



# TOWARDS A SHARED ASSESSMENT LEXICON

## ABSTRACT

RAD Science's first working paper simply establishes a lexicon by which clients, partners, scientists, policymaker (actually any affiliate) can engage in meaningful and shared dialogue. We will continue to add new entries, so please feel free to contact us if you would like a term defined.

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### Author Notes

1. As a living document we will continually be updating this working paper, adding new construct definitions based off any feedback you might provide. Future versions will also seek to include frequent business terminology used in the assessment space, and any other suggestions that the reader might like to make.
2. Sometimes you might believe a term might fit better in another section. Please let us know if you feel strongly about this at any point in time.
3. And it may be the case that you disagree with a given definition. Feel free to propose a better one! And if your arguments are compelling, we will include it along with a footnoted acknowledgement.
4. If there is interest, we will also create a set of quizzes around the terms (see entry on Formative Assessment).

## Glossary of Terms Associated with SEL/Noncognitive Constructs

### **Affect**

A broad, umbrella term for feeling states that includes emotions and moods. Affect is broadly divided into positive affect (e.g., happiness, calmness) and negative affect (e.g., anxiety, unhappiness, anger).

### **Agreeableness**

A major noncognitive factor associated with the Five Factor Model of personality, referring to the tendency to act in a cooperative, friendly, collegial, unselfish and non-hostile manner; the opposite of disagreeable on this continuum. Within our assessment system, we give both its technical name and market facing label (i.e., Teamwork). Because it is important to understand just how broad this construct is, we provide additional information here (and for all the other Big Five constructs). Thus, traits typically associated with both high and low performance in this domain are given below:

High (Positive) Pole	Low (Negative) Pole
cooperative, accommodating, helpful, patient, peaceful, reasonable, amiable, cordial, friendly, genial, pleasant, considerate, kind, empathetic, sympathetic, trustful, understanding, lenient, uncritical, undemanding, courteous, diplomatic, polite, respectful, tactful, benevolent, charitable, generous, obliging, humble, modest, selfless, unassuming, ethical, honest, moral, principled, sincere, truthful, affectionate, compassionate, sentimental, warm, earthy, casual, easygoing, informal, natural, relaxed	selfish, greedy, self-indulgent, prejudiced, unfriendly, ungracious, unkind, miserly, stingy, inconsiderate, tactless, thoughtless, cranky, cold, impersonal, insensitive, antagonistic, argumentative, combative, harsh, unforgiving, unsympathetic, bossy, demanding, domineering, manipulative, abusive, disrespectful, impolite, rude, scornful, cruel, ruthless, vindictive, condescending, pompous, smug, snobbish, boastful, conceited, egocentric, egotistical, deceitful, dishonest, vain, obstinate, stubborn, cynical, distrustful, skeptical, suspicious, caustic, curt, flippant, gruff, surly, crafty, cunning, devious, sly

### **Avoidance Coping**

A form of coping, where the individual employs strategies that are designed to circumvent or avoid the stressful situation, either using person-oriented or task-oriented coping strategies.

### **Basic Emotions**

A set of emotions such as anger, fear and happiness that are believed to be fundamental, universal and supported by specific brain circuits. Each has a characteristic facial expression (popularized in modern culture with the emoji 😊).

### **Chronotype**

The behavioral manifestation of underlying circadian rhythms of myriad physical and psychological processes. A person's chronotype is the propensity for the individual to sleep at different times during a 24-hour period.

### **Conscientiousness**

A major noncognitive factor of the Five Factor Model of personality that reflects the individual's achievement striving, orderliness, organization, and related behaviors. Notably the combination of disorderly, easy-going, and other related behaviors is seen as the opposite of Conscientiousness on this trait continuum. Within our assessment system its market facing label is Work Ethic. Traits typically associated with both high and low performance in this domain are given below:

High (Positive) Pole	Low (Negative) Pole
achievement-orientated, industrious, persistent, tenacious, ambitious, thorough, planful, orderly, organized, systematic, concise, exacting, efficient, fastidious, self-disciplined, dependable, reliable, responsible, meticulous, perfectionistic, precise, careful, cautious, prompt, punctual, decisive, deliberate, firm, purposeful, dignified, formal, consistent, predictable, steady, economical, thrifty, conventional	lazy, slothful, aimless, unambitious disorganized, haphazard, inefficient, scatterbrained, sloppy, unsystematic, careless, negligent, undependable, unreliable, erratic, inconsistent, unpredictable, forgetful, absent-minded, rash, reckless, indecisive, extravagant, frivolous, nonconforming, unconventional

### **Coping**

Set of strategies employed to mitigate the impact of challenging and/or harmful events on the individual. Major types of coping include problem-focused, emotion-focused, and avoidance coping.

### **Cognitive Biases and Heuristics**

Heuristics are simple and efficient rules that people frequently use to form judgments and make complex decisions. They are mental shortcuts that usually involve focusing on one aspect of the problem space and ignoring other features that may actually be far more important. A cognitive bias is, as our prominent colleague Larry Jacoby once described them, "a heuristic in a bad neighborhood". (Essentially where the heuristic leads to irrational decision making).

### **Cross-Cultural Competence**

A construct representing the knowledge, skills, affect, and even motivation that enable people to adapt effectively to environments other than the one that they are typically immersed in.

**Emotion-Focused Coping**

A form of coping, where the person regulates, reduces, channels, or eliminates the aversive emotions associated with a stressful encounter.

**Emotional Intelligence**

Emotional intelligence (EI) involves the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought.

**Emotional Perception**

The ability to register, identify and encode emotional displays and emotional messages.

**Emotional Regulation**

The ability to successfully maintain, change, or modify emotions, both in self and others (also sometimes referred to as Emotional Management).

**Emotional Stability**

A major noncognitive factor associated with the Five Factor Model of personality, referring to a calm, resilient temperament; the opposite of Neuroticism on this continuum. Within our assessment system its market facing label is Stress Tolerance. Traits typically associated with both high and low performance in this domain are given below:

High (Positive) Pole	Low (Negative) Pole
good-natured, happy, calm, unexcitable, patient, satisfied, impulse-controlled, unemotional, autonomous, secure, temperate, tranquil, self-esteem, self-efficacy, independent, individualistic, moderate	emotional, excitable, temperamental, touchy, unstable, vulnerable, impulsive, defensive, fretful, insecure, negativistic, self-critical, self-pitying, anxious, fearful, nervous, envious, jealous, gullible, naive, suggestible, intrusive, meddlesome, nosey

**Emotional Understanding**

The ability to comprehend emotion language and to appreciate complicated relationships among emotions. As such, the ability includes being sensitive to slight variations between emotions and the ability to recognize and describe how emotions evolve over time.

**Eveningness**

Generally defined by a delayed sleep period and delayed wakefulness, which has various psychological concomitants. One of two extremes (see Morningness) with most individuals having some flexibility in the timing of their sleep period.

**Extraversion**

A broad personality trait of the Five Factor Model of personality characterized by outgoing, social, and gregarious behavior; the opposite of Introversion on this continuum. Within our

assessment system its market facing label is Communication Style. Traits typically associated with both high and low performance in this domain are given below:

High (Positive) Pole	Low (Negative) Pole
enthusiastic, spirited, vivacious, zestful, gregarious, sociable, adventurous, playful, communicative, expressive, verbal, carefree, spontaneous, impetuous, uninhibited, unrestrained, active, energetic, vigorous, talkative, verbose, wordy, assertive, dominant, forceful, demonstrative, exhibitionistic, brave, courageous, daring, assured, confident, proud, direct, frank, straightforward, humorous, cheerful, jovial, merry, optimistic	inhibited, restrained, seclusive, detached, reserved, secretive, bashful, shy, timid, quiet, silent, untalkative, unsociable, withdrawn, docile, passive, submissive, unadventurous, unaggressive, uncompetitive, lethargic, sluggish, bitter, pessimistic, somber

**Extrinsic Motivation**

When the motivation to engage in an activity comes from an external incentive (contrasted with intrinsic motivation).

**Five Factor Model (FFM) of Personality**

A leading personality model that proposes there are five major, universal personality dimensions, known as the Big Five Factor (BFF) Model. See also Extraversion, Emotional Stability, Agreeableness, Conscientiousness, Openness, and related terms.

**Flow**

A state of optimal experience arising from intense involvement in an activity that is enjoyable, such as playing a sport, engaging in an art form, or reading a good book.

**Grit**

A non-cognitive skill thought to emanate from an individual's passion for a long-term goal or end state, coupled with a powerful motivation to achieve this objective.

**Growth Mindset**

A self-perception that one holds about oneself. In a fixed mindset, people believe their basic qualities are simply static traits and that nothing can be done to change them. The growth mindset requires people believing these same traits can be developed through dedication, practice, and hard work. While most often applied to views about intelligence or talent, growth mindset may be even more important with respect to SEL skills.

**Intrinsic Motivation**

When the motivation to engage in an activity comes from a source other than an external incentive (contrasted with Extrinsic Motivation).

**Introversion**

A broad personality trait involving orientation towards the internal private world of one's self and one's inner thoughts and feelings rather than toward the outer world of people and things. Introverts tend to be relatively reserved, quiet, withdrawn and deliberate, in relation to their extroverted counterparts.

**Machiavellianism**

A trait or attribute marked by a calculating attitude towards interpersonal relationships and a belief that ends justify the means -- however ruthless. Machiavellian individuals tend to view others as objects to be manipulated in pursuit of their goals, even if it involves deliberate deception.

**Metacognition**

A proposed higher-order thinking mechanism that involves active control over the thinking processes and learning, involving decisions that help to identify the task on which one is currently working, to evaluate that progress, and predict outcomes of that progress.

**Morningness**

Generally defined by an advanced sleep period and advanced wakefulness, which has various psychological concomitants (see also Chronotype, Morningness).

**Neuroticism**

A noncognitive skill from the Five Factor Model, which is characterized by a chronic level of emotional instability, proneness to psychological stress, and difficulty in coping with life's challenges (see also Emotional Stability).

**Noncognitive Skills**

An operational term, rather than one with a literal meaning, generally referring to those skills that have not been traditionally assessed by cognitive tests. It subsumes related constructs such as SEL, personal skills, soft skills, transversal skills, C21 competencies, behavioral skills, cross-cutting skills and many others.

**Openness**

A noncognitive skill from the Five Factor Model of personality, associated with qualities such as intellectual and artistic interest, curiosity, and related terms; the opposite of Closedness on this continuum. Within our assessment system its market facing label is Curiosity. Traits typically associated with both high and low performance in this domain are given below:

High (Positive) Pole	Low (Negative) Pole
curious, inquisitive, creative, imaginative, innovative, inventive, contemplative, intellectual, introspective, meditative, philosophical, complex, deep, insightful, perceptive, bright, intelligent, smart, artistic, cultured, refined, sophisticated, worldly	shallow, unintellectual, unreflective, uncreative, unimaginative, imperceptive, unobservant, dull, unintelligent

**Problem-Focused Coping**

Where the individual manages or solves the problem by removing or circumventing the stressor in a rational way (sometimes referred to as, Task-Focused Coping).

**Self-Concept**

One’s mental knowledge and understanding of one’s self.

**Self-Efficacy**

An individual’s belief in their capacity to act effectively to bring about results perceived as favorable or desirable (e.g., belief in ability to control food intake during a 10-week diet program).

**Social Anxiety**

An intense fear, apprehension, or worry of social situations and being evaluated with others; this anxiety often involves a physiological, cognitive, and behavioral component.

**Social Competency**

A term similar to social intelligence and social adjustment, signifying that the person is capable of managing social interactions effectively.

**Social Emotional Learning (SEL)**

The process through which students learn to recognize and manage emotions, care about others, make good decisions, behave ethically and responsibly, develop positive relationships, and avoid negative behaviors.

**Social Intelligence**

The set of abilities and competencies hypothesized to support effective social interaction with other people, including social awareness and insight, and the capacity to influence others adaptively.

**Socialization**

The process of learning the norms, values, and rules of one’s culture in order to live in it.



**Stress**

Loosely, symptoms of distress including negative emotions, disruption of behavior and actual or perceived ill-health. Stress is defined more precisely in the transactional model of stress as a state of being taxed or overloaded by external demands for which the person's coping capabilities are inadequate. Thus, stress reflects both external events ('stressors') and the individual's psychological vulnerabilities.

**Teamwork and Collaboration**

The combined action of a group of individuals generally working on some common goal.

**Temperament**

The foundation of personality, usually assumed to be biologically determined, and present early in life. Temperament includes such characteristics as energy level, emotional responsiveness, impulsiveness, response tempo and willing to explore.

**Trait**

A consistent pattern of behavior in a psychological domain (e.g., anxiety, hostility) that shows stability over time. Traits are often treated as latent constructs that may be measured using psychological assessments.

**Transactional Leadership**

A style of leadership that is based on the setting of clear objectives, goals, and deliverables for the followers, as well as the use of either punishments, rewards, or other contingencies to encourage compliance with these goals.

**Transformational Leadership**

A charismatic, inspiring style of leading others that usually involves heightening followers' motivation, confidence, and satisfaction, uniting them in the pursuit of shared, challenging goals, and changing their beliefs, values, and needs.

## **Glossary of Terms Associated with Cognitive Constructs**

### **Broad Auditory Reception**

A form of cognitive ability involved in any task or performance that requires the perception of, or discrimination of, auditory pattern of sounds or speech.

### **Broad Cognitive Speed**

A broad organization of ability in any task or performance that requires rapid cognitive processing of information.

### **Broad Decision Speed**

A broad organization of ability in task or performance that requires rapid processing of very simple stimuli.

### **Broad Memory and Learning Capacity**

A broad organization of ability involved in any task involving retention of material over a short period of time (also known as Short-term Acquisition and Retrieval Ability).

### **Broad Olfactory Reception**

A form of cognitive ability involved in any task or performance that requires the perception of, or discrimination of, odors.

### **Broad Retrieval Ability**

A broad organization of ability involved in any task involving retention of material learned in the distant past (also known as Tertiary Storage and Retrieval).

### **Broad Tactile-Kinesthetic Ability**

A form of cognitive ability involved in any task or performance that requires the perception of, or discrimination of, tactile stimuli.

### **Broad Visualization Ability**

A broad organization of ability involved in any task that requires the perception of visual forms, as such.

### **Cattell-Horn-Carroll Model of Cognitive Abilities**

Considered by many commentators the consensual model of human cognitive ability, it finds less appeal in the high-stakes assessment arena of education than might otherwise be the case, largely because to measure all constructs at scale, with demonstrable reliability and validity would be extremely costly. Nevertheless, it is the framework upon which many gold standards of cognitive assessment are now firmly entrenched, including the Stanford-Binet, Wechsler, and Kaufman assessment batteries. It also is seen more widely represented in the battery of assessments comprised for military selection, such as the ASVAB. Because many of the terms in this part of the glossary are represented by it, we provide its many elements in the table that

follows. This representation should also serve to provide richer meaning to many of the constructs described previously, since the table includes sample items.

<b>Construct</b>	<b>Primary Mental Abilities</b>	<b>Sample Tests and Item</b>
General Mental Ability	All	
Fluid Intelligence	Sequential Reasoning Induction Piagetian Reasoning Speed of Reasoning Quantitative Reasoning	<u>Induction</u> : What are the next two letters in this sequence: F F C H H E J J G L L ? ?  <u>Arithmetic Reasoning</u> : If 10 programmers are needed to finish a job in 6 days, how many programmers would be needed to finish the job in 1 day?
Crystallized Intelligence	Verbal Comprehension Listening Ability Phonetic Coding Lexical Knowledge Reading Decoding Reading Speed Oral Production Writing Ability Language Development	<u>Vocabulary</u> : What is the meaning of the word, “obfusate”?  <u>General Knowledge</u> : The author of the book “The Life and Opinions of Tristram Shandy” was?
Memory and Learning (also called Short-term Acquisition Retrieval)	Memory Span Associational Memory Free Recall Memory Meaningful Memory Visual Memory Learning Ability	<u>Digit Span</u> : The test administrator presents a series of digits with a one second delay between each. The participant recalls the digit string ( <i>Stimuli</i> . 2 4 6 7 5 9). Test is also given “backwards” wherein, for the example, the correct answer is: 9 5 7 6 4 2.
Broad Visualization	Visualization Spatial Relations Closure Speed Flexibility of Closure Serial Perceptual Integration Length Estimation Perception of Illusions Spatial Scanning	<u>Card Rotations</u> : Consists of 10 target 2-D shapes, each with 8 variations. Participants decide if the variations are reflections of the target or the same shape, marking one of two boxes designating their response as quickly and accurately as possible

Construct	Primary Mental Abilities	Sample Tests and Item
Broad Auditory Reception (Ga)	Absolute Pitch Temporal Tracking Maintaining Rhythm Resistance to Distortion Sound Localization Hearing-speech Threshold Sound Frequency Discrimination Memory for Sound Patterns Speech Sound Discrimination	<u>Auditory Closure</u> : Words are presented orally, but with some sounds omitted. The task is to complete the word. <i>Stimuli</i> . bo/le [bottle]
Retrieval Ability (also known as Tertiary Storage and Retrieval)	Originality Ideational Fluency Figural Fluency Expressional Fluency Word Problems Naming Facility Associational Fluency Figural Flexibility	<u>Ideational Fluency</u> : In two minutes list the members of a broadly defined class, with the score being the number of things listed. E.g., FLUIDS THAT BURN?
Broad Cognitive Speed	Rate of Test-taking Numerical Facility Perceptual Speed	<u>Number Comparison</u> : Indicate whether or not the two-digit strings are the same or different (Note, time, rather than accuracy, is the dependent variable). 367954381937 - 367954381937
Broad Decision Speed	Simple Reaction Time Choice Reaction Time Mental Comparison Time Semantic Processing Speed	<u>Card-sorting</u> : Sort a deck of playing cards into colors, suits, or number. <u>Posner Task</u> : Indicate whether two letters have the same meaning (e.g., Aa - Yes) or are physically the same (e.g., Aa – No)

**Cognitive Abilities**

Skills, aptitudes, and/or competencies for processing information, including perception, learning, memory, understanding, awareness, reasoning, judgment, intuition, and language.

**Creativity**

The use of imagination, original ideas, and related skills that leads to the production of an artefact that is generally perceived as a cultural enhancement. Many commentators believe it is best represented by Broad Retrieval Ability.

### **Critical Thinking**

The objective analysis of verified facts to form a veridical judgment. While several different definitions exist, they tend to converge on the notion that critical thinking includes the rational, skeptical, unbiased analysis, and/or evaluation of factual evidence (see also Biases and Heuristics). Critical thinking is also thought to be self-directed, self-disciplined, self-monitored, and self-corrective.

### **Crystallized Intelligence**

A form of cognitive ability, representing a broad cluster of primary mental abilities acquired via acculturation, reflecting the acquired store of factual knowledge (compare fluid intelligence).

### **Fluid Intelligence**

A broad cluster of primary mental abilities acquired via incidental learning experiences, reflecting the ability to reason and actively process complex information (compare crystallized intelligence).

### **General Mental Ability**

General mental ability (GMA, sometimes psychometric  $g$ ) is the underlying attribute accounting for performance on a wide range of tests and cognitively demanding tasks; some critics of the construct attribute  $g$  to statistical artifact.

### **Intelligence**

A mental ability (or set of mental abilities) that permit the recognition, learning, memory for, and capacity to reason about a particular form of information, such as verbal information.

### **Primary Mental Abilities**

Constructs revealed by factor analysis to be essential components of intelligence. The psychometrician Louis Thurstone proposed that there are seven primary abilities: verbal ability (V), word fluency (WF), numerical ability (N), spatial intelligence (S), memory (M), perceptual speed (P), and reasoning (R). As can be seen from the table above, many more have been discovered over the years, and those listed here continue to be added to with the advent of new scientific findings.

### **Specific Factor(s)**

Abilities unique to specific ability tests, over and above general mental ability, in the early intelligence theory of Charles Spearman.

## **Glossary of Terms Associated with Methods/Models**

### **Achievement Tests**

Generally, a cognitive test designed to measure acquired knowledge within a subject matter domain. Often defined via distinction, achievement tests emphasize ability acquired through formal learning or training, whereas aptitude tests emphasize innate potential. In addition to their use in academic areas, achievement tests are employed for a variety of vocational, professional, and diagnostic purposes.

### **Aptitude Tests**

Assessment instruments designed to measure (a) individual concrete abilities such as visual acuity and clerical performance; (b) abilities of candidates for professional training, such as in medicine, engineering, or pharmacy; or (c) a wide range of basic abilities required for academic or vocational success, such as verbal comprehension, numerical ability, mechanical knowledge, and reasoning.

### **Biodata Method**

Also known as biographical data, this is a method for collecting information about an individual's background that can be used to predict future performance.

### **Case Study**

An in depth and detailed analysis of a single individual (often in a clinical context) or of a single rare event.

### **Chronometric Measures**

Indices of behavior based on reaction times, typically obtained in controlled laboratory studies of simple tasks.

### **Cognitive Lab**

Used mostly in the assessment industry, a cognitive lab is a set of methods deployed to study the cognitive processes one uses when completing a task such as solving mathematics problems, answering a question about one's attitudes, or interpreting a passage of text.

### **Criterion-Referenced Tests**

Tests in which the individual is scored in relation to a specific standard, instead of having their performance compared to the performance of other examinees.

### **Cross-Sectional Study**

A study in which a sample of participants is tested on a single occasion only (compare longitudinal study).

**Dimensional Model**

A model of traits or other constructs that assumes that they vary in a continuous fashion, rather than being distinct types or categories. For example, rather than assume that people are either extraverts or introverts (types), it is supposed that extraversion-introversion is a spectrum along which people show varying degrees of extraverted and introverted qualities.

**Evidence-Centered Design**

A term frequently used in educational assessment that is more generally represented by the concept of evidence-based design. The latter is a formal process for the conscientious, explicit, and judicious (i.e., free from various cognitive biases) use of current best evidence from scientific research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project.

**Experimental Group**

A group of participants exposed to various levels of the treatment variable (“independent variable”) in an experiment. The responses of the experimental group are compared to the responses of the control group, other experimental groups, or both.

**Forced-Choice Method**

The forced-choice method is the use of two or more specific response options on a questionnaire or survey, for example “Yes” versus “No” or “Most Like Me” versus “Neutral” versus “Least Like Me”. The method forces the respondent to commit to an actual answer.

**Formative Assessment**

A set of methods and procedures for monitoring student learning to provide ongoing feedback that can be used (a) by instructors to improve their teaching practices and (b) by students to improve their learning and related outcomes (see also Summative Assessment).

**Informed Consent**

The principle that individual’s participating in psychological research or assessment should be informed beforehand about the nature of the task and the potential risks and threats inherent in the activity.

**Intervention**

A generic term for a systematic program that aims to improve behavioral competence and/or wellbeing in some specific context. Examples are school programs for enhancing learning, training courses at work, and psychotherapies.

**Longitudinal Study**

A study where the same sample of people are tested on two or more occasions at different ages, sometimes over many years (compare cross-sectional study).

### **Multiple Intelligence Model**

Howard Gardner's theory that there are many independent types of intelligence, including musical intelligence, spatial intelligence, and interpersonal intelligence, as well as cognitive intelligence.

### **Multi-Stratum Models**

Models of ability or personality dimensions that discriminate multiple strata or levels of constructs, differing in how broadly defined the dimensions are. Upper level constructs are far-reaching in scope (e.g., general mental ability, crystallized intelligence, fluid intelligence), whereas lower strata are narrowly defined (e.g., primary mental abilities).

### **Multi-Trait Multi-Method (MTMM) Assessment Systems**

MTMM is a technique that uses the correlations between multiple methods (e.g., self-report, peer-report, forced-choice) and multiple traits (e.g., Big Five) to assess the validity of a measurement event or process. When used to form an assessment system, the scoring and reporting is intended to circumvent problems (e.g., faking, response bias) evident in using any one method in isolation.

### **Natural Language Processing (NLP)**

NLP is a branch of the science of artificial intelligence concerned with analyzing, understanding and generating the languages that humans use naturally. NLP techniques allow the human to interface with computers in both written and spoken contexts using natural human languages instead of computer languages.

### **Peer-Report Method**

Assessment of a target person by peers (e.g., classmates, work associates, etc.).

### **Post-Test**

Testing done after a treatment or intervention has ended; post-test scores are compared to pre-test scores in order to see if change has occurred.

### **Pre-Test**

Testing done before treatment has occurred in-order to establish a baseline score.

### **Projective Measures**

Measure of personality, often more subjectively scored, that involves analyzing an individual's responses to abstract or unstructured stimuli (e.g., inkblots, ambiguous pictures).

### **Psychological Test**

Measurement instrument that consists of a sample of behavior obtained under standardized conditions and employing established scoring rules. The test provides quantitative scores for some psychological construct.



**Psychometrics**

The science of applying measurement principles to psychological qualities, leading to development and formal evaluation of psychological tests.

**Response Style**

A general tendency by participants to agree or disagree with statements, independent of test content.

**Qualitative Methods**

Well-articulated scientific methods of observation that allow the researcher to gather non-numerical data (e.g., cog labs).

**Self-Report Method**

A statement or series of answers to questions provided by an individual as to his or her mental state, feelings, beliefs, and so forth. Self-report methods may be impacted by the honesty and self-awareness of the participant.

**Situational Judgment Test**

A test that presents complex work, education, or social situations in a written, video, or narrative format, and requires the respondents to assess the desirability of various action alternatives.

**Summative Assessment**

A set of methods and procedures for evaluating student learning at the end of an instructional unit or perhaps developmental period by comparing it against some objective standard or established benchmark (see also Formative Assessment).

## **Glossary of Terms Associated with Statistics/Psychometrics**

### **Analysis of Variance (ANOVA)**

Statistical technique for comparing multiple means, typically within an experimental design (see also F-test).

### **Bias**

Tendency of an assessment device to make systematic errors in prediction for a particular social group (e.g., racial, ethnic, or cultural).

### **Coefficient of Correlation**

A statistical measure of the degree of linear association between two variables, designated by  $r$ . It ranges from +1.00 (perfect positive relationship) to -1.00 (perfect inverse relationship). The statistic gives an effect size for the strength of the association; it may also be tested for statistical significance.

### **Concurrent Validity Evidence**

A form of test validity demonstrated by the relationship between a test and another related criterion measured at the same time.

### **Confirmatory Factor Analyses**

A set of procedures used in the technique of data condensation called “factor analysis”, intended to demonstrate that a group of variables possess a theoretically expected structure (see also structural equation modeling).

### **Confounding Variable**

An extraneous variable that covaries with the independent variable and lead to an alternative explanation of the results.

### **Consequential Validity**

Both the unintended and intended consequences associated with the use of a psychological or educational test.

### **Construct**

A hypothetical factor that, although it cannot be observed directly, can be inferred from behavioral regularities that follow certain circumstances.

### **Content Validity Evidence**

Determination of how well a test covers the content it sets out to cover.

### **Convergent Validity Evidence**

Evidence demonstrating that performance on a test correlates with other measures of the same construct.

**Criterion**

An external measure or outcome against which performance on a test is often compared.

**Criterion Contamination**

An instance when the test being used as a predictor contains items that inflate its observed relationship to the criterion being predicted.

**Criterion Validity Evidence**

An index of how well a test correlates with a criterion, that is, an established standard of comparison. The criterion can be measured before, after, or at the same time as the test being validated (see also predictive validity).

**Discriminant Validity Evidence**

A form of “construct validity” demonstrated by showing that measures of constructs that are conceptually unrelated do not correlate in the data.

**Ecological Validity**

The degree to which results obtained from research or experiment is representative of conditions in the wider world. For example, psychological research carried out exclusively among first year psychology college students might have a low ecological validity when applied to the population.

**Effect Size**

The quantitative strength of a statistical relationship between variables. A relationship or effect may attain statistical significance but remain trivial if the effect size is very small.

**Error**

The difference between the obtained and true score on a test.

**Exploratory Factor Analyses**

A set of data-analytical techniques, applied to a covariance or correlation matrix, which may reveal the fundamental dimensions underlying the set of correlation coefficients.

**F-test**

Statistic used to test the statistical significance of differences between multiple means, often used with analysis of variance.

**Face Validity**

The extent to which a test (on face value) appears to provide a reasonable and acceptable measure.

**Factor Analysis**

A statistical technique that is used to analyze patterns of relationship among (many) different psychological variables. See also confirmatory factor analyses and exploratory factor analyses.

**Goodness of Fit**

A statistical measure that establishes whether an observed frequency distribution differs from a theoretical (expected) distribution.

**Incremental Validity**

The extent to which a test adds to the predictive validity already provided by other measures, when multiple tests are used to predict some independent criterion.

**Internal Consistency Reliability**

A measure of reliability that involves assessing consistency in performance across test items (see Cronbach alpha coefficient).

**Item Analysis**

A set of statistical techniques for analyzing responses to individual test items and the relationship between item and total test characteristics.

**Item Response Theory**

A modern psychometric theory of measurement, which assumes that the probability of a correct response on an ability (and sometimes noncognitive) test is a function of the person's underlying latent trait and other parameters, such as item difficulty and guessing.

**Linear Transformation**

A method of transforming a psychological test score to produce a more useful scale of measurement without changing the essential characteristics of that score.

**Mean**

The sum of all the scores divided by the number of scores (average).

**Measurement**

Concerned with the assignment of numerals to objects according to a set of rules.

**Mediator**

A variable that transmits the effect of an independent variable on a dependent variable; the mediator may indicate an intervening mechanism that explains the effect of the independent variable. For example, maladaptive coping may mediate the effect of neuroticism on emotional distress (distinguish from moderator).

**Meta-analysis**

A statistical technique that aggregates then summarizes the findings from a large pool of related studies in terms of effect sizes.

**Moderator**

A factor or variable that controls the strength and direction of the association between two other variables. For example, social support moderates the association between life events and stress symptoms (distinguish from mediator).

**Multiple Regression**

A statistical technique used to predict a criterion variable from multiple independent measures. The multiple correlation coefficient is designated as R and indicates the effect size (0 – 1.0). It may also be tested for statistical significance.

**Negative Correlation**

A relationship where as one of the dimensions increase, the other decreases.

**Nomological Net(work)**

A conceptual network, often comprising inferences about a variable. More generally, this represents the interconnected terms and ideas that scientists use to understand their field of study. Scientists' ideas are characterized as connected with one another in logical fashion, and as tied to real-world phenomena, in an integrated, meaningful fashion.

**Norms**

A detailed record of test performance in a normative group, used to generate an assessment of relative performance levels.

**Objective Test**

A test that can be scored in a simple, concise, clerical manner against some independent standard of accuracy; such as multiple choice or true-false questions that have explicit correct and incorrect answers.

**Predictive Validity Evidence**

An index of how well a test correlates with a variable that is measured in the future, at some point after the test has been administered (e.g., relationship between high school achievement test scores and future college first year GPA).

**Partial Correlation**

The correlation between two variables that remains after controlling for one or more other variables; a process described as “partialling-out”. Partial correlations may be used to control for confounding variables; for example, we might calculate a correlation to test whether intelligence predicts job proficiency with social class “partialled-out”.

**Quasi-Experimental Design**

A type of study, often comparing different groups in the real world, that may be analyzed as though it were an experiment. Such designs cannot yield causal conclusions about the effect of an independent variable because there is incomplete control over all the variables.

### **Reliability**

The accuracy with which a test measures whatever underlying quality or construct it assesses; technically, the correlation between observed test scores and the underlying 'true scores' on the measured construct. Statistics for quantifying reliability include Cronbach alpha, which assesses internal consistency reliability, and test-retest reliability coefficients, which assess stability.

### **Regression Analysis**

Any of several statistical techniques that are designed to allow the prediction of the score on one variable, the dependent variable, from the scores on one or more other variables, the independent variables.

### **Stability**

The consistency of test scores over a specified period, assessed by a test-retest reliability coefficient.

### **Standard Error of Measurement**

A measure of the variability in scores expected as a result of measurement error.

### **Statistical Significance**

Loosely, a statistical test is said to be significant when it can be demonstrated that the probability of obtaining a given effect by chance is low. More precisely, significance indicates that the probability of the null hypothesis (that there is actually no effect) is sufficiently low (typically <5%) that we can reject the null hypothesis. That is, the data are compatible with there being a real effect (see also effect size).

### **Structural Equation Modeling**

A statistical technique for modeling causal relationships between multiple variables that are typically latent variables (not measured directly). The adequacy of the model is assessed using a goodness of fit statistic.

### **t-test**

A statistical test of whether the means of two variables differ from one another significantly (see statistical significance).

### **Test Fairness**

A test should be reliable and valid in all cultural, racial and other demographic groups that may take it. In addition, test items should not be offensive, irrelevant or meaningless to individuals belonging to specific groups.

### **Test-Retest Reliability Coefficient**

The correlation between scores on the same test taken on two occasions separated by a designated time interval, providing an index of stability. If the test measures a stable trait, the coefficient may be used as an index of reliability.

**True Score**

The expected value of a test score if measured with perfect reliability (i.e., the average value expected over many, many measurements).

**Validity**

The capacity of a test score to reflect the underlying construct that it purports to measure. High reliability is a necessary condition for validity evidence, but the converse is not true. Evidence for validity may be provided by concurrent validity, consequential validity, content validity, convergent validity, criterion validity, discriminant validity, ecological validity, face validity, incremental validity, and predictive validity. Note though that these terms frequently change (predictive validity is now referred to as test-criterion evidence), and this makes the terminology surrounding this domain tricky even for the most seasoned science-practitioner. But the intent is almost always the same: To demonstrate the test is meaningful and useful for its intended purpose.

**Variance**

Basically, a statistical measure of how far a data set is spread out. The technical definition is: “The average of the squared differences from the mean”. Absent of establishing variance the score given by an assessment loses its validity, since it assumes all people are equal on that trait (which in turn means no meaningful claim can be supported).