

# SCIENCE OF ASSESSMENTS



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## EXECUTIVE-LEVEL TECHNICAL SUMMARY OF THE PEOPLECLUES® ASSESSMENTS

There are currently four independent PeopleClues® Assessments, each of which is a different measure that taps important aspects of human behavior. The four assessments are: (1) The Personality Assessment; (2) The Cognitive Assessment; (3) The Attitude Assessment; and, (4) The Engagement Assessment. Each of these assessments is based on the most up-to-date psychological research and theory, and the suite has been developed and standardized by our in-house professional staff, a team of two psychologists each of whom has over 40 years of experience in developing, constructing, standardizing, and validating psychological assessments.

This document is an executive level summary of our technical manuals, one that provides a brief overview of the PeopleClues® suite of assessments and their underlying research support. We urge interested persons to review the more complete individual technical manuals which provide an indepth exposition of the theory underlying each assessment: its development, standardization, and validation.

## TECHNICAL ISSUES

In developing our assessments we have been guided by the Standards for Education and Psychological Testing promulgated by the American Educational Research Association, the American Psychological Association, and the National Council for Measurement in Education; The Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association;

the Principles for the Validation and Use of Personnel Selection Procedures of the Society for Industrial and Organizational Psychology; and our in-depth knowledge of the research and theoretical literature in psychology on assessment, personality, measurement, and selection. Further, we are aware of various laws and regulations at the Federal, state, and local levels, as well as case law concerning fairness in personnel selection, adverse impact, and related matters and have tried diligently to ensure that our assessments are as fair as possible.

Following a rigorous evaluation by its panel of experts, the PeopleClues® personality and

cognitive assessments have been Certified by the British Psychological Society as meeting its high standards for use in the United Kingdom. While there is no such national certification process currently operating in the United States, we believe that this

“Good Housekeeping Seal of Approval” provides testimony that our assessments meet the highest technical standards.

Our technical manuals provide comprehensive accounts of the development, standardization, and validation of the PeopleClues® suite of assessments. They include descriptions of the various specific steps taken to make our assessments consistent with contemporary professional and legal standards as well as being culturally fair and non-discriminatory.

Without exception, each of our assessments is well-standardized, reliable, and valid. The PeopleClues® Personality, Cognitive and Attitude Assessments have been taken by over a million job applicants and therefore

The PeopleClues® personality and cognitive assessments meet **high standards** for the British Psychological Society

the current norms presented in the technical manuals are based on very large samples. Further, as data from additional cases become available, our norms are updated. We currently are in the process of developing a larger normative sample on our newest assessment, the Engagement Assessment.

Each of the PeopleClues® assessments is a reliable measure of its intended characteristics. We have routinely used Cronbach's alpha as our measure of internal consistency, the most important index of the reliability of an assessment. The question of predictive validity of the PeopleClues® suite as a whole is clearly a more complicated one. Demonstrating that specific patterns of personality, cognitive, attitude and engagement variables are associated with specific on-the-job successes is not an easy task. Our routine approach to validity is through benchmarking; that is, by demonstrating systematic and

meaningful differences between groups of employees at three different levels of job performance— high, average, and marginal—as judged by supervisory personnel, plus readily available performance data. In developing over one hundred job categories that utilize our Personality and Cognitive Assessments for measuring Job Fit, we have used three data sources: objective client data, job descriptions, and the extensive professional experience of our team with the world of work. We strongly recommend that in keeping with best practices that each employer conduct company-specific benchmarks to ascertain the unique pattern of assessment results that are predictive of success in their organization.

the “**BIG FIVE**”  
go a long way in  
accurately describing  
individual personality.

Each of the four PeopleClues® assessments is administered, scored, and profiled via an online dashboard. The dashboard identifies the best fit individuals together with a variety of narrative reports explaining each individual's profile, and these reports are provided to the system user. They range from a simple graphic profile to more-comprehensive narrative reports together with targeted behavioral interview questions based on the individual's responses, depending upon the needs and desires of the system user.

While the PeopleClues® Attitude Assessment is primarily intended for pre-employment evaluations, the other three PeopleClues® assessments— Personality, Cognitive, and Engagement—are intended both for pre-employment and a variety of post-employment uses. Their primary preemployment use is to provide objective data to enhance the selection process, while the postemployment uses are for training and development, promotion, succession planning and research, among other uses. It should be noted that the PeopleClues® assessments should NOT be used as the sole basis for either rejecting or selecting a candidate. They simply provide one additional data source to include in the decision-making process.

### THE PERSONALITY ASSESSMENT

There is widespread agreement among personality researchers that personality assessments that provide data on five factors—the so-called **Big Five**—go a long way in accurately describing individual personality. Further, research reveals that these five factor scores, in a variety of patterns, are valid and useful predictors of

on-the-job success in a wide range of jobs. The PeopleClues® Personality Assessment is based on this research. It includes the five factors of (1) Conscientiousness, (2) Likeability or agreeableness, (3) Unconventional thinking, (4) Extroversion, and (5) emotional Stability. In addition, we have added a Teamwork scale and also a measure of the response set of Good Impression, the tendency to present oneself in a highly favorable light, as being “too good to be true.” Thus, the PeopleClues® Personality Assessment is comprised of seven scales, each consisting of ten items that require a response on a five-point Likert-scale ranging from “Very True” to “Not at All True.” In keeping with client preferences in looking at the reports, we have reversed the scoring on both the Unconventional thinking scale and the Likeability or agreeableness scale. The former is relabeled ‘Conventional,’ and the latter relabeled as ‘Tough-mindedness.’

In designing a measure of cognitive ability, three types of content need to be considered: **verbal, numerical, and spatial**

Each of the seven scales has been subjected to an exhaustive set of analyses to ascertain internal consistency and factor purity. Each meets commonly accepted psychometric standards; reliabilities as measured by Cronbach’s alpha range from .61 for Conventional to .83 for Teamwork with a median of .76, based on 151,429 cases. Norms for each of the seven scales are based on over 150,000 cases and are updated regularly as more data become available.

Our research shows no meaningful differences on any of these seven personality scales on the basis of gender, age, educational level, or race. As a measure of concurrent validity, a group

of 67 undergraduates were given both the PeopleClues® Personality Assessment and the Revised NEO Personality Inventory—the most widely accepted and generally used measure of the **Big Five**. The correlations between the scores on the PeopleClues® personality scales and the NEO ranged from .37 to .83 with a median correlation of .71, indicating that the PeopleClues® personality scales align with corresponding NEO measures of the same trait. Several benchmarking studies of the relationships between the PeopleClues® personality scale scores and level of on-the-job performance demonstrate consistent and clear differences in job performance that are related to specific, identifiable

patterns of PeopleClues® personality scores for such diverse occupations as call-center representatives, light factory workers, home-health care providers, managers and others.

Versions of the PeopleClues® Personality Assessment

are available in Spanish and Chinese, together with appropriate normative data. Separate norms for the UK and Australia/ New Zealand also have been developed.

## THE COGNITIVE ASSESSMENT

A substantial body of research going back for more than a century has shown that an individual’s level of cognitive functioning; that is, general mental ability, is a reliable and statistically significant predictor of that individual’s job success. Further, there is considerable research evidence that a measure of cognitive ability provides incremental validity to scores on the personality scales. It should be noted that, for every class of jobs, there is an optimal range of cognitive ability. This body of research evidence led us to

include a brief measure of cognitive ability in the PeopleClues® assessment suite.

In designing a measure of cognitive ability, three types of content need to be considered: verbal, numerical, and spatial. Another important factor is the length of the test; that is, the number of items. To fully tap each of the three content areas would require quite a lengthy instrument. In order to develop a briefer measure, we decided not to include very easy items or very difficult items. Our preliminary research indicated that using 30 items of moderate difficulty would meet the requirement of a high quality cognitive measure within a limited time.

We began the test construction task with a large pool of 84 items of moderate difficulty that covered each of the three content areas and related directly to general mental ability. This preliminary version of our cognitive assessment was administered to a sample of 152 undergraduates who were then placed in one of five groups based on their total score on these preliminary items, from high to low. Those items that did not show a meaningful increase in correct answers over the five groups from the lowest to the highest were discarded, leaving a pool of 55 items.

The next step was to administer the 55-item version using a 15-minute time limit to two new groups of undergraduates. One group (N = 64) was also given the Wonderlic Personnel Test, the most widely used measure of cognitive ability in personnel settings, and the second group (N = 30) was given the Otis Self-Administering Test of Cognitive Ability Form B, another commonly used measure. The obtained correlation of our 55-item cognitive assessment was .61 with the Wonderlic and .63 with the Otis, providing good evidence that our brief measure was tapping the same domain

as these longer, widely used measures.

Our examination of the item responses to the 55-item version revealed that many of them had a low rate of correct responding, suggesting that they were too difficult for these average-range samples (Mean IQ = 103). A number of these difficult items and a few very easy items were therefore eliminated, leaving us with a 30-item assessment consisting of 15 verbal items, 10 numerical items, and 5 spatial items. In order to evaluate the validity of this 30-item version of our cognitive assessment, we administered four subtests of the Wechsler Adult Intelligence Scale-III (WAIS-III)—Vocabulary, Similarities, Digit Symbol, and Picture Absurdities—to a new group of 185 undergraduates. The obtained correlations between the four WAIS subtests and our 30-item assessment ranged from .73 for Vocabulary to .23 and .24 for Digit Symbol and Picture Absurdities. Inspection of the data showed that scores on Picture Absurdities were heavily skewed, with almost all respondents giving correct answers, and we determined that the Digit Symbol subtest was not a central measure of general mental ability. The substantial correlation with the Vocabulary subtest provided good support for our measure as tapping general mental ability.

We currently have data on 151,429 US-based job applicants, with demographic data on 58,740. The scores for the overall sample closely approximate a normal curve. Males score slightly higher (1.5 points) than females, a difference of less than half a SD and thus not considered meaningful. No differences were found as a function of age, but (as would be expected) there were systematic differences related to educational level, with respondents having more education scoring higher than those

with less education. As is usually the case, there were significant differences as a function of race, with African American respondents scoring almost a full SD lower than the Caucasians, a difference that holds despite educational level. As is also typical, we have no easy answers to explain these racial differences, and we therefore voice a note of caution about over-reliance on cognitive assessments under such circumstances in making selection decisions.

Slightly different versions of the Cognitive Assessment have been developed for the UK and for Australia/New Zealand, together with appropriate local norms. A Chinese version has also been developed. Additional forms of the US Cognitive Assessment are under development and should be available in the near future.

### THE ATTITUDE ASSESSMENT

Counter-productive behavior by employees continues to be a major problem for American organizations. Such behavior includes absenteeism, tardiness, computer misuse, theft, alcohol and drug abuse, aggression, and sexual/racial harassment. These behaviors are far more widespread than is commonly known. For example, some studies indicate that over two-thirds of employees admit that they have stolen something of value from their employer, while other studies reveal that over 40 percent admit to some form of sexual harassment. There is little question that both the scientific and popular literatures agree that employee workplace deviance is a wide-spread and serious problem. Since the prohibition of the use of polygraph testing (lie detection) by Congress in 1988, the use of psychological

assessments to identify and screen out any potential miscreants has greatly increased.

At the same time, there is a body of research that clearly indicates that personality assessments such as those discussed above, despite their strengths, are not adequate for identifying individuals who are likely to engage in deviant behavior in the workplace. This understanding has given rise to the development of 'integrity' assessments—psychological inventories that directly address workplace deviance rather than general personality characteristics. The PeopleClues® Attitude Assessment is such an instrument, intended to directly assess

prior workplace counter-productive behavior and the specific attitudes that underlie such behavior.

Our review of the literature led us to focus on the six most commonly reported areas of workplace deviance:

(1) Low Conscientiousness, demonstrated by absences, tardiness, poor work standards, and the like; (2) Hostility, marked by uncalled-for verbal and/or physical aggression and the creation of a hostile work environment; (3) Low Integrity, shown by lying, theft, and other antisocial acts; (4) Substance Abuse, as shown by reporting for work drunk, drinking on the job, using illegal drugs, etc.; (5) Sexual Harassment, marked by inappropriate jokes, remarks, e-mails, as well as by direct sexual behavior; and (6) Computer Misuse, demonstrated by violating organizational policies regarding personal e-mail, on-line shopping, etc. We also added a seventh scale, Good Impression, to provide an index of test-takers' tendency to make an overly favorable impression.

Counter-productive behavior continues to be a **MAJOR PROBLEM** for American organizations.

The items on integrity assessments invariably ask respondents whether or not that they engaged in a specific counter-productive behavior, or have a positive or negative attitude towards such behavior. It is usually surprising to employers and HR specialists to learn that individuals, including job applicants, readily endorse counter-productive behavior. The research on this matter strongly indicates that there is a generalized belief that such behavior is very wide-spread and that “I do less of it than others.” Further, such individuals believe that to deny such behavior and attitudes puts one at risk of being regarded as “too good to be true.”

In developing the PeopleClues® Attitude Assessment, we followed a similar procedure to what is described above for developing the Personality Assessment. First, a pool of items was developed to represent the content of each concept. Groups of individuals were then asked to complete this preliminary form of the assessment, and the results were used to discard items that did not differentiate high and low scorers, or for other relevant reasons. The data from these studies confirm the expectation that people, including job applicants, will indeed admit to a variety of counter-productive behaviors

The final form of the Attitude Assessment consists of 140 items (20 for each of the seven areas identified above), half of which are behavioral in content and half attitudinal. The initial norms were based on the responses of 963 adult job applicants and were then updated with a sample of 103,142 in 2009. As with all of our assessments, these norms are regularly updated as additional data become available.

There are no significant differences in mean scores on any of the Attitude Assessment

scales as a function of gender, age, race or educational level. The reliability of the seven scales as estimated by Cronbach’s alpha ranges from .52 for Low Conscientiousness and Substance Abuse to .80 for Low Integrity. These coefficients compare favorably with those in the published literature and indicate adequate reliability for individual prediction. The validity of the Attitude Assessment is difficult to determine statistically. We believe, however, that admitting to such counter-productive behavior needs to be taken at its face value and followed up by a series of behavioral questions (which are supplied with the score profile) in order to determine the risk involved in hiring a person who admits to a series of such prior behaviors in a work-related setting.

Similarly, we have developed norms for the Attitude Assessment for both the United Kingdom and Australia/New Zealand each based on substantial samples.

### THE ENGAGEMENT ASSESSMENT (UNDER DEVELOPMENT)

Employee engagement is a positive emotional connection between employees and their jobs and between employees and their employers. Engaged employees are inspired to go above and beyond the job description to help meet business goals. They are loyal to their employers and see their jobs as a source of pride and satisfaction. Highly engaged employees freely give their work extra effort on an ongoing basis.

In a large-scale study of over 300 businesses, it was found that only 17 percent of all employees reported themselves to be “highly engaged,” while 19 percent were “disengaged,” and 64 percent—the “massive middle”—were neither highly engaged

nor disengaged. With few exceptions, the published research clearly shows that businesses with more highly engaged employees have higher profits, higher sales volume, less absenteeism, less shrinkage of inventory, and better customer feedback than businesses with fewer highly engaged employees. These differences are also found on the business unit level in complex, multi-unit structures. There is little question that having highly engaged employees is an essential ingredient of business success.

Given the relatively small percentage of employees in the highly engaged group, it is clear that moving even a small percentage of employees from the massive middle to the highly engaged and eliminating some of the disengaged group would have strong positive outcomes for any business. Making such changes would be a function of both improving the employee selection process to focus on employees who will be highly engaged and working to improve those working conditions that preclude engagement.

There are at least two elements involved in employee engagement. One is a positive view on a personal and emotional level of one's employer or company, especially its management. The second is a high degree of personal work motivation—"need for achievement." Profiles based on these engagement factors can be used for selection and for measuring the degree to which an organization's employees are engaged as well as indicating areas in which improvement is necessary.

In a large-scale study of over 300 businesses, it was found that **only 17%** of all employees reported themselves to be **"highly engaged"**

On the basis of the literature on employee engagement, we developed an initial 30-item questionnaire, Engagement Assessment, consisting of five-point Likert-scale items. Half of the items were concerned with the respondent's relationships with his or her employer and the other half with work motivation. This 30-item Engagement Assessment was administered to 239 persons, all of whom were employed as nurses in a large metropolitan hospital. An inspection of the means and standard deviations of the responses to the individual items showed that some items had a very high rate of endorsement and needed

to be revised. None had very low rates of endorsement, so no item was revised on that basis.

To further understand the internal structure of the 30 Engagement items, a series of factor analyses were conducted. These factor analyses were intended to determine which items

were most strongly related to each other and would constitute a facet of the engagement domain. We set an arbitrary rule that there would need to be three or more significantly intercorrelated items in order to constitute a factor. Thus, with each successive factor analysis we eliminated items that either stood alone or else consisted of only two items. By means of this process of successive rotated factor analyses we were able to identify four facets of the Engagement scale. These four facets are: (1) Positive Engagement with Employer; (2) Positive Engagement with Job; (3) Negative Engagement with Employer; and (4) Negative Engagement with Job.

These four facets clearly identify the domain of employee engagement. They support





the notion that engagement can best be understood as involving two aspects: engagement with one's employer and engagement with the job itself. This division makes good intuitive sense—one can be happy with one's employer, but this is rather independent of one's attitude toward the work itself. What is surprising about these facets is that positive attitudes both towards one's employer and one's work are relatively independent of one's negative attitudes toward employers and work.

The reliabilities of the four facets ranged from .66 to .74 using Cronbach's alpha as a measure of internal consistency. The norms are based on the 249 participants in the initial study but will be revised in 2012 as additional data becomes available.

### **PEOPLECLUES**

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