

Helsinki University of Technology
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CONSTRUCTION AND VALIDATION OF A WORK PERSONALITY INVENTORY

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ABSTRACT

In comparison to currently popular traits as descriptors of personality, other variables such as motives and cognitive styles deserve more attention, particularly in research related to the work life. While observable traits, the “Big Five” framework has caused a renaissance in personality and test development, other factors of personality have resided in shadow. Work comprises functions with processes that span way beyond what can be described by observable traits and appropriate measurement instruments are in call. The present paper describes an effort to develop a personality inventory to measure a multifactor set of personality for work settings. First, work was categorized along five work functions. Then, function-based constructs and measurement scales were defined for the three categories of personality factors, i.e., motives, cognitive styles and attitudes. Finally, lengthy item analyses were performed on the altogether fourteen self-report scales. Reliabilities were computed and validity was studied with peer and spouse ratings as criteria. Construct validity was studied through the scales’ relationships to a wide set of acknowledged personality and work behaviour measures. The resulting validity evidence conveys substantial validity and promise for the inventory as an instrument for research and application in work settings.

THE MULTIPLICITY AND RICHNESS OF PERSONALITY FACTORS

The variety of factors in personality is evident in both traditional and modern definitions. Allport (1937) distinguished between expressive-stylistic traits and motivational or “telic” traits. McClelland (1951) presented a trichotomy of traits, attitude-schemas and motives as basic factors of personality. Cattell (1965) classified the main personality factors of cognitive-ability traits, temperament-stylistic traits and dynamic traits. Guilford (1975) presented a distinction of temperament traits, motivational traits and attitudes. Among more recent scholars, Winter (1996) divides personality into four different elements: motives, traits, cognitions and social contexts. Funder (1997) relates personality to individuals’ characteristic patterns of thought, emotion and behaviour. Finally, McAdams lays out observable traits, personal adaptations and socio-culturally ingrained identities as different levels of personality (McAdams, 1995, 2001).

Despite the proposed variety of personality factors, traits have throughout time occupied a dominant position as units of personality research and the current strong position of the “Big Five” traits is evident in the claim for their cultural universality (McRae & Costa, 1997). In comparison, motives and emotional factors have attracted only moderate research interest occurring primarily within the clinical field of personality. Cognitive styles have remained in a shadowy position within mainstream personality research despite the steady interest enjoyed in educational psychology (Messick, 1976, 1984). Attitudes, not frequently viewed as factors of personality, have remained in a clearly peripheral position.

The success of traits may be explained by their conceptual simplicity being originally introduced as statistical clusters of behaviour descriptors coded in everyday language (Cattell, 1957; Norman, 1963). Traits’ conceptual properties have since been widened although they remain on a more atheoretical position compared to the other less popular factors of personality. The other factors, such as motives, cognitive styles and emotions derive often from research traditions independent of personality and thereby offer excellent avenues to construction of theory-based (Burisch, 1984) scales.

Personality inventories are relatively rare in number. Because of their claim of delivering comprehensive depictions of personality, inventories must be based on some overall theory or conception of personality. The conceptual challenge together with vast empirical effort required to devise an omnibus measurement instrument explain this rarity in number. With the exception of the proliferation of Big Five

inventories all over the world during the last two decades, comprehensive personality inventories tend to emerge and attain established position with the pace of one rather than many in a decade. As stated in the previous, the vast majority of currently used personality inventories draw upon the trait concept, either the Big Five framework or some other general trait conception of personality.

Traits as behavioural summaries have proven their ability to predict behaviour and performance across many life domains and across cultural contexts (McRae & Costa, 1997). Traits are behaviour summaries that function as probabilistic statements, i.e., draw upon observed regularities as predicates for future behaviour (Loevinger, 1984). In contrast, motives and cognitive styles are purposive-cognitive factors, causal agents related to behaviour through conjunctions to other premises (Buss & Craik, 1984). The promise of such factors is in predicting responses that are not explicable or predictable from traits. Using both factors as predictors, Winter and colleagues have shown how traits and motives yield complementary information on individuals (Winter et al., 1998). Today's post-industrial workplace presents itself as complex and multifaceted which require maximally broad coverage of related psychological processes. Concepts such as lifelong learning and multimodal careers call for motivational analysis, while "information economy" emphasizes more attention to cognitive factors in personality.

Among the established non-trait inventories currently in use, three endorse Henry Murray's (1938) taxonomy of motivational needs: Edwards' Personality Preference Schedule (Edwards, 1959/1985), Jackson's Personality Research Form (Jackson, 1967/1999) and Gough & Heilbrun's Adjective Check List (Gough & Heilbrun, 1965/1983). To the authors' best knowledge, only one published, scientifically established inventory measures cognitive styles, the Myers Briggs Type Indicator (Myers & McCaulley, 1993) which is based on Jung's theorizing on psychological types (Jung, 1923/1971).

It is worth noting that all these self-report personality inventories limit their attention to one factor category, be it needs, motives or cognitive styles. Therefore, they perform inventories of personality within one factor instead of different categories of personality factors. Finally, none of these well-known inventories make the claim for targeting specifically on work settings. Instead, they have been devised as general purpose instruments to be used in educational, clinical, counselling settings which make them less optimal in addressing work behaviour. True, the last two decades have seen the birth and prominence of two personality inventories particularly developed for the work life, namely the Occupational Personality

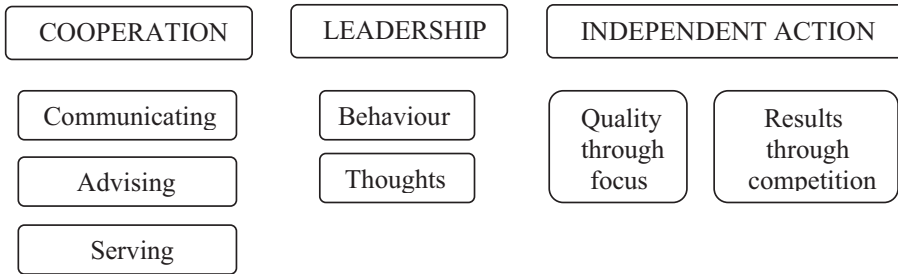
Questionnaire (SHL, 1999) and the Global Personality Inventory (Schmit et al., 2000). However, both of these have been developed within the context of general trait framework of personality. We set out to devise an inventory for measurement of work related personality factors across motive, cognitive style and attitude categories. Our explicit goal was to cover the “multifactorial” personality in all its richness. To the best of the authors’ knowledge, no such inventory has yet been published.

FIVE WORK FUNCTIONS

Functional Job Analysis (FJA; Fine & Cronshaw, 1999) is a job analysis method where tasks in all jobs can be described through broad functions such as Things, Data and People. Instead of detailed listings of task activities performed within such functions, we defined three main work functions referring to broad behaviours that people perform universally at work. In contrast to FJA’s primary focus on jobs, we pursued a descriptive framework which could be applied simultaneously to jobs and people. We term the three main functions as action, planning and problem solving and viewing. Conceptually they resemble natural categories (Rosch, 1973) which is apparent in their simplistic content: people act to accomplish things; they plan and solve problems and they form views about the environment and themselves.

Action obviously covers a very broad area of behaviour and we subdivided it into three sub-functions of independent action, leadership and cooperation. Namely, things are accomplished in all jobs through these three action function. The functions are defined by their inherent goal and attendant behaviour. Hence, independent action has two goals as basis for differential description of jobs and people. In some jobs (people) independent action has quality attainment as its main goal. Quality is attained through people’s focused action. In other jobs (people) independent action has attainment of (quantitative) results as its main goal. Results are attained through competitive action. Similarly, the leadership function is divided by two different goals and related behaviours. In some jobs (people) leadership of others’ behaviour is the main goal. This is attained through direct, operative leadership actions so as to make other people behave in desired ways. In other jobs (people) the main goal is leadership of other people’s thoughts. This is attained through indirect, inspirational actions so as to lead other people’s thinking towards some end. The third action function, cooperation is divided into three different actions, communicating, advising and serving. See figure 1 showing the three action functions at work.

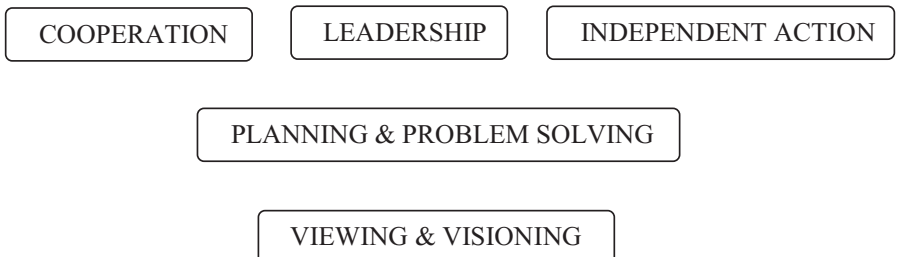
Fig.1 Three action functions and behaviours



In addition to action, we posited planning and problem solving as the second main function of work. In other words, all jobs involve planning and problem solving and all people plan and solve problems. We started out with a tentative notion of planning and problem solving as a process. Work has generally moved from mechanistic and piecemeal operations towards wider-spanning contents and longer time frames. Along this line of development, planning and problem solving has become more process-like, composed of inter-related phases that span over long time periods and allow iterative correction. Such process emphasizing view of planning and problem solving also enables developmental interventions at different waypoints. In regard to the third main function, formation of views and visions, we proposed three independent viewings as important in work settings. Because today's work environment is growingly ambiguous and changing we chose viewing of environmental ambiguity and change as our first option. This category of the viewing function can be used in description of jobs and people at the same time. The two remaining categories of viewing are more concerned with description of people rather than jobs. We set upon the general expectancy of success and perception of self as important psychological categories of viewing in today's work life.

Figure 2 shows all the five functions of work.

Fig.2 Five functions of work



Function-driving personality constructs

What kind of personality constructs might function as psychological organizers or “drivers” of action, planning and problem solving and viewing at work? Motivation emerged as the natural choice for the driver of action (independent action, leadership and cooperation). According to the classical notion, motivation refers to variables that activate, orient and direct behaviour (Madsen, 1959; McClelland, 1985; Cofer, 1985). Motives are about wanting something and, at work they may be viewed as addressing the question what the individual wants to do. Cognitive styles in turn seemed the obvious choice to function as drivers of planning and problem solving. Cognitive styles are defined as individually characteristic modes of processing information (e.g., Sternberg & Grigorenko, 1997). The educational psychologist Samuel Messick conceptualizes cognitive styles explicitly as organizers of “lower order” categories such as abilities, problem solving and learning (Messick, 1984). Because planning and problem solving occur typically in process form, we wanted the process quality to be represented in our chosen set of driver constructs. Attitudes, commonly defined as individuals’ ways of disposing towards objects or state of affairs in the environment or oneself (Allport, 1935; Eagly & Chaiken, 1993), appeared as our choice to serve as the organizer of viewing at work.

MOTIVES AS DRIVERS FOR ACTION FUNCTIONS

Henry Murray’s (1938) taxonomy of motivational needs or motives served as our main source in the search for constructs that drive action functions: independent action, leadership and cooperation. The taxonomy includes about thirty psychological (“psychogenic”) needs or motives (need for achievement, affiliation, etc.) that have wide consequences to humans’ psychological and social functioning. The taxonomy has provided a rich source for construction of self-report scales and inventories in personality psychology and the achievement motive alone has stimulated construction of more than 70 published scales (Ray, 1986). Several general personality inventories based on Murray’s taxonomy rank among the most frequently cited tests in personality psychology, e.g., Edwards’s Personal Preference Schedule (Edwards, 1959/1985), the Adjective Check List (Gough & Heilbrun, 1965/1983) and the Personality Research Form (Jackson, 1967/1999). As mentioned, there exists no published self-report inventory based on Murray’s taxonomy that was specifically

constructed for work settings. Murray's taxonomy has also served as the beginning point for his student's, David McClelland's seminal work on achievement and other motives and measurement in thematic narratives, such as the Thematic Apperception Test (McClelland et al., 1953; Smith, 1992).

Independent action. In regard to identifying specific drivers for independent action, our fairly straightforward choice was on the widely studied achievement motive. We decided to endorse McClelland's simple definition of the achievement motive as a concern for "doing something better" (McClelland et al., 1953; McClelland, 1985). Review of the numerous published achievement scales shows quickly the wide variation in scale content. Jackson and Healy (1976) have identified at least five content facets that appear in different published achievement scales. What is more, content domains such as competition, risk-taking and high aspiration, and on the other hand such facets as sustained effort, persistence and perfection often appear intermingled in single achievement scales. Guided by our initial notion that in the work life independent action at work comprises two distinct motivational categories, i.e., quality and results orientation, we set out to define two different achievement motives, coined focused and competitive achievement. *Focused achievement (fo)* is doing something better by focussing on the task at hand for the purpose of attaining quality. Sustained focus, persistence until full completion of task is presumed to produce quality and perfection. There was no direct counterpart for this achievement construct in Murray's taxonomy. Our *Competitive achievement (co)* construct is closer to Murray's need for Achievement (need to accomplish difficult tasks) although we wanted to further underscore the competitive element in the construct. Therefore, we defined Competition as a concern for doing something better by competing with others and self, for the purpose of breaking records and turning out maximal results.

Leadership. The second action category performed at work is leadership of others. Our initial naturalistic conceptualization stated that leadership may be divided into two different categories, leading of others' action vs. leading of others' thoughts. There are several earlier personality constructs that may be presumed drive action leadership, such as the familiar need for Dominance construct in Murrays' taxonomy (need to be a leader and influence others). The Need for Dominance construct is included as such in the well-known self-report inventories constructed from the taxonomy (Edwards, 1959/1985; Gough & Heilbrun, 1965/1983; Jackson, 1967/1999). However, no existing construct appeared available to serve as the driver of thought leadership. Murray's need for Exhibition construct (need to be the centre of attention) comes closest

to our notion, but lacks the interpersonal directing aspect that we consider central in leading the thoughts of people at work. We felt that particularly the modern work life is fraught with instances where the goal is to direct other people's thoughts. Such activities range from marketing and promotional efforts to the much talked "charismatic" leadership (e.g., Weber, 1947; Conger & Kanungo, 1998). We decided to name the action leadership motive simply as *Leadership (le)*, the wish to make other people behave in desired direction. The desire to influence other people's thoughts was termed *Inspiration (is)* in our scheme.

Cooperation. Identification of constructs for the third action category, cooperation was guided by our original notion of three processes underlying cooperative action. Accordingly, cooperation is driven by the general desire to do things for, or with others. This broad motivation is performed in three ways: by communicating and forming relationships, by helping, advising and supporting others and, by serving and listening to other people. In regard to the first process, Murray's need for Affiliation construct (need to form friendships and attachments) came closest in its psychological content. We arrived at the term *Sociability (so)* as to emphasize the behavioural nature of social relations in work settings. In regard to helping and supporting others, earlier scale developers have adhered to Murray's need for Nurturance construct, a term that denotes a wish to help or "nurture" others. We wanted to emphasize the construct's behavioural element and communicability by choosing the term *Empathy (em)*. Empathy measures' multidimensional character (Davis, 1983, Johnson et al., 1983) was recognized and we consulted several prominent scales (e.g., Hogan, 1969) to further refine our construct definition. Finally, for the category of serving others, we were unable to find direct parallels in any of the earlier research literature. Some coinciding aspects could be found in Murray's need for Deference construct (need to defer to others) but "deference" lacked the adaptive nature of serving others at work. We set our aim on a bipolar construct with the dimension's low end denoting to relying on oneself (self sufficiency) while the high end reflecting reliance on others in social interaction situations. Accordingly, we termed our construct as *Reliance (re)*, with dimension ends having opposite meanings.

COGNITIVE STYLES AS DRIVERS FOR PLANNING AND PROBLEM SOLVING

Cognitive styles represent a rich collection of individual differences constructs. In his review, Messick distinguished 19 separate constructs (reflection-impulsivity, category width, etc.) and Riding and Cheema

extended their list to over 30 different cognitive style constructs (Riding & Cheema, 1991). As stated in the previous, cognitive styles were our choice as drivers of planning and problem solving. Our target construct would have to reflect the process nature of planning and problem solving at work. The other criterion we felt as important was bipolarity of constructs. In contrast to the unipolar ability construct (less and more of ability) planning and problem solving at work seems to occur in bipolar pattern. In other words, either dimension end can be efficient or adaptive as in the case of cautious vs. risk-taking implementation of plans.

Our quest for process-like cognitive style constructs found a solution in the educational philosopher John Dewey's notion of thinking (Dewey, 1910, revised 1933). Dewey conceptualized thinking and problem solving as essentially a process composed of interrelated phases. Based on Dewey's ideas, D'Zurilla and Goldfried presented their five-stage model of problem solving therapy (D'Zurilla & Goldfried, 1971). This widely influential model of cognitive-affective-behavioural processes incorporated orientation, problem identification and formulation, solutions generation, decision making and implementation as well as outcome evaluation as the five consecutive stages in problem solving. In parallel with the D'Zurilla & Goldfried framework, we postulated a sequence of planning and problem solving. Here, all planning and problem solving begins with (1) approaching the plan or the problem at hand, is followed by (2) defining the plan or the problem, and is followed by (3) production of solutions. Closure to planning and problem solving is brought about by (4) implementing the plan or problem solution.

Our choice for the driver of the first, approaching phase was a cognitive style construct that we termed *Orientation (or)*. Orientation is an attention process, that is, individuals differ in their general tendency to direct attention or interest to either facts or ideas. Consequently, individuals' orientation is presumed to shape the way they approach plans or problems: either by emphasis on the factual side of things or through ideas elicited by the plan or problem at hand. Both ends of such a bipolar dimension can be useful, depending on the planning and problem solving situation.

We termed *Perception (pc)* the cognitive style that is presumed to drive or shape the definition phase in planning and problem solving. In regard to perception we were mainly guided by Harvey and Schroder's concept of conceptual complexity (Harvey et al., 1961; Schroder et al., 1967) which refers to individuals' tendency to perceive the environment in simple vs. differentiated terms. In our definition, Perception reflects consistency in perceiving the world in concrete vs. abstract terms. Individuals' perceptual habits are

presumed to shape the way that they define plans and problems. People define in a concrete, focussed manner or by reaching for an abstract, complex picture of the plan or problem at hand. Both ends can be useful, depending on the work context.

We termed the driver for the third, solution production phase as *Thinking (th)*. In defining the concept of Thinking, we waded through the scattered and voluminous literature available on the subject. Our earlier mentioned search for bipolar constructs led us to land on the classical distinction of analytic - intuitive thinking. Our main definitional source was Egon Brunswik's notion of analytic and intuitive thought as two ends of one continuum (Brunswik, 1966). Much has been written about the analysis-intuition distinction (Bartlett, 1958; Brunswik, 1966; Epstein, 1994) and intuition in particular has attracted much research as well as popular interest (e.g., Westcott, 1968; Bastick, 1982). The distinction of analytic or rational and intuitive or experiential thinking has inspired development of several self-report instruments most notable of which include Epstein's Rational-Experiential Inventory (Epstein et al. 1996) and Allinson and Hayes's Cognitive Style Index (Allinson & Hayes, 1996). According to our notion, individuals' habitual manner of thinking shapes the way how they generate solutions to plans and problems. In our notion, analytical thinkers tend to produce standardized, logically based solutions while intuitive thinkers produce potentially creative, situation-sensitive solutions to plans and problems.

Finally, the implementation phase in our framework needed a cognitive style driver. No greater strain was involved in deciding upon the reasonably clear-cut construct of *Decision making (dc)*. Our main theoretical sources included Kagan's description of individual differences in decision making under uncertain conditions (Kagan, 1965). Similarly educative were studies on inclination to general risk taking vs. caution (Kogan & Wallach, 1964) and Messer's review (Messer, 1976) of reflection-impulsivity. In our notion, decision making would shape the manner in which people implement plans and problem solutions.

ATTITUDES AS DRIVERS OF VIEWING

In our scheme, attitudes were deemed as drivers of the third main function, viewing. We were able to identify at least three important viewings important at work: attitude towards environmental ambiguity and change, the expectancy of success and finally, viewing of oneself as being free from or, fraught with imperfections. Our choice was on three independent attitudinal constructs: *Ambiguity-change (am)*,

Optimism (op) and *Self image (si)*. In defining the construct of Ambiguity-Change we drew heavily upon Else Frenkel-Brunswik's classical writings on tolerance of ambiguity (Frenkel-Brunswik, 1949). Several earlier scales of tolerance of ambiguity (Budner, 1962) as well as measurement issues were consulted (Norton, 1975). The element of change was blended into the ambiguity construct and work-related content was emphasized in subsequent item writing.

Scheier and Carver define optimism as a relatively stable, generalized expectancy of a good outcome (Scheier & Carver, 1985). In our thinking, optimism was presumed to shape individuals' viewing of being successful in all their endeavours. Finally, Self-image was presumed to shape viewing realism in self perception. Among the elements attached to the concept in psychological literature, we were mostly influenced by individuals' desire to see and present themselves in socially desirable ways, familiar from the response style literature in personality psychology (Crowne & Marlowe, 1960; Paulhus, 1984). Our notion was that overly (socially) desirable viewing of oneself would lead to disregard for shortcomings and imperfections in self, while socially non-desirable viewing would lead to emphasis of deficiencies and imperfections in self.

ITEM GENERATION

Under the authors' leadership, the item writing teams were composed of graduate students in psychology and cross-cultural studies as well as numerous professional human resource consultants, psychologists and non-psychologists. The huge item writing procedure lasted throughout the year 2002 and consisted of reviewing and modifying of existing published items as well as writing of new items. Item writers were equipped with brief construct definitions (see in Appendix I) as guides and they were instructed to favour work content as much as possible in their effort. In regard to writing items for the motive constructs, the item writers equipped with item lists from Murray's taxonomy (Murray, 1938), the three aforementioned Murray based inventories as well as numerous single self-report scales on motives. In regard to cognitive style constructs, item writers were equipped with all previously mentioned cognitive style inventories and numerous published single scales. In regard to attitudes, item writers consulted mainly the previously mentioned single scales. Finally, the huge item pool from the International Personality Item Pool (IPIP; <http://ipip.ori.org/ipip/>) served as a source in generating items for the altogether fourteen scale constructs.

An important principle in definition of constructs and generation of items was fair treatment of respondents across age, gender and cultural variability. Age fairness involved careful balancing between young and old respondents, where the older, more experienced respondents would not get advantage by their longer exposure to work. The gender factor appeared an important challenge. We were particularly wary of not introducing item contents that might favour males, e.g., by using items from predominantly masculine contexts such as the military work. At least as big a challenge was posed by our search for culturally fair constructs and items. We were particularly cautious for subtle Judeo-Christian and Euro-Atlantic biases. Basically, our strategy was to seek items that would reflect everyday life situations, presumably shared by all adult populations across different cultural contexts. Finally, attention was paid to avoid academic or abstract wordings and instead pursue standard, everyday language presumably shared by different educational tiers.

The item writing teams produced lengthy listings of items for each fourteen construct. The number of item candidates varied from 87 to 171 items per construct. Before introducing items to empirical trials, we performed so-called prototypicality ratings (Mervis & Rosch, 1981) to ensure that the items really were representative of the conceptual definitions. All items were rated, on a scale of 1 to 7 according to their prototypicality as exemplars of target constructs. Average prototypicality scores were calculated for each item and an arbitrary cut-point was set so that the final item set (to enter empirical trials) consisted of items that had attained an average prototypicality rating of 5 or above. The retained items formed the pilot scales to undergo empirical scale trials.

Scale trials

The 14 pilot scales contained initially from 28 to 41 item statements printed on paper. The items were responded on a dichotomous (True-False) scale, depending whether the item content is, or is not descriptive of the respondent. A portion of the items were written in reversed form to control for acquiescent responding. The scale trials were run in real-world recruitment and training samples in Finnish private enterprise and public sector organizations. Two private sector organizations, a world-leader telecommunications corporation a leading Nordic teleoperator corporation served as the main trial sites, together generating responses from over 2500 individuals. The remaining about 1000 individual respondents were drawn from recruitment and training samples from a variety of private and public organizations; Finland's central and local government organizations, business schools and vocational colleges. To diminish

the respondents' burden, the scales were portioned in two halves: the seven motive scales and the seven thinking and attitude scales were separately in the initial trials. In order to reflect genuine, real-life responding, the trials were run as integral parts of the assessment batteries used in recruitment and training programs. In other words, respondents received no mention of "instruments under development". Of all the respondents 95 % were Finnish speaking and they responded in their native language. The remaining 5 % were non-Finnish speakers who responded in English. Taken together, the samples had roughly an equal number of men and women. The age distribution approximated that of the working age population.

The development effort towards final scales was a tremendously lengthy and tedious process which took almost a whole year from 2002 to 2003 despite the fact that the two major contributing trial sites provided extra resources for the project. The scale refinement was realized essentially through an item deletion process focused on examination of item means and item-total correlations. We adopted a strict initial criterion according to which items with means falling outside the .3 to .7 were deleted (where .5 indicates ideal discriminatory power for dichotomous items). This strict hurdle was followed by examination of item-total correlations. The correlations were always required to appear on two samples, one representing recruitment and the other representing training populations.

In order to enhance discriminant validity (Campbell & Fiske, 1959) for the scales, we examined item-total scale correlations which always had to exceed item different-total correlations. The resulting final scales had to pass the criterion of retaining comparable internal consistency coefficient values in two new samples. The scale length was set on 16 items which was considered to ensure sufficient reliability for the scales. The final inventory would therefore be composed of 224 items with each fourteen scales measured by 16 items. The inventory was named the "Work Personality Inventory", hereafter referred as the "WOPI". The final scales were finally exposed to undergo standard psychometric tests on reliability and validity.

RELIABILITY AND DESCRIPTIVE STATISTICS

Age distribution

The age distribution in the final composite sample reflects responses obtained from the total 1534 of altogether 1644 individuals who had expressed their age. The distribution gives an approximate representation of the age distribution of the active work force. The total sample used for calculating basic

descriptive statistics is composed of roughly an equal number of men and women. By level of education, the vast majority of people in the sample have at least college degrees which means that the sample represents highly educated worker population. Roughly two thirds of all respondents partook recruitment programs and one third took part in various training and development programs.

Table 1. Age distribution in total sample, median=35 years.

Under 20 years	2
20 to 29 years old	471
30 to 39 years	438
40 to 49 years	339
50 to 59 years	243
Over 60 years	41

Total N=1534

Reliability and social desirability

Reliability is considered to be the necessary if not sufficient condition of valid measurement. There cannot be validity without sufficient measurement reliability. In personality and behavioural measurement it is important to yield estimates for two aspects of reliability. More common is internal consistency, demonstration that the items really form a coherent, measurable construct. Stability or so-called retest reliability should also be assessed with new scales. Particularly personality scales have to show sufficient temporal stability, that is, demonstrate that personality doesn't change in a moment to moment fashion. The concept of social desirability has always occupied an important position in personality psychology, particularly in work settings. Although the current view doesn't require the measures to be perfectly free from the tendency of social desirability it is useful to know its effect on measurement scales. Table 2 shows results from studies on the two aspects of reliability and the WOPI scales' relation to different social desirability scales.

Both the internal consistency and temporal stability coefficients are comparable to figures reported on more established personality inventories, attesting to sufficient reliability across all fourteen scales. The

two social desirability scales, WOPI's own self image scale (si) and the widely acknowledged Crowne-Marlowe Social Desirability scale (Crowne & Marlowe, 1960) are highly inter-correlated which is obviously expected of two scales purporting to measure the same thing. Partly derivable from this, but deserving a specific mention, is the finding that the two social desirability scales share a common relational pattern with the WOPI scales. A similar pattern of socially desirable personality dimensions is observed in other personality inventories as constructs like sociability, empathy and optimism tend to be seen as socially valued features in people. While the scales on the WOPI appear to have equal or less saturation of social desirability compared to other more established inventories, the test user should be aware of the desirability effects on particular scales.

Table 2. Scale reliabilities (KR-20 and retest reliability) and bivariate correlations for social desirability (WOPI-si and C-M).

WOPI scale	Scale reliabilities		Social desirability	
	KR-20 ¹⁾	Retest ²⁾	WOPI-si ³⁾	C-M ⁴⁾
Focused ach	.76	.71	.34**	.39**
Competitive ach	.78	.83	.08**	-.29*
Leadership	.80	.89	.09**	-.18
Inspiration	.74	.86	.01	-.06
Sociability	.74	.84	.26**	.37**
Empathy	.75	.85	.36**	.38**
Reliance	.69	.76	-.12**	-.10
Orientation	.77	.89	-.14**	-.05
Perception	.78	.80	.03	-.04
Thinking	.81	.80	-.33**	-.16
Decision making	.77	.91	-.06*	-.21
Ambiguity-change	.71	.85	-.02	.04
Optimism	.81	.85	.46**	.43**
Self-image	.78	.73	1	.64**

Probabilities are two-tailed values. * $p < .05$. ** $p < .01$.

¹⁾ Internal consistency reliability; Kuder-Richardson-20 for dichotomous scales. N=723 adults in a wide set of recruitment and training programs.

²⁾ Temporal stability. N=33 vocational counsellors, five-week interval between testing 1 and 2.

³⁾ Scales' correlation to WOPI social desirability scale (si). N=1644 adults in a wide set of recruitment and training programs.

⁴⁾ Scales' relation to the Crowne-Marlowe social desirability scale. N=61 recruitment candidates to an ITC company.

Scale means and standard deviations by sex

Overall, sex differences in mean scores remain small with only two scales yielding significantly different means between men and women, which can be seen in table 3. This implies that our initial goal of writing gender-fair items seems to have been successful. Differences in the Reliance and Thinking scales means that women tend to respond in ways that show greater reliance on other people and that women tend to demonstrate thinking that is closer to the intuitive end of the bipolar analytic-intuition construct. Common wisdom or not, men appear to rely more on analytics and logic in their thinking or information processing. We take particular pride on the Leadership scale which measures the desire to lead others' behaviour. Many

established and well-validated inventories report sex differences on similar scales such as dominance and assertiveness.

Finally, the fact that the observed score means fall closely within the arithmetic mean (across the total range of 0 to 16), when combined with the observed standard deviation values indicate approximate normality in score distributions. Such an outcome again testifies success in writing items that discriminate effectively between respondents (ideal discrimination .50 for dichotomous items).

Table 3. Scale means and standard deviations by sex and correlations with age in total sample.

WOPI scale	Scale means and SD's				Bivariate correlations		
	All ¹⁾	SD	Male ²⁾	SD	Female ³⁾	SD	Age ⁴⁾
Focused ach	7.85	3.63	8.00	3.66	7.72	3.59	-.16**
Competitive ach	7.49	3.81	8.06	3.94	6.97	3.60	-.18**
Leadership	9.63	3.61	9.87	3.70	9.40	3.51	-.06
Inspiration	9.10	3.51	9.09	3.58	9.09	3.44	-.16**
Sociability	8.97	3.49	8.89	3.63	9.05	3.35	-.34**
Empathy	8.80	3.52	8.60	3.54	8.97	3.50	-.04
Reliance	7.22	3.29	6.51	3.17	7.87	3.27	-.15**
Orientation	7.08	3.50	6.52	3.49	7.58	3.42	-.03
Perception	8.53	3.64	8.63	3.63	8.43	3.65	.02
Thinking	8.26	3.63	7.29	3.49	9.13	3.52	-.01
Decision making	8.31	3.56	7.96	3.58	8.61	3.51	.03
Ambiguity-change	8.99	3.34	8.94	3.36	9.03	3.32	-.03
Optimism	9.32	3.85	9.71	3.96	8.96	3.71	-.17**
Self-image	7.73	3.59	8.19	3.55	7.31	3.58	.01

*Probabilities are two-tailed values. *p <.05. **p <.01.*

- 1) All, adults in a wide set of recruitment and training programs, N = 1646.
- 2) Males, adults in a wide set of recruitment and training programs N = 786.
- 3) Females, adults in a wide set of recruitment and training programs N = 857.
- 4) All, adults in a wide set of recruitment and training programs N = 1387.

Main respondent groups

The pattern of score means between the two main respondent populations, recruitment and training, is very informative as observed in table 4. Focused achievement, Sociability, Logical thinking (low th), Optimism and flawless Self-image (high si) tend to yield elevated scores in situations where people are

applying for jobs. In other words, in recruitment situations people want to look focused, cooperative, show clear-headed, analytical-logical thinking, optimistic attitudes and want to appear in socially desirable light. What is also worth noting is that such a score pattern coincides largely with the pattern of socially desirable scales. In fact, social desirability may be the very explanation for score elevation in recruitment situations. The only socially desirable scale (indexed by both Crowne-Marlowe and WOPI-si scale) that doesn't become elevated in recruitment situations is empathy. Although socially highly valued, the "soft-hearted" empathy may not be felt as a "sure bet" for success in applying for jobs. The third respondent population, students, comprises students from a particular study area which obviously calls for caution in interpretation. Students (at least in humanistic-cultural studies) differ from the adult working population by relying more on others, being more idea-oriented and more intuitive in thinking, while having less tendency to appear and present themselves in socially desirable light (generally expected or not).

Occupational groups

Occupational group differences are often treated under the rubric of construct validity because they present arenas to test hypothesized differences in personality factors. Table 4 displays means and SD's on four very distinct occupational groups picked from the total composite sample.

The table shows that engineers and managers working in technological fields seem to follow closely to the pattern of mean scores found in the total sample with the notable exception that engineers show slightly stronger fact-orientation as well as stronger analytical-logical thinking. The group of senior district court judges stands out more radically. The largest differences to the general sample appear on judges' heavy orientation to facts (*sic!*) together with a less optimistic general attitude. In regard to motives, senior judges appear to be less competitive, lesser inspirational as well as have less overall motivation towards social interaction (in terms of WOPI dimensions). While the findings on court judges' thinking and motivational tendencies may be expectable (even comforting in terms of the judicial system) the mean scores lend support to the construct validity of the WOPI scales. Finally, by their role of main users of the WOPI test, HR consultants were picked as an exemplary group. Human resource consultants seem to favour intuitive thinking which coincides nicely with the fact of having people as the occupation's target – an occupational

field where creative, situation-sensitive solutions are often in need. People are often notoriously non-logical in their behaviour which calls more for intuitive than analytic thinking. This finding is even more pronounced when comparing human resource consultants' thinking to engineers way of thinking. Engineers are generally believed to emphasize analytic, logical thinking which is considered a resource when dealing with the material, mechanistic or linear world. Finally, HR consultants' positive attitude towards ambiguous and changing environments reinforces what might be considered as consultants' core competence – producing advice in an ambiguous world.

Table 4. Scale means and standard deviations across different sample and occupational groups.

WOPI scale	Scale means and SD's across different sample groups				Scale means and SD's across different occupational groups									
	All ¹⁾	SD	Recruit ²⁾	SD	Training ³⁾	SD	Student ⁴⁾	SD	Tech ⁵⁾	SD	Judge ⁶⁾	SD	HRD ⁷⁾	SD
Focused ach	7.85	3.63	9.41	3.46	7.20	3.53	6.98	3.35	6.93	3.34	7.10	3.40	7.21	3.55
Competitive ach	7.49	3.81	8.05	3.72	7.28	3.85	6.04	3.31	7.58	3.93	4.64	3.26	7.89	3.73
Leadership	9.63	3.61	10.41	3.51	9.01	3.60	8.77	3.64	9.98	3.41	8.50	3.31	9.43	3.57
Inspiration	9.10	3.51	9.77	3.35	8.82	3.53	9.51	3.41	8.43	3.52	6.90	3.16	9.92	3.06
Sociability	8.97	3.49	10.89	2.89	7.79	3.42	9.49	2.86	8.10	3.30	6.78	3.10	8.43	3.51
Empathy	8.80	3.52	9.51	3.57	8.28	3.50	9.07	2.91	8.82	3.41	8.69	3.53	8.50	3.29
Reliance	7.22	3.29	6.84	3.00	6.87	3.36	9.39	3.06	8.04	3.25	6.69	3.02	7.01	3.45
Orientation	7.08	3.50	6.38	3.36	7.62	3.42	9.28	3.62	6.19	3.27	5.29	2.70	8.66	3.66
Perception	8.53	3.64	8.58	3.54	8.39	3.64	9.09	3.61	8.71	3.75	7.42	3.47	9.26	3.74
Thinking	8.26	3.63	6.90	3.55	9.23	3.36	10.97	3.26	7.45	3.33	7.69	2.96	10.15	3.08
Decision making	8.31	3.56	8.01	3.45	8.46	3.52	7.86	3.90	8.67	3.58	6.99	3.14	8.83	3.44
Ambiguity-change	8.99	3.34	9.17	3.25	8.96	3.33	9.61	3.12	8.64	3.56	7.81	3.19	10.60	2.56
Optimism	9.32	3.85	11.43	3.17	8.17	3.76	7.67	3.83	8.81	3.56	6.35	3.62	9.23	3.53
Self-image	7.73	3.59	9.14	3.54	6.76	3.33	5.16	3.48	8.55	3.12	7.87	2.90	6.86	3.08

1) Adults in a wide set of recruitment and training programs (N=1646).

2) Participants of assessment center recruitment programs (N=554).

3) Participants of various kinds of HR training programs (N=656).

4) Students of psychology and cultural studies (N=109).

5) Engineers and managers working in a technology corporation (N=236).

6) Senior district court judges (N=105).

7) HRD consultants (N=98).

CRITERION VALIDITY: SELF-OTHER AGREEMENT

One of the most widely used ways to study validity of self-report personality scales is to compare them to external judgments of personality (John & Robins, 1993; Funder, 1999). The current view is that on the average, people are able to come up with fairly accurate self-reports of personality when compared to external judges' ratings (Zebrowitz & Collins, 1997; Funder, 1999). The WOPI scales' criterion validity was studied through relation to external judgments of personality at two levels of acquaintanceship. The brief descriptions of the fourteen scales in Appendix I was given to the target persons' work colleagues and spouses or individuals with spouse-like relationship to target individuals. The judges on the two levels of acquaintance were asked to rate the target individuals' personality on a 1 to 10 point graphical rating scale while being blind to the targets' WOPI scores. Table 5 shows the correlations across all fourteen WOPI scales.

Table 5 shows substantial self-other agreement in several areas of personality, in both groups of judges. 13 out of 14 WOPI dimensions yielded significant ($p < .01$) self-other correlations across all judges. The magnitude of the self-other agreement is comparable to those derived from more established measures of personality such as the Personality Research Form (see Paunonen, 1989 on nine levels of acquaintanceship), the Five-Factor traits of personality (John & Robins, 1993) as well as Q-sortings of personality (Funder & Colvin, 1988). Altogether, the findings on self-other agreement lend strong support to the WOPI scales' validity in terms correspondence between the test taker and knowledgeable external observers.

Overall, external judges seem to assess motives with slightly better accuracy than cognitive styles. Cognitions obviously offer less observable material for the external judge. One exception to this rule is decision making which ranks as the most accurately judged personality dimension. This probably derives from the fact that in contrast to cognitions in general, decision making leads to observable behaviour. Attitudes, in turn display a mixed picture with optimism being judged with relatively good accuracy while the individual's self-image remains much less known to the external observer. Several intriguing differences appear between the two groups of judges with different level of acquaintanceship. An explanation for the better accuracy of work colleagues in judging leadership might be that the home environment (spouses'

judgments) does not readily invite leadership behaviour for the observing eye. Another interpretation is that leadership between spouses and among the family is somehow different from leadership at work. The reason for less accurate judgments of empathy at home may be due to different judgment standards in work situations where empathy may be a rare commodity. Again, the family or “spousal” relationship may introduce confusion to the concept.

Table 5. Self-other agreement coefficients in order of magnitude across all judges (N=202) colleagues' (N=102), and spouses/spouse-likes' (N=100).

WOPI scale	Bivariate Correlations		
	All raters	Colleagues	Spouses/spouse-likes
Focused ach	.51**	.47**	.54**
Competitive ach	.39**	.35**	.42**
Leadership	.39**	.40**	.38**
Inspiration	.36**	.45**	.28**
Sociability	.32**	.33**	.31**
Empathy	.32**	.39**	.24*
Reliance	.31**	.27**	.37**
Orientation	.28**	.33**	.23*
Perception	.26**	.31**	.21*
Thinking	.26**	.29**	.22*
Decision making	.25**	.20*	.29**
Ambiguity-change	.24**	.19	.28**
Optimism	.21**	.25*	.17
Self-image	.16*	.09	.22*

*Probabilities are two-tailed values. *p < .05. **p < .01.*

Targets for both judge groups were recruited from WOPI user certification training and included HRD professionals (total N=202)

CONSTRUCT VALIDITY

The Big Five. As stated by McAdams and Pals, personality traits have throughout time occupied a dominant position in personality psychology and probably personality psychology cannot do without observable traits (McAdams & Pals, 2006). The currently popular version of the trait framework is the “Big Five” model, according to which personality can be described with five broad categories: Conscientiousness,

Extraversion, Agreeableness, Openness to Experience and Neuroticism. Much empirical support has been rendered on the five traits' applicability across cultural contexts around the world (McRae & Costa, 1997). The enormous popularity of the five-factor model (FFM) is evidenced in numerous inventories published in countries all over the world. It is not unreasonable to talk about a "renaissance" of personality research with the re-introduction of the trait framework in the form of the FFM. The WOPI scales were correlated with Oliver John's Big Five Inventory (John & Srivastava, 1999) in a group of 55 students of psychology and cultural studies.

On the whole, correlations with the "Big Five" traits of personality are very much in the expected direction. Namely, the WOPI scales show predictable alignment to self-reported behaviour traits indexed in John's inventory. Of the numerous single relations between the two inventories, there appear two instances that serve to further delineate WOPI scales' construct validity. The WOPI Inspiration scale's (is) creative element is illuminated in that the scale reaches moderate correlation with Openness to Experience which is a creativity-related scale in the FFM. The WOPI Reliance scale's (re) negative correlation with FFM Neuroticism demonstrates the Reliance scale's validity as a construct of positive dependence, without the neurotic quality that is often reported on dependency-related scales of personality. The WOPI Self-image scale's (si) correlation with the Agreeableness corroborates the WOPI scale's social desirability element. And, vice versa, FFM Agreeableness seems to carry elements of social desirability.

What is of particular interest is that the correlation pattern implies a structural difference between the two systems of describing personality. FFM describes personality with much fewer categories and is therefore a more economical descriptive solution. For example, Consciousness and Extraversion show eight significant correlations with distinct WOPI scales. The criticism against the FFM is that many behaviourally distinct domains are collapsed together on purely statistical grounds with the consequence that much potentially valuable information is lost. Another information loss may arise in the blurring together of functionally different processes (emotion, cognition, motivation, behavioural processes, etc.) for the sake of arriving at the smallest set of behaviourally observable and statistically coherent indicators.

Problem solving and creativity. Problem solving is one core process of work behaviour. One of the most widely used instruments to study problem solving styles is Kirton's Adaption-Innovation Inventory, KAI (Kirton, 1976). The KAI measures two contrasting styles of problem solving. Adaptors perform standard problem solving, whereas Innovators use creative problem solving. While both can be efficient, Adaptors seek improvements to existing problems ("do things better") and Innovators seek to change the framework of problems ("do things differently").

Creativity has always been central topic in the world of work. There appears to be an ongoing high tide of creativity under the newer term innovation. Almost innumerable measures of creativity have been developed within psychological and educational research traditions. One of the most successful and well-validated measures of creative personality is the nonverbal Barron-Welsh Art Scale (BWAS; Barron & Welsh, 1952). Respondents express liking or disliking to fuzzy and unstructured vs. tidy and structured non-representational line drawings. Since early 1950's the scale has repeatedly shown to relate to creative and extraordinary performance across diverse occupations (see review by Gough et al., 1996). The WOPI scales were correlated with KAI and BWAS in groups of 68 vocational counselling psychologists and 50 psychology students.

The correlation pattern of WOPI to KAI falls almost perfectly with what is theoretically expected from WOPI. The Orientation scale (high scores indicating idea orientation) correlate very highly with the Innovator style. The scale's negative correlation to Adaptor style means that fact orientation, the low end of the bipolar Orientation scale relates to Kirton's Adaptor style. The same bipolar pattern appears on the Perception scale: abstract perception relates to the Innovator style while concrete perception parallels the Adaptor style. The Thinking scale (high scores indicating intuitive thinking) is related to the Innovator style although the scale fails to show relation to the Adaptor style. Some of the WOPI motive scales show non-expected but construct-aligned relations. In line with the earlier findings on Inspiration scale's relation with Openness to Experience in the FFM and Concrete Experience on the LSI (in table 8), Inspiration scale's correlation with the Innovator style serves to underscore the construct's innovative-creative element. Finally, the bipolar correlation of WOPI Ambiguity-change scale to the Adaptor-Innovator measures is recognized as a non-expected but construct-aligned finding.

Correlations with the Barron-Welsh Art scale call for special attention because its nonverbal response format cancels out the possibilities of shared method variance, an issue that is present in all self report-self report studies. Three WOPI scales may be predicted to connect to “creative personality”: Orientation (high scores indicating idea orientation), Thinking (high scores indicating intuitive thinking) and Ambiguity-change (high scores indicating preference for ambiguous-diverse, “non-standard” environments, which is the feature of the BWAS items). All of these WOPI scales demonstrate at least moderate correlation to the BWAS. These findings lend very strong support to the construct validity for the WOPI cognitive style scales. Finally, some non-expected findings appear on WOPI motive scales’ relations to creativity. Both Focused and Competitive achievement show from moderate to marked *negative* correlations to BWAS. Generally presumed to be a strong predictor of work accomplishment, achievement motivation seems to work here against creativity. Focused achievement, with its disciplined work style is more easily understood to reflect non-creative mentality, but the anti-creativity feature of Competitive achievement is more difficult to interpret. Perhaps the instrumental, heavily results-driven mentality of Competition doesn’t leave room for the alternating, freely moving mentality that is viewed to be the essence of creativity. Restrictions should obviously be made in regard to potential sample effects.

Table 6. Correlations with problem solving measures (KAI, N=68), BWAS creativity (Barron-Welsh Art Scale, N=50), and with the FFM's (John & Srivastava, 1999) Conscientiousness (C), Extraversion (E), Agreeableness (A), Openness (O), and Neuroticism (N).

Bivariate Correlations									
WOPI scale	KAI Innovator	KAI Adaptor	BWAS	C	E	A	O	N	
Focused ach	.18	.46**	-.38**	.46**	.08	.07	.06	.04	
Competitive ach	.28*	-.02	-.48**	.55**	.52**	.00	.03	-.19	
Leadership	.08	-.11	-.03	.26	.46**	-.08	.08	-.32*	
Inspiration	.36**	-.13	-.08	.28*	.64**	.12	.37**	-.23	
Sociability	-.03	.13	.09	.24	.55**	.42**	.16	-.42**	
Empathy	-.01	.10	.11	-.01	.12	.49**	.16	.23	
Reliance	-.29*	.40**	-.04	.17	.25	.38**	.00	-.40**	
Orientation	.59**	-.39**	.30*	-.42**	-.36**	-.09	.56**	.23	
Perception	.49**	-.21	.26	-.29*	-.27*	.00	.40**	.05	
Thinking	.28*	-.26*	.29*	-.28*	-.05	.03	.23	.27*	
Decision making	.37**	-.54**	-.03	-.03	.38**	.01	.06	-.08	
Ambiguity-change	.44**	-.58**	.39**	-.27*	-.08	.00	.22	-.22	
Optimism	.18	-.25*	-.12	.38**	.38**	.07	.16	-.69**	
Self-image	-.01	.06	.06	.08	-.15	.45**	.13	.21	

Probabilities are two-tailed values. * $p < .05$. ** $p < .01$.

Kirton's Adaptors and Innovators measure, N=68 vocational counselling psychologists.
Barron-Welsh Art Scale, N=50 psychology students.

The FFM of John & Srivastava, N=55 Finnish students of psychology & cultural studies

Values. Values link the individual to the social world as socially shared “conceptions of the desirable” (Kluckhohn, 1951). Some theorists view values as cognitive representations of underlying motives, transformed to take into account institutional goals and demands (Rokeach, 1979). Milton Rokeach’s Value Survey (RVS-Form G; Rokeach, 1988) is one of the most widely studied value instruments in the world. The RVS contains two value sets: instrumental and terminal. The former reflect preferred ways of conduct while the latter reflect what the person would like to achieve in his or her lifetime. Rank order correlations were run between WOPI scales and the instrumental values in a group of 72 recruitment candidates to an ITC company.

The correlation pattern falls well in the expected direction. In addition, Rokeach’s notion of values’ relation to underlying personality constructs may be examined along the emerged set of correlations. Most scholars share the notion that values are related and influenced by what is considered socially valuable and desirable. The ingenuity of RVS is its ability to control for such influences by using a ranking procedure. Therefore, negative correlations on particular WOPI scales can be very illuminating for construct validity. For example, the fact that WOPI competitive achievement (co) and leadership (le) scales relate to low rankings of forgivingness and lovingness shows that these motives tend to concur with “harsher” or socially less desirable personal values.

Organisational culture. Organisational culture has been a major research topic during the last two decades in organisational studies (Schein, 1985) and there has been a proliferation of research instruments. One of the most widely used measurement instruments is O’Reilly’s and colleagues’ Organisational Culture Profile (OCP; O’Reilly et al., 1991). The OCP has been used to assess employees’ and organisations’ value congruence leading to commitment, satisfaction and longer tenure. The OCP is composed of 54 values that make up the cultural fabric of an organisation and the values are ranked by a Q-sorting procedure. In the present study, 64 vocational counsellors performed Q-sortings to express their desired, i.e., ideal organisational culture. Rank order correlations were run against the WOPI scales.

The correlations with ideal organisational culture values throw light to WOPI scales’ relation to cultural values. Overall, the relations of WOPI motive, thinking and attitude scales to organisational values

support the motivational, cognitive and attitude scales' construct validity. Particularly critical construct validity supporting evidence arises. Namely, the finding that the two different achievement motives in the WOPI system, Focused and Competitive achievement relate differentially to organisational values. Focused achievement relates to values of quality and precision while Competitive achievement correlates with organisational values of competition and results orientation. This is precisely what was presumed in our initial conceptual definitions of the two achievement motives which represent two distinct categories of independent action. Also worthy of mention is the finding that, in similarity to the study on instrumental values, WOPI Competitive achievement and Leadership dimensions link with socially "tough" values, observed in the scales' negative correlation to the value of fairness. Particular unexpected single findings arise, too. WOPI Sociability's connection to aggressiveness and negative correlation to stability, predictability are difficult to interpret. On the whole, the connections to organisational values render clear evidence to construct validity to the WOPI scales.

Table 7. Rank order correlations with instrumental values (Rokeach's Value Survey; Form G; Rokeach, 1988) (N=72, Rho ≥ .30) and Organisational culture (Organisational Culture Profile; O'Reilly et al., 1991) (N=64, Rho ≥ .30)

Rank order Correlations	
WOPI scale	Preferred organizational culture (OCP)
Rokeach Values (RVS)	
Obedient (.40)	Quality emphasis (.33), Fairness (-.31), Precision (.30)
Forgiving (-.48), Ambitious (.42), Logical (.30)	Competition (.51), Results orientation (.38), Aggressiveness (.35), Action orientation (.33), High level of performance (.31), Being careful (-.39), Employment security (-.39), Stability (-.37), Low level of conflict (-.31), Fairness (-.30), Supportiveness (-.30)
Ambitious (.33), Loving (-.31)	Being careful (-.36), Action orientation (.36), Competition (.35), Supportiveness (-.31)
Ambitious (.36)	Stability (-.43), Employment security (-.34), Action orientation (.32), Aggressiveness (.30), Reputation of organization (.30), Taking advantage of opportunities (.30)
-	Stability (-.38), Predictability (-.37), Aggressiveness (.35), Action orientation (.33), Individual responsibility (-.31)
Helpful (.49), Capable (-.43), Forgiving (.32)	Competition (-.43), Collaboration (.40), Tolerance (.37), Social responsibility (.36), Adaptability (.32), People orientation (.32), Achievement orientation (-.30)
-	Collaboration (.40), Social responsibility (.35), Experimentation (-.34)
Imaginative (.44), Responsible (-.32), Logical (-.31)	Rule-orientation (.35), Precision (-.33)
-	Individual responsibility (.46), Analytic thinking (.36), Fitting in (-.36), Low level of conflict (-.35), Rule-orientation (-.35)
Loyal (.36), Logical (-.33), Capable (-.32)	Social responsibility (.37), Supportiveness (.36), Competition (-.35), Developing friendship relationships (.32), Working long hours (-.30)
-	Reflection (-.41), Employment security (-.35), Competition (.31)
Broad-minded (.30)	Rule-orientation (-.52), Stability (-.48), Working long hours (.36), Innovativeness (.33), Employment security (-.30)
Ambitious (.37)	Employment security (-.43), Supportiveness (-.41), Innovativeness (.36), Competition (.32)
-	Competition (-.36)

RVS Sample: recruitment candidates to ITC company, N=72

OCP Sample: vocational counsellors, N=64.

Learning styles. Learning is obviously an important part of the work life, exemplified in the concept of the "Learning organisation" (Senge, 1990). Individual differences in learning styles has been an object of steady interest both in educational psychology and in organisational studies. Lawrence Kolb has developed a widely known learning model (Kolb et al., 1971, 1976) where four learning stages are arranged in a sequential order from Concrete Experience, to Reflective Observation, to Abstract Conceptualization and, finally to Active Experimentation. The WOPI scales were correlated with the four learning stages in Kolb's Learning Style Inventory (LSI) in a group of 93 recruitment candidates applying for administrative positions in the Finnish local government.

Our main expectation was fulfilled in the strongest inter-correlations clustering around the WOPI cognitive style scales evident in table 8. The Orientation scale (high scores indicating orientation to ideas) is very much in line with the content of Concrete Experience scale on the LSI. Even more in the expected direction emerges the strong correlation between WOPI Perception scale (high scores indicating abstract perception) and the Abstract Conceptualization stage in the LSI. Finally, the Decision making scale shows fairly strong negative correlation to Reflective Observation which is expected from the two inventories' conceptual definitions. Two motive-learning correlations appeared somewhat unexpectedly although being in line with WOPI motives' construct definitions. Focused achievement involves a concentrating, focusing behaviour style which is the central element in Reflective Observation in the LSI. WOPI Inspiration scale's moderate correlation with Concrete Experience parallels with the thought-leading essence of the Inspiration scale. Namely, the finding suggests that the Inspiration scale carries an important experiential-creative element which in turn is an ingredient in persuasion and charisma.

Table 8. Significant correlations with learning styles (Kolb's Learning Style Inventory; Kolb et al., 1971) (N=93)

WOPI scale	Bivariate Correlations			
	Abstract conceptualization	Active Experimentation	Concrete Experience	Reflective Observation
Focused ach				.31 **
Competitive ach				
Leadership				
Inspiration			.27**	
Sociability		.22*		
Empathy				
Reliance			.25*	
Orientation		-.36**	.39**	
Perception	.54**	-.46**		
Thinking	-.29**		.39**	
Decision making		.22*		-.43**
Ambiguity-change	.28**		.21*	
Optimism				
Self-image	.25*			

Probabilities are two-tailed values. * $p < .05$. ** $p < .01$.

Sample: recruitment candidates for administrative positions in local government, N=93

Teamwork. Teamwork has become the chosen form of work in the post-industrial world. Meredith Belbin's (1981) team role model and attendant measure are perhaps the most well-known in this category. Brief descriptions of roles are given for the unknowledgeable reader in the following. Plant = creative problem solver; Resource Investigator = outgoing opportunity seeker; Chairman (Co-ordinator) = clarifier of goals; Shaper = dynamic driver of things and people; Monitor-Evaluator = clear-sighted judge; Team-worker = diplomatic co-operator; Completer-Finisher = conscientious, persistent finisher of things. The WOPI scales were correlated with Belbin's team roles in a group of 70 students of psychology and cultural studies.

Overall, as seen in table 9 the pattern of correlations with team roles coincides well with what is theoretically expected from the WOPI scales. The only apparent divergence in the overall pattern concerns WOPI scales' relations to the Chairman (Co-ordinator) role. While several correlations emerge with Belbin's Chairman role, they seem to be at odds with Belbin's definition of the Chairman role. Without going to the

specifics of all the observed relationships, it may be concluded that the WOPI scales relate to work team roles in ways that clearly support their construct validity.

Table 9. Correlations with Belbins Team Roles (Belbin, 1981) (N=70)

WOPI scale	Bivariate Correlations							
	Company Worker	Chairman	Shaper	Plant	Resource Investigator	Monitor-Evaluator	Teamworker	Completer-Finisher
Focused ach	.04	-.14	-.15	-.01	-.26*	.11	-.14	.40**
Competitive ach	-.13	-.14	.25*	.31**	-.01	-.10	-.24*	.04
Leadership	.08	.09	.49**	-.05	-.03	-.10	-.43**	-.08
Inspiration	-.13	.13	.37**	.07	.23	-.13	-.20	-.24*
Sociability	.04	.21	.06	-.17	.12	-.33**	.26*	-.13
Empathy	-.22	.24*	-.10	.05	.08	-.11	.03	.12
Reliance	-.08	-.11	-.31*	-.04	.04	-.15	.43**	.21
Orientation	-.36**	.03	.07	.52**	.39**	-.13	-.04	-.26*
Perception	-.27*	-.08	-.02	.43**	.26*	.14	-.12	-.25*
Thinking	-.21	.07	.07	.25*	.29*	-.25*	.18	-.23
Decision making	-.15	.01	.32**	.24*	.31**	-.14	-.18	-.30*
Ambiguity-change	-.10	.24*	.17	.18	.43**	-.24*	0.00	-.49**
Optimism	.02	.32**	.24*	-.19	.01	-.00	-.27*	-.09
Self-image	-.03	.21	-.22	-.13	-.06	.06	.01	.15

Probabilities are two-tailed values. * $p < .05$. ** $p < .01$.

Sample: 70 students of psychology and cultural studies

CONCLUSION

The present effort involved construction and validation of a comprehensive, multifactor self-report inventory of personality for work settings. The root idea was to develop an instrument that draws upon different factors of personality instead of only observable traits. The work life presents today a multifaceted stage for multifaceted responses which require to employ many kinds of personality factors, particularly motivational and cognitive factors. The effort began with a formulation of three main work functions: action, planning and problem solving and viewing and subdivision of the action function into three subcategories. Then, personality drivers for these functions and subcategories were identified, specific constructs defined and

items were written. Lengthy item analyses were performed on pilot scales to arrive at the final construct scales. Reliabilities and appropriate descriptive test theoretical statistics were computed resulting in the conclusion that a reliable self-report inventory had been constructed, the scales met commonly accepted measurement standards. The scales' criterion validity was studied using peer and spouse ratings as validity criteria. The results show validity coefficients that are fully comparable to those reported on more established personality inventories. Construct validity was studied through assessment of numerous relationships to a wide set of personality and work behaviour measures. WOPI scales' construct validity demonstrated strong support from correlational patterns that emerged with external scales measuring similar, neighbouring or related constructs. These patterns coincide well with what is predicted from the WOPI construct scales. The conclusion is that the Work Personality Inventory represents a measurement instrument with sufficient reliability and validity. The WOPI stands out as a promising new research instrument and practical tool for work and organisational settings. Future research is under way on predictive criterion studies as well as studies on "innovative personality". Conceptual challenges for the future include further delineation of the functional differences of the three factor categories, motives, cognitive styles and attitudes.

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APPENDIX

WOPI scale definitions

- (fo) Focused achievement Less focused --- Very focused, quality oriented
High scorers strive for quality and perfection even in minor projects. They sustain their focus on the task at hand and want to reach full completion before they can move on to new things. Low scorers are not up-giving but not willing to stretch themselves “too much”, either. They move on to other things while the high scorers persist in their focus.
- (co) Competitive achievement Less competitive --- Very competitive, results oriented
High scorers strive for results and winning even at the cost of other things. They want and need to win, not just participate. They enjoy competition and are willing to sacrifice much to be successful. Low scorers are not lazy, weak or yielding but are satisfied with less competitive goals and actions. They have less urge to get ahead/reach the top, instead, they set more easily attainable, “realistic” goals
- (le) Leadership Not leading of others --- Strongly leading of others
High scorers want to lead others by direct, face-to-face means, by giving instructions and getting things going. They prefer to lead others and show the way rather than comply to the will of others. Low scorers are not necessarily meek or yielding but prefer to leave the initiative and decisions to others – not to take responsibility over other people.
- (is) Inspiration Reserved, unassuming --- Presentational, inspiring of others
High scorers want to lead others indirectly, inspire and persuade them with ideas and presentations. They want to be centres of attention, become seen and heard. Low scorers are uninspiring, “technical”, conventional and task-oriented. Low scores lack “spirit” and enthusiasm, but don’t show weak or bad leadership as such.
- (so) Sociability Solitary, withdrawing --- Seeks company, contacts
High scorers want to spend much time and do things with others rather than alone. They seek and maintain contacts with others and are therefore often skilled in interpersonal communication. Low scorers are comfortable alone and don’t actively seek company. They maintain neutral detachment to others and like quieter social events.
- (em) Empathy Distant, remote --- Supports, advises others
High scorers want to support and advise others, particularly those in need. They are often unselfish and empathetic, protecting and responsible. Low scorers are more selective in giving sympathy and are unaware of others’ feelings.
- (re) Reliance Autonomous, self-sufficient --- Relies on, serves others
High scorers want to rely on and serve others rather than try to do things by themselves. They want to be helped and rely often on stronger, more competent individuals. Low scorers are autonomous and self-sufficient. They are self-directed and less interested in cooperation. “Thick-skinned” and fearless.
- (or) Orientation Pursues facts --- Pursues ideas
High scorers approach things by seeking new ideas in planning & problem solving. Low scorers approach things by emphasizing facts in planning & problem solving.
- (pc) Perception Concrete perception --- Abstract perception
High scorers define things as complex wholes in planning & problem solving. Low scorers define things in a focused, concrete manner in planning & problem solving.
- (th) Thinking Analytical, logical thinking --- Intuitive, instinctive thinking
High scorers produce creative, situation-sensitive solutions in planning & problem solving. Low scorers produce standardized, logically based solutions in planning & problem solving.
- (dc) Decision making Cautious, controlled decisions --- Quick, risk-taking decisions
High scorers implement plans & problem solutions quickly, without hesitation. Low scorers implement plans & problem solutions slower, with greater caution.
- (am) Ambiguity-Change Prefers clarity, stability --- Prefers novelty, change
High scorers (prefer novelty) prefer to work in environments that offer variety. Low scorers (prefer clarity) prefer to work in environments that stay the same.
- (op) Optimism Less optimistic --- Highly optimistic
High scorers have strong belief in their personal success. Low scorers have less belief in their personal success.
- (si) Self-Image Finds faults in oneself --- Faultless, flawless self-image
High scorers view themselves without any faults or flaws. Low scorers view themselves fraught with faults and flaws.

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