Translating and Implementing Measures of Neurocognition in Eastern Europe and Asia

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Founder of NeuroCog Trials, Inc., which provides rater training, data quality assurance and consultation to several pharmaceutical companies and other consortia

Royalties: Brief Assessment of Cognition in Schizophrenia (BACS), MATRICS Consensus Cognitive Battery

MATRICS Consensus Cognitive Battery (MCCB)

Speed of Processing
- Category Fluency
- BACS Symbol Coding
- Trial Making A

Attention / Vigilance
- Continuous Performance Test
  - Identical Pairs version

Working Memory
- Letter Number Span
- WMS-III Spatial Span

Verbal Learning
- Hopkins Verbal Learning Test-R

Visual Learning
- Brief Visuospatial Memory Test-R

Reasoning and Problem Solving
- NAB Mazes

Social Cognition
- MSCEIT Managing Emotions

Nuechterlein et al., *Am J Psychiatry*, 2008

Brief Assessment of Cognition in Schizophrenia (BACS) and Bipolar Disorder (BAC-A)

- **List Learning (Verbal Memory)**
- **Digit Sequencing (Working Memory)**
- **Token Motor Task (Motor Speed)**
- **Verbal Fluency (Processing Speed)**
- **Tower Test (Executive Functions)**
- **Symbol Coding (Attention and Motor Speed)**
- **Affective Interference Test (Emotional Distractibility and Affective Memory)**
- **Emotion Inhibition Test (Emotional Distractibility)**

Fox et al, in preparation

BACS Translation Status

BACS TRANSLATIONS

Language	Stage	Back-Translation	Translated By	Validation	# of Word Lists	Semantic Category	Beautified
Bengali	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Bhasa Indonesian	needs validation	yes	Industry Sponsor	No	8	Animals	No
Bulgarian	incomplete	no	?	No	2	Supermarket Items	No
Czech	final review	yes	Industry Sponsor	No	8	Animals	No
Danish	Semantic?	yes	Birgitte Fargerlund	No	8	Supermarket Items	Yes
Dutch (Flemish)	needs validation	yes	Industry Sponsor	No	8	Animals	No
English	complete	n/a	n/a	Yes	8	Animals	Yes
Finnish	?			No		?	No
French	complete	yes	Marie-Cecile Bralet	Yes	8	Animals	Yes
German	complete		Gabrielle Sachs	Yes	8	Animals	Yes
Gujarati	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Hebrew	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Hindi	needs validation	no	Industry Sponsor	No	8	Animals	Yes
Italian	beautification	yes	Simona Anselmetti	Yes	8	Animals	In process
Japanese	incomplete	yes	Yasuhiro Kaneda	Yes	2	Supermarket Items	No
Kannada	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Malay	not good?	no	?	No	1	Supermarket Items	No
Malaylam	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Mandarin	not good?	no	?	No	1	Supermarket Items	No
Marathi	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Polish	needs validation	yes	Industry Sponsor	No	8	Animals	No
Portugese (Braz.)	incomplete	yes	J.V. Salgado	Yes	2	Supermarket Items	No
Portuguese (Euro.)	in process			No			No
Punjabi	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Romanian	needs validation	Yes	Industry Sponsor	No	8	Animals	Yes
Russian	needs validation	no	Industry Sponsor	No	8	Animals	Yes
Spanish	complete	yes	Nuria Segarra	Yes	8	Animals	Yes
Tagalog (PH)	needs validation	yes	Industry Sponsor	No	8	Animals	No
Tamil	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Telegu	needs validation	yes	Industry Sponsor	No	8	Animals	Yes
Thai	needs validation	yes	Industry Sponsor	No	8	Animals	No
Traditional Chinese (HK)	needs validation	yes	Industry Sponsor	No	8	Animals	No
Traditional Chinese (TW)	needs validation	Yes	Industry Sponsor	No	8	Animals	Yes
Urdu	needs validation	yes	Industry Sponsor	No	8	Animals	Yes

Last update 25 JAN 10

Translation and Cultural Adaptation Guidelines

- Guidelines for adapting psychological tests for different languages and cultures have been established and refined for several decades
- The International Test Commission (ITC) published guidelines for international test adaptation in 2001, which are described in detail in Hambleton, R.K., Merenda, P.F., & Spielberger, C.D. (eds.), *Adapting Educational and Psychological Tests for Cross-Cultural Assessment.* Lawrence Erlbaum, 2005.

Test Equivalence

- Construct equivalence
  - Does the test score accurately represent an individual's standing with respect to the same construct as measured in the target population?
- Functional equivalence
  - Do similar activities and behaviors have the same meaning in different cultural or linguistic groups?
- Translational equivalence
  - One cannot assume that a test translation produces a version that is equivalent to the original in content, difficulty level, reliability and validity
  - Back-translation alone is not sufficient as it does not account for meaning within the new culture: "where does bird with webbed feet usually live?" In Swedish, 'webbed' is translated as 'swimming', making the question easier
- Metric equivalence
  - Do scores in different languages have the same psychometric properties?
    - Demonstration of "Differential Item Functioning" (DIF): members of the two cultures with equal ability should perform equivalently on the adapted test

Standards for Educational and Psychological Testing, American Psychological Association, 1999

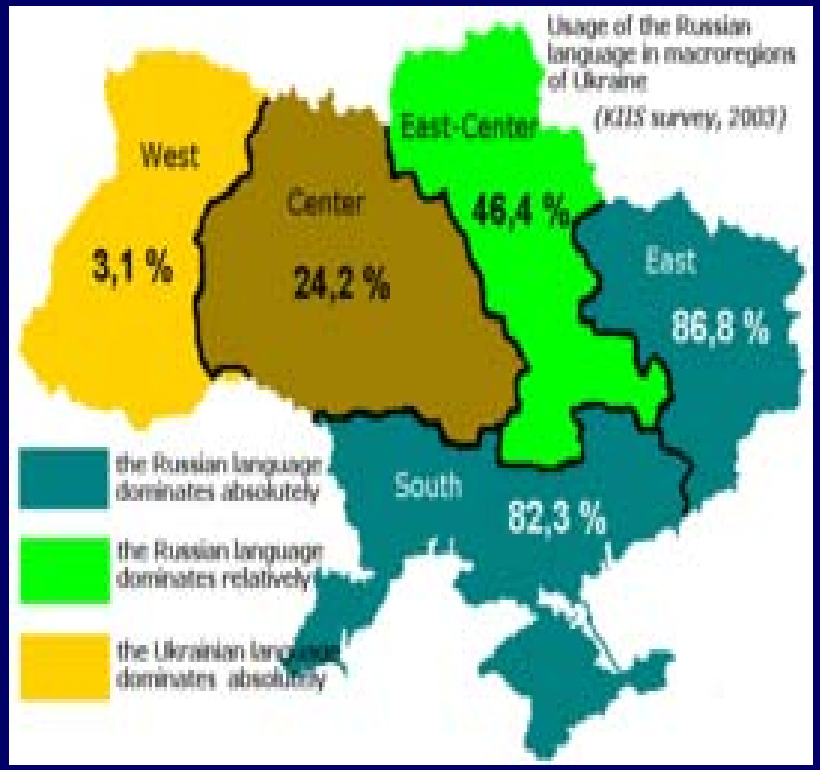
Key General (Seemingly Simple) Questions about Adapted Tests

- Is psychological assessment in the situation valid?
- Is the test battery valid?
- Is the individual test valid? Are items valid?
- Will cultural differentially affect a healthy population and one with a CNS disorder?
- In a test-retest treatment design, how much do these issues really matter?
  - To the extent that a test is not culturally or linguistically equivalent, cognitive outcome measures will increasingly depend upon features that are unrelated to the construct intended, and thus will be increasingly less likely to be sensitive to real treatment change
    - In other words, a drug is very unlikely to teach a patient how to speak English or how to understand American culture

Test Situation

- Test environment
  - How does the culture perceive psychological assessment?
    - Does the patient-doctor relationship change the nature of the test environment? Is gender, age, ethnicity of tester important?
      - E.g. great increase in anxiety or fear of being incorrect
    - The importance of cultural appreciation of *speed*
    - Far more patient refusals in Russia than Singapore
      - "I don't fully understand; I will/won't do it."
    - Incorrect answers have differential effect based upon culture
  - Is a quiet testing environment available?
- Language of choice
  - Some patients in Ukraine refuse to be tested in Russian; others refuse to be tested in Ukrainian

Cognitive Testing In Ukraine



- Ukraine is almost equally divided into language camps, with language issues associated with political alliance and national identity.
- Clinical studies in Ukraine must be sensitive to the linguistic needs and preferences of raters, monitors, and patients.
- Some sites need Russian language materials only, and correspondence with them should be conducted in Russian. Others strongly prefer Ukrainian only. Sites in Kiev may ask for both.
- Sites may have an internal language conflict
- According to the Constitution of the Autonomous Republic of Crimea, Ukrainian is the only state language of the republic. However, the republic's constitution specifically recognizes Russian as the language of the majority of its population and guarantees its usage “in all spheres of public life”. Russian speakers constitute an overwhelming majority of the Crimean population (**97 percent**).

Validity of Test Battery

- Are the translations adequate?
  - Initial translation of the MSCEIT Managing Emotions test in Russian was poor, and some patients refused any further testing
- What is the impact of age, education, ethnicity on the test battery?
  - Does it differ from the normed original?
    - Example of Singapore where English has become the main language of education, and younger people speak fluently and older people are less likely
    - A study of 1,092 community-living elderly, comprising Chinese, Malays, and Indians in Singapore, were given MMSE, Geriatric Mental State, and other demographic and health questionnaires and found significant ethnic differences in mean MMSE scores among non-educated but not educated Chinese, Indians, and Malays.
  - How may differences between healthy and patient groups manifest in test batteries?
    - E.g., older schizophrenia patients in Singapore tend to have less education and may not be able to be tested legitimately in any language
- Are norms necessary in each language? In each culture? APA standards argue so

Cultural Issues with Individual Tests: Social Cognition

- The effect of language and culture on performance varies across individual tests
- Social cognition tests are the most sensitive to cultural differences
  - MSCEIT Managing Emotion items focus on self-reflective insight, which is not encouraged in some cultures.
    - Singaporeans are more likely to respond in terms of satisfying the will of an authority figure. Some Russian patients were offended by the MSCEIT items.
  - Emotion recognition tests should include stimuli (e.g. faces) that are from one's culture.
    - Faces from other cultures are more likely to be perceived as angry

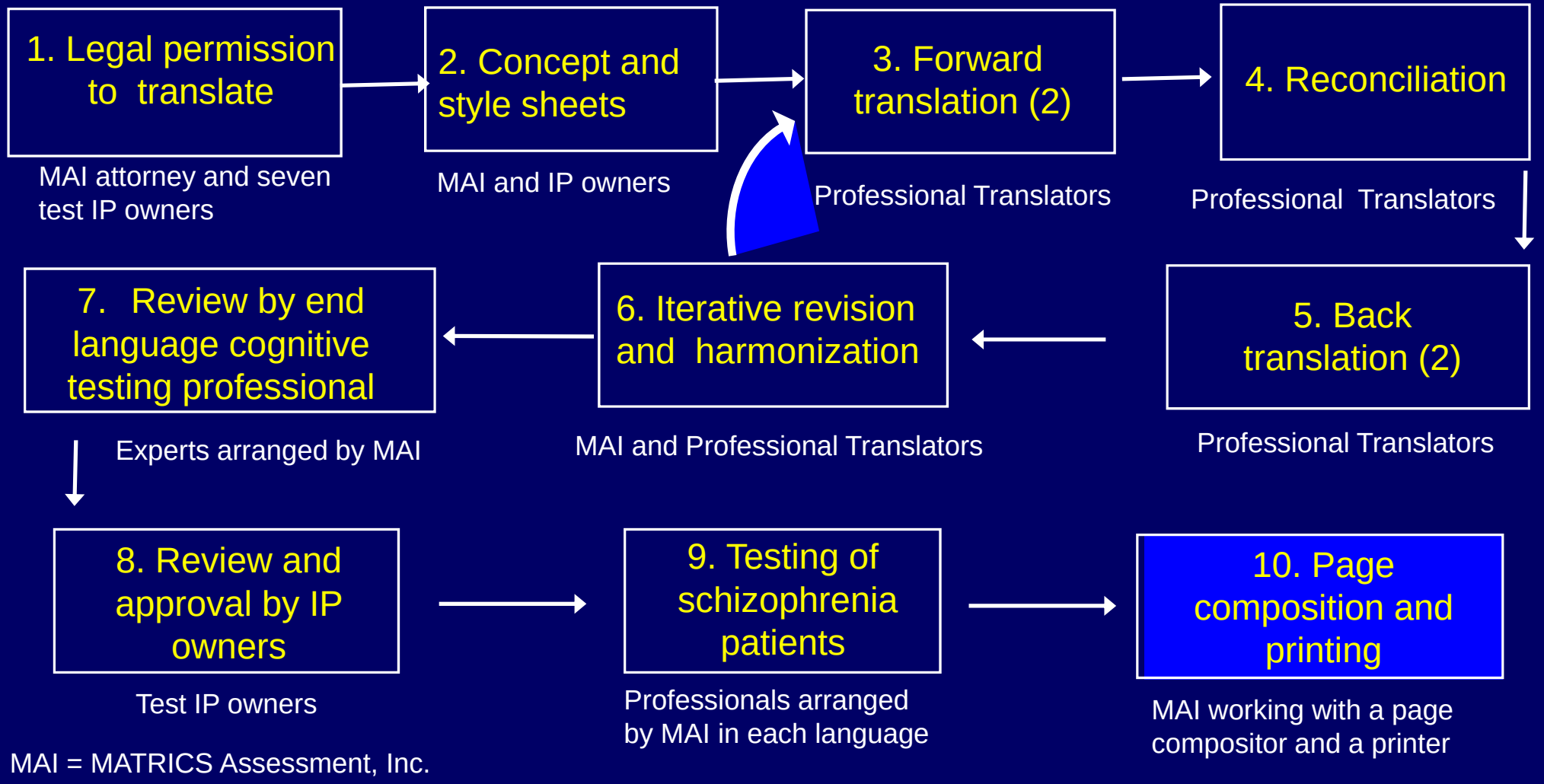
Cultural Issues with Other Key Tests

- Verbal memory tests
  - Direct translation of words is often not sufficient as word frequency reduces the ability to remember a word.
  - Other words do not translate well, eg, ‘four-wheeler’ in Hindi became “Vishnu” the four-legged goddess.
- Letter-number sequencing in Mandarin which does not sequentially order letters.
  - In Russian, ‘Z’ can be a number or a letter
- Verbal stimuli have different emotional valences in different cultures
  - In BAC-A affective interference test with positive, negative and neutral words, is ‘confident’ a positive word?
- Scoring of ‘animal’ responses in verbal fluency.
  - Testers in some cultures do not want to accept ‘man’ as a correct response
  - Indian testers repeatedly score birds as incorrect
- Computerized tests
  - Level of sophistication with computers varies considerably across countries, and is mediated by socioeconomic factors which will not change during a clinical trial

MATRICS-CT: Goals of the Translation Work Stream

1) To establish high-priority languages for translation of the MATRICS Consensus Cognitive Battery (MCCB) to facilitate international clinical trials;
2) To create professionally translated and culturally adapted versions of the MCCB in these languages that are approved and licensed by test developers and intellectual property (IP) owners;
3) To print and arrange distribution of the translated MCCB versions; and
4) To gather community normative data to aid interpretation of these translated MCCB versions.

Steps in Translation and Cultural Adaptation of the MATRICS Consensus Cognitive Battery



MAI = MATRICS Assessment, Inc.

Nuechterlein, MATRICS-CT Meeting, Bethesda, October 27, 2009

Why Collect Community Normative Data?

1. Improves ability to detect “signal” in clinical trials as it reduces error variance due to scaling
2. Puts all tests on common metric (based on mean & SD of stratified community sample)
3. Enables valid composite scores (e.g., overall score)
4. Enables valid comparisons between cognitive domains (to detect domain-specific effects)
5. Provides basis for age, gender, and education corrections

Why Collect Community Normative Data for Translated Versions of Cognitive Batteries?

1. Detects and adjusts for differences in difficulty level between English and translated tests
2. Detects and adjusts for cultural variations in meaning of items
3. Puts scores on common metric across languages (based on mean & SD of stratified community samples)
4. Enables comparisons across samples using different languages (to compare findings and combine data across languages)
5. Improves sensitivity to real treatment signal!

Implementation Issues

- Extra training preparation needed
  - Time for testers to learn testing procedures
  - Extra time for training
    - Translation of training sessions and materials
    - Certification in local language
  - Some individuals may be embarrassed to reveal their limited understanding of English
- General consideration of training differences and the way that the culture experiences being ‘trained’ by someone outside their culture
  - US data review procedures may be experienced as harsh and critical
    - Change of ‘errors’ to ‘inconsistencies’ in Singapore

Summary

- By following established guidelines for translation and cultural adaptation of psychological instruments, culturally valid neurocognitive tests can be developed and implemented in clinical trials
- A variety of issues must be considered and addressed to accomplish this task
- Detailed attention to these issues is likely to enhance any real signal in a clinical trial with cognitive endpoints

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