared by all three domains of functioning, and personality measures had 9% of predictive variance in common with the interface measures. However, as indicated in our second hypothesis about the relative predictive strength of the

three domains of intelligence, personality, and the personality-intelligence interface, we found that, indeed, the measures of the personality-intelligence interface contributed the largest unique share of variance (15%). After accounting for overlap in the predictions of the three domains, neither the personality measures nor the intelligence measures contributed a significant unique share (2%).

In our view, these results indicate that wisdom-related performance, as we have construed it, is not just another measure of cognitive ability or a measure that exclusively focuses on the cognitive side of wisdom as some authors have claimed about our approach to wisdom (e.g., Chandler & Holliday, 1990, pp. 127, 129). Rather, the commonality analysis demonstrated just the opposite. Our conception of wisdom-related knowledge and judgment and its operationalization is more closely related to measures of personality and of the personality-intelligence interface than to intelligence. Given the heterogeneity of the present sample, it is unlikely that this result is due to a limited range of intellectual abilities.

### *Specific Results With Regard to the Prediction of Wisdom-Related Performance*

In a further set of hypotheses, we predicted, based on our theory and on findings from studies of lay conceptions of wisdom, relationships between specific measures within each of the three domains of functioning and wisdom-related performance. As we interpret the findings, we need to note our inclination to view the predictor variables as antecedent conditions of wisdom-related performance. In principle, however, the predictive relationships identified signify any of three kinds: antecedents, correlates, or consequences.

*Intelligence and wisdom-related performance.* As expected, each of the two components of the mind—the mechanics and the pragmatics—was related to higher wisdom-related scores. Tests indexing the pragmatics of the mind (i.e., verbal ability, practical knowledge), however, showed a somewhat stronger connection. This is in line with our conception of wisdom as a prototypical construct of the pragmatics of the mind (Baltes et al., 1984; Baltes & Staudinger, 1993).

If one acknowledges that the ability to draw analogies and inferences is an important facet of dealing with and judging wisely about a given life problem (e.g., Assmann, 1994), the predictive power of the APM appears theory consistent. Thus, as hypothesized, basic functioning of the cognitive mechanics is a fundamental precondition for starting to gain insight into and to make judgments about difficult and uncertain life dilemmas. Similarly, the predictive power of the HAWIE vocabulary subtest and the practical knowledge test can be seen as consistent with the view that semantic knowledge is important

when engaging in wisdom-related behavior, such as learning about life, communicating about life, and giving advice (e.g., Chandler & Holliday, 1990; Staudinger & Baltes, 1994; Sternberg, 1990a). In other work, we have shown that although verbal ability is significantly correlated with wisdom-related performance, it does not preempt our measure (e.g., Baltes et al., 1995; Smith et al., 1994; Staudinger, 1989; Staudinger & Baltes, 1996; Staudinger et al., 1992). When controlling for verbal ability, theoretically predicted group differences were preserved.

*Personality and wisdom-related performance.* In the personality domain, openness to experience and psychological-mindedness emerged as the strongest predictors of wisdom-related performance in the backward regression analysis. When we also consider the zero-order correlations (Bonferroni corrected), the dimension of personal growth also showed a significant relationship.

In our theoretical conception of correlates of wisdom-related knowledge and judgment, openness to experience plays an important role (cf. Baltes & Staudinger, 1993). This is based on the argument that if a person remains open-minded and continues to take in new information and experiences, it is possible to refine knowledge and insights and update knowledge about the fundamental pragmatics of life. But also notions of personality growth, such as reflected in Erikson's theory of personality development (e.g., Erikson et al., 1986), are considered in our model of antecedents of wisdom when it comes to person characteristics that are specific to the domain of the fundamental pragmatics of life and not primarily reflective of general adaptive functioning. The positive relationship between personal growth and wisdom-related performance can be taken as empirical evidence supporting models of personality development such as Erikson's. In his theory, Erikson clearly relates the notion of wisdom with the maturation of character.

The high predictive power of psychological-mindedness reflects another aspect of wisdom-related knowledge and judgment that we stress in our conceptualization and operationalization. Psychological-mindedness is meant "to measure the degree to which the individual is interested in, and responsive to, the inner needs, motives, and experiences of others" (Gough, 1964, p. 11). The strong predictive and positive relationship of psychological-mindedness and wisdom-related performance seems to indicate that high scorers in wisdom-related performance also have a higher interest in understanding psychological phenomena within themselves and others. This kind of curiosity and insight has been shown to be an important facet in lay theories about the characteristics of a wise person (e.g., "except-

tional understanding," Holliday & Chandler, 1986; "sagacity," Sternberg, 1990a).

*The personality-intelligence interface and wisdom-related performance.* It was surprising to us that neither of the two social intelligence measures emerged as a strong predictor of wisdom-related performance. Certainly, this could be due to the operationalization of social intelligence chosen in the present study. Also, the argument again applies that this might be due to shared variances within an ensemble of measures representing a domain. However, this lack of a significant relationship between social intelligence and wisdom-related performance could also be interpreted to imply that wisdom-related performance is less dependent on efficient strategies of social interaction than on their content—that is, on the value orientation underlying those interactions (i.e., toward the good of others).

The strong predictive contribution of the creativity measure to wisdom-related performance seems to suggest that deep insight and good judgment with regard to difficult life problems require at least a certain degree of creative potential. In the wisdom literature, moving beyond the given or outside of the system defined by the given problem situation is often described as a central feature of a wise solution (e.g., Assmann, 1994). The predictive power of creativity also suggests that wisdom-related knowledge and judgment is not, as sometimes suspected, conservative in nature (e.g., Hahn, 1991). Rather, at least when seen in the present context of measuring wisdom-related performance, persons with high scores are also those who have the potential to be innovative and to move beyond the given. This interpretation finds further support in the evidence concerning the relationship between wisdom-related performance and cognitive style, as discussed next.

When it comes to cognitive style, it should first be noted that wisdom-related knowledge and judgment was related to a distinct profile of cognitive style as measured by the Sternberg inventory. No relationship was found, however, with the classical performance indicators of cognitive style in the sense of reflexivity and impulsivity (Kagan et al., 1964). This lack of relationship might be due to the fact that the Matching Familiar Figures Test focuses on the interplay between speed and accuracy of response behavior. In our measure of wisdom-related performance, however, the time-accuracy trade-off is not evaluated as participants respond under power conditions.

The profile of mental self-government (Sternberg, 1994, 1996) obtained in the present data to a large degree matched our theoretical conception of wisdom. A higher score on the wisdom-related performance was related to the judicial function of mental self-government—that is, to judging, evaluating, and

comparing. Furthermore, higher wisdom-related performance was negatively related to the oligarchic form of mental self-government, which reflects the experience of tension and conflict between multiple goals. This fits the notion that a wise person should be able to pursue multiple goals without getting lost or losing sight of priorities. Finally, people with higher wisdom-related scores did not report a cognitive style labeled as conservative—that is, adhering to existing rules, minimizing change, and avoiding ambiguous situations. Rather, such participants reported a progressive style that implies moving beyond existing rules and being tolerant of ambiguous situations. As expected, the distinction between internal and external scope of mental self-government did not differentiate high from low wisdom. Again, a wise person may have a more dialectical than an either-or approach to such matters.

*Is There Uniqueness to Our Measure of Wisdom-Related Performance?*

Finally, we found solid evidence that besides the theory-consistent and substantial relationship with measures of intelligence, personality, and the personality-intelligence interface, our measure of wisdom-related performance also holds uniqueness. None of the individual measures by themselves accounted for more than 18% of the variance. In other words, none of these measures captured more than about one fourth of the predictive variance in wisdom-related performance.

This conclusion is further supported by the fact that even after entering all 33 predictors into the prediction equation, 49% of its variance was not accounted for. Furthermore, if individual wisdom-related tasks served as criterion, then the other two wisdom tasks still accounted for additional significant variance (7%, 24%, and 25%) after the other 33 measures had “occupied” their share of variance. Thus, wisdom-related performance, as we have construed it, seems to possess enough uniqueness to recommend itself as a construct in its own right.

This uniqueness apart from measures of intelligence, personality, and the personality-intelligence interface, however, leaves open the question of further construct validity of this share of variance in the wisdom-related performance scores. From past research, we have an indication (Baltes et al., 1995; Smith et al., 1994; Staudinger et al., 1992) that exposure to rich experiences and guided practice in the domain of the fundamental pragmatics of life are related to higher levels of wisdom-related performance. Furthermore, we assume that post-formal types of reasoning and certain self-regulatory processes such as coping behavior or self-verification tendencies may cover another portion of what has been

identified as unique in the present study. In future work, it will be interesting to try to integrate these different groups of predictors into one study.

CONCLUSION AND OUTLOOK

Before offering a set of conclusions, we want to emphasize possible limitations of this study. To start, there is the issue of our measurement approach to wisdom-related performance. As amply documented in Sternberg (1990b), there is no general agreement on the definition and measurement of wisdom. In fact, for many researchers, wisdom is unequivocally an “illusory” concept that defies empirical scientific inquiry (Baltes & Smith, 1990, p. 89). Our approach is the only one that we know of that attempts to quantify wisdom as an expertise in the domain of the fundamental pragmatics of life. Of course, once other operationalizations of the behavioral assessment of wisdom are advanced, it will be interesting to see their empirical relationships to intelligence, personality, and the personality-intelligence interface and to explore whether they differ from the present ones.

Regarding the specification of the psychometric space, we need to be cautious as other researchers may have opted for different measures. Therefore, our conclusions about “intelligence, personality, or more?” need to be seen in the light of the three domains selected as predictors and the instruments chosen to represent these domains. Someone interested in a multifactor theory of intelligence (e.g., Horn & Hofer, 1992), for instance, might claim that such a measurement approach to intelligence would have produced a higher prediction of wisdom-related performance than is evident in the present data set using a two-factor model of intelligence. Similar arguments could be advanced for the domains of personality and the personality-intelligence interface. For example, in the personality realm, models other than the Big Five or the growth approach have been discussed. Cloninger’s psychobiological model, for instance, aims at combining dimensions of temperament and character in the study of personality (e.g., Cloninger, Svrakic, & Przybeck, 1993).

In a similar vein, it can be seen as a limitation of the present study that we confined this first approach to the psychometric localization of our measure of wisdom-related performance to standard measures of intelligence, personality, and their interface. It seemed important to us to first establish this new measure with regard to long-standing and widely used measures in the fields of intelligence, personality, and their interface. That way, however, other factors of potential relevance to the accumulation of wisdom-related performance such as life experiences and their interpretation as well as self-

regulatory processes were saved for inclusion in future studies.

Finally, another methodological issue concerns a possible method-of-assessment and level-of-analysis confound. Our measure of wisdom-related knowledge and judgment is performance based (thinking aloud in response to a life problem). Most of the personality and interface measures are based on self-report. It may be that a more performance-based assessment of the same personality and interface constructs (psychological-mindedness, openness to experience, etc.) would yield different and higher relationships with our measure of wisdom-related performance than obtained in this study.

These methodological limitations aside, we suggest that the present study has provided promising first evidence on the psychometric location of a measure of wisdom-related performance. Wisdom-related performance showed meaningful overlap with existing measures of personality, intelligence, and their interface and at the same time enough uniqueness to justify the introduction of a new construct. Consistent with our theory, the results suggested that our measure of wisdom-related performance indexes a specific configuration of intellectual and personality-related functioning. A hybrid of intellectual and personality-related abilities and characteristics, rather than one or the other alone, seems to be related to higher levels of wisdom-related performance.

## APPENDIX

### Wisdom-Related Tasks: Problem Texts and Illustrations From Top Responses

#### *Suicide Problem*

Somebody gets a phone call from a good friend who says that he/she cannot go on anymore, that he/she has decided to commit suicide. What should one/the person do and consider?

*Illustrative excerpt from a high-score response.* On one hand, this problem has a pragmatic side—one has to react one way or other. On the other hand, it also has a philosophical side—whether human beings are allowed to kill themselves, etc. . . . First, one would need to find out whether this decision is the result of a longer process or whether it is a reaction to a momentary life situation. In the latter case, it is uncertain how long this condition will last. There can be conditions that make suicide conceivable. But I think no one should be easily released from life. They should be forced to “fight” for their death if they really want it. . . . It seems that one has a responsibility to try to show the person alternative pathways. Currently, for example, there seems to be a trend in our society that it becomes more and more accepted that old people commit suicide. This can also be viewed as dangerous. Not because of the suicide itself but because of its functionality for society.

#### *Meaning-of-Life Problem*

In reflecting over their lives, people sometimes realize that they have not achieved what they had once planned to achieve. What should one/they do and consider?

*Illustrative excerpt from a high-score response.* First, I would want to say that only very few and most likely uncritical people would say that they are completely satisfied with what they have achieved. . . . It depends very much on the type of goals we are considering, whether they are more of the materialistic or more of the idealistic kind. It also depends on the age of the person and the life circumstances in which he/she is embedded. . . . Next, one would start to analyze possible reasons for why certain goals were not attained. Often, it is the case that multiple goals were pursued at the same time without setting priorities and, therefore, in the end, things get lost. . . . It is important to gradually become realistic about goals. Often, it is helpful to talk to others about it. . . . Conditions external and internal to the person or sometimes it is also the match between the two that can lead to difficulties in life.

#### *Family Problem*

A 14-year-old girl absolutely wants to move out of her family home immediately. What should one/she do and consider?

*Illustrative excerpt from a high-score response.* First, I would ask why it is that the girl wants to move out. There can be reasons like violence or abuse, but it can also be more emotional reasons due to adolescence. If it is the case that there are real problems at home, it depends on their severity. There can be cases where it is absolutely necessary to help the girl to move out right away. . . . But in the case of emotional disturbances on the part of the girl, I would first try to talk to the girl and the parents as well. If no compromise can be reached, one could also think about a temporary separation. Often, time helps. . . . Any solution to the problem needs to take into account that circumstances and attitudes are likely to change and that modification after a certain amount of time should be possible. . . . One also has to consider that these things become fads among teenagers. . . . Also, times have changed, and girls at 14 nowadays are more grown up than girls at 14 twenty years ago.

## NOTES

1. Eight years of school attendance are mandatory in Germany.
2. During the second session, subjects also participated in another study in which they received experimental manipulations. To determine whether subjects, who were randomly assigned to experimental conditions, differed systematically in their level of wisdom-related performance (despite random assignment), analyses were conducted to assess whether experimental groups differed significantly with regard to their level of performance in Session 1. Analyses revealed no Subject  $\times$  Treatment interaction,  $F(4, 120) < 1, ns$ . All standardizations of subjects' wisdom-related scores derived from the second session were conducted within experimental condition.
3. If the zero-order correlations are computed separately for the three wisdom-related tasks (averaged across criteria) and for the five

wisdom-related criteria (averaged across tasks), the overall relational pattern is highly similar.

4. For cross-validation purposes, the same analyses were run not only for the overall sample but also for the randomly split sample. The same pattern of results was obtained.

5. When the commonality analysis was computed for the whole set of predictors (33 variables), the basis pattern of result stayed the same. In total, 51% of the variance in the wisdom-related score was explained. The total amount of variance explained was divided up in the following manner: intelligence-personality interface measures (unique) 18%, intelligence (unique) 5%, personality (unique) 6%, personality and interface measures (shared) 9%, intelligence and personality (shared) 1%, intelligence and interface measures (3%), and intelligence and personality and interface measures (shared) 9%. Also, no significant differences were found when gender and age were controlled for.

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