Using Speech Screening Process for Preschool-Age Children: Do Results Lead to Action?

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Cover Page Footnote
Mentor: Dr. Whitney Schneider-Cline, Department of Communication Disorders

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USING A SPEECH SCREENING PROCESS FOR PRESCHOOL-AGE CHILDREN: DO RESULTS LEAD TO ACTION?

Autumn Rhoads

Mentor: Dr. Whitney Schneider-Cline, Department of Communication Disorders

ABSTRACT

The purpose of this study was to screen preschool children’s speech to determine if knowledge of a possible speech sound disorder (SSD) would lead to further action by parents. Eight males and one female, from ages three to five, participated in this study. While the participants were screened using the Preschool-Language Scales 5th Edition Articulation Screener (PLS-5 AS), the parents completed the Intelligibility in Context Scale (ICS) and the Case History form. Two weeks after the screenings concluded, a brief survey was sent to the parents of the participants to determine satisfaction and define related action based on the screening results. The results of this study concluded that 89% (8) of the participants passed the screening while 11% (1) failed the screening. The results of the ICS concluded that the child who failed the screening had lower ratings (was less understood by others) than those who passed the screening. The results of the survey concluded that 17% (1) of the parents that completed the survey (n = 6) had not heard of services to treat speech sound disorders before participating in the study and 83% (5) of the parents were aware of speech services. The survey also showed that 17% (1) of the participants will receive further services while 83% (5) of the participants will not receive further services.

USING A SPEECH SCREENING PROCESS FOR PRESCHOOL-AGE CHILDREN: DO RESULTS LEAD TO ACTION?

The first-time speech-language pathologists studied children with speech sound disorders (SSD) was during the 1960s (Bernthal, Bankson, & Flipsen, 2017). The reason they started to look at younger children is because they wanted better outcomes for treatments. They also hypothesized that the earlier a child was treated for an SSD, the more likely it would be for the child to avoid developing bad speech habits (Bernthal, Bankson, & Flipsen, 2017). The purpose of the current study is to determine if children who are identified with possible SSD through early (preschool) screenings are likely to seek the services of SLPs.

In order to understand the value of early identification, we will first explore the different types of SSD. First, articulation disorders are one type of SSD; they occur when a child has motor production difficulties. This means that the child struggles with understanding where and how a single phoneme (or sound) is produced in a word (Bowen, 2011). An example of an articulation disorder is when a four-year-old male consistently cannot say the phoneme /f/. This is an example of a disorder because a male four-year-old is expected to have mastered the /f/ phoneme by the age of three and a half (Smit, Hand, Freilinger, Bernthal, & Bird, 1991). The other type of SSD is phonological disorders. A phonological disorder is when a child has difficulties learning the phonological rules for language. A child with a phonological disorder is unsure how to use sounds within words, such as whether certain sounds need to be placed at the beginning or ends of words (Bowen, 2011). A common type of phonological process used among children is stopping. Stopping is when a child substitutes a stop consonant like /p/ and /d/ for a fricative (/s/) or an
affricate (/tʃ/) (Bernthal, Bankson, & Flipsen, 2017). An example of a phonological disorder when using stopping would be a six-year-old female that replaces long sounds like /s/ and /ʃ/ with short sounds like /p/ and /d/. This is an example of a disorder because a six-year-old female should have decreased use of stopping for these phonemes by the age of three (Deutsch, 2013).

With both articulation and phonological disorders, in most cases, the cause of the SSD is unknown (Bernthal, Bankson, & Flipsen, 2017). The prevalence of SSDs varies across studies, however, one recent research study suggests that 15% of three-year-old children have an SSD and about 3.8% of six-year-old children have and SSD (Macrae & Tyler, 2014). Another study suggests that among pre-kindergarten children that are referred for possible communication difficulties, about 75% are identified with having articulation/intelligibility difficulties, meaning the child’s speech is not understood by others (Bernthal, Bankson, & Flipsen, 2017).

In children with SSDs, other aspects of their academics may be impacted. Richgels (1995) suggested that children who show early signs of an SSD may be at risk for later spelling and literacy abilities. Children with SSDs, compared to their typically developing peers, also have been shown to perform more poorly on spelling measures (Bird, Bishop, & Freeman, 1995). Children are typically at risk of developing these literacy skills due to their poor phonological awareness and skills. Phonological awareness is shown when the child understands how the sounds in spoken words are structured. When the child has an SSD they are unable to understand how consonants, syllables, etc. are important to create words (Skebo et al., 2013).

Spelling and reading are not the only risks to children who have an early SSD. If not identified early, a child with a speech sound disorder can develop comorbid conditions. Comorbid means that the child develops other communication problems along with that of a speech sound disorder. The prevalence of comorbid conditions ranges from 1.3% to 4.6% of children with an SSD (Eadie et al., 2014). One comorbid condition that a child can generate from an SSD is emotional/psychiatric disorders. An example of this is if a child was bullied because of the way he speaks. The child would be less likely to speak with other children or adults because he feels ashamed of the way he speaks and may not want to be bullied anymore (Bernthal, Bankson, & Flipsen, 2017). Other risk factors of having an SSD include difficulties communicating with people, less participation in social interactions, and an inability to be understood (Harrison, McLeod, McAllister, & McCormack, 2017).

Overall, knowing about SSDs and the effects they have on children are an important part of this study. This study was founded upon the idea that the earlier that SSDs are identified and treated, then the less likely the child would be suffer long-term risks. This study aims to reach the target audience of preschool age children and to determine if parents of these children who are knowledgeable of potential SSDs will seek further services for their child. For this study, the researcher addressed four main research questions. These questions, and the hypothesis for each, include:

1. What percentage of preschool children will pass/fail a speech screening?
   - According to the American Speech and Hearing Association, “2.3-24.6% of school-aged children have speech delay or speech sound disorders” (Speech Sound
Disorders, n.d.). The researcher predicted, because of this statement, that approximately 15% of the total population of participants would fail the speech screening.

2. Do the results of the Intelligibility in Context Scale match those of the PLS-5 AS?
   
   - Asha.org suggests that by the time a child is the age of three that child speech should be 75% understood by unfamiliar listeners (Speech Sound Disorders, n.d.). Therefore, the researcher predicted that the results of the ICS would match the results of the PLS-5 AS because a child who fails the screening would likely be less intelligible than those that pass the screening.

3. Are parents of preschoolers aware of services?
   
   - The researcher predicted that 75% of the parents would be aware of the services to treat speech sound disorders and 25% of them would not be aware of speech services. The researcher believes that more parents are aware of speech sound disorders now than they were 15 years ago. She believes this because even though being in speech therapy herself she never heard of people discussing treatment services for SSDs growing up. It was not until high school that SSDs were making an appearance in conversations she would have with people.

4. What percentage of preschool children will seek further services?
   
   - The researcher predicted that six percent of the participants will seek further services and 94% will not seek further services. This is the prediction because with such a small sample of up to 30 children, it is likely that 2.3-24.6% will have an SSD (Speech Sound Disorders, n.d.). The researcher used 15% out of this percentage and found what 15% of 30 of the participants would be and calculated that 6% of the 30 participants would have an SSD. The goal of this study is for the participants who fail the screening to seek further services, so the researcher predicted that all 6% of the thirty participants will seek further services.

**METHOD**

**Participants**

This study included children ages three to five years (see Figure 1; mean age of participants = 4 years, 1 month) with English as their primary language. The participants were recruited using informational flyers (see Appendix A) that were distributed at four area daycares, in the local newspaper, and on social media. A total of 9 children participated in the study (8 males, 1 female). Demographic information about the participants was gathered through a case history form each parent completed the day of the speech screening (see Appendix B for Case History Form). Participants ranged from having no siblings to five siblings (see Figure 2). Two participants had previously participated in speech screenings and the other seven had never participated in a speech screening. Six out of the nine participants reportedly had hearing screenings completed prior to
this study. The ages of completion for the most recent hearing screening performed are located in Figure 3. One participant reported a family history of speech sound disorders; the participant’s mother received speech therapy as a child. Three out of the nine participants had a history of frequent ear infections, and three of the participants reported other serious illnesses or injuries including: RSV as an infant, tubes in the ear twice and a hole in the ear drum, and a broken leg at age two.

Figure 1. Participants’ Age at Time of Screening

![Age of Participants](image1)

Figure 1. Participants’ age at the time of speech screenings grouped by six-month intervals. The mean age of participants was 4 years, 1 month (when rounding to the nearest month).

Figure 2. Number of Siblings for Each Participant

![Number of Siblings](image2)

Figure 2. The number of siblings for each participant were calculated and groups by how many each participant had. The mean number of siblings each participant had was two.
Participants’ parents contacted the primary investigator via email to schedule an appointment. All appointments were conducted across one week during the summer. Children were a necessary part of this study because the main goal was to identify SSDs in children at an earlier age rather than later.

**Materials**

For this study, during the scheduled screening appointment, parents completed a brief case history form (see Appendix B), and the Intelligibility in Context Scale (ICS; see Appendix C); participants completed the PLS-5 Articulation Screening (PLS-5 AS). Some examples of words that were targeted in this screening were chicken, horse, zebra, lamp, sun, dog, etc. The case history form was used to gather background information on each participant. This form was necessary because it gave the researcher more information on each child and potential explanation as to why he or she may need further evaluation. The following paragraphs describe the ICS and PLS-5 AS in greater detail.

**Intelligibility in Context Scale**

The ICS was acquired from McLeod, Harrison, and McCormack (2012); its purpose was to inform the clinician how the child’s speech impacted his/her everyday life. The ICS can be used with monolingual children or bilingual children and has been translated multiple times to be used in a variety of countries (McLeod, Harrison, and McCormack, 2012). The form was completed by the parent(s) and consisted of seven questions that rated how well different types of people (i.e. familiar versus unfamiliar listeners) understood the child’s speech on a five-point scale. It took approximately five minutes to complete. The average score was calculated by adding each of the
ratings together and dividing by seven. This score identified the child’s level of intelligibility (1.00 indicating low intelligibility and 5.00 indicating high intelligibility).

**Preschool Language Scale, Fifth Edition Articulation Screener (PLS-5 AS)**

The PLS-5 AS was revised from the fourth edition to provide clinicians a screener that offered visual stimuli for children (Zimmerman et al., 2011). A new word list was created to be more easily identifiable by children and provided appropriate target phonemes for ages 2;0 to 7;11 (Zimmerman et al., 2011). The PLS-5 AS consisted of fourteen pictures of animals and common objects. The clinician pointed to each picture and asked the child, “What is this?” and the child then replied with the answer. The clinician transcribed what the child said. If the child said a target phoneme correctly then a 1 was used as the score; if the child said the target phoneme incorrectly, then a 0 was awarded. The screener consisted of 24 phonemes in total, and at the end of the screener the clinician counted the number of correct phonemes produced and marked it at the bottom of the page. The clinician then used the table presented on the PLS-5 AS protocol to determine, based on the participant’s age, which of the following categories was appropriate for the child: speech typical of age level, further evaluation indicated, or further evaluation strongly indicated.

**Procedures**

This project used a speech screening process to identify if children needed further assessment (which could identify SSDs, if present), and to determine if failed screening results led to parents accessing a full evaluation. For this study, participants speech abilities were screened using the PLS-5 AS.

Participants’ parents contacted the primary investigator via email to sign up for an appointment. All appointments were conducted across one week during the summer. The study was conducted at a university speech clinic. When participants arrived for their appointment, the primary investigator obtained parental consent (See Appendix D for consent form) and child participant assent (See Appendix E for assent form). Then, the participant was asked to follow the primary investigator into a separate room from the parent(s) in order to conduct the screening. The primary investigator conducted the PLS-5 AS; this screening took 2-5.5 minutes per child (average administration time was 3.33 minutes). In three of the cases the participants’ parent was in the room with him, and in one of the cases the secondary advisor was in the room during the screening to comfort the participant. Within that amount of time, the child was asked to say a series of 14 words based on pictures in the screening booklet. During this screening the child’s responses were digitally audio recorded. At the end of the screening, the total number of accurate productions were calculated into a raw score. The raw score paired with the child’s age allowed the clinician to determine whether further evaluation was indicated.

During the time that the child was in the room completing the screening, the parent was asked to complete a short case history form (see Appendix B) and the ICS (see Appendix C). After the screening was complete the child went back into the room with the parents and a results summary (see Appendix F) was provided to the parents. For the children who did not pass the screening, the parents were also given information on further resources they could seek out (i.e. where to obtain a full evaluation), if interested (see Appendix G). Two weeks after the screenings
were conducted, the primary investigator contacted the parents asking them to complete a brief survey to determine if any action was taken following the screening (see Appendix H for full survey).

Data collection and organization

Following the screenings, hard copies of each participant’s screening protocols were stored in the faculty mentor’s office in a locked file cabinet. De-identified data was stored in an Excel spreadsheet that was stored in the mentor’s secure BOX research folder. The data in the spreadsheet was marked with numerical identifiers so there were no ties to the actual client names. At the completion of the project, all data related to this project was shredded and destroyed.

RESULTS

What percentage of preschool children will pass/fail a speech screening?

During the PLS-5 AS the child was asked to label 14 pictures of objects/animals after the clinician pointed to it. Based on the accuracy of the participant’s response, the clinician either awarded a 1 (if the child produced the target phoneme correctly) or a 0 (if the child produced the target phoneme incorrectly). The total score correct was then calculated at the end and the child and parents were given feedback to whether the screening result was typical of the child’s age or if further evaluation was warranted. Eight of the participants passed (89%) and one of the participants did not pass the screening (11%). The child who failed the screening was in the 3;6-3;11 age range.

To determine the reliability of these results, the secondary investigator/faculty mentor blindly rated the speech screening results using the audio recordings from each screening. A total of 194 out of 207 item responses were rated (93% of items administered); the interrater agreement between the primary and secondary investigators was 90%. In order to account for chance, Cohen’s kappa was calculated (results are presented in Table 1). According to McHugh (2012), a kappa of .634 is representative of a moderate level of agreement between raters.

Table 1

<table>
<thead>
<tr>
<th>Measure of Agreement: Kappa</th>
<th>Value</th>
<th>Asymptotic Standard Error</th>
<th>Approximate T</th>
<th>Approximate Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>N of Valid Cases</td>
<td>194</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Asterisk (*) indicates statistical significance (p <.05).

Do the results of the Intelligibility in Context scale match those of the PLS-5 AS?
The ICS was completed by a parent of each participant. The ICS posed seven questions about who can or cannot understand the child (and how well) based on a rating scale of 1-5 (5 being always and 1 being never). Each ICS was collected so the responses could be further analyzed. The results were calculated to determine the total score and average score for each individual as well as each age group (see Figure 4). The overall group average for each question was also calculated and reported (see Figure 5).

**Figure 4. Average ICS Scores by Age**

**Figure 4**. The average ICS score for each question and average total score were calculated for each age group from 3;0-5;11.

**Figure 5. Overall ICS Totals for All Age Groups**

**Figure 5**. The overall total for each question and ICS average were calculated for all age groups together.
Survey Results: Are the parents of preschoolers aware of services? What percentage of preschool children will seek further services?

A follow-up survey was sent to the parents of participants about two weeks after the screenings were conducted. Out of nine of the participants, six parents completed the survey. The results of the survey show that three of the parents heard of this study from the flyers that were handed out at daycare, two from social media, and one from another source. This survey also shows that even though none of the parents have scheduled a speech evaluation for their child, there was one parent who indicated that the child was planning on receiving services (17% of the total population accounted for). All of the parents who reported had been aware of speech sound disorders before participating in the study, but there was one parent who had not heard of services to treat these disorders before participation. Five of the parents thought that the study was very helpful and one thought that it was somewhat helpful. This led to two of the six parents doing further research about speech sound disorders. Overall, five of these parents felt that participating in this study had enlightened them on their child’s speech sound productions.

DISCUSSION

What percentage of preschool children will pass/fail a speech screening?

The results of the PLS-5 AS answers the first research question: What percentage of preschool children will pass and fail the speech screening? The results of this study indicated that 11% of the participants failed the speech screenings and 89% passed. The one participant that did not pass the screening suffered from partial hearing loss and has never received services due to delays within the early intervention system. His hearing loss likely played a major role in his speech development because with only partial hearing he is not able to hear how others speak; therefore, he is not able to understand how he should accurately produce words and phonemes. To illustrate, phonemes such as /s/, /ʃ/, /f/, /t/, and /k/ are produced at very low frequencies, so the child may not be able to produce these because they are all too quiet for him to hear (Effects of Hearing, 2015). This is another way that having hearing loss has affected this child’s speech and it may be a reason why he failed the screening. As a result of this study, the family was educated about additional resources and options for obtaining services for this child. The parent of this child was incredibly grateful for this information due to the lack of success the family has experienced in the past to get this child the services he needs.

As for the children who passed, there were two of them that just barely met the requirement for typical speech for their age level. Due to the nature of their errors (i.e. some of the speech sound errors were not developmentally appropriate), and the parents’ concerns, the researchers provided information to these two parents regarding further resources for speech sound evaluations should they be needed/desired in the future. These families were educated on the importance of continuing to monitor their child’s speech and encouraged to seek help if they do not see change/growth in their child’s speech in the next few months. One of the participant’s parents were concerned about their child’s fluency. This participant passed the speech screening, but occasional dysfluent speech was observed. The parents were educated about typical preschool-age dysfluency, and also provided resources about local options for further evaluation.
Do the results of the Intelligibility in Context scale match those of the PLS-5 AS?

The results from the ICS demonstrated outcomes as expected for each age range and child. It is logical that a typically developing child would range anywhere from ICS ratings of 3-4 for each question because children by the age of 37 months should be at least 75% intelligible to unfamiliar listeners (Speech Sound Disorders, n.d.). This was appropriate for all the children who passed the screenings. It is typical for children these ages to not have perfect speech yet so that would explain why most parents did not circle any fives for the questions. On the other hand, there was one child who ranged in the 2-4 ratings with lower ratings (2) associated with “Do friends acquaintances and strangers understand the child?” It makes sense that the parent scored the child this way because those are the groups that are not around the child as much compared to parents and immediate family members. This was also the child who failed the screening. Again, it is reasonable for a child who fails a speech sound production screening tool to be understood less by different people in his life.

In summary, the results of the ICS helped answer the research question of: Will the ICS results match those of the screening results? The results of the ICS do match the PLS-5 AS results because the child who failed the screening was scored lower than the other children on the form. This is not surprising since the child failed the screening, it is logical that he would be less understood by those around him than the children who passed the screening.

Survey Discussion: Are the parents of preschoolers aware of services? What percentage of preschool children will seek further services?

The researcher predicted that 25% of the parents would not be aware of services to treat speech sound disorders. In reality 17% of the parents had not heard of services and 83% of the parents had heard of services. This is a good sign because that means that knowledge of speech sound disorders and services are reaching parents of preschoolers. This means that children are getting treated for these disorders at an earlier age rather than later. Being treated earlier in life means that there are less long-term effects for these children.

The researcher also predicted that 6% of the participants would seek further services and 94% of the participants would not seek further services. The results of this survey show that 17% of the participants will seek services and 83% will not seek services. Although the actual percentage of participants that will seek further services is a little off from what the researcher had predicted, this study did its job of determining if parents who are aware of a potential speech sound disorder will take action and seek further services.

LIMITATIONS

With this study there were limitations. One major limitation was that this study was conducted during the summer so there was a limited amount of time for recruitment. It would have been ideal to be able to recruit during spring activities such as kindergarten round-up, but because this was conducted in the summer that was not an option. As a result, the study only included nine participants; a larger sample size is needed for more reliable and generalizable results.
Another limitation was that since the children were only being screened based on the articulation of a word, and not participating in a full speech evaluation, the researcher only captured an understanding of the child’s speech based on the production of fourteen single words. This made it challenging to obtain an accurate depiction of the child’s overall speech patterns. It would have been best if the researcher could have obtained a sample of the child’s connected speech by having him or her tell a story. This would have given an accurate depiction of how the child uses his or her speech in everyday life. This study also lacked diversity in the matter of gender and that there was only one female screened and the rest were males.

Based on the survey results, it became evident there was a limitation in that all of the parents who completed the survey had already heard of speech sound disorders before participating in the study, and most had already heard of services to treat these disorders. Ideally, this study would have reached parents who were unaware and provide an educational service to families in need. Future studies similar to this should recruit from more diverse locations in order to obtain more diverse participants; low-income, at-risk families would benefit from participation in such studies.

**CONCLUSION**

The purpose of this study was to determine if parents who were aware of a possible speech sound disorder would take action and seek further services for their child. The main reason why this study was conducted was to provide awareness of SSDs and services for them. This study was important because being treated for an SSD earlier is better than receiving treatment later in life. Receiving treatment at a preschool age will decrease the risks of having spelling and reading difficulties. This also decreases the risk of comorbid conditions such as emotional and psychiatric disorders, difficulties communicating with people, and taking part in social interactions.

Overall, the outcomes of the study were positive. The results of PLS-5 AS indicated that 89% (n = 5) of the participants passed the screening while 11% (n = 1) did not pass the screening. While only one child failed the screening, their family was very grateful for the additional information provided, and, due to their participation, this child will likely receive the speech services needed for successful speech development. The results of the ICS matched those of the PLS-5 AS, as they showed that the child who failed the screening was less understood by unfamiliar listeners than those who passed the screening. The survey showed that most parents were aware of speech services (17% of the parents that completed the survey had not heard of services to treat SSDs before participating in the study and 83% of the parents had heard of services). Furthermore, the study was productive, as the survey revealed that 17% (n = 1) of the participants intend to receive further services while 83% (n = 5) of the participants will not receive further services.

For people who are interested in researching in this area in the future, one thing to consider is to recruit from different types of populations. Another thing the researcher suggests is to broaden the time available for screening, whether that be conducting the study for 5-6 hours in the day or screening for 3-4 weeks. Also, keep in mind that most people are probably going to be aware of what speech sound disorders are and that there are services to treat them. Fear not though, there can never be enough promotion of identifying SSDs at an earlier age.
REFERENCES


APPENDIX A
Recruitment Flyer

FREE PRESCHOOL SPEECH SCREENINGS

Who: Children ages 3-5 with English as primary language.

What: Speech screening; an undergraduate student researcher from the Department of Communication Disorders will be conducting brief (approximately 10-15 minute), free screenings to determine if preschool-age children would benefit from full speech sound production evaluations.

When: July 8-12 2-4 pm

Where: University of Nebraska Kearney Speech, Language, and Hearing Clinic
1615 W 24th St.
(at the west end of the College of Education building)

How: If you are interested in scheduling an appointment, please email Autumn Rhoads at rhoadsad@lopers.unk.edu.
APPENDIX B

Case History
Child’s Name: ________________________________ Birth date: __________

Parent(s) Name: ________________________________________________________________

Phone Number: ________________________________________________________________

Email Address: _________________________________________________________________

Number of siblings: ________ Date of last hearing screening (if performed): __________

Date of last speech screening (if performed): __________

Are there any other speech problems in the family (parents and/or siblings), if so please explain:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Has the child had frequent ear infections: __________________________________________

Has the child suffered from any other serious illness or injury? If yes please explain:
_____ Yes  ___ No
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
APPENDIX C
Intelligibility in Context Scale

Appendix A. The Intelligibility in Context Scale in English. Please download the original version from http://www.csu.edu.au/research/multilingual-speech/ics

Intelligibility in Context Scale (ICS)
(McLeod, Harrison, & McCormack, 2012)

Child’s name: ________________________________
Child’s date of birth: __________________________
Male/Female: ________________________________
Language(s) spoken: __________________________
Current date: ____________________________
Child’s age: ____________________________
Person completing the form: ______________________
Relationship to child: __________________________

The following questions are about how much of your child’s speech is understood by different people. Please think about your child’s speech over the past month when answering each question. Circle one number for each question.

<table>
<thead>
<tr>
<th>Question</th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2. Do immediate members of your family understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. Do extended members of your family understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4. Do your child’s friends understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5. Do other acquaintances understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6. Do your child’s teachers understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. Do strangers understand your child?</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

TOTAL SCORE = /35
AVERAGE TOTAL SCORE = /5

1 This measure may be adapted to adults’ speech, by substituting child with spouse.
2 Partners or stranger may be changed to other relative people.

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APPENDIX D
Results Summary: Pass

Dear Parent,
Today your child’s speech was screened by Autumn Rhoads, an undergraduate student in the Communication Disorders Department at the University of Nebraska Kearney, under the supervision of a certified and licensed speech-language pathologist.

Your child passed the speech screening

If you have any questions, please contact Whitney Schneider-Cline, Autumn’s research mentor and supervisor for the screenings, at schneiderwm@unk.edu or (308) 865-8612.

Thank you for allowing your child to participate in this screening.
Sincerely,

Whitney Schneider-Cline, Ph.D., CCC-SLP
Assistant Professor
Department of Communication Disorders
University of Nebraska Kearney
Results Summary: Did Not Pass

Dear Parent,

Today your child’s speech was screened by Autumn Rhoads, an undergraduate student in the Communication Disorders Department at the University of Nebraska Kearney, under the supervision of a certified and licensed speech-language pathologist.

Your child did not pass the speech screening today.

There may be many reasons a child does not pass, such as, limited attention, being tired or hungry, or demonstrating decreased skills for their age. Based on today’s screening results, we recommend seeking further evaluation of your child’s speech abilities. We provide these evaluation services at the Speech, Language, and Hearing Clinic at UNK. Our contact number is (308) 865-8300. Alternatively, you may want to seek evaluation through your local school system or a private group.

If you have any questions or would like to further discuss your child’s results, please contact Whitney Schneider-Cline, Autumn’s research mentor and supervisor for the screenings, at schneiderwm@unk.edu or (308) 865-8612.

Thank you for allowing your child to participate in this screening.

Sincerely,

Whitney Schneider-Cline, Ph.D., CCC-SLP
Assistant Professor
Department of Communication Disorders
University of Nebraska Kearney
APPENDIX E
Further Resources

Based on your child’s screening results, we hope that you will consider accessing local services provided by a licensed, ASHA-certified speech-language pathologist. A full speech evaluation will provide more information about your child’s speech and determine if he/she could benefit from speech therapy. These services are available through a variety of venues; here are a few local resources for you to consider:

1. University of Nebraska Kearney Speech Language and Hearing Clinic
   (http://www.unk.edu/academics/cdis/speech-language_hearing-clinic.php)
   Clinic Director (Laura Moody) Office Phone: (308)865-8507, email: moodyln@unk.edu

2. Kearney Public Schools (or your local school district):
   https://www.kearneypublicschools.org/departments/special-education/
   Office of Special Education at Kearney Public Schools Phone: (308)698-8017

3. Private practices (ask your primary care physician for a referral/order for services at a local practice such as Alpha Rehabilitation, Family Physical Therapy, etc.).

Thank you again for your participation in our study!

Sincerely,

Autumn Rhoads
Undergraduate Student Researcher
Department of Communication Disorders

Whitney Schneider-Cline, Ph.D., CCC-SLP
Assistant Professor
Department of Communication Disorders
APPENDIX F
Survey

1. Since the screening, have you scheduled your child for a speech evaluation?

2. If your child participated in a speech evaluation, is your child:
   a) Receiving services
   b) Planning on receiving services
   c) Not planning on receiving services

3. Based on the following scale, please rate how helpful the screening was.
   a) Not helpful
   b) Somewhat helpful
   c) Very helpful

4. Were you aware of speech sound disorders before your participation in this study?
   a) Yes
      Comments (optional):
   b) No
      Comments (optional):

5. Have you heard of services to treat speech sound disorders before your participation in this study?
   a) Yes
      Comments (optional):
   b) No
      Comments (optional):

6. Did you do any further research of your own on speech sound disorders after the screening?
   a) Yes
      Comments (optional):
   b) No
      Comments (optional):

7. Did the results of the screening enlighten you about your child’s speech sound productions?
   a) Yes
      Comments (optional):
   b) No
      Comments (optional):

8. How did you hear about this study?
   a) Flyer at daycare
   b) Social Media
   c) Newspaper
   d) Other (please explain)