Speakaboo

An *observation instrument for (speech) development in the home language*

Manual Version 1.4

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Bridging communication barriers.

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Foreword

This is the first version of Speakaboo's manual. In this manual, you will primarily find information about the purpose and the scope of the instrument. We will also focus on how to use the instrument in practice. You will receive instructions for working together with the interpreter and the use of score sheets. In the last part of the manual, we justify the way the test has been established and make a first attempt at a glossary.

A description per language can be found on the website: resources/language specific resources. In this description, you will find brief background information about the language, a description of the consonant system, and – if available – information about the phonological development in the language. If we have studied the performances of normally developing children, then the results of that study are also described. This allows you to read how children with the same home language, who are growing up in the Netherlands, perform in the test; how many words they come up with spontaneously, how many mistakes they make on average, and what phonological processes they demonstrate.

This version has been read and commented on by a limited number of people. By making Speakaboo, including the manual, available for free for the time being, we hope to receive comments that will allows us to make both even better. Your comments are more than welcome at:

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1. Why this instrument

1.1. Cause

More and more speech therapists have to deal with multilingual children in their practice. In some practices in large cities, almost all children in the caseload have a multilingual upbringing. The diagnostics of language and speech problems in multilingual children is a difficult matter: the researcher often does not speak the home language of the child and no tests are available, and if they are, they are not standardised for the multilingual target group.

Even so, it is necessary to (also) examine skills in the home language with concerns about speech and language (Blumenthal, 2012). Young children who grow up in the Netherlands in a situation where they first receive input in one language, and only later in Dutch, are usually dominant in that first language for a number of years. Only by assessing the development in that language can one get a reliable impression of the possibilities and problems of the child.

An important aspect of language development is speech production. One way to study the speech production in a foreign language is to analyse spontaneous language. However, this is a time consuming process, and the researcher may still have no understanding of certain sounds (combinations) because the child did not use them in that language sample.
Another way is to systematically elicit certain expressions or words by an interpreter and have that same interpreter take note of them. In 1996, Segerien Donner (who was a speech therapist at the Audiological Centre The Hague at the time) invented a word naming task in the form of a game for this, which she called the 'articulation lotto'. The instrument was designed to assess the pronunciation of words in Turkish.

An advantage of the articulation lotto is that toddlers liked to participate. The interpreter would not ask the child to name the words initially, but to match first: the child would place the picture of the cow with the cow on the sheet, and had thus already done something right. This way, there was less emphasis on saying the word, which made the child more willing to do so. Another advantage was that the task could be performed in a short time. This created a relatively simple and quick way to gain an impression of the speech development in the home language. Because this was an informally developed instrument without substantiation, it was not possible to distribute it further. However, the instrument was used satisfactorily at the AC for many years.
In 2013, a project to further develop this instrument started from the Kentalis Academy. Mid-2016, this instrument has the form of an app that can be used on a tablet. The name of the app is Speakaboo.

1.2. Target group

Speakaboo is suitable for children between approximately 3 to 6 years old. Our experience is that children under the age of 3 usually do not want to name words (see also Priester et al. 2013). They do want to play the game, but they fail to name the words. If a younger child initially does start naming, the test often does not get completed. The games are designed for toddlers (doors) and pre-schoolers (swiping). Older children do not find these games interesting anymore.

The test is intended for children with a home situation where their mother tongue is primarily spoken. This means that the children are dominant in their home language or at least speak as much of their home language as they speak Dutch. A study among 12 Moroccan children with Tarifit as their 'mother tongue' showed that these children had difficulty naming the pictures in Tarifit. Despite being spoken to in Tarifit by the interpreter, very few words were spontaneously named in Tarifit. The children did not want to name or named the pictures in Dutch.
It is important to ask about what the language situation is like at home. What is spoken with the children and especially: do the children also use the home language productively (in conversations with parents and grandparents, but also with brothers and sisters).

1.3. Purpose and scope

The purpose of Speakaboo is to specifically elicit words as a screening of problems in the development in the home language. The test gives the speech therapist a general impression of the language development in the home language, and a more detailed impression of the speech development. That impression is not easily obtained in a different way. Speakaboo is primarily an instrument which – if sufficient items are named – can provide information about the following areas:

1. **Participation, attention, understanding of a simple assignment**
   How well does the child participate when playing a game in their own language?

2. **Naming, repeating**
   How many items can the child name? How many items does the child name in Dutch despite being asked to do so in their home language? If the child names everything in Dutch: can the child not do so in their home language, or do they not want to speak the home language in a 'Dutch' environment? If the child repeats a word in the home language, then do they appear to be familiar with the word (is there a sort of 'aha'-moment) or does it look more like a non-word repetition task?

3. **Global impression of the consonant production**
   Are there many or only a few replacements? Does the child reduce clusters? Does the child leave out syllables in polysyllabic words? Is the child better at speaking individual words rather than spontaneous language (intelligibility)?

   The intelligibility of the child can be tested with a short questionnaire for parents. The questionnaire is available in many languages, including Dutch, Turkish, Polish, and Somali. There is also a version in Standard Arabic, to be used for Moroccan Arabit, Tarifit-Berber, and Egyptian Arabic speaking parents who can read Arabic. See: http://www.csu.edu.au/research/multilingual-speech/ics

   How does this compare with the child's ability in Dutch? Are the errors in the home language less severe, or just as severe?

4. **Phonological processes**
   Does the child demonstrate conventional processes, or atypical processes as well? Are similar processes observed in the home language and in Dutch?

Hypotheses can be formulated from the results based on the nature and severity of potential problems in the field of phonological development. Starting points for therapy can also be formulated.

Language diagnostics for multilingual children naturally involves more than just testing with Speakaboo. More information about multilingual diagnostics can be found at http://blog.asha.org/2013/11/26/leisha-vogle-assessing-bilingual-children-as-a-monolingual-slp/ and http://www.londonsigbilingualism.co.uk/

1.4. Limitations

Speakaboo is an instrument for gaining an impression of the language development of a child's home language via a systematic observation in a short time. The speech development can be specifically observed if the child has named sufficient items in the home language. The current version of Speakaboo is an experimental version. A lot of attention has been paid to its development, both with regard to content and user-friendliness. Multiple test versions have been tested for usability inside and outside Audiological Centres. The results are encouraging: children enjoy it and professionals like to work with it. Professionals are of the opinion that that it often has added value in diagnostics of multilingual children. However, the current version has not been widely tested. As of yet, no standardisation is linked to the outcome. The usability of Speakaboo for diagnostics and treatment is still being studied.

2. Use of the app

2.1. Requirements for the user

The user will be an expert in language development at a higher vocational or university level: a speech therapist, , clinical linguist, or neurolinguist. If the user does not speak the target language, the assistance of an official interpreter is needed. If no official interpreter is available, an informal interpreter may be used.

The user first needs to develop some aptitude with the app. One way of doing this is by first using the app to test children in the therapist's native language.
If the user studies the phonological system of the language beforehand, the testing and interpretation will be better. This can be done as follows:

1. Read the factsheet of the relevant language.
2. Listen to the items via the app, or view and listen to the video on the website.

2.2. Requirements for the interpreter

Ideally, the interpreter will be an official interpreter with experience in this kind of work. Ask for a native speaker. Sometimes, interpreters do not have the target language as their home language .The child will notice this and be less inclined to answer in their home language.
An informal interpreter is also a possibility: a parent, family member, or someone else. That person must speak the therapist's language well enough to understand what the intention is, and speak the home language well enough to guide the child appropriately.

2.3. Coordination of speech therapist-interpreter-child

In most cases, it is very confusing for the child to have to suddenly answer in the home language, while this is usually not the case in the test environment. The speech therapist needs to make the situation as clear as possible to the child: the interpreter and the child will speak in the home language. The speech therapist remains responsible for carrying out the test, but for the child, the interpreter is the one playing the game with them. If the speech therapist remains the interlocutor during the test, the child will remain in the therapist's language mode and continue to answer in this language or say nothing at all. In any case, the speech therapist should not ask the child something like: 'what is that? Say it in Turkish'. That is very strange and confusing to the child.

The speech therapist must take the time to prepare the interpreter for the test. It is important to adjust accordingly based on the interpreter in question; for instance, it makes a big difference whether the interpreter is a professional or a family member. Explain the purpose of the test: to assess speech production in the home language. The child has to say certain words in order to hear how well the child can pronounce the consonants of the home language. Then show the interpreter how the 'game' works, if possible without the child being present. Then explain that the interpreter needs to let the child get accustomed to the idea of really saying the words in, for instance, Somali.

The interpreter will have the opportunity to ask questions about what is going to happen and to prepare by practicing with the operation of the app. Some interpreters like to see the score sheet in advance, so that they already know the items.

You can use following section to instruct the interpreter.

2.4. Instructions for the interpreter

In this section, you will find instructions that you can give the interpreter. If the interpreter can properly read English, you could print out this page and give it to the interpreter. Always demonstrate the game first, whereby the interpreter takes the role of the child and you take the role of the game leader.

For the interpreter:

Always speak to the child in the home language and do not speak another language with the child. This way, the child knows they can speak their home language and it is more likely that the child will say the words in the home language. Remember that this can be confusing for the child at first. Usually, the child is expected to speak another language outside the home, and now, they are suddenly allowed to speak the home language. Set the child at ease by first engaging in a little conversation, e.g. about the clothes they are wearing or a toy they have with them.

The words in the app have been chosen in a way that allows us to hear as many different sounds of the language as possible. Therefore, it is important that the words are pronounced as they are listed on the score sheet. Try not to add an article or use a different case. This not only changes the word form, but it may also mean we do not hear the exact sounds we are looking for. This also means the score sheet will no longer be correct. If a child speaks a word in a different way, try to elicit the desired shape. If that does not work, tell the researcher exactly what was said.

The instructions of the game are as follows:

We're going to play a game.
Doors*: You will hear a sound, and then you can tap on the door. Listen carefully! [child taps and a picture emerges]. Hey, what a pretty picture. Do you know what that is?*
Lotto: *You see a picture [point to the picture at the bottom of the screen], can you find the same one? Very good. Drag it to the other one. And do you know what it is?*

If a child does not spontaneously name a picture, you can help the child with a question or a supplementary sentence. For instance, with the picture of the elephant:
"It has a trunk, it is an……"

If the child does not react to the prompt, you may say the word and indirectly have the child repeat it. For example:
"It is an elephant. Can you say that too?"

If the child still does not respond, the word may be repeated literally.
"Say after me: elephant."

If the child still does not speak, you proceed to the next item.

The next item will appear if you have clicked it or if the word is correct or incorrect. You will likely see the screen upside down, because the child is sitting opposite you. From this angle, the bottom right is 'correct' and the bottom left is 'incorrect.' Tap right if you think the word was correct.
Incorrect
-The child uses a different word than the target word.
-The word was not pronounced correctly.

Please note: it is normal for young children to pronounce words incorrectly. But we also want to identify those normal errors. Therefore, with every pronunciation that deviates from the target form, you tap the bottom left of the screen (if you are sitting opposite the child). Are you unsure about the pronunciation? Still tap the bottom left. These words can be listened to again with the speech therapist later.

You do not need to translate what the child says during the test. In general, this is not even desirable, because it interferes with the interaction in the home language. Moreover, the app records everything, so whatever is said can be listened to and translated afterwards. Only if you need advice, you can translate what the child is saying if necessary.

2.5. Testing

If possible, place the interpreter opposite the child, and sit behind the interpreter. This allows the interpreter to 'take position' to assume their role. Moreover, it makes it clear to the child who the interlocutor is.

The interpreter is not responsible for the result of the test, because after all, as an 'amateur-assistant-speech therapist', they are not a professional. An official interpreter is expected to point out lexical variation ('in the region/village where the family is from, they use a different word'), or regional variation in pronunciation, to the speech therapist if the interpreter knows about it.

While the interpreter carries out the test, the speech therapist has other tasks.

1. Support the interpreter.
   If they are unsure about what to do, provide advice. For instance, if the child is not willing to speak: continue or ask again? Have them repeat it? You should certainly not give too much advice, but not too little, either. Give the interpreter the chance to build up the contact and let some things go wrong if necessary; you can always repeat an item. Moreover, this test is about eliciting words in the home language, so that the speech therapist can observe the naming and pronunciation. Try to stay in the background, and preferably do not address the child. Give the interpreter advice by whispering as inconspicuously as possible.
2. Fill out the score sheet.

Once the test is complete, the incorrect items (red in the score overview) can be listened to together with the interpreter. By listening to those items together and comparing them to the target word in the app, the speech therapist can further fill out the score sheet.

2.6. Use of the score form

Cover
On the cover of the score form, the information of the examined child is noted. This information is deliberately kept separate from the scoring data, so that the scoring data could be anonymously copied for further research. Of course, permission from the parents is necessary before using this information.

Sheet 1
Notation of the words
The score form contains the words in English and, where possible, in the target language. This was not possible for the two Arabic versions and the Tarifit version.
Then, the pronunciation is given in IPA, for which every sound has a separate block. IPA has the advantage that it is used worldwide to describe sound systems. Moreover, the system (more or less) provides uniform information about the articulation position and method of the respective sound.
A complete overview of the IPA symbols including sound files can be found at http://www.ipachart.com/

Scoring of the sounds and words
Because this is an initial screening of the articulation in the home language, it is only scored whether the consonants of the word are substituted (X through the phoneme) or omitted (Ø through the phoneme). If nothing is indicated, this means the realisation of the word is correct.
Only the consonants need to be scored. The vowels are generally acquired earliest, and therefore, few errors are made in that area. Moreover, in vowels, a relatively large amount of (allowed) variation is possible.
In the 'process' column, the speech therapists can indicate which phonological process they observed. It is not necessary for the screening to transcribe the exact replacement of the phoneme. This way, the speech therapist does not need to have a working knowledge of IPA.
In the 'repeated' column (R), the speech therapist can place a cross if the picture is not spontaneously named. This provides information about the vocabulary of the child, but it also indicates what the 'value' of the produced sounds is. Some children may be able to imitate a sound well, but that does not mean the properly control the sound spontaneously.

If a word cannot be assessed, e.g. because the child refused to speak it, then you indicate it as _ (underscore). This is important for the assessment of the percentage consonants correct (PCC). This is because the consonants of the non-assessed words must be reduced from the total.

PCC
At the bottom of sheet 1, you can easily calculate the PCC.

1. First enter how many consonants the child got wrong (A.)

2. Then calculate how many consonants you have assessed (B.). This is the total number of consonants in the test (this is already given) minus the consonants of the words the child did not say or repeat. If, for instance, you could not elicit the word 'cabinet', 4 consonants should be reduced from the total.

3. Finally, you calculate the total number of consonants the child got right (B-A) and divide this by the number of assessed consonants (B). If you multiply this result by 100, you will get the Percentage Consonants Correct.

According to research by Shriberg & Kwiatkowski (1982), the PCC may be an indication of a possible impairment. With a PCC below 65, Shriberg says there is a moderate to severe impairment. It should be noted here that Shriberg based this on an analysis of 100 words of spontaneous speech.
You can also compare the PCC of the tested child with the average PCC of normally developing children with the same home language (if available). You can find this information in the section on the relevant language (language specific recources).

Sheet 2

Sheet two contains all syllable-initial and syllable-final consonants grouped by age of acquisition (insofar as literature could be found on this subject). For every consonant, it is indicated how often it appears in the test. Here, the speech therapist can record how often a sound was not or incorrectly produced. This makes it clear in a single glance which part of the realisations was incorrect and the speech therapist gains an indication of whether this fits with the age of the examined child or strongly deviates from it.
If no information about the acquisition order is available, then the Dutch acquisition order is maintained. This way, the speech therapist can see where there are still errors in sounds that occur in both the home language and in Dutch.

3. Justification

3.1. Research into the languages

For all specified languages, we started with a literature review regarding the phonological system of that language and the phonological and lexical development in that language. We searched the university libraries of the VUA and Leiden, used the Internet, used literature references in articles, contacted experts, and used our own network and social media. We searched for literature in Dutch and English. All sources found are listed by language in the 'Sources' section for each language.

The phoneme inventory is known for all of these languages. However, information about the phonological development was only found for Dutch, Turkish, Polish, and Egyptian Arabic. It should be noted here that the acquisition order of the sounds was found for Polish, but accessible information about the underlying study is missing. The information is only available in Polish.

Information about the lexical development is only available in the form of word lists that are part of a test for the active vocabulary or part of an articulation test. How these lists came about is only known for the Dutch word lists. For the other languages, a justification in English is missing.

3.2 Choice of words/items

As many consonants as possible
Each language version of Speakaboo has a unique set of words. The words are selected to contain as many consonants per language as possible, both in (syllable) initial position and in syllable final. The position of the syllable within the word is not taken into account. This corresponds with the assessment in the Methaphon (Leijdekker-Brinkman, 2002).

Up to 36 words
Each language version contains up to 36 words. This number has to do with the target group of the test: children between 3 and 6 years old. Young children have a short attention span, so the test must be taken in a short time (<10 minutes). We have taken the fact that Speakaboo will often be part of a larger set of tests into account here.

Only nouns
The stimulus words are only nouns. Nouns are easier to depict than other word types. In addition, nouns are learned earlier than other word types in most languages (Gentner in: Boerma, 2005). Therefore, they make up a larger part of the early vocabulary.

Part of the vocabulary of young children
For Dutch, research into lexical development was available (Schlichting, 2001). The words of the Dutch version are part of the first 1000 words that children learn.
For the Turkish, Moroccan- Arabic, and Tarifit versions, we used the relevant Lexicon lists (Schlichting, 2006). These are lists that allow parents to indicate which words of their native language the children understand and which words they can produce themselves. These lists only have a limited number of nouns and these nouns do not all consist of the desired sounds. These lists were not available for the other languages, which means other sources had to be found regardless.

We first looked for articulation tests in the relevant language. These were found for Turkish, Polish, and Egyptian Arabic. However, we needed to be cautious, because these tests were designed for a different target group than Speakaboo.
We then searched for other word lists, e.g. in the form of a course for second language learners. These kinds of lists often contain highly frequent words such as different foods, body parts, and clothing.
Eventually, words from language versions that were already done were translated into the languages for which we still needed more words. Translation was done via online dictionaries and Google Translate. This search was continued until all consonants occurred in each position at least once.

Illustrated by pictures
For all words, pictures were purchased from Shutterstock. The pictures are in colour and depict the object with a white background. We chose to use pictures due to the cost, the attractiveness, and the fact that objects are often recognised much easier by young children if they are shown in a photo (Simcock & DeLoache, 2006).

Check with native speakers
All word lists were presented to native speakers with the following questions:

- Is the photo named with the target word?
- Does the pronunciation match what we have transcribed?
- Does the word (in the opinion of the speaker) belong to vocabulary of young children?

The native speakers were interpreters, linguists, or part of a native speaker panel (Egyptian Arabic, Moroccan Arabic, Somali, Tarifit).

Items that were named with a different word too frequently have been removed from the test. This mainly applied to the Tarifit version.

New pictures were purchased for any items that were displayed with the wrong picture. For example: the word for woman in Somali is /na:g/. The picture of a young Somali woman was named differently by the interpreter. When it became clear we were looking for the word /na:g/, the interpreter told us that word is used for much older women.
Reviewing the pictures not only uncovered differences in word boundaries; it was also important to determine what is considered the most prototypical word in each specific language. In Dutch, everything with steps can be considered ‘stairs’. However, a staircase is most prototypical, which makes an image of a staircase preferable over, for instance, a ladder.

Word sequence in the test
The sounds are tested in their acquisition sequence as much as possible. Many young children have difficulty in a test situation, and this is even more true for children with a speech disorder. By starting with the easiest words, the child gets the feeling of being up to the task and is challenged to try to pronounce the more difficult words as well.

3.3 Reliability

With presentations about Speakaboo, we have often received the question of whether a non-native speaker can assess the speech of children speaking a foreign language. This question prompted a study into the evaluation reliability of the Polish version of Speakaboo.
In 2015, Holstvoogd studied 16 Polish children and 19 Dutch children with the paper version of the test and compared its assessment with that of a trained speech therapist. For the Polish children, this was a Polish native speech therapist working in the Netherlands. The evaluation reliability for the Polish version, although slightly lower than that of the Dutch version, was still substantial.
Internationally, there has been a study into the assessment of Chinese by English-speaking speech therapy students (Lockart & McLeod, 2013). Research has shown that the accuracy of the evaluation increases if students receive information about the phonological system of the language, if the target words are transcribed in IPA, and if they can compare the expression of a child with an adult example. This is the reason why in Speakaboo, we include an audio fragment from the interpreter for each word. In addition, there are videos available for every language in which the interpreter pronounces all words.

If you doubt your own ability to evaluate a foreign language, you should realise that it concerns words that are spoken in isolation. For each word, it is known how the target word should sound. The desired pronunciation is displayed in IPA and can be listened to. It is good to listen to the complete list of words prior to any testing and to pay close attention to the transcription. Doubts and questions can be shared with the interpreter.
Carrying out the tests will certainly take some getting used to, but your confidence in your own judgment will grow with each evaluation.

4. Glossary

Affricate	The combination of a plosive and a fricative is called an affricate. Both consonants have the same place of articulation and share the attribute of 'voicing'. In an affricate, the pronunciation of both consonants is shorter than in a real cluster. That is why affricates are considered a single phoneme. Examples include: /ʧ/ and /ʤ/
Allophone	Allophones are different realisations of the same phoneme. Allophones do not create different meanings. The best-known example in Dutch is the 'r'. It is pronounced differently in different parts of the country; as a rolling r, a flap r, a 'Gooische 'r or a uvular r. The pronunciation can also depend on the position in the word. The 'r' often sounds different at the start of a word than at the end of a word. All those different realisations are allophones of the phoneme /r/.
Language mode	The extent to which a language is activated at a given time (Grosjean, 2000). According to Grosjean, a multilingual speaker has subsystems for each language they speak. There is always one dominant language and one guest language. The dominant language is maximally activated. The activation of the guest language depends on the situation the speaker is in. If the interlocutor only speaks the dominant language, then the guest language is suppressed. This means the multilingual speaker goes into a *monolingual mode*. If the interlocutor speaks both languages, the speaker will activate both language systems equally and enter a *bilingual mode*. In the bilingual mode, switching between languages is easy. There is a continuum. At the monolingual end, there is no language switch, and at the multilingual end, the speaker can freely use both language systems interchangeably. Depending on the situation, the multilingual speaker will be somewhere on the continuum between these two ends. In a diagnostic setting, it is important that the native language of the child is activated as much as possible. Therefore, it is recommended to only speak to the child in their native language before and during the test.

5. References

Boerma, I. (2005). *Woordenschatontwikkeling van jonge Marokkaanse kinderen in Nederland. Doctoraalscriptie Taalwetenschap*, Universiteit van Amsterdam

Blumenthal, M. Giannuzzi, B., Holstvoogd, L., Ruiter, E. de, Bos, P. (2016). *Development of a screening tool for speech production skills in two Arabic dialects for multilingual children in the Netherlands.* Nog niet gepubliceerd.

Grosjean, F. (2000). The bilingual's language modes. In J. Nicol (Ed.), *One mind, Two Languages: Bilingual language processing.* (pp 1-22). UK: Blackwell.

Holstvoogd, L. (2015). *Beoordeling van de spraakontwikkeling van Poolse peuters door een niet-moedertaalspreker met behulp van de Meertalige Articulatielotto. Master thesis,* Vrije Universiteit, Amsterdam.

Leijdekker-Brinkman, W. (2002). *Methaphon Screening*. Swets & Zeitlinger Publishers B.V., Lisse, The Netherlands.

Lockart, R., & McLeod, S. (2013). Factors that enhance English-speaking speech-language pathologists' transcription of Cantonese-speaking children's consonants. *American Journal of Speech-Language Pathology 22,* 523-539.

Priester, G.H., Post, W.J. & Goorhuis-Brouwer, S.M. (2013). Measuring speech sound development: An item respons model approach. *International Journal of Pediactric Otorhinolaryngology, 77, 1469-1473*.

Schlichting, L. (2001). Woordselectie in het onderwijs aan jonge kinderen, in: *Toegepaste taalwetenschap in artikelen* 65 (1), 11-122.

Schlichting, L. (2006). Lexiconlijst Turks-Nederlands. Amsterdam: JIP.

Schlichting, L. (2006). Lexiconlijst Marokkaans-Arabisch-Nederlands. Amsterdam: JIP.

Schlichting, L. (2006). Lexiconlijst Tarifit- Berbers-Nederlands. Amsterdam: JIP.

Simcock, G. & DeLoache, J. (2006). Get the picture? The effects of iconicity on toddlers' reenactment from picture books. *Developmental Psychology*, 42, 1352-1357.

Shriberg, L.D., & Kwiatkowsky, J. (1982). Phonological Disorders III: a procedure for assessing severity of involvement. *Journal of Speech and Hearing Disorders, 47*, 242-256.