EVALUATION OF ACQUIRED SKILLS IN COMMUNICATION

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Introduction

- Learning language is one of the most important developmental achievements.

- Infants acquire a number of skills and behaviors enabling them to build communication competence throughout the first 12 months of life. (1)


Introduction

- Prelinguistic behaviors occur before the onset of words.

- Individual differences of prelinguistic skills contribute to language outcome in typically developing children. (1)

(1) Watt, Nola; Wetherby, Amy; Shumway, Stacy. Prelinguistic predictors of language outcome at 3 years of age. Journal of speech, language, and hearing research : (JSLHR) 2006; 49(6): 1224-37
Introduction

- Prelinguistic skills include:
  - Deferred imitation
  - Perceptual causality
  - Object permanence
  - Social cognitive skills
    - Joint attention
    - Gestures
    - Gaze following
    - Imitative learning

Deferred imitation
- Infant’s emerging ability to form and maintain a mental representation of the target event. (9 months). \(^{(1)}\)

Perceptual causality
- An event is seen as causing another, even without physical objects interacting. (8 months) \(^{(2)}\)

Object permanence
- Awareness that objects continue to exist even when they are no longer visible, guided by sensations other than vision. (8-9 months)

\(^{(1)}\) Herbert J., Gross J., Hayne H.. Age-related changes in deferred imitation between 6 and 9 months of age. Infant Behavior & Development, 2006; 29:136–139

\(^{(2)}\) Schlottmann, A., Surian, L., & Ray, E. 8-and 10 months old infants perceive action and reaction. manuscript submitted for publication. 2002
Introduction

- Social cognitive skills

Joint attention

- The infants’ capability to coordinate attention between people and objects.
  - Sharing attention
  - Following attention
  - Directing attention
Introduction

**Pointing gesture:** the simultaneous extension of the arm and index finger toward a target. (12, 14 months of age)

- Pointing → maternal responsiveness → increase vocabulary size.

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**Gaze following**

- Paying close attention to the direction of visual gaze of other people.
- Adult’s head movement → 12 months
- Eye movement → 18 months
- Predicts vocabulary comprehension at 14 and 18 months but not vocabulary production.\(^{(1)}\)

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Imitative learning

- Following an adult behavior on an object and learning a *new* behavior towards that object as a result of the observation, thus demonstrating an active adaptation to the adult’s relation to the object.
Rationale

- Definitive diagnosis of language impairment is not usually made until beyond 3 years. (1)
- An important developmental language periods occurred from 8 months to 2 years of age.
- Effective early intervention targeting this period would represent a major advance. (2)

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Rationale

- Almost all the available standardized tests evaluate children above the age of 2 years.
- No available Arabic tools for evaluation of the prelinguistic skills in Egyptian infants and toddlers.
- Provision of assessment tools for the stage of first two years is mandatory for the early diagnosis of Autism spectrum disorders and Specific language impairment.
Aims of the work

- To formulate and standardize an *Arabic version* of “Evaluating Acquired Skills in Communication-Revised (EASIC-R) test”

- To apply it on delayed language children in order to detect its effectiveness in evaluating the communicative skills in children with language delay.

SUBJECTS AND METHODS
Subjects

- 183 children
  - 90 normal, 93 delayed language developed
- Age range: 9 months to 6 years
- Group A: Children ≤ 2 years: Five age groups, 3 months interval
- Group B: Children > 2 years: Seven age groups, 6 months interval except the last group’s interval was 12 months.

Subjects

- Pilot study: 60 children
  - 30 normal, 30 delayed language development of both sexes.
- Aimed at:
  - Checking the materials used in the test.
  - Checking the pattern of presentation of the test items themselves, order of presentation and scoring system.
  - Application of the test-retest method and the internal consistency in order to assess the reliability of the test.
Methods

• I- Elementary diagnostic procedures
  A- Parent’s interview
  B- General examination.
  C- Vocal tract examination.
  D- Neurological examination.
  E- Assessment of motor development.

• II- Clinical diagnostic aids:
  A- psychometric evaluation:
    • Denver developmental screening test
    • Stanford Binet intelligence scale (4th edition)
    • Vineland Social Maturity Scale
    • Childhood Autism Rating Scale (CARS)
  B- Audiological evaluation
Methods

C-Language evaluation using:

- **The Communication and Symbolic Behavior Scale- checklist** \(^{(1)}\)
  - Screen the normal behavior of language development
  - Assess the criterion related validity for group A
- **The Arabic language test** :\(^{(2)}\)
  - Determine the normal profile of language development
  - Assess the criterion related validity for group B
- **The proposed test:**

  \(\text{Test of Acquired Communicative Skills}\)

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Test of Acquired Communicative Skills (TACS)

Test description:

- It is a modified and translated Arabic assessment tool originated from the “*Evaluating Acquired Skills in Communication- Revised*” test.
- EASIC-R components:
  1. **Pre-language level**: Skills encountered before meaningful speech.
  2. **Receptive I level**: Comprehending simple noun labels, action verbs, and basic concepts.
  3. **Expressive I level**: Emerged simple mode of communication.
  4. **Receptive II level**: Understanding more complicated language functions.
  5. **Expressive II level**: Expressing more complicated levels of language
Test Modifications

**A Test Format:**
- **Inventory I** (children aged ≤ 2 years.)
  - The level of pre-language skills (< 2 years) + some items of receptive I + expressive I levels.
- **Inventory II receptive** (2 years to 6 years)
  - The rest of receptive I level + receptive II level.
- **Inventory II expressive** (2 years to 6 years)
  - The rest of expressive I level + expressive II level
**Test Modifications**

- The items in each inventory format were ordered from easy to difficult skills.
- The items in each inventory format regrouped into skill clusters that specify the basic communicative skills and symbolic behavior.
- The profile chart included the skills, clusters, and the age range at which each skill is normally acquired.

**Test Modifications**

**B) Test Materials:**
- *The pictures book* was revised and inappropriate pictures were replaced to suit the Egyptian culture.
- It has two sections: *receptive* and *expressive*.
- Each stimulus page contains three small pictures.
- Its number is labeled to those inventory items that require pictures.
Test Modifications

- **Supplementary pictures cards:**
  - Matching, association, categorizing, sequencing and other tasks.
  - Numbered and referred to in the inventory items, when required.
- **Additional objects:**
  - Toys and objects (combs, toothbrush, cups, spoons, cubes, balls, and cars).
**Test Modifications**

C) *Scoring the inventories:*

- **Qualitative scoring:**
  To record qualitatively the student's responses using six categories of performance.
  - The examiner checks the initials representing the level of the student's skill performance.
    - *Spontaneous*
    - *Cued*
    - *Imitated*
    - *Manipulated*
    - *No response*
    - *Wrong*

**Test Modifications**

- The level of skill accomplishment is indicated according to this key:

  - **Boxed** = *Skill accomplished* - Majority of student’s responses are spontaneous.
  - **Grayed** = *Skill emerging* - Majority of student's responses are cued.
  - **White** = *Skill not yet developed* - Majority of student's responses are imitated, manipulated or wrong.

- Goals and educational plan are selected from those skill areas found to be emerging and not developed.
Test Modifications

- **Quantitative scoring:** *developed in* (TCS)
  - [2] spontaneous
  - [1] cued, imitated and manipulated
  - [0] wrong or no response
- Record the responses numerically to yield an age referenced score for comparison the child’s score with performance of normal children.
Results

- Sample data
- Reliability
- Validity
- Relation with demographic variables
- Normative scores

I. Sample data
Comparison between control and delayed groups regarding age

![Bar chart showing mean age comparison between control and delayed groups](attachment:image.png)
Comparison between control and delayed groups regarding sex

Control

- Female: 49%
- Male: 51%

Delayed language developed

- Female: 32%
- Male: 68%

Reliability and internal consistency

- Reliability was assessed for all questions of the Test of Acquired Communicative Skills by the Kappa test which revealed high significance (p<0.01)

- Internal consistency was tested through Cronbach’s coefficient alpha which revealed highly significant correlation of the test item with the total test inventories.
Validity

High validity of the test was proven through:
1. Content validity
2. **Construct validity**: developmental validity

Developmental validity

Mean of total scores of inventory I

- Mean of scores

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-11 m</td>
<td>95.2</td>
</tr>
<tr>
<td>13-15 m</td>
<td>128.3</td>
</tr>
<tr>
<td>16-18 m</td>
<td>189.3</td>
</tr>
<tr>
<td>19-21 m</td>
<td>215.1</td>
</tr>
<tr>
<td>22-24 m</td>
<td>270.7</td>
</tr>
</tbody>
</table>
Developmental validity

Increase mean scores with age

Validity

3. Internal consistency validity:
   - Highly significant correlation between the composites with each other and with the total scores of inventory I. \((p<0.001)\)
   - Highly significant correlation between the subtests with each other and with the total scores in both receptive and expressive parts of inventory II. \((p<0.001)\)
Validity

4. **Criterion related validity:**
   - Highly statistically significant correlations in inventory I, receptive and expressive parts of inventory II.
   - Cut-off values was calculated for the inventory I composites, receptive I, II, total score, expressive I, II, total score and the total final score for each age group.

5. **Convergent and divergent validity**

   **Group A**

   - TACS
   - PSYCHOMETRY
   - COMMUNICATIVE
   - CSBS
   - DENVER DEVELOPMENTAL SCALE
   - VINELAND SOCIAL MATURITY SCALE
   - CSBS
Validity

- Convergent and divergent validity

Group B

- PSYCHOMETRY
- LANGUAGE
- STANFORD BINET
- VINELAND SOCIAL MATURITY SCALE
- ARABIC LANGUAGE TEST

Relation to demographic variables

- Significant relation was found between inventory II receptive and expressive parts with:
  - sex.
  - level of mother job.
- Significant relation was found between all the inventories with day care.
Normative scores

- Language age, quotient, mean, standard deviation, minimum and maximum.
- Developmental profile for the communicative skills in the first two years was identified.

### Developmental profile

<table>
<thead>
<tr>
<th>Prelinguistic skills</th>
<th>The Egyptian profile</th>
<th>The western profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory stimulation</td>
<td>9-12 m</td>
<td>0-12 m</td>
</tr>
<tr>
<td>Object relation</td>
<td>9-12 m</td>
<td>0-12 m</td>
</tr>
<tr>
<td>Causality</td>
<td>12-24 m</td>
<td>0-21 m</td>
</tr>
<tr>
<td>Communication gestures</td>
<td>9-21 m</td>
<td>6-18 m</td>
</tr>
<tr>
<td>Social interaction</td>
<td>15-18 m</td>
<td>9-24 m</td>
</tr>
<tr>
<td>Rejection affirmation</td>
<td>12-15 m</td>
<td>6-21 m</td>
</tr>
<tr>
<td>Imitation</td>
<td>12-18 m</td>
<td>12-21 m</td>
</tr>
<tr>
<td>Matching objects</td>
<td>18-24 m</td>
<td>15-24 m</td>
</tr>
</tbody>
</table>
### Developmental profile

<table>
<thead>
<tr>
<th>Task</th>
<th>Ages (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nouns identification</td>
<td>12-24 m</td>
</tr>
<tr>
<td>Obeying orders</td>
<td>15-24 m</td>
</tr>
<tr>
<td>People identification</td>
<td>15-24m</td>
</tr>
<tr>
<td>Social expressive interaction</td>
<td>12-15m</td>
</tr>
<tr>
<td>Labeling</td>
<td>15-24m</td>
</tr>
<tr>
<td>Expression of aff., rej., neg.</td>
<td>15-18m</td>
</tr>
<tr>
<td>Expression of Two word sentence</td>
<td>18-21m</td>
</tr>
<tr>
<td>Ask for recurrence</td>
<td>18-21m</td>
</tr>
</tbody>
</table>

**Conclusion**
Conclusion

- The Test of Acquired Communicative Skills (TACS) is a valid and reliable test for the use in the evaluation of prelinguistic skills and language development of the Arabic speaking children in Egypt, aged from 9 months to 6 years.

- The ability of the test to tailor an individual intervention plan as it can highlight the skill areas distinguishing the emerging ones from those which are not yet developed.

- To our knowledge (TACS) is considered to be the first Arabic objective test that evaluate the prelinguistic skills in non verbal children.

Recommendation
Recommendation

- Application on a large sample of children ≤ 2 years to enable the formulation of a detailed profile for the prelinguistic skills for the Egyptian infants and toddlers.

- Longitudinal study to detect predictive value of TACS for language outcome in delayed language development.

Thank you