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Adaptation and validation of Common Object Token (COT) test into the Sinhalese language

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ABSTRACT

Objectives: This manuscript presents a translation and adaptation of the Common Object Token (COT) test, which assesses speech perception, into the Sinhalese language and an attempt to validate it for use on children with normal hearing (NH) and children with a cochlear implant (CI).
Methods: Ninety-five children (70 with NH, 25 with a CI) participated in the study. The COT test was translated, back-translated, and evaluated by a team of experts until the Sinhalese translation was deemed acceptable. Data of Sinhalese children with NH and values of children with a CI were analysed. Internal reliability and consistency of the COT total score were determined. Lastly, a quick version of the COT test was created.
Results: The total mean scores and subtest mean scores improved with age for children with NH. For children with a CI, a strong relationship between the COT total score and device experience, i.e. hearing age, was found. A Quick Sinhalese COT test version, suitable for children with a CI, could be created from Subtests 2, 3, and 4.
Conclusion: The Sinhalese COT test is valid for assessing the age-related development of speech perception and identification skills of children with NH. Results suggest that the COT is valid for use in children with a CI.

1. Introduction

As many factors influence the language development outcomes of cochlear implant (CI) users, regular formal evaluations are necessary to monitor progress post-implantation. The standardized assessment materials used in such formal evaluations of speech perception skills are not widely available in Sinhalese, a language with more than 15 million speakers, the vast majority of whom live in Sri Lanka [1]. Most CI clinics in Sri Lanka resort to using informal translations of the available English assessment materials, e.g. the Common Object Token (COT) test, which is a closed-set test used for assessing the perceptual skills, auditory memory, and auditory-motor integration skills of paediatric CI users as young as 3 years old [2,3]. The COT test was chosen for adaptation into the Sinhalese language for the following reasons: (1) the COT test is useful for children who are able to complete closed set tasks but not quite ready for open set tests, (2) it is interesting for children (because it involves colourful toys), (3) it is suitable for use with children who have limited speech production skills (because it requires a motor response rather than a verbal response), and (4) it is suitable for assessing performance over time (due to demonstrated test/retest reliability) [2].

The current study had the following 3 aims:

- to adapt the COT test into the Sinhalese language,
- to validate the Sinhalese language version of the COT test on children with normal hearing (NH), and
- to use the Sinhalese language version of the COT test to assess the speech perception and identification skills of children with a CI.

2. Materials and methods

2.1. Subjects

Subjects were 95 children and were divided according to unaided hearing ability. All children, by virtue of being Sri Lankan would have participated in the "Child Health Development

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Record" (Revised 2009). This island-wide project, which was established by the Family Health Bureau of Ministry of Health in collaboration with UNICEF and WHO, demands mandatory visits to the Ministry of Health at the age of 1 month, 2, 6, 9, 18, 36, 48, and 60 months. A midwife visits newborns every month until the child's first birthday and, if there are concerns, monthly during the next year also. During these visits each child undergoes a hearing check.

Consent from school authority and parents were obtained prior to study start. If individual children displayed unwillingness to participate, they were excluded.

2.1.1. Children with normal hearing (NH)

Seventy children with NH (35 male, 35 female) were recruited for the study. Mean age at time of testing was 5 years (range 2–8 years). All children (1) were monolingual Sinhalese speakers and (2) were recruited from local schools. Children with diagnosed or obvious sensory, cognitive, or behavioural additional needs, as per school records, were not recruited. NH was not confirmed via audiometry; lack of parental or scholastic report of hearing difficulty was taken a sufficient evidence of NH.

2.1.2. Children with a cochlear implant (CI)

Twenty-five children with a CI (16 male, 9 female) were recruited for the study. Therefrom 3 children with a device experience of less than 7 months were not included in the analyses. Mean age at time of implantation was 4.9 years (range 1–12.6 years). Mean device experience was 22.6 months (range 14–36 months). All children

(1) came from a monolingual Sinhalese background;
(2) had profound, bilateral, prelingual deafness;
(3) were unilaterally implanted with a MED-EL (Innsbruck, Austria) CI;
(4) were implanted between June 2010 and February 2013;
(5) had a device experience of $\geq$1 year at time of testing, and
(6) had no apparent additional needs.

2.2. The test materials: The COT test

The complete MED-EL COT test was used. It contains the following items: a manual with score sheets; 1 train; and 4 cars, helicopters, planes, boats, and circles (1 of each in red, blue, green, and yellow). To avoid confusion generated by the propellers being a different colour than the helicopter body, the test administrator coloured the propellers the same colour as the helicopter bodies.

The complete COT test consists of 6 subtests, each containing 10 sentence-items. Subtests 1 to 6 are arranged in ascending difficulty (i.e. Subtest 1 is the easiest, Subtest 6 the most difficult). Each sentence-item gives a command requiring an action, e.g. 'Point to the blue boat.' to the child being tested. If, after listening to the entire sentence, the child performed the requested motor task correctly, he/she received 1 point. If he/she did not correctly perform the requested motor task, he/she received a score of '0' points. At the end of the test, the child received a total score for each subtest (maximum 10 points) and a grand, or cumulative, total (maximum 60 points).

2.3. Procedure

2.3.1. Adaptation of the COT test into Sinhalese

2.3.1.1. Translation. The COT test score sheets were translated into Sinhalese using the forward-backward translation design, according to best practice recommended by the *International Test Commission* [4,5]. The design mainly focused on keeping the 'variable meaning' in addition to producing a linguistically correct version [6]. The translation from English into Sinhalese (forward translation) was done by a speech language pathologist and audiologist competent in English and Sinhalese, and who has experience working with paediatric CI users. The resulting Sinhalese version was then translated back into English (back translation) by a professional translator, who was supervised by the people in charge of the adaptation process.

In order to create an acceptable Sinhalese version, the 2 English versions were compared item-wise by the people in charge of the adaptation process. Three words were highlighted as being potentially problematic. 'Car' and 'plane' caused concern because they had been translated into Sinhalese although Sinhalese-speaking children routinely use the English words for these vehicles. 'Pick' had been translated to mean 'take'. The expert appraisal method was used to resolve these concerns and arrive at a final Sinhalese version [7].

2.3.1.2. Evaluation of the translations (expert appraisal method). Five experts were chosen for this task: a special educator, a professional translator, a speech therapist, and 2 audiologists. All but one of the experts were experienced in working with hearing-impaired children. The experts compared the 60-sentence-items of Sinhalese version, against the original English version and assessed to what extent they had the same meaning of words and expressions. The sentence-items were rated on a 3-point scale ('1': Not an appropriate translation; needs to be changed; '2': Not an exact translation; but does not need to be changed; '3': An appropriate translation). Evaluation forms were provided to the experts so that the task could be systematically carried out. The experts were also asked to comment and make suggestions for sentences rated '1' and '2'.

A review of suggested corrections was carried out by the expert team and translators. They agreed upon the most suitable translations for the 3 expressions which had caused concern: the English words 'car' and 'plane' were used and the Sinhalese word that means 'take' was retained, even though it was not a linguistic equivalent for word 'pick'. This finalized Sinhalese version was then evaluated by primary teachers to ensure the language was appropriate for children's vocabulary and language experience. The primary teachers approved the language; no changes were necessary.

2.3.2. Administration of the adapted Sinhalese COT test

Administration of the Sinhalese COT test was conducted in a distraction free, quiet room within the school premises for children with NH and at clinical premises of MEDCON Pvt Ltd (Nugegoda, Sri Lanka) for children with a CI. The test administrator was an adult, native Sinhalese speaker.

2.3.2.1. Familiarization. The test administrator reviewed the names and colours of the toys with the subjects and asked them to 'pick' or 'point to' a few of the toys to ensure that any lack of vocabulary knowledge, poor understanding of the task, or poor colour perception did not affect performance.

2.3.2.2. Testing. For children with NH, testing was conducted in quiet rooms; for children with a CI, testing was conducted in quiet rooms at an audiological clinic, as per usual clinical sessions. Subjects were seated in a comfortable chair and the test objects specified for each subtest were placed in a matrix format on the table in front of the child. The test administrator was an audiologist/speech pathologist and a trained media announcer who is experienced with working with children with a CI. Additionally, prior to testing the test administrator had used a