

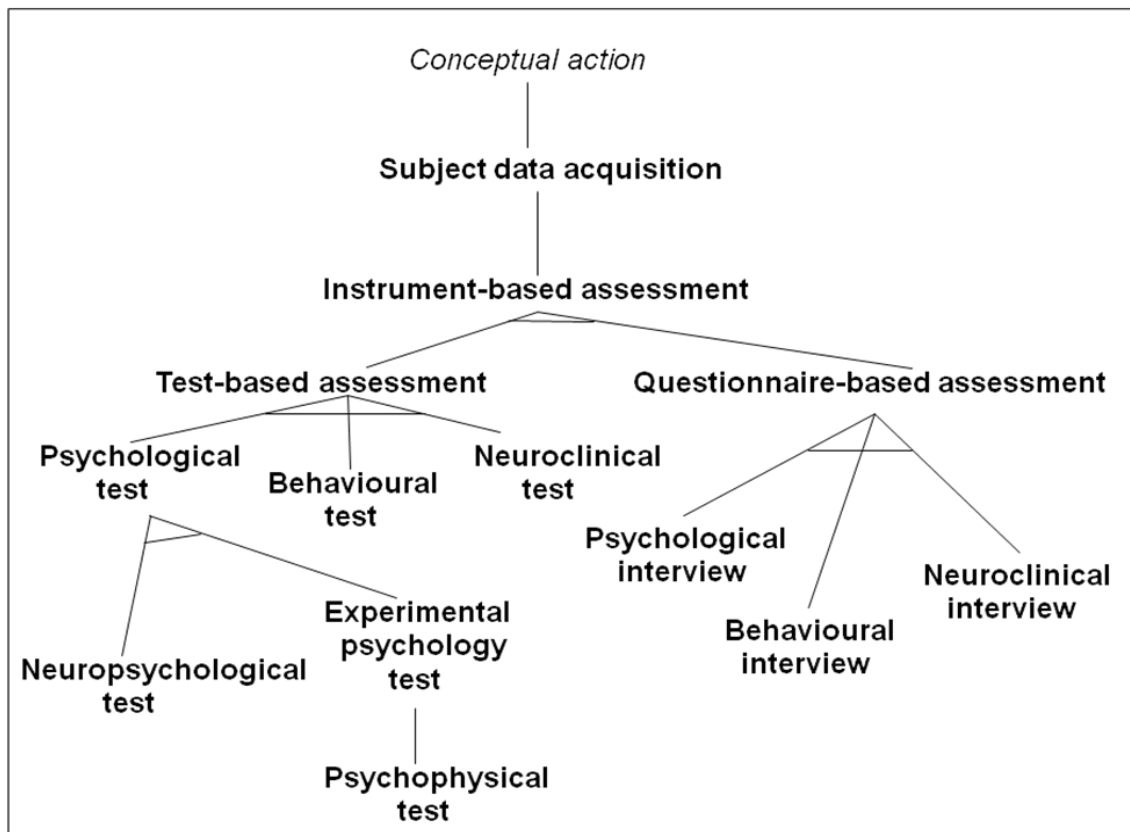
## Instrument-OS

// Metadata

Name	Instrument-OS
Keywords	Psychological instrument, Behavioural instrument, Scale, Test-instrument, Mono-domain instrument, Instrument variable, Main variable, Standardized variable, Cultural skill dependent variable, Test, Score, Maximum score, Coded score, Numerical score, Raw score
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Has contributor	Bénédicte Batrancourt, Michel Dojat, Adrien Fanet, Bernard Gibaud, Gilles Kassel
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Is of type	Domain ontology
Natural language	English
Has ontology language	OntoSpec
Has formality level	Semi-informal
Has reference	<ul style="list-style-type: none"><li>- M.D. Lezak, D.B. Howieson, D. W. Loring, H.J. Hannay, J.S. Fischer, <i>Neuropsychological Assessment</i>, Oxford University Press, 2004.</li><li>- CDISC (Clinical Data Interchange Standards Consortium), CDISC Clinical Research Glossary Version 7.0, <i>Applied Clinical Trials</i> (2008), 12-58. Available at: <a href="http://www.cdisc.org/glossary/CDISC2008GlossaryVersion7.0.pdf">http://www.cdisc.org/glossary/CDISC2008GlossaryVersion7.0.pdf</a></li></ul>
Ressource locator	<a href="http://www.laria.u-picardie.fr/IC/site/IMG/pdf/Instrument-OS.pdf">http://www.laria.u-picardie.fr/IC/site/IMG/pdf/Instrument-OS.pdf</a>
Version	1.0
Number of concepts (classes)	48
Number of relations (properties)	18

### 1) Instrument-based assessments

// Concepts



## Subject data acquisition

### Meta-properties

SUBJECT DATA ACQUISITION is RIGID (**R**). SUBJECT DATA ACQUISITION is EXTERNALLY-DEPENDENT (**+D**).

### Properties

[EP/SL] A SUBJECT DATA ACQUISITION is a CONCEPTUAL ACTION. [EP/ER] Every SUBJECT DATA ACQUISITION *has for agent* a HUMAN *at* a TIME INTERVAL. [EP/ER] Every SUBJECT DATA ACQUISITION *affects* exactly one SUBJECT *at* a TIME INTERVAL.

### Comment

[DEF] A Subject data acquisition is an action which is conducted to capture some required information (data pertaining to the status of a subject under investigation) along with study conditions.

## Instrument-based assessment, Instrument administration, Testing

### Meta-properties

INSTRUMENT-BASED ASSESSMENT is RIGID (**+R**). INSTRUMENT-BASED ASSESSMENT is EXTERNALLY-DEPENDENT (**+D**). TEST-BASED ASSESSMENT and QUESTIONNAIRE-BASED ASSESSMENT *is a non-trivial partition of* INSTRUMENT-BASED ASSESSMENT.

### Properties

[EP/SL] An INSTRUMENT-BASED ASSESSMENT, or INSTRUMENT ADMINISTRATION, or TESTING, is a SUBJECT DATA ACQUISITION. [EP/ER] Every INSTRUMENT-BASED ASSESSMENT *has for instrument* exactly one SUBJECT DATA ACQUISITION INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every

INSTRUMENT-BASED ASSESSMENT *is a proper part of* exactly one EXAMINATION.

**Comment**

[DEF] An Instrument-based assessment is a Subject data acquisition which involves the integration of data from instruments: tests and/or questionnaires. An Instrument-based assessment relies on a wide range of procedures, methods and techniques for use in psychological, behavioural and neuroclinical assessment, for the measurement of subject data. An Instrument-based assessment is normally designed to be administered under carefully controlled or standardised conditions that embody systematic scoring data.

[SA] INSTRUMENT-BASED ASSESSMENTS are divided among TEST-BASED ASSESSMENTS and QUESTIONNAIRE-BASED ASSESSMENTS according to the kind of instrument which is administered and therefore to the specific roles played by the subject and the healthcare professional in the assessment.

Test-based assessment

**Meta-properties**

TEST-BASED ASSESSMENT is RIGID (+**R**). TEST-BASED ASSESSMENT is EXTERNALLY-DEPENDENT (+**D**). PSYCHOLOGICAL TEST, BEHAVIOURAL TEST, and NEUROCLINICAL TEST *is a disjunction sub-division of* TEST-BASED ASSESSMENT.

**Properties**

[EP/SLD] A TEST-BASED ASSESSMENT is an INSTRUMENT-BASED ASSESSMENT which *has for instrument* exactly one TEST-INSTRUMENT *at a* TIME INTERVAL.

**Comment**

[DEF] A Test-based assessment is an Instrument-based assessment which involves the integration of data from tests. A Test-based assessment is conducted as a formal testing session to provide normative data, consistent measures about cognitive function ability. These procedures require the performance of tasks or operations (e.g., work samples, psycho-motor tracking tests) and provide measures of cognitive task execution performance.

[SA] TEST-BASED ASSESSMENTS are divided among PSYCHOLOGICAL TESTS, BEHAVIOURAL TESTS and NEUROCLINICAL TESTS according to the kind of instrument that is used.

Psychological test

**Meta-properties**

PSYCHOLOGICAL TEST is RIGID (+**R**). PSYCHOLOGICAL TEST is EXTERNALLY-DEPENDENT (+**D**). NEUROPSYCHOLOGICAL TEST and EXPERIMENTAL PSYCHOLOGY TEST *is a disjunctive sub-division of* PSYCHOLOGICAL TEST.

**Properties**

[EP/SLD] A PSYCHOLOGICAL TEST is a TEST-BASED ASSESSMENT which *has for instrument* exactly one TEST-INSTRUMENT which is a PSYCHOLOGICAL INSTRUMENT *at a* TIME INTERVAL. [EP/ER] Every PSYCHOLOGICAL TEST *is a proper part of* exactly one PSYCHOLOGICAL EXAMINATION.

**Comment**

[ALIGN] “Standardized tests designed to measure abilities, as in intelligence, aptitude, and achievement tests, or to evaluate personality traits”. (Source: MSH/MH). (Concept:

[CUI C0033905] Psychological Tests (procedure), Semantic Type: Diagnostic Procedure).

[SA] PSYCHOLOGICAL TESTS are divided among NEUROPSYCHOLOGICAL TESTS and EXPERIMENTAL PSYCHOLOGY TESTS according to the kind of instrument that is used.

## Neuropsychological test

### Meta-properties

NEUROPSYCHOLOGICAL TEST is RIGID (+**R**). NEUROPSYCHOLOGICAL TEST is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SLD] A NEUROPSYCHOLOGICAL TEST is a PSYCHOLOGICAL TEST which *has for instrument* exactly one NEUROPSYCHOLOGICAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every NEUROPSYCHOLOGICAL TEST *is a proper part of* exactly one NEURO-PSYCHOLOGICAL EXAMINATION.

### Comment

[DEF & CIT] “Neuropsychological tests are specifically designed tasks used to measure a psychological function known to be linked to a particular brain structure or pathway. They usually involve the systematic administration of clearly defined procedures in a formal environment. Neuropsychological tests are typically administered to a single person working with an examiner in a quiet office environment, free from distractions. As such, it can be argued that neuropsychological tests at times offer an estimate of a person's peak level of cognitive performance. Neuropsychological tests are a core component of the process of conducting neuropsychological assessment” (Source: [://en.wikipedia.org](http://en.wikipedia.org)).

[ALIGN] “Tests designed to assess neurological function associated with certain behaviors; used in diagnosing brain dysfunction or damage and central nervous system disorders or injury.” (Source: CSP/PT). (Concept: [CUI C0027902] Neuropsychological Tests, Semantic Type: Diagnostic Procedure).

## Experimental psychology test

### Meta-properties

EXPERIMENTAL PSYCHOLOGY TEST is RIGID (+**R**). EXPERIMENTAL PSYCHOLOGY TEST is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SLD] An EXPERIMENTAL PSYCHOLOGY TEST is a PSYCHOLOGICAL TEST which *has for instrument* exactly one EXPERIMENTAL PSYCHOLOGY INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every EXPERIMENTAL PSYCHOLOGY TEST *is a proper part of* exactly one EXPERIMENTAL PSYCHOLOGY EXAMINATION.

## Psychophysical test

### Meta-properties

PSYCHOPHYSICAL TEST is RIGID (+**R**). PSYCHOPHYSICAL TEST is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SLD] A PSYCHOPHYSICAL TEST is an EXPERIMENTAL PSYCHOLOGY TEST which *has for instrument* exactly one PSYCHOPHYSICAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every PSYCHOPHYSICAL TEST *is a proper part of* exactly one PSYCHOPHYSICAL EXAMINATION.

## Behavioural test

### Meta-properties

BEHAVIOURAL TEST is RIGID (+**R**). BEHAVIOURAL TEST is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SLD] A BEHAVIOURAL TEST is a TEST-BASED ASSESSMENT which *has for instrument* exactly one TEST-INSTRUMENT which is a BEHAVIOURAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every BEHAVIOURAL TEST *is a proper part of* exactly one BEHAVIOURAL EXAMINATION.

### Comment

[ALIGN] “standardized set of questions or stimuli which are administered to assess or measure the presence or absence of a particular skill, knowledge or behavior.” (Source: CSP/PT). (Concept: [CUI C0683444] behavioral test, Semantic Type: Diagnostic Procedure).

## Neuroclinical test

### Meta-properties

NEUROCLINICAL TEST is RIGID (+**R**). NEUROCLINICAL TEST is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SLD] A NEUROCLINICAL TEST is a TEST-BASED ASSESSMENT which *has for instrument* exactly one TEST-INSTRUMENT which is a NEUROCLINICAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every NEUROCLINICAL TEST *is a proper part of* exactly one NEURO-CLINICAL EXAMINATION.

## Questionnaire-based assessment

### Meta-properties

QUESTIONNAIRE-BASED INTERVIEW is RIGID (+**R**). QUESTIONNAIRE-BASED INTERVIEW is EXTERNALLY-DEPENDENT (+**D**). PSYCHOLOGICAL INTERVIEW, BEHAVIOURAL INTERVIEW, and NEUROCLINICAL INTERVIEW *is a disjunctive sub-division of* QUESTIONNAIRE-BASED ASSESSMENT.

### Properties

[EP/SL] A QUESTIONNAIRE-BASED ASSESSMENT is an INSTRUMENT-BASED ASSESSMENT.

### Comment

[DEF] A Questionnaire-based assessment is an Instrument-based assessment which involves the integration of data from questionnaires. A questionnaire-based assessment involves sets of questions (items), carried out in a structured way (known as structured interview) or semi-structured way, to provide normative data, consistent measures about intensity/severity of a subject's trait (behavioral, personality, psychological, psychopathological). Interview-based measures and rating scales are designed to be completed by clinicians, subjects, parents, caregivers. The scoring of each item contributes to the measure of each major content (trait: eg. Sadness) constituent of the explored domain (eg. Depression).

[ALIGN] “A directed conversation with the subject aimed at eliciting information for psychiatric diagnosis, evaluation, treatment planning, etc. The interview may be conducted by a social worker or psychologist.” (Source: MSH/MH). (Concept: [CUI C0021819] Interview, Psychological, Semantic Type: Diagnostic Procedure).

[SA] QUESTIONNAIRE-BASED ASSESSMENTS are divided among PSYCHOLOGICAL INTERVIEWS, BEHAVIOURAL INTERVIEWS, and NEUROCLINICAL INTERVIEWS according to the kind of questionnaire that is used.

### Psychological interview

#### Meta-properties

PSYCHOLOGICAL INTERVIEW is RIGID (+**R**). PSYCHOLOGICAL INTERVIEW is EXTERNALLY-DEPENDENT (+**D**).

#### Properties

[EP/SLD] A PSYCHOLOGICAL INTERVIEW is a QUESTIONNAIRE-BASED ASSESSMENT which *has for instrument* exactly one QUESTIONNAIRE which is a PSYCHOLOGICAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every PSYCHOLOGICAL INTERVIEW *is a proper part of* exactly one PSYCHOLOGICAL EXAMINATION.

#### Comment

[DEF] < A psychological interview is a Questionnaire-based assessment which involves sets of questions (items), carried out in a structured way (known as structured interview) or semi-structured way, during a psychological examination, to provide normative data, consistent measures about intensity/severity of a psychological and/or psychopathological trait.>

### Behavioural interview

#### Meta-properties

BEHAVIOURAL INTERVIEW is RIGID (+**R**). BEHAVIOURAL INTERVIEW is EXTERNALLY-DEPENDENT (+**D**).

#### Properties

[EP/SLD] A BEHAVIOURAL INTERVIEW is a QUESTIONNAIRE-BASED ASSESSMENT which *has for instrument* exactly one QUESTIONNAIRE which is a BEHAVIOURAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every BEHAVIOURAL INTERVIEW *is a proper part of* exactly one BEHAVIOURAL EXAMINATION.

#### Comment

[DEF] < A behavioural interview is a Questionnaire-based assessment which involves sets of questions (items), carried out in a structured way (known as structured interview) or semi-structured way, during a behavioral examination, to provide normative data, consistent measures about intensity/severity of a behavioral trait.>

### Neuroclinical interview

#### Meta-properties

NEUROCLINICAL INTERVIEW is RIGID (+**R**). NEUROCLINICAL INTERVIEW is EXTERNALLY-DEPENDENT (+**D**).

#### Properties

[EP/SLD] A NEUROCLINICAL INTERVIEW is a QUESTIONNAIRE-BASED ASSESSMENT which *has for instrument* exactly one QUESTIONNAIRE which is a NEUROCLINICAL INSTRUMENT *at* a TIME INTERVAL. [EP/ER] Every NEUROCLINICAL INTERVIEW *is a proper part of* exactly one NEUROCLINICAL EXAMINATION.

#### Comment

[DEF] < A neuroclinical interview is a Questionnaire-based assessment which involves sets of questions (items), carried out in a structured way (known as structured interview)

or semi-structured way, during a neurological examination, to provide normative data, consistent measures about intensity/severity of a neurological trait.>

## 2) Subject data acquisition instruments

// Relations

Explores

### Properties

[EP/DR & RR] A SUBJECT DATA ACQUISITION ARTEFACT *explores* a DOMAIN.

[EP/IVL] *Explores* mutually implies *is explored by*.

### Comment

[DEF] A SUBJECT DATA ACQUISITION ARTEFACT, i.e. a SUBJECT DATA ACQUISITION INSTRUMENT or an INSTRUMENT VARIABLE, allows exploring different kinds of entities (e.g. states, abilities, cognitive function, behaviour) that constitute the DOMAIN of the ARTEFACT.

Has for sub-instrument

### Properties

[EP/DR & RR] A SUBJECT DATA ACQUISITION INSTRUMENT *has for sub-instrument* a SUB-INSTRUMENT. [EP/SL] *x has for sub-instrument y* implies that *x has for constant part y*. [EP/IVL] *Has for sub-instrument* mutually implies *is a sub-instrument of*.

Has for variable

### Properties

[EP/DR & RR] A SUBJECT DATA ACQUISITION INSTRUMENT *has for variable* an INSTRUMENT VARIABLE. [EP/SL] *x has for variable y* implies that *x has for constant part y*. [EP/IVL] *Has for variable* mutually implies *is a variable of*.

Is a sub-instrument of

### Properties

[EP/DR & RR] A SUB-INSTRUMENT *is a sub-instrument of* a SUBJECT DATA ACQUISITION INSTRUMENT. [EP/SL] *x is a sub-instrument of y* implies that *x is a constant part of y*. [EP/IVL] *Is a sub-instrument of* mutually implies *has for sub-instrument*.

Is a variable of

### Properties

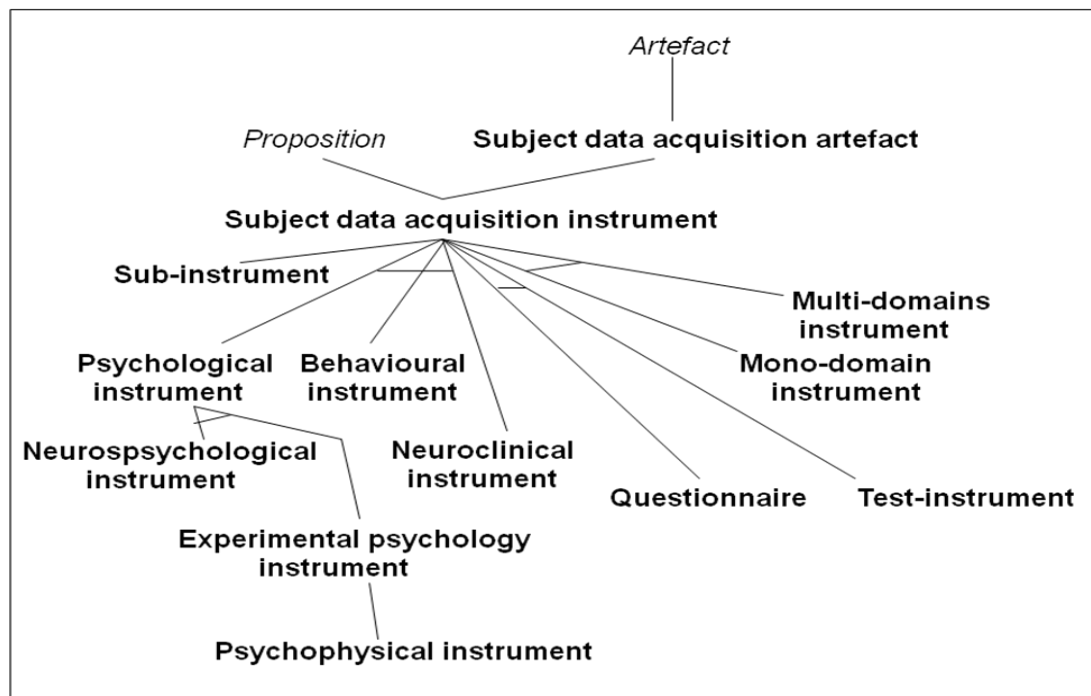
[EP/DR & RR] An INSTRUMENT VARIABLE *is a variable of* a SUBJECT DATA ACQUISITION INSTRUMENT. [EP/SL] *x is a variable of y* implies that *x is a constant part of y*. [EP/IVL] *Is a variable of* mutually implies *has for variable*.

Is explored by

### Properties

[EP/DR & RR] A DOMAIN is explored by a SUBJECT DATA ACQUISITION ARTEFACT. [EP/IVL] *Is explored by* mutually implies *explores*.

// Concepts



Domain

#### Meta-properties

DOMAIN is ANTI-RIGID ( $\sim R$ ). DOMAIN is EXTERNALLY-DEPENDENT ( $+D$ ).

#### Properties

[EP/SLD] A DOMAIN is a CONCEPT which *is explored by* a SUBJECT DATA ACQUISITION ARTEFACT.

Subject data acquisition artefact

#### Meta-properties

SUBJECT DATA ACQUISITION ARTEFACT is RIGID ( $R$ ). SUBJECT DATA ACQUISITION ARTEFACT is EXTERNALLY-DEPENDENT ( $+D$ ).

#### Properties

[EP/SL] A SUBJECT DATA ACQUISITION ARTEFACT is an ARTEFACT which *allows to carry out* SUBJECT DATA ACQUISITIONS.

Subject data acquisition instrument

#### Meta-properties

SUBJECT DATA ACQUISITION INSTRUMENT is RIGID ( $+R$ ). SUBJECT DATA ACQUISITION INSTRUMENT is EXTERNALLY-DEPENDENT ( $+D$ ). MULTI-DOMAINS INSTRUMENT and MONO-DOMAIN INSTRUMENT *is a non-trivial partition of* SUBJECT DATA ACQUISITION INSTRUMENT. PSYCHOLOGICAL INSTRUMENT, BEHAVIOURAL INSTRUMENT, and NEUROCLINICAL INSTRUMENT *is a disjunctive sub-division of* SUBJECT DATA ACQUISITION INSTRUMENT.



INSTRUMENT. QUESTIONNAIRE and TEST-INSTRUMENT is a *disjunctive sub-division* of SUBJECT DATA ACQUISITION INSTRUMENT.

**Properties**

[EP/SLD] A SUBJECT DATA ACQUISITION INSTRUMENT is a PROPOSITION which is a SUBJECT DATA ACQUISITION ARTEFACT. [EP/ER] Every SUBJECT DATA ACQUISITION INSTRUMENT *has for name* at least one NAME. [EP/ER] Every SUBJECT DATA ACQUISITION INSTRUMENT *explores* at least one DOMAIN. [EP/ER] Every SUBJECT DATA ACQUISITION INSTRUMENT *refers to* at least one INSTRUMENT DEFINITION ARTICLE.

**Comment**

[DEF & CIT] Instrument (CDISC Clinical Research Glossary, v. 7.0): “A means to capture data (e.g., questionnaire, diary) plus all the information and documentation that support its use. NOTE: Generally, instruments include clearly defined methods and instructions for administration or responding, a standard format for data collection, and well-documented methods for scoring, analysis, and interpretation of results.”

[SA] SUBJECT DATA ACQUISITION INSTRUMENTS are divided among PSYCHOLOGICAL INSTRUMENTS, BEHAVIOURAL INSTRUMENTS, and NEUROCLINICAL INSTRUMENTS according to the kind of entity (a function or a behaviour) they explore.

[SA] SUBJECT DATA ACQUISITION INSTRUMENTS are divided among QUESTIONNAIRES and TEST-INSTRUMENTS according to their mode of administration and whether they involve sets of questions, or require the performance of tasks or operations.

[SA] SUBJECT DATA ACQUISITION INSTRUMENTS are divided among MONO-DOMAIN INSTRUMENTS and MULTI-DOMAINS INSTRUMENTS according to the number of DOMAINS they *explore*.

**Mono-domain instrument**

**Meta-properties**

MONO-DOMAIN INSTRUMENT is RIGID (+**R**). MONO-DOMAIN INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A MONO-DOMAIN INSTRUMENT is a SUBJECT DATA ACQUISITION INSTRUMENT which *explores* exactly one DOMAIN.

**Multi-domains instrument**

**Meta-properties**

MULTI-DOMAINS INSTRUMENT is RIGID (+**R**). MULTI-DOMAINS INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A MULTI-DOMAINS INSTRUMENT is a SUBJECT DATA ACQUISITION INSTRUMENT which *explores* at least two DOMAINS.

**Sub-instrument**

**Meta-properties**

SUB-INSTRUMENT is RIGID (+**R**). SUB-INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A SUB-INSTRUMENT is a SUBJECT DATA ACQUISITION INSTRUMENT which *is a sub-instrument of* exactly one SUBJECT DATA ACQUISITION INSTRUMENT.

## Psychological instrument

### Meta-properties

PSYCHOLOGICAL INSTRUMENT is RIGID (+**R**). PSYCHOLOGICAL INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**). NEUROPSYCHOLOGICAL INSTRUMENT and EXPERIMENTAL PSYCHOLOGY INSTRUMENT *is a disjunctive sub-division of* PSYCHOLOGICAL INSTRUMENT.

### Properties

[EP/SL] A PSYCHOLOGICAL INSTRUMENT is a SUBJECT DATA ACQUISITION INSTRUMENT which *explores* mental states, functions and behaviour. [EP/NMC] Every SUB-INSTRUMENT of a PSYCHOLOGICAL INSTRUMENT is itself a PSYCHOLOGICAL INSTRUMENT.

### Comment

[SA] PSYCHOLOGICAL INSTRUMENTS are divided among NEUROPSYCHOLOGICAL INSTRUMENTS and EXPERIMENTAL PSYCHOLOGY INSTRUMENTS according to the kind of DOMAINS they explore.

## Neuropsychological instrument

### Meta-properties

NEUROPSYCHOLOGICAL INSTRUMENT is RIGID (+**R**). NEUROPSYCHOLOGICAL INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SL] A NEUROPSYCHOLOGICAL INSTRUMENT is a PSYCHOLOGICAL INSTRUMENT which *explores* function of the brain (known to be linked to a particular brain structure or pathway) related to specific psychological processes and overt behaviors. [EP/NMC] Every SUB-INSTRUMENT of a NEUROPSYCHOLOGICAL INSTRUMENT is itself a NEUROPSYCHOLOGICAL INSTRUMENT.

### Comment

[DEF] NEUROPSYCHOLOGICAL INSTRUMENTS are used as tools in NEUROPSYCHOLOGICAL EXAMINATIONS to measure a psychological function known to be linked to a particular brain structure or pathway.

[CIT] “Most neuropsychological tests in current use are based on traditional psychometric theory. In this model, a person's raw score on a test is compared to a large general population normative sample, that should ideally be drawn from a comparable population to the person being examined. Normative studies frequently provide data stratified by age, level of education, and/or ethnicity, where such factors have been shown by research to affect performance on a particular test. This allows for a person's performance to be compared to a suitable control group, and thus provide a fair assessment of their current cognitive functioning.” (Wikipedia)

## Experimental psychology instrument

### Meta-properties

EXPERIMENTAL PSYCHOLOGY INSTRUMENT is RIGID (+**R**). EXPERIMENTAL PSYCHOLOGY INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

### Properties

[EP/SLD] An EXPERIMENTAL PSYCHOLOGY INSTRUMENT is a PSYCHOLOGICAL INSTRUMENT which *explores* the relationship between the nervous system and cognitive function. [EP/NMC] Every SUB-INSTRUMENT of an EXPERIMENTAL PSYCHOLOGY INSTRUMENT is itself an EXPERIMENTAL PSYCHOLOGY INSTRUMENT.

#### Psychophysical instrument

##### Meta-properties

PSYCHOPHYSICAL INSTRUMENT is RIGID (+**R**). EXPERIMENTAL PSYCHOPHYSICAL INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

##### Properties

[EP/SLD] A PSYCHOPHYSICAL INSTRUMENT is an EXPERIMENTAL PSYCHOLOGY INSTRUMENT which *explores* the relationship between physical stimuli and their subjective correlates, or percepts. [EP/NMC] Every SUB-INSTRUMENT of a PSYCHOPHYSICAL INSTRUMENT is itself a PSYCHOPHYSICAL INSTRUMENT.

#### Behavioural instrument

##### Meta-properties

BEHAVIOURAL INSTRUMENT is RIGID (+**R**). BEHAVIOURAL INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

##### Properties

[EP/SL] A BEHAVIOURAL INSTRUMENT is a SUBJECT DATA ACQUISITION INSTRUMENT which *explores* the subject's behaviour. [EP/NMC] Every SUB-INSTRUMENT of a BEHAVIOURAL INSTRUMENT is itself a BEHAVIOURAL INSTRUMENT. [ICL] No BEHAVIOURAL INSTRUMENT is a TEST-INSTRUMENT.

#### Neuroclinical instrument, neurological instrument

##### Meta-properties

NEUROCLINICAL INSTRUMENT is RIGID (+**R**). NEUROCLINICAL INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

##### Properties

[EP/SL] A NEUROCLINICAL INSTRUMENT, or NEUROLOGICAL INSTRUMENT, is a SUBJECT DATA ACQUISITION INSTRUMENT which *explores* the subject's physiological functions related to the nervous system. [EP/NMC] Every SUB-INSTRUMENT of a NEUROCLINICAL INSTRUMENT is itself a NEUROCLINICAL INSTRUMENT.

##### Comment

[DEF] NEUROCLINICAL INSTRUMENTS are used in neurology, to precisely quantify symptoms and related patient disability.

#### Questionnaire

##### Meta-properties

QUESTIONNAIRE is RIGID (+**R**). QUESTIONNAIRE is EXTERNALLY-DEPENDENT (+**D**).

##### Properties

[EP/SL] A QUESTIONNAIRE is a SUBJECT DATA ACQUISITION INSTRUMENT.

##### Comment

[DEF & CIT] Questionnaire (CDISC Clinical Research Glossary, v. 6.0): *A set of questions or items shown to a respondent in order to get answers for research purposes.*

Test-instrument

**Meta-properties**

TEST-INSTRUMENT is RIGID (+**R**). TEST-INSTRUMENT is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A TEST-INSTRUMENT is a SUBJECT DATA ACQUISITION INSTRUMENT.

**Comment**

[DEF] A test-instrument is an instrument that solicits an authentic production from the subject, e.g., a reflex, a performance (such as a drawing, or a 500-meter walk). This production is recorded under control of a healthcare professional, but remains objective.

### 3) Instrument variables

// Relations

Has for allowed coded variable value

**Properties**

[EP/DR & RR] A CODED VARIABLE *has for allowed coded variable value* a CODED VARIABLE VALUE. [EP/IVL] *Has for allowed coded variable value* mutually implies *Is an allowed coded variable value of*.

Has for maximum coded variable value

**Properties**

[EP/DR & RR] A CODED VARIABLE *has for maximum coded variable value* a CODED VARIABLE VALUE. [EP/SL] *x has for maximum coded variable value y* implies that *x has for allowed coded variable value y*.

Has for minimum coded variable value

**Properties**

[EP/DR & RR] A CODED VARIABLE *has for minimum coded variable value* a CODED VARIABLE VALUE. [EP/SL] *x has for minimum coded variable value y* implies that *x has for allowed coded variable value y*.

Has for score value

**Properties**

[EP/DR & RR] A NUMERICAL VARIABLE *has for score value* a NUMBER.

Has for maximum score value

**Properties**

[EP/DR & RR] A NUMERICAL VARIABLE *has for maximum score value* a NUMBER. [EP/SL] *x has for maximum score value y* implies that *x has for score value y*.

Has for minimum score value

**Properties**

[EP/DR & RR] A NUMERICAL VARIABLE *has for minimum score value* a NUMBER.

[EP/SL] *x has for minimum score value y implies that x has for score value y.*

Has for score

**Properties**

[EP/DR & RR] An INSTRUMENT VARIABLE *has for score* a SCORE. [EP/IVL] *Has for score mutually implies is a score of.*

Is measured by

**Properties**

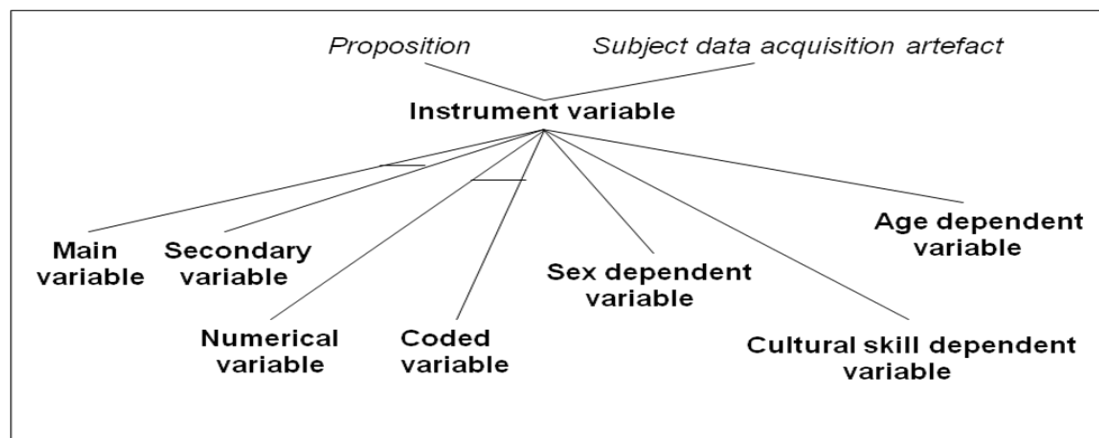
[EP/DR & RR] A QUALITY is measured by an INSTRUMENT VARIABLE. [EP/IVL] *Is measured by mutually implies measures.*

Measures

**Properties**

[EP/DR & RR] An INSTRUMENT VARIABLE *measures* a QUALITY. [EP/IVL] *Measures mutually implies is measured by.*

// Concepts



Instrument variable

**Meta-properties**

INSTRUMENT VARIABLE is RIGID (+**R**). INSTRUMENT VARIABLE is EXTERNALLY-DEPENDENT (+**D**). MAIN VARIABLE and SECONDARY VARIABLE *is a non-trivial partition of* INSTRUMENT VARIABLE. NUMERICAL VARIABLE and CODED VARIABLE *is a non-trivial partition of* INSTRUMENT VARIABLE.

**Properties**

[EP/SL] An INSTRUMENT VARIABLE is a PROPOSITION which is a SUBJECT DATA ACQUISITION ARTEFACT. [EP/ER] Every INSTRUMENT VARIABLE *has for name* an ACRONYM. [EP/ER] Every INSTRUMENT VARIABLE *is a variable of* exactly one SUBJECT DATA ACQUISITION INSTRUMENT. [EP/ER] Every INSTRUMENT

VARIABLE *explores* exactly one DOMAIN. [EP/ER] Every INSTRUMENT VARIABLE *measures* exactly one QUALITY.

**Comment**

[DEF] An Instrument variable is the part of an instrument that refers to the precise measurement of a specific quality of a subject's performance or a subject's trait (in a qualitative or quantitative way), and to the related domain (of brain) that it allows to explore. Instrument variables specify how the registering of scores must be done, by characterizing the domain of values of the scores. Of course, several instrument variables may be necessary to characterize the subject's performance or trait.

[SA] INSTRUMENT VARIABLES are divided among MAIN and SECONDARY VARIABLES according to whether they explore the same domain than the SUBJECT DATA ACQUISITION INSTRUMENT.

[SA] INSTRUMENT VARIABLES are divided among NUMERICAL and CODED VARIABLES according to the way the score they register is coded (i.e. by a NUMBER or a lexical item).

**Main variable**

**Meta-properties**

MAIN VARIABLE is RIGID (+**R**). MAIN VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A MAIN VARIABLE is an INSTRUMENT VARIABLE.

**Comment**

[DEF] A main variable explores the same cognitive function or trait of the subject than the instrument.

**Secondary variable**

**Meta-properties**

SECONDARY VARIABLE is RIGID (+**R**). SECONDARY VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A SECONDARY VARIABLE is an INSTRUMENT VARIABLE.

**Comment**

[DEF] A secondary variable provides some additional information about a cognitive function or a trait of the subject.

**Coded variable**

**Meta-properties**

CODED VARIABLE is RIGID (+**R**). CODED VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SLD] A CODED VARIABLE is an INSTRUMENT VARIABLE which *has for allowed coded variable value* CODED VARIABLE VALUES.

**Comment**

[DEF] <à compléter>

**Numerical variable**

**Meta-properties**

NUMERICAL VARIABLE is RIGID (+**R**). NUMERICAL VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SLD] A NUMERICAL VARIABLE is an INSTRUMENT VARIABLE which *has for score value* NUMBERS.

**Comment**

[DEF] <à compléter>

## Age dependent variable

**Meta-properties**

AGE DEPENDENT VARIABLE is RIGID (+**R**). AGE DEPENDENT VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] An AGE DEPENDENT VARIABLE is an INSTRUMENT VARIABLE.

**Comment**

[DEF] An age dependent variable supports the registering of a standard score which is function of the subject's age.

## Cultural skill dependent variable

**Meta-properties**

CULTURAL SKILL DEPENDENT VARIABLE is RIGID (+**R**). CULTURAL SKILL DEPENDENT VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A CULTURAL SKILL DEPENDENT VARIABLE is an INSTRUMENT VARIABLE.

**Comment**

[DEF] A cultural skill dependent variable supports the registering of a standard score which is function of the subject's cultural skill.

## Sex dependent variable

**Meta-properties**

SEX DEPENDENT VARIABLE is RIGID (+**R**). SEX DEPENDENT VARIABLE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A SEX DEPENDENT VARIABLE is an INSTRUMENT VARIABLE.

**Comment**

[DEF] A sex dependent variable supports the registering of a standard score which is function of the subject's sex.

**4) Scores and Score codes**

## // Relations

## Codes

**Properties**

[EP/DR & RR] A SCORE CODE *codes* a CODED VARIABLE VALUE. [EP/IVL] *Codes* mutually implies *is coded by*.

## Qualitatively codes

**Properties**

[EP/DR & RR] A QUALITATIVE SCORE CODE *qualitatively codes* a QUALITATIVE CODED VARIABLE VALUE. [EP/SL] x *qualitatively codes* y implies that x *codes* y. [EP/IVL] *Qualitatively codes* mutually implies *is qualitatively coded by*.

**Quantitatively codes****Properties**

[EP/DR & RR] A QUANTITATIVE SCORE CODE *quantitatively codes* a QUANTITATIVE CODED VARIABLE VALUE. [EP/SL] x *quantitatively codes* y implies that x *codes* y. [EP/IVL] *Quantitatively codes* mutually implies *is quantitatively coded by*.

**Is a score of****Properties**

[EP/DR & RR] A SCORE *is a score of* an INSTRUMENT VARIABLE. [EP/IVL] *Is the score of* mutually implies *has for score*.

**Is a coded score of****Properties**

[EP/DR & RR] A CODED SCORE *is a coded score of* a CODED VARIABLE. [EP/SL] x *is a coded score of* y implies that x *is a score of* y.

**Is a numerical score of****Properties**

[EP/DR & RR] A NUMERICAL SCORE *is a numerical score of* a NUMERICAL VARIABLE. [EP/SL] x *is a numerical score of* y implies that x *is a score of* y.

**is an allowed coded variable value of****Properties**

[EP/DR & RR] A CODED VARIABLE VALUE *is an allowed coded variable value of* a CODED VARIABLE. [EP/IVL] *Is an allowed coded variable value of* mutually implies *has for allowed coded variable value*.

**Is coded by****Properties**

[EP/DR & RR] A CODED SCORE *is coded by* a SCORE CODE. [EP/IVL] *Is coded by* mutually implies *codes*.

**Is qualitatively coded by****Properties**

[EP/DR & RR] A CODED SCORE *is qualitatively coded by* a QUALITATIVE SCORE CODE. [EP/SL] x *is qualitatively coded by* y implies that x *is coded by* y. [EP/IVL] *Is qualitatively coded by* mutually implies *qualitatively codes*.

**Is quantitatively coded by****Properties**

[EP/DR & RR] A CODED SCORE *is quantitatively coded by* a QUANTITATIVE SCORE CODE. [EP/SL] x *is quantitatively coded by* y implies that x *is coded by* y. [EP/IVL] *Is quantitatively coded by* mutually implies *qualitatively codes*.



Is specialised by

**Properties**

[EP/DR & RR] A CODED VARIABLE VALUE *is specialized by* a CODED SCORE.

[EP/IVL] *Is specialised by* mutually implies *specialises*.

Is derived from

**Properties**

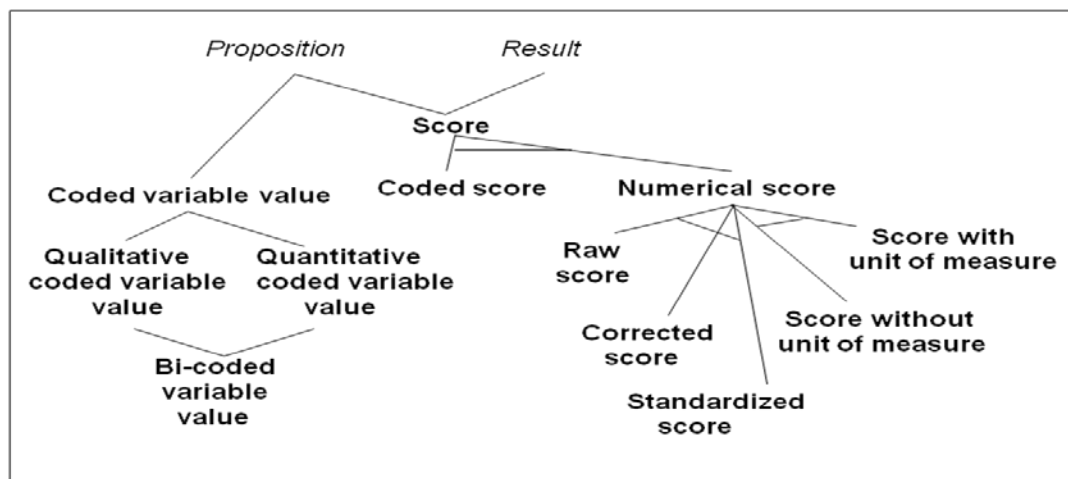
[EP/EDR & RR] A CORRECTED SCORE or a STANDARDIZED SCORE *is derived from* a RAW SCORE.

Specialises

**Properties**

[EP/DR & RR] A CODED SCORE *specialises* a CODED VARIABLE VALUE. [EP/IVL] *Specialises* mutually implies *is specialised by*.

// Concepts



Coded variable value

**Meta-properties**

CODED VARIABLE VALUE is ANTI-RIGID (~**R**). CODED VARIABLE VALUE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SLD] A CODED VARIABLE VALUE is a PROPOSITION which *is an allowed coded variable value of* exactly one CODED VARIABLE. [EP/ER] Every CODED VARIABLE VALUE *is specialized by* CODED SCORES.

Qualitative coded variable value

**Meta-properties**

QUALITATIVE CODED VARIABLE VALUE is ANTI-RIGID (~**R**). QUALITATIVE CODED VARIABLE VALUE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SLD] A QUALITATIVE CODED VARIABLE VALUE is a PROPOSITION which *is qualitatively coded by* exactly one QUALITATIVE SCORE CODE.

### Quantitative coded variable value

#### Meta-properties

QUANTITATIVE CODED VARIABLE VALUE is ANTI-RIGID (**~R**).  
QUANTITATIVE CODED VARIABLE VALUE is EXTERNALLY-DEPENDENT (**+D**).

#### Properties

[EP/SLD] A QUANTITATIVE CODED VARIABLE VALUE is a PROPOSITION which *is quantitatively coded by* exactly one QUANTITATIVE SCORE CODE.

### Bi-coded variable value

#### Meta-properties

BI-CODED VARIABLE VALUE is ANTI-RIGID (**~R**). BI-CODED VARIABLE VALUE is EXTERNALLY-DEPENDENT (**+D**).

#### Properties

[EP/SLD] A BI-CODED VARIABLE VALUE is a PROPOSITION which *is qualitatively coded by* exactly one QUALITATIVE SCORE CODE and which *is quantitatively coded by* exactly one QUANTITATIVE SCORE CODE.

### Score

#### Meta-properties

SCORE is ANTI-RIGID (**~R**). SCORE is EXTERNALLY-DEPENDENT (**+D**). CODED SCORE and NUMERICAL SCORE *is a non-trivial partition of* SCORE.

#### Properties

[EP/SLD] A SCORE is a PROPOSITION which *is the result of* exactly one INSTRUMENT-BASED ASSESSMENT *at* a TIME INTERVAL. [EP/ER] Every SCORE *is a score of* exactly one INSTRUMENT VARIABLE.

#### Comment

[DEF] <à compléter>

[SA] SCORES are divided into CODED SCORES AND NUMERICAL SCORES according to whether they are coded by a LEXICAL ITEM or a NUMBER.

### Coded score

#### Meta-properties

CODED SCORE is ANTI-RIGID (**~R**). CODED SCORE is EXTERNALLY-DEPENDENT (**+D**).

#### Properties

[EP/SLD] A CODED SCORE is a SCORE which *is a coded score of* exactly one CODED VARIABLE. [EP/ER] Every CODED SCORE *specialises* exactly one CODED VARIABLE VALUE.

### Numerical score

#### Meta-properties

NUMERICAL SCORE is ANTI-RIGID (**~R**). NUMERICAL SCORE is EXTERNALLY-DEPENDENT (**+D**). SCORE WITH UNIT OF MEASURE and SCORE WITHOUT UNIT OF MEASURE *is a non-trivial partition of* NUMERICAL SCORE. RAW SCORE, CORRECTED SCORE, and STANDARDIZED SCORE *is a non-trivial partition of* NUMERICAL SCORE.

**Properties**

[EP/SLD] A NUMERICAL SCORE is a SCORE which *is a numerical score of a NUMERICAL VARIABLE*. [EP/ER] Every NUMERICAL SCORE *refers to* exactly one NUMBER.

Score with unit of measure

**Meta-properties**

SCORE WITH UNIT OF MEASURE is ANTI-RIGID (~**R**). SCORE WITH UNIT OF MEASURE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SLD] A SCORE WITH UNIT OF MEASURE is a NUMERICAL SCORE which *refers to* a UNIT OF MEASURE.

Score without unit of measure

**Meta-properties**

SCORE WITHOUT UNIT OF MEASURE is ANTI-RIGID (~**R**). SCORE WITHOUT UNIT OF MEASURE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SLD] A SCORE WITHOUT UNIT OF MEASURE is a NUMERICAL SCORE which doesn't *refer to* a UNIT OF MEASURE.

Raw score

**Meta-properties**

RAW SCORE is ANTI-RIGID (~**R**). RAW SCORE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A RAW SCORE is a NUMERICAL SCORE.

**Comment**

[DEF & CIT] (M.D. Lezak *et al.*, 2004): "The raw score is the simple sum of correct answers or correct answers minus a portion of the incorrect ones. For in itself a raw score communicates nothing about its relative value"

Standardized score

**Meta-properties**

STANDARDIZED SCORE is ANTI-RIGID (~**R**). STANDARDIZED SCORE is EXTERNALLY-DEPENDENT (+**D**).

**Properties**

[EP/SL] A STANDARDIZED SCORE is a NUMERICAL SCORE. [EP/ER] Every STANDARDIZED SCORE *is derived from* exactly one RAW SCORE. [EP/ER] Every STANDARDIZED SCORE *refers to* at least one SCORE STANDARDIZATION ARTICLE.

**Comment**

[DEF & CIT] (M.D. Lezak *et al.*, 2004): "To make the comparisons necessary for evaluating impairment, test-makers generally reports scores as values of a scale based on the raw scores made by a standardization population (the group of individual tested for the purpose of obtaining normative data on the test). The scale that is most meaningful statistically is one derived from the normal probability curved and based on the standard deviation unit. There are a variety of standard scores that are all translations of the same scale, based on the mean and the standard deviation.

The z-score is the basic, unelaborated standard score from which all others can be derived. The z-score represents, in standard deviation units, the amount a score deviates from the mean of the population from which the score is drawn. The mean of the normal curve is set at zero and the standard deviation unit has a value of one. Scores are stated in term of their distance from the mean as measured in standard deviation units. Scores above the mean have a positive value; those below the mean are negative. Neuropsychological test data can be handled very appropriately in a z-score format. Elaborations of the z-score are called derived scores. Among the most widely used derived scores are T-scores, which are very popular in educational testing. The T-score has a mean of 50 and a standard deviation of 10.”

### Corrected score

#### Meta-properties

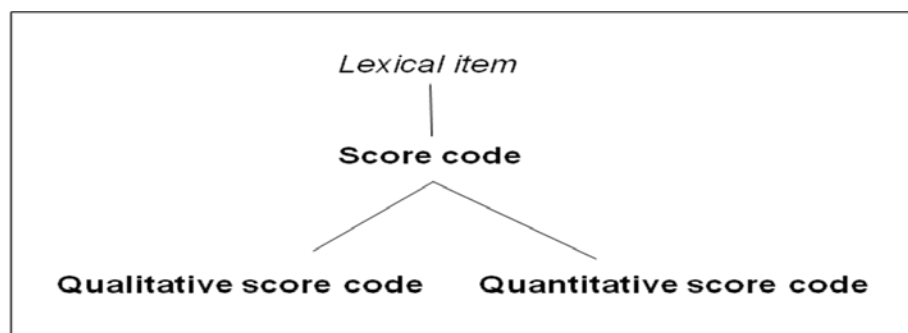
CORRECTED SCORE is ANTI-RIGID (~**R**). CORRECTED SCORE is EXTERNALLY-DEPENDENT (+**D**).

#### Properties

[EP/SL] A CORRECTED SCORE is a NUMERICAL SCORE. [EP/ER] Every CORRECTED SCORE *is derived from* exactly one RAW SCORE.

#### Comment

[DEF] The corrected score is the raw score corrected according to the cultural skill, and/or the age, and/or the sex of the subject. The correction is obtained from a table of normative data provided in the manual of the test-based assessment.



### Score code

#### Meta-properties

SCORE CODE is ANTI-RIGID (~**R**). SCORE CODE is EXTERNALLY-DEPENDENT (+**D**)

#### Properties

[EP/SLD] A SCORE CODE is a LEXICAL ITEM which *codes* CODED VARIABLE VALUES.

### Qualitative score code

#### Meta-properties

QUALITATIVE SCORE CODE is ANTI-RIGID (~**R**). QUALITATIVE SCORE CODE is EXTERNALLY-DEPENDENT (+**D**)

#### Properties

[EP/SLD] A QUALITATIVE SCORE CODE is a SCORE CODE which *qualitatively codes* QUALITATIVE CODED VARIABLE VALUES.

**Comment**

[EX] Examples of QUALITATIVE SCORE CODES are ‘occasionally’, ‘frequently’, ‘severe’, ‘moderately serious’.

**Quantitative score code****Meta-properties**

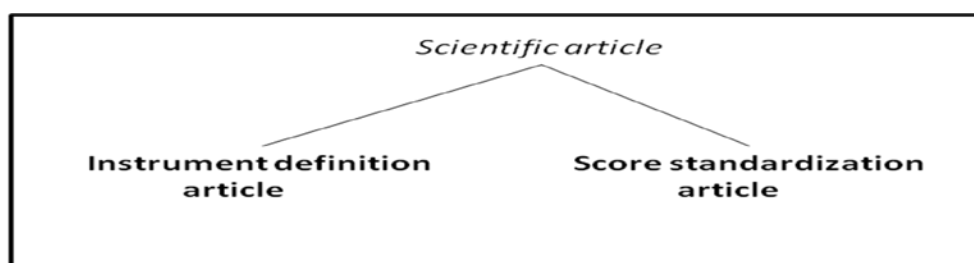
QUANTITATIVE SCORE CODE is ANTI-RIGID (**~R**). QUANTITATIVE SCORE CODE is EXTERNALLY-DEPENDENT (**+D**)

**Properties**

[EP/SLD] A QUANTITATIVE SCORE CODE is a SCORE CODE which *quantitatively codes* QUANTITATIVE CODED VARIABLE VALUES. [EP/ER] Every QUANTITATIVE SCORE CODE *refers to* a NUMBER.

**Comment**

[EX] Examples of QUANTITATIVE SCORE CODES are numerals or numerals followed by a letter (e.g. ‘2a’, ‘3b’).

**Instrument definition article****Meta-properties**

INSTRUMENT DEFINITION ARTICLE is RIGID (**+R**). INSTRUMENT DEFINITION ARTICLE is EXTERNALLY-DEPENDENT (**+D**).

**Properties**

[EP/SL] An INSTRUMENT DEFINITION ARTICLE is a SCIENTIFIC ARTICLE which *expresses at* a TIME INTERVAL a DEFINITION which *defines* a SUBJECT DATA ACQUISITION INSTRUMENT.

**Score standardization article****Meta-properties**

SCORE STANDARDIZATION ARTICLE is RIGID (**+R**). SCORE STANDARDIZATION ARTICLE is EXTERNALLY-DEPENDENT (**+D**).

**Properties**

[EP/SL] A SCORE STANDARDIZATION ARTICLE is a SCIENTIFIC ARTICLE which *expresses at* a TIME INTERVAL a DEFINITION which *defines* a STANDARDIZED SCORE.