Adapting the Bilingual Aphasia Test for East Cree speakers

Recommendations for the Cree Health Board

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The Bilingual Aphasia Test: BAT

The underlying scope behind the BAT[1] is to develop an objective and language-equivalent assessment method. In simple words, lay speakers need to be able to administer and score it successfully, and it needs to allow comparison between a speaker's two languages, as well as between speakers of the same language. Specifically, the test aims to determine the level at which the linguistic deficits are situated (phonological, morphological, syntactic or semantic), and the degree to which each language function is affected (comprehension, production, repetition, lexical access, reading, writing).

Currently, there is no universally agreed upon classification of aphasic types based on the BAT score. Each institution/clinician/researcher follows its own internal guidelines. The main advantage of BAT at this point is to reveal which aspects of language are deficient; hence, which aspects of language are in need of rehabilitation. The test is comprised of 32 tasks which aim to asses each of the languages of a bilingual or multilingual individual in an equivalent way. It is important that various versions of BAT be not mere translations of each other, but *culturally* and *linguistically* equivalent tests.

In what follows, we discuss the steps proposed for effective adaptation of the BAT to East Cree. We fist present some overall considerations, followed by a task-by-task analysis with our suggestions.

Overall considerations

The BAT consists of three major parts: A) a history of bilingualism questionnaire ; B) a language specific test; and C) a test for each specific language pair.

A) History of bilingualism questionnaire: the bilingualism questionnaire should be fitted to the lives of Cree individuals.

- Specifically, things such as the number of hours they learn Cree in school as well as interruptions in the learning process need to be considered.
- Changes in Cree dialects need to be considered as well, as Cree speakers might spend some seasons in neighboring communities,

[1] There is also a short version of BAT, which can be used when it is not possible to administer the whole test to a patient.

B) Language specific test: This section contains 32 tasks (e.g., spontaneous speech, pointing, simple commands).

- While many individuals are fluent in Cree and English or French, they might not have the same reading or writing abilities in some of these languages. While some individuals might be able to complete most tasks in English, others might do so in French and others in Cree. We need to consider the rich linguistic profiles of our target population and identify, by language, which tasks require reading and writing.
- Community or individual specific, it might be the case that the spontaneous speech task, verbal auditory discrimination task, and the listening comprehension task might be the only ones relevant.
- We need to evaluate each task, and see whether the grammar aspect is present in both Cree and English or French, and identify grammar aspects that might be problematic in English or French due to negative transfer from Cree (refer to table of Cree specific grammar aspects).
- Stimulus needs to be culturally and linguistically appropriate. Words/vocabulary needs to be culturally relevant (e.g, ties might not be very common in isolated communities, while things such as tamarack trees would be).

C) Test for each specific language pair: this part of the BAT consists of only 4 tasks: word recognition, word translation, translation of sentences, and grammaticality judgements. Out of the 4 tasks, only 1 involves reading, thus only is appropriate for literate individuals in both languages. The other three involve listening and translating, either sentences or words, or judging whether a phrase is grammatical or not. The main concern for this section of the test is to provide stimulus that is culturally appropriate, as well as sentences of equivalent grammatical complexity for the grammaticality judgement task.

1. Word recognition: Task involves reading; therefore, it is only appropriate for individuals able to read in both languages. Words presented need to be culturally appropriate (15 words in English/French, and 15 in Cree).

2. Word translation: Task does NOT involve reading. Words presented need to be culturally appropriate (10 words in English/French, and 10 in Cree).

3. Translation of Sentences: Task does NOT involve reading. Sentences presented need to be culturally appropriate (6 phrases in English/French, and 6 in Cree).

4. Grammaticality Judgements: Task does NOT involve reading. Sentences presented need to be culturally appropriate (8 phrases in English/French, and 8 in Cree).

Psychometric values of the BAT:

The final step is to investigate the psychometric values of the BAT. Specifically, this step would verify the reliability and validity of the English and Cree versions of the BAT. To do so, several groups of individuals should be tested, and if the two versions are appropriately adapted, they should be able to successfully discriminate between groups (e.g., patients with aphasia, mild cognitive impairment, and Alzheimer's disease contrasted with a group of healthy volunteers). Aside from being able to distinguish between people with different degrees of language impairment, the test also needs to measure what it intends to

(e.g., it needs to detect syntactic, semantic, and morphological deficits successfully). To do so, results from the BAT should be compared to other typical aphasia tests.

Task-by-task evaluation

Part A :

History of bilingualism: this section aims to establish the patient's language history. It is not part of the aphasia test itself, but it is intended to obtain information about the patient's premorbid state of bilingualism and contexts of acquisition. If the patient is unable to provide this information, the questionnaire may be completed with the help of family, friends etc. In simple words, this section would allow the test administrator/health care specialist to understand the patient's language abilities before aphasia, in order to understand how much of the language deficiency may be correlated with aphasia, and how much is because of limited knowledge in a certain language or language ability (e.g., was the patient able to read and write in a certain language before aphasia).

Suggestions/concerns: this section needs to be adapted to English, and French and translated to Cree. Moreover, it needs to be adapted to the Cree multilingual background (e.g., to different dialects). On a different note, new questions need to be added to account for the lives of Cree speakers.

Part B:

English background: This section provides information relative to the patient's experience with each language tested. The purpose of the questionnaire is to give an overview of the patterns of language use and acquisition.

Suggestions/concerns: This section needs to be adapted to English, and French and translated to Cree. Moreover, it needs to be adapted to different Cree dialects. New questions need to be added to account for the lives of Cree speakers (e.g., have you ever lived in a different community where Cree was spoken).

Spontaneous speech: This section aims to collect 5 minutes of spontaneous free speech. The analysis of the speech collected here is to be compared with language use in other tasks (e.g., writing), which allows comparison across modalities.

Suggestions/concerns: The only suggestion for this section is to avoid any negative topics when providing suggestions to the patient for the spontaneous speech (e.g., his/her illness).

Verbal comprehension:

Pointing: This section is a test of auditory comprehension. The message length and vocabulary need to be simple, as the aim is to simply test auditory comprehension, and any complexity in the message or instructions would interfere with that.

Suggestions/concerns: Ensure all objects/stimulus are unambiguous and portable. We suggest replacing the words *envelope* and *glass* as they are possibly ambiguous to Cree speakers. A possibility is replacing them with *book* and *cup*.

Simple and semi-complex commands: The simple commands section tests the patient's ability to understand a message. The semi-complex commands section measures the patient's ability to understand and carry out commands that require the manipulation of common objects.

Suggestions/concerns: For the simple commands section, the objects need to have unambiguous names in different Cree dialects. Alternatively, the Cree version should provide the words in two or more dialects. Examples 38-42 require carefully adaptation as some prepositional phrases might be ambiguous in Cree (e.g., put the glass next to the pencil).

Complex commands: This section is a relatively complex test of the patient's comprehension and mnemonic ability.

Suggestions/concerns: This section needs to be adapted to Cree. Specifically, items 43 and 47 are problematic (e.g., the small one, the middle sized one, the large one). For this section we suggest using classifiers, as it would be linguistically appropriate. For 47, getting rid of the ranking should make the task unambiguous without interfering with what it intends to measure.

Verbal auditory comprehension: This section is a composite test of phonemic discrimination and auditory word comprehension.

Suggestions/concerns: Because of its complexity, we propose this section as a separate project, which would on its own (apart from the BAT) have lots of applications such as serve as auditory and production assessment. This section requires completely changing the stimuli list; it requires identifying words with the same minimal pairs across Cree dialects and finding/creating appropriate pictures to match the new set of words. The main difficulty with this task is that is requires phonetic research, to create appropriate sets of minimal pairs.

Syntactic comprehension: This section measures comprehension of sentences in which syntactic construction is systematically varied. **This section require a particularly large adaptation Cree because Cree is a language with free word order, which makes many of the syntactic aspects tested in English inappropriate for Cree.**

Suggestions/concerns:

(1) In Cree there is a contrast between animate and inanimate, as well as transitive animate and transitive inanimate. This adds additional complexity to sentences that are simple in English. (2) The construction *by* as in *the girl is pushed by the boy* is not possible in Cree because the agent is absent in the passive form. A possibility is to keep the passive form and drop the *by* phrase. Another option would be to use transitive sentences with obviative subjects, preferably in the plural because the morphological contrast is clearer in all dialects. 3) Sentences such as *The dog bites the cat* as well as negative sentences such as *The girl does not spray the boy* are possible in Cree, as long as animacy is taken into account. Sentence pairs such as *Show me the mother's baby* versus *Show me the baby's mother* are not appropriate for Cree as Cree does not use possessive in a similar way --it has dependent nouns, always taking possessive inflections for family terms and body-parts. These items will have to be adapted to Cree. Overall, this section requires a systematic analysis of what a Cree speaker masters in terms of syntax. Language attrition is also affecting the Transitive Animate verb, so this needs to be taken into account for younger patients.

Semantic categories:

Synonyms: This section is a complex test of language use assessing the patient's short-term memory, individual word comprehension as well as understanding the relationship of each word to the other words in the sequence (e.g., tulip, rose, frog, daisy).

Suggestions/concerns: This section needs to be adapted to be culturally appropriate. We suggest replacing the fruits and vegetables category as many Cree speakers will not know these, or have neologisms for them. Possible alternatives include types of trees/bush or bodies of water and land.

Antonyms: This section measures the patient's ability to recognize the opposites of common adjectives, and to distinguish adjectival forms from adverbial, nominal and/or verbal forms in particular, it measures in general, the patient's metalinguistic knowledge in this area.

Suggestions/concerns: This section needs to be largely modified for Cree as the adjective/adverb/noun classification does not work (Junker et al. 2012). Items such as *ugly, silent, sad* are verbs in Cree. A possibility is to have items such as *he is sad* versus *he looks sad* versus *it makes him sad*.

Semantic acceptability: This section is firstly a test of general sentence comprehension. A high degree of comprehension is required if the patient is to decide whether a sentence makes sense. As a judgement task, the subtest offers a view of the interface between the patient's real world knowledge and his linguistic knowledge.

Suggestions/concerns: Sentences need to be adapted to Cree and we need to ensure they do not have some sort of metaphorical meaning.

Repetition of words and nonsense words, and lexical decision: measures the patient's ability to repeat monosyllabic and multisyllabic real words as well as monosyllabic and multisyllabic nonwords. It is a composite test of listening and speaking.

Suggestions/concerns: This section requires changing the stimuli list and adapting it to Cree by selecting monosyllabic and multisyllabic Cree words that are culturally appropriate.

Sentence repetition: In this section the patient needs to process and repeat the auditory stimuli. Sentence repetition may be sensitive to the patient's mnemonic ability.

Suggestions/concerns: When adapting the sentences to Cree the aspects mentioned under syntactic comprehension need to be considered, as well as any other syntactic differences between English and Cree. Also, the length of the new sentences should be relatively the same as in English to avoid any unintended cognitive load on the short-term memory.

Series: This section measures the patient's ability to produce highly formulaic and practiced speech.

Suggestions/concerns: Naming all of the months of the year might not be practiced speech for all Cree individuals. We suggest using seasons, or other culturally salient sets.

Verbal fluency: This section measures verbal fluency and word finding difficulty.

Suggestions/concerns: We need to identify Cree sounds that are often found at the beginning of a word in Cree (e.g., sh).

Naming: This section measures single word finding and production ability.

Suggestions/concerns: The stimuli used in this section needs to be culturally appropriate and refer to objects that are available and portable (most of the stimuli is reused from the pointing section, and few new words need to be added).

Sentence construction: This section evaluates the patient's productive ability from different perspectives. First, the task assesses whether the patient can construct a sentence at all. Second, it assesses the grammaticality and semantically of the sentences. Third, it assesses whether the patient uses all the given words, and respects the minimum length requirement.

Suggestions/concerns: The sets of words need to be selected carefully, specifically when it comes to verbs. Different forms of the verb lead to different sentence lengths. This task requires further consideration with respect to the form of the given verbs, and whether we use animate, inanimate, or both.

Semantic opposites: This section assesses the patient's lexical comprehension, word-finding ability, and production. Specifically, it measures whether the patient is able to understand the stimulus word, has access to the stimulus' antonym, and is able to produce that antonym.

Suggestions/concerns: The stimulus would have to be verbs instead of adjectives.

Derivational morphology: This section assesses the patient's morphological ability.

Suggestions/concerns: In this task patients have to change a noun into an adjective, adjective into adverb, noun into verb and so on. There is a high chance that people will not know the different word classes, and the instructions will need to be simplified.

Morphological opposites: This section assesses the patient's morphological ability.

Suggestions/concerns: In Cree antonyms are not necessarily formed by derivational morphology (e.g., pack versus unpack). Instead, we can simply ask patients to form a new work containing/derived from the initial one. Even though this word would not be an antonym, it would still assess the patient's morphological ability.

Description: This section allows comparing the patient's spontaneous speech production with his or her ability to tell a structured story.

Suggestions/concerns: The pictures need to be culturally appropriate, however, also neutral.

Mental arithmetic: This section measures the patient's ability to perform an essentially nonlinguistic cognitive operation. The problems are, however, presented in the language being tested and the patient must give the response in that language. Therefore the test offers the possibility for controlled-cross linguistic comparison of the patient's language input and output performance in such an automatized task.

Suggestions/concerns: The premorbid level of arithmetic knowledge needs to be considered in scoring.

Listening comprehension: This section offers a multifaceted view of the patient's ability to comprehend and produce connected discourse.

Suggestions/concerns: This section does not require any adaptation.

Reading: This section measures the patient's ability to read aloud words, sentences, and a paragraph.

Suggestions/concerns: In Cree, the text might need to be provided in syllabics, latin letters, as well as adapted to different dialects.

Text reading comprehension: This section measures the patient's ability to understand written text and to verbally produce connected discourse.

Suggestions/concerns: In Cree, the text might need to be provided in syllabics, latin letters, as well as adapted to different dialects.

Copying: This section measures the patient's graphemic ability.

Suggestions/concerns: In Cree, the text might need to be provided in syllabics, latin letters, as well as adapted to different dialects. Some Cree speakers might not know how to write in Cree at all. Since the section measures graphemic ability, the patients could potentially be asked to copy a sequence of symbols instead of words.

Dictation: This section is a measure of both receptive and productive abilities, as well as auditory word recognition.

Suggestions/concerns: The words and sentences need to be culturally appropriate. The task is easy to implement in English; however, the Cree version might not be as useful, considering many speakers have limited writing and reading abilities in Cree.

Reading comprehension for words: This section measures the patient's visual word comprehension ability.

Suggestions/concerns: The words need to be culturally appropriate. The task is easy to implement in English; however, the Cree version might not be as useful, considering many speakers have limited writing and reading abilities in Cree.

Reading comprehension for sentences: This section measures the patient's visual sentence comprehension ability.

Suggestions/concerns: The sentences need to be culturally appropriate. The task is easy to implement in English; however, the Cree version might not be as useful, considering many speakers have limited writing and reading abilities in Cree.

Writing: This section measures the patient's expressive ability. It provides data towards the assessment of the patient's fluency, the grammatical complexity and accuracy of his or her utterances, the richness of his or her vocabulary, the coherence and semantic acceptability of his or her discourse, as well as a measure of paraphasias, neologisms, and perseveration in his or her speech.

Suggestions/concerns: The topic should be changed (e.g., *family* instead of *illness*).

Note: the description of each task is from Paradis (1987).

Part C:

This part of the BAT (a language specific test) examines the speaker's performance in each language in 4 modalities:

1. hearing
2. speaking
3. reading
4. writing

In each modality, performance is evaluated at the level of the word, the sentence, and the paragraph. The same considerations as for Part B apply. A good description of literacy profiles among Cree speakers should be prepared: Do people read aloud, silently, and in which language?

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