

# Effectiveness Of Phonemic Cues In Word Production Of School-Aged Children With Down Syndrome (Ds): An Experimental Study Of Rawalpindi, Pakistan

Wajeeha Iqbal<sup>1\*</sup>, Irum Nawaz<sup>2</sup>

<sup>1</sup>*Speech and Language Pathology/Therapy Department, Lecturer, FRAHS (RIU)*

<sup>2</sup>*Assistant Professor, FRAHS (RIU), HOD, RCDC-FRAHS (RIU)*

*\*Corresponding Author: Wajeeha Iqbal*

*\*Speech and Language Pathology/Therapy Department, Lecturer, FRAHS (RIU),*

## Abstract

**Background:** In Pakistan, children with Down syndrome face various challenges in their language development, including word production. Limited research exists on the effectiveness of phonemic cues for word production in school-aged children with Down syndrome. However, considering the general language difficulties experienced by these children, it is plausible that phonemic cues may positively impact their word production skills, although further research is needed to understand their specific effects in the Pakistani context.

**Method:** A quasi-Experimental study conducted for a duration of six months. The sample was collected through a convenient sampling strategy N= 10 children from the age group of 6-12 years with both genders having Down Syndrome and comprehending one information carrying words (ICW) level. Permission was conducted from the institute, Special education centre with the assurance of confidentiality maintenance. Pre testing of all the participants was assessed on both five verbs using picture stimuli. The protocols of phonemic cue therapy mentioned in “Word Therapy Guide for the Clinician” were used. All the participants received 24 sessions of each 30mins in 6 weeks using Picture stimuli of the list five nouns (hat, arm, bell, glass, socks and five verbs (running, reading, brushing, laughing, playing). The participants were post-tested on the word retrieval of 5 nouns and 5 verbs list of picture stimuli using phonemic cue therapy. Given time for each response was 20 seconds, and responses were audio recorded. The timeline of the utterance of each response of nouns and verbs was noted in the pre and post-test.

**Results:** The results showed that noun production was better than verb production in children aged 6-12 years having Down syndrome.

**Keywords:** phonemic cues, young children, school children, down syndrome

## Introduction

According to an estimation, approximately every 0.2 % of women delivered children with Down syndrome in Pakistan <sup>(1)</sup>. It has been indicated that 1 in 300 babies in Pakistan is diagnosed with Down syndrome <sup>(2)</sup>. The highest number of children with Down syndrome prevails in Rural areas, especially in Sindh and Northern Pakistan villages, such as Rawalpindi <sup>(3)</sup>. Studies indicated that children who have Down syndrome (DS) are at a mean delay of 12 months in reaching the first ten words compared to developed children <sup>(4)</sup>, and the time to reach the two-word stage is much slower than the first ten words and a delay of 18 months is seen <sup>(5,6)</sup>. But it should be considered that Down syndrome children have individual differences in speech development but learn similar words as typically developed children <sup>(7)</sup>.

A comparison study revealed that the appropriate words and comprehension usage in children and adults with DS had suggested difficulty in syntax and retrieval of verbs, such as by mentioning a single naming <sup>(8)</sup>. Furthermore, the study was conducted to explore the comparison of children among children and children with DS while providing them with naming tasks and the use of gestures; it concluded that Down Syndrome children produced fewer responses on the target picture than developing children and used more gestures during the picture naming task that was strongly associated with the target picture <sup>(9)</sup>. Another research suggested that children with Down Syndrome show more errors in a single-word naming task than the mental age control groups <sup>(10)</sup>. The results of another study signified visual-semantic and graphical errors during the picture naming task as matched to the mental control group <sup>(11)</sup>.

## NOUNS AND VERBS IN CHILDREN WITH DS

A previous study on Spanish children collected data from 108 children with DS and 108 typically developed children between ages 8 to 29 months with similar vocabulary composition using Macarthur Bates Communicative Development Inventories and assessed on nouns predicates, closed-class words, and social words. Both the groups performed similarly and only difference was produced larger number of nouns than verbs<sup>(12)</sup>. A previous study on the comparison of verb use and comprehension in children and adults with DS has suggested that they have difficulty in syntax and retrieval of verbs<sup>(13)</sup>. The participants were given 36 nouns and 36 verbs in a single naming task, and the list and verb list were administered separately and given 20 s to respond to the picture. Noun list consisted of the following words kite, belt, hat, moon, box, shirt, church, door, pear, vest, show, axe, foot, carrot, gun, stool, corn, boat, goat, nose, window, bell, star, arm, hand, house, rabbit, table, heart, glass, grapes, bus, book, pie, tree and eye. The Verb list consisted of the following words: bark, crawl, cry, jump, laugh, pray, run, sit, sneeze, snore, swim, wink, carry, erase, pull, spill, stir, weigh, zip, climb, ride, shave, sweep, watch, give, put, bake, build, cut, fry, knit, pour, read, sew, throw and write. The DS children and typically developed had no significant differences in naming a single noun or verb but both showed was minor difficulty in retrieving verbs. DS children also indicated weak syntax ability, producing shorter utterances and less complex nouns, very verbs, and sentence structures<sup>(14)</sup>.

Collection of Researches in speech and vocabulary of children with DS has concluded words by giving vocabulary 1, vocabulary 2 and 3 for guidance to families to engage children in the process to acquire Vocabulary. Vocabulary 1 is designed for children having first words Vocabulary 2 is designed for children having 50 to 60 words or say or use signs for at least 10 words. Vocabulary 3 is designed for children having 80 -120 words or say and use signs for 20 or more words. Considering that rate of progress varies widely due to individual differences among this group of children. It includes becoming familiar with sounds like storing sound in the memory then discriminating between sound like hearing the difference among sound, producing individual sounds and in combination, saying words that begin with a particular word and then saying complex words which included one, two, three and four syllable words and joining them

together. The lists include Nouns and Verbs. The three Lists of words including UK and USA vocabulary contains the Nouns including pant, star, foot, hat door, glass, moon, bell, book, sock, belt, arm, knife, light and bus and includes Verbs like drinking, eating, playing sleeping, walking, brushing, writing, running, reading, laughing, climbing, throwing, crying, sitting, cutting<sup>(15)</sup>.

### Cue Therapy

Various techniques have been used or implemented with children with Down syndrome to explore their effectiveness in language development. The cue technique is intended to encourage a student to initiate or continue a task that children have previously performed. The hierarchy of cues moves from Verbal Indirect Cue to Verbal Direct Cue to Visual Cue, then to Pointing, and finally to Gestural cue. A phonemic cue is a verbal cue that uses phonological information to trigger a word. The cue includes a variety of information ranging from the initial phoneme/sound of a word to the first few phonemes that will give a hint so that the object or picture can be identified for the words that are difficult to recognize. The purpose of providing phonemic cues is to facilitate word retrieval – a cognitive process of producing a known word, primarily with children, like producing the sound ‘s’ for sun and ‘ph’ for the phone<sup>(16)</sup>.

The Phonemic Cue therapy (Phonological condition) using the word web given by “Word Therapy Guide for clinicians includes: **1)** First sound: what sound does it start with? **2)** First sound associates: what other words start with the same sound? **3)** First letter: show the alphabet card **4)** Number of syllables: clap for each sound in the word **5)** Rhymes: what does it rhyme with?<sup>(17)</sup>. Furthermore, a meta-analysis conducted on the development of Phonological awareness (PA) in Down's syndrome showed that phonological awareness skills of Down's syndrome were weaker than typically developed children of the same age<sup>(18)</sup>. A randomised control trial was used with mainstream children diagnosed with Word Finding Difficulty in the sample of N=20 children aged 6 to 8 years, indicating no apparent difference between groups as there were improvements<sup>(19)</sup>.

(10). Moreover, adapting phonological awareness intervention for 6- 8 years was beneficial for 5 DS children, such as; increasing phonological awareness, letter sounds, and words with the enhancement of phonological awareness abilities (providing the first sound of the word) in DS children<sup>(19)</sup>.

### **Aim of the Study:**

The current study aims to explore the Effectiveness of phonemic cues in word production of school-aged children with Down syndrome (DS) in Rawalpindi, Pakistan.

### **The Objective of the Study:**

- To determine the effectiveness of phonemic cues in word production of school-aged children with Down's syndrome.

### **Method**

The Quasi-experimental study was conducted at the Institute of special needs children in Rawalpindi, Pakistan. The sample was collected through the convenient sample technique for six months with children with Down syndrome. A sample of N=10 children (G=5: B=5) aged between 6 to 12 years were recruited for the study.

### **DATA COLLECTION TOOL:**

- Time of Utterance (measured in seconds)
- Number of errors
- Word List (Nouns & Verbs)

### **Picture Stimuli:**

A list of words was taken from nouns and verbs list from the Down's syndrome vocabulary 1, 2 and 3 and a list of verbs and nouns from the literature used in the research of verb comprehension in adolescents having Down's syndrome that were monosyllabic in nature in the English language<sup>(20)</sup>. A professional review of the words list was conducted, and the words were changed from high-frequency words to mixed-frequency (high and low-frequency) words. The word list consisted of 5 nouns and 5 verbs. The stimuli/words were presented to the participants of this study in the form of pictures.

### **Noun word List:**

The noun word list consisted of pant, foot, door, moon and book.

### **Verb word List:**

The verb list comprised eating, throwing, sitting, cutting and walking.

### **Scoring and Coding:**

**Age Coding:** The age ranges were specified according to the child development stages guided by the Centres for disease control and Prevention. The age range for Middle childhood ranging from 6-8 years was assigned 1, and the Middle childhood ranging from 9-12 years was assigned 2.

**Responses Coding:** Each participant's response for each word was rated from 1-3, in which 1 was no response, 2 was the incorrect response, and 3 was the correct response.

**Time of Utterance:** Keeping in view the literature for Down syndrome, the response time was noted in seconds, and each participant was given 20 seconds to respond for pre and post-test.

**Number of Errors:** Total errors before and after the therapy were noted.

### **DATA COLLECTION PROCEDURE:**

Written informed consent (English and Urdu) was obtained from the special need centre and special education school. The study was divided into 3 phases: pretesting, therapy/intervention and post-testing.

### **Phase I: Pre Testing**

A total of N=24 Children ranging from 6 to 12 years were assessed for Pre-testing from which 10 children were included in the study. 10 Participants were assessed on both reception and expression on the word list of 5 nouns and 5 verbs for Pre-testing using picture stimuli. The response time given for each word was 20 seconds according to the literature on Down syndrome (reference). The time duration for utterance and the number of errors before the intervention was noted. Responses of all the participants during pre-testing were audio recorded.

### **Phase 2: Therapy**

The protocols of phonemic cue therapy mentioned in "Word Therapy Guide for the Clinician" were used. All the participants received 24 sessions of each 30mins for 6 weeks. The list of 5 nouns and 5 verbs picture stimuli were used for intensive therapy (6 weeks), and errors in expression during pretesting were also targeted for correction in a therapy session.

### **Third Phase: Post Testing**

After 6 weeks of therapy sessions, the participants were post-tested on the word retrieval of 5 nouns and 5 verbs list of picture stimuli using phonemic cue therapies. Given time for each response was 20 seconds, and responses were audio recorded. Time of utterance of each response of nouns and verbs was noted. The number of errors in nouns and verbs were also noted in posttest.

#### **Instrument:**

A comprehensive assessment has been done to determine the language problem among children with Down syndrome. A comprehension of the operative word at 1-information carrying word (ICW) level. Children with phonological disorders, cleft, tongue tie and hearing impairment were excluded from this study.

#### **Intervention:**

The protocols of phonemic cue therapy mentioned in “Word Therapy Guide, the for clinician” were used. The intervention consisted of 24 sessions of 30 minutes for the duration of 6 weeks. The session includes a variety of strategies, including; Picture stimuli of the list of 5 nouns (hat, arm, bell, glass, socks) and five verbs (running, reading, brushing, laughing, playing) were used for phonemic cue therapy. The participants were post-tested on the

word retrieval of 5 nouns and five verbs list of picture stimuli using phonemic cue therapies. Given time for each response was 20 seconds, and responses were audio recorded. The time of the utterance of each response of nouns and verbs was noted in the posttest. The pre-post analysis has been done to conclude the results.

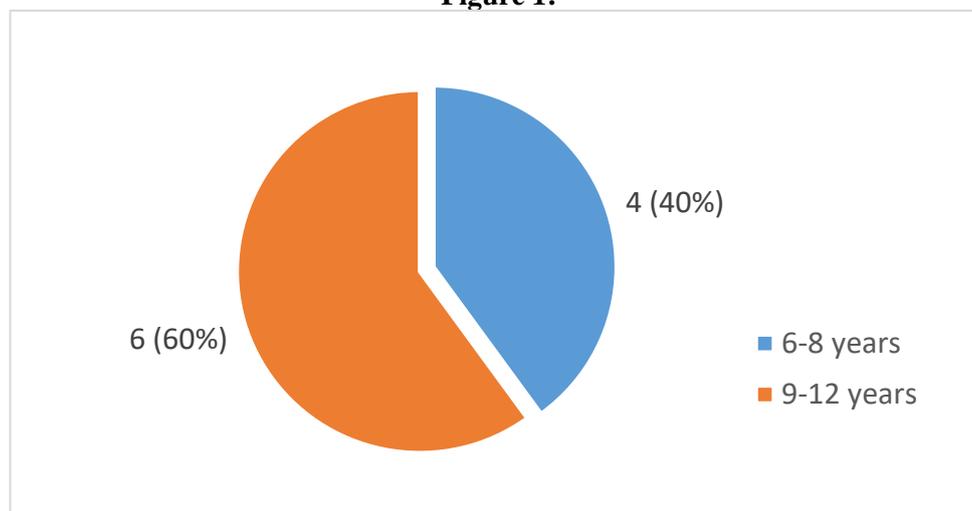
#### **Ethical considerations:**

The study was conducted in the Riphah International University. The ethical board of the university granted the permission. The information sheet was developed with the consent and assent form. Permission was conducted to the particular education school to conduct the research. The meetings have been done in which parents and faculty of the school were briefed about the purpose of the research. The school faculty have been ensured that no confidentiality has been broken during and after the research. The anonymity of the participants will be maintained. Furthermore, it has also been conveyed that their children have the right to withdraw from the study at any stage of the study.

#### **Results**

The following tests has been implicated while using the Statistical Package of Social Sciences.

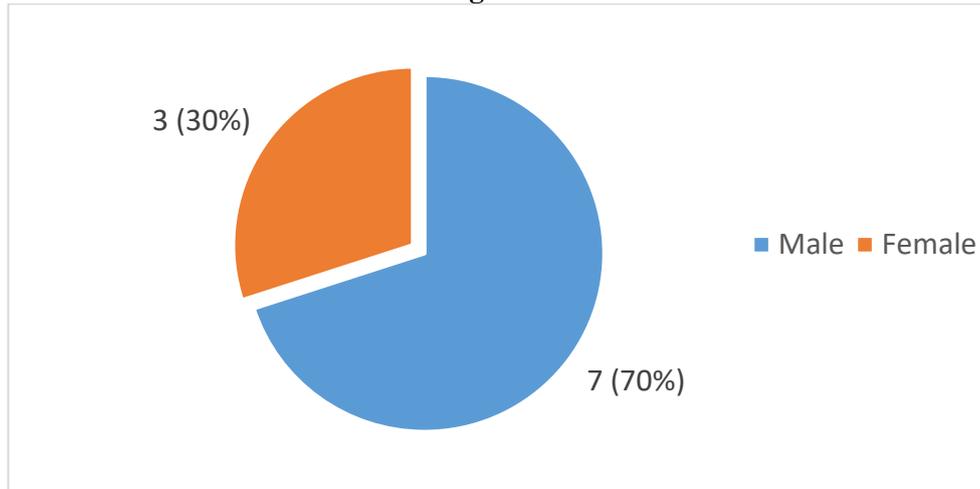
**Figure 1:**



#### **Pie chart of frequency and percentage of age of participants**

Figure 1 shows the frequency and percentage of age groups of participants. The total frequency of participants is 10 with age range from 6-8 years in which the frequency of participants is 4 (40%) and with age range from 9-12 years in which frequency of participants is 6 (60%).

**Figure 2:**



**Pie chart of frequency and percentage of the gender of participants**

Figure 2 shows the frequency and percentage of the gender of participants. The total frequency of gender is 10 in which the frequency of male participant is 7 (70%) and female participants is 3 (30%).

**Table 1** Frequency of responses of participants of different age groups on nouns through Phonemic Cue therapy

| NOUNS    | Phonemic Cue |                    |                    | Age (years) |      | Total |
|----------|--------------|--------------------|--------------------|-------------|------|-------|
|          |              |                    |                    | 6-8         | 9-12 |       |
|          |              |                    |                    |             |      |       |
| NOUNS    | Pant         | Pretest            | Incorrect Response | 3           | 5    | 10    |
|          |              |                    | Correct Response   | 1           | 1    |       |
|          |              | Posttest           | Incorrect Response | 1           | 0    | 10    |
|          |              |                    | Correct Response   | 3           | 6    |       |
|          | Moon         | Pretest            | No Response        | 1           | 2    | 10    |
|          |              |                    | Incorrect Response | 3           | 4    |       |
|          |              | Posttest           | Incorrect Response | 1           | 0    | 10    |
|          |              |                    | Correct Response   | 3           | 6    |       |
|          | Foot         | Pretest            | Correct Response   | 4           | 6    | 10    |
|          |              | Posttest           | Correct Response   | 4           | 6    | 10    |
|          | Book         | Pretest            | No Response        | 1           | 0    | 10    |
|          |              |                    | Incorrect Response | 3           | 6    |       |
|          |              | Posttest           | Incorrect Response | 2           | 0    | 10    |
|          |              |                    | Correct Response   | 2           | 6    |       |
|          | Door         | Pretest            | Incorrect Response | 4           | 4    | 10    |
|          |              |                    | Correct Response   | 0           | 2    |       |
| Posttest |              | Incorrect Response | 0                  | 1           | 10   |       |
|          |              | Correct Response   | 4                  | 5           |      |       |

Table 1 shows the cross-tabulation age of participants of both groups with Pre-test and Post-test Noun Pant. The total number of participants were 10 with 4 participants with ages ranging from 6-8 years and 6 participants from 9 to 12 years. In the pre-test, 4 participants with the age ranged 3 incorrect responses and 1 correct. In the post-test showed 1 incorrect and 3 correct responses. The 6 participants with an age range from 9-12 years on the pre-test showed 5 incorrect and 1 correct response and for post-test showed 6 correct responses.

The cross-tabulation of age participants of both groups with pre-test and post-test Noun Moon. The total participants were 10 with 4 participants with age ranging from 6-8 years and 6 participants with age ranging from 9 to 12 years. The 4 participants with ages 6-8 years on pre-test shows 1 no response and 3 incorrect responses and for post-test showed 1 incorrect and 3 correct responses. The 6 participants with an age range from 9-12 years the on pre-test shows 2 no responses and 4 incorrect and for post-test showed 6 correct responses.

The cross tabulation of age of participants with Pre-test and Post Test Noun Foot. The total participants were 4 with an age range from 6-8 years 6 with age range of 9-12 years for Noun Foot. The 4 participants with age range from 6-8 years on pre-test shows 4 incorrect responses and for post-test, shows 4 correct responses. The 6 participants with age ranging from 9-12 years on pretest show 6 incorrect responses and for post-test, show 6 correct responses.

The cross-tabulation of age of participants of both groups with Pre-test and Post Test Noun Book. The total participants were 4 with age range from 6-8 years and 6 with age range from 9-12 years for Noun Book. The 4 participants with age range from 6-8 years on pre-test shows 1 no response and 3

incorrect responses and for the post-test 2 incorrect response and 2 correct response. The 6 participants with age range from 9-12 years on the pre-test shows 6 incorrect response and for post-test showed 6 correct response

The cross tabulation of age of participants of both groups with Pre-test and Post Test Noun Door. The total participants were 4 with age range from 6-8 years and 6 with age range from 9-12 years for Noun Door. The 4 participants with age range form 6-8 years on pre-test show 4 incorrect response and for post-test 4 correct responses. The 6 participants with age range form 9-12 years on pre-test show 3 incorrect response and 3 correct responses and for post-test shows 1 incorrect response and 5 correct responses.

**Table 2** Frequency of Time of Utterance of participants of different age groups on nouns

| Time of Utterance | Age (years) |               | Total |   |    |
|-------------------|-------------|---------------|-------|---|----|
|                   | 6-8         | 9-12          |       |   |    |
| <b>Pant</b>       | Pretest     | 5.1 - 10 sec  | 2     | 4 | 10 |
|                   |             | 10.1 - 15 sec | 2     | 2 |    |
|                   | Posttest    | 5.1 - 10 sec  | 3     | 5 | 10 |
|                   |             | 10.1 - 15 sec | 1     | 1 |    |
| <b>Moon</b>       | Pretest     | no utterance  | 1     | 2 | 10 |
|                   |             | 5.1 - 10 sec  | 2     | 3 |    |
|                   | Posttest    | 10.1 - 15 sec | 1     | 1 | 10 |
|                   |             | 5.1 - 10 sec  | 4     | 6 |    |
| <b>Foot</b>       | Pretest     | 5.1 - 10 sec  | 1     | 2 | 10 |
|                   |             | 10.1 - 15 sec | 2     | 2 |    |
|                   | Posttest    | 0 - 5 sec     | 1     | 2 | 10 |
|                   |             | 5.1 - 10 sec  | 2     | 3 |    |
|                   | Posttest    | 10.1 - 15 sec | 2     | 3 | 10 |
|                   |             | no utterance  | 1     | 0 |    |
| <b>Book</b>       | Pretest     | 5.1 - 10 sec  | 1     | 2 | 10 |
|                   |             | 10.1 - 15 sec | 2     | 4 |    |
|                   | Posttest    | 5.1 - 10 sec  | 3     | 5 | 10 |
|                   |             | 10.1 - 15 sec | 1     | 1 |    |
| <b>Door</b>       | Pretest     | 5.1 - 10 sec  | 1     | 2 | 10 |
|                   |             | 10.1 - 15 sec | 3     | 4 |    |
|                   | Posttest    | 5.1 - 10 sec  | 3     | 5 | 10 |
|                   |             | 10.1 - 15 sec | 1     | 1 |    |

Table 2 **indicates** cross tabulation of time of utterance for Pant for each of participants of both groups with Pre-test and Post Test noun pant. In the pretest, out of the total 4 participants with age range from 6-8 years on pre-test, one participants showed no utterance while two participants responded between 5.1 sec to 10 seconds and one participant showed responses between 10.1 to 15 seconds. In the posttest 4 participants with an age range of 6-8 years showed responses between 5.1-10 seconds and 1 response was in 10.1 to 15 seconds. The total of 6 participants age range from 9-12 years for the utterance of pant was seen. Out of the total 6 participants, the two participants with age range of

9-12 years showed no utterance while 3 showed between 5.1-10 seconds while one participant responded between 10.1- 15 seconds on pre-test. In the posttest 6 participants responded in 5.1 to 10 second while 1 participant responded between 10.1 to 15 seconds.

Table 2 **indicates** cross tabulation of time of utterance for each of participants of both groups with Pre-test and Post Test for the noun Moon. The 4 participants with age range from 6-8 years on pre-test showed by two participants between 5.1 sec to 10 seconds and two participants showed responses between 10.1 to 15 seconds. In the posttest 3

participants with age range of 6-8 years showed responses between 5.1-10 seconds and 1 response was in 10.1 to 15 seconds. In the post test all 4 participants responded between 5.1- 10 seconds. The total of 6 participants age range from 9-12 years for the utterance of noun moon was seen. In the pretest 6 participants with age range of 9-12 years showed 2 participants with no utterance, 2 responded between 5.1-10 seconds while 1 participant responded between 10.1- 15 seconds. In the posttest 5 participants responded in 5.1 to 10 seconds while 1 participants responded between 10.1 to 15 seconds.

Table 2 **indicates** cross tabulation of time of utterance for each of participants of both groups with Pre-test and Post Test for the noun Foot. In the pretest the 4 participants with age range from 6-8 years on pre-test showed by one participants between 0 sec to 5 seconds and one participants showed responses between 5.1 to 10 seconds and two participant response between 10.1 to 15 seconds. . In the posttest two participants with age range of 6-8 years showed responses between 5.1-10 seconds and two responded between 10.1 to 15 seconds. The total of 6 participants age range from 9-12 years for the utterance of noun foot was seen. In the pretest 6 participants with age range of 9-12 years showed 2 participants responded between 0-5 seconds, 2 responded between 5.1-10 seconds while 2 participant responded between 10.1- 15 seconds. In the posttest 3 participants responded in 5.1 to 10 seconds while 3 participants responded between 10.1 to 15 seconds.

Table 2 **indicates** cross tabulation of time of utterance for each of participants of both groups

with Pre-test and Post Test for the noun Book. In the pre test the 4 participants with age range from 6-8 years on pre-test showed by 1 participants showed no utterance, 1 participant responded between 5.1 to 10 seconds and two participants responded between 10.1 to 15 seconds. In the posttest, 3 participants aged 6-8 years showed responses between 5.1-10 seconds and 1 response was in 10.1 to 15 seconds. A total of 6 participants ages ranging from 9-12 years for the utterance of noun Book was seen. In the pretest, 2 participants with an age range of 9-12 years showed between 5.1-10 seconds while 4 participants responded between 10.1- 15 seconds. In the posttest, 5 participants responded in 5.1 to 10 seconds while 1 participant responded between 10.1 to 15 seconds.

Table 2 **indicates** cross-tabulation of time of utterance for each of the participants of both groups with Pre-test and Post Test for the noun door. In the pretest, the 4 participants with an age range from 6 years on the pre-test showed that 1 participant showed responses between 5.1 to 10 seconds, and three participants responded between 10.1 to 15 seconds. In the posttest, 3 participants aged 6-8 years showed responses between 5.1-10 seconds and 1 response was in 10.1 to 15 seconds. In the post-test, all 4 participants responded between 5.1- 10 seconds. A total of 6 participants age range from 9-12 years for the utterance of noun door was seen. In the pretest 6 participants with an age range of 9-12 years showed 2 participants with no utterance, 2 responded between 5.1-10 seconds while 4 participants responded between 10.1- 15 seconds. In the posttest, 5 participants responded in 5.1 to 10 seconds while 1 participant responded between 10.1 to 15 seconds.

**Table 3** Frequency of responses of participants of different age groups on verbs through Phonemic Cue therapy

| Phonemic Cue |          |                  | Age (years)        |      | Total |    |
|--------------|----------|------------------|--------------------|------|-------|----|
|              |          |                  | 6-8                | 9-12 |       |    |
| VERBS        | Eating   | Pretest          | Incorrect Response | 1    | 0     | 10 |
|              |          |                  | Correct Response   | 3    | 6     |    |
|              |          | Posttest         | Incorrect Response | 1    | 0     | 10 |
|              |          |                  | Correct Response   | 3    | 6     |    |
|              | Sitting  | Pretest          | No Response        | 4    | 6     | 10 |
|              |          |                  | No Response        | 0    | 1     |    |
|              |          | Posttest         | Correct Response   | 4    | 5     | 10 |
|              |          |                  | No Response        | 4    | 6     |    |
|              | Walking  | Pretest          | No Response        | 4    | 6     | 10 |
|              |          |                  | No Response        | 4    | 6     |    |
|              |          | Posttest         | No Response        | 4    | 5     | 10 |
|              |          |                  | Incorrect Response | 0    | 1     |    |
| Cutting      | Pretest  | No Response      | 2                  | 0    | 10    |    |
|              |          | Correct Response | 2                  | 6    |       |    |
|              | Posttest | No Response      | 4                  | 6    | 10    |    |
|              |          | No Response      | 4                  | 6    |       |    |

The table 3 indicates cross tabulation of age of participants of both groups with Pre-test and Post Test Verb Eating. The 4 participants in Phonemic group with age range from 6-8 years on pre-test show 1 incorrect response and 3 correct and for post-test 1 incorrect and 3 correct responses. The 6 participants in Phonemic group with age range from 9-12 years on pre-test show 6 correct response and for post-test shows 6 correct responses.

It shows cross tabulation of age of participants of both groups with Pre-test and Post Test Verb Sitting. The 4 participants in Phonemic group with age range from 6-8 years on pre-test show 4 no response and for post-test 4 correct responses. The 6 participants in Phonemic group with 9-12 years on pre-test show 6 no response and for post-test shows 1 no response and 5 correct responses.

It shows cross tabulation of age of participants of both groups with Pre-test and Post Test Verb Walking. The 4 participants in Phonemic group with age range from 6-8 years on pre-test shows 4

no response and for post-test shows 4 no response. The 6 participants in Phonemic group with age range from 9-12 years on pre-test show 6 no responses and for post-test show 6.

It shows cross tabulation of age of participants of both groups with Pre-test and Post Test Verb Cutting. The 4 participants in Phonemic group with age range from 6-8 years on pre-test show 4 no response and for post-test 2 no response and 2 correct responses. The 6 participants in Phonemic group with age range from 9-12 years on pre-test show 5 no responses and 1 incorrect response and for post-test show 6 correct responses.

It shows cross-tabulation of age of participants of both groups with Pre-test and Post Test Verb Throwing. The 4 participants in the Phonemic group with age range from 6-8 years on pre-test show 4 no responses and for post-test show 4 no responses. The 6 participants in Phonemic group on the pre-test shows 6 no responses and for post-test shows 6 no responses.

**Table 4.** Frequency of Time of Utterance of participants of different age groups on verbs

| Time of Utterance | Age (years) |               | Total |   |    |
|-------------------|-------------|---------------|-------|---|----|
|                   | 6-8         | 9-12          |       |   |    |
| <b>Eating</b>     | Pretest     | 5.1 - 10 sec  | 2     | 5 | 10 |
|                   |             | 10.1 - 15 sec | 2     | 1 |    |
|                   | Posttest    | 5.1 - 10 sec  | 2     | 6 | 10 |
|                   |             | 10.1 - 15 sec | 2     | 0 |    |
| <b>Sitting</b>    | Pretest     | no utterance  | 3     | 6 | 10 |
|                   |             | 10.1 - 15 sec | 1     | 0 |    |
|                   | Posttest    | 5.1 - 10 sec  | 2     | 1 | 10 |
|                   |             | 10.1 - 15 sec | 2     | 5 |    |
| <b>Walking</b>    | Pretest     | no utterance  | 4     | 6 | 10 |
|                   |             | no utterance  | 3     | 5 |    |
|                   | Posttest    | 5.1 - 10 sec  | 1     | 0 | 10 |
|                   |             | 10.1 - 15 sec | 0     | 1 |    |
| <b>Cutting</b>    | Pretest     | no utterance  | 4     | 5 | 10 |
|                   |             | 5.1 - 10 sec  | 0     | 1 |    |
|                   | Posttest    | no utterance  | 2     | 0 | 10 |
|                   |             | 5.1 - 10 sec  | 1     | 4 |    |
| <b>Throwing</b>   | Pretest     | 10.1 - 15 sec | 1     | 2 | 10 |
|                   |             | no utterance  | 4     | 6 |    |
|                   | Posttest    | no utterance  | 4     | 5 | 10 |
|                   |             | 5.1 - 10 sec  | 0     | 1 |    |

Table 4 indicates cross tabulation of time of utterance for each of participants of both groups with Pre-test and Post Test for the verb eating. In the pretest the 4 participants with age range from 6-8 years on pre-test showed by 2 participants showed responses between 5.1 to 10 seconds while and two participants responded between 10.1 to 15 seconds. In the posttest 2 participants with age range of 6-8 years showed responses between 5.1-10 seconds and 2 responses was in 10.1 to 15

seconds. The total of 6 participants age range from 9-12 years for the utterance of verb eating was seen. In the pretest 6 participants with age range of 9-12 years showed by 5 participants responded between 5.1-10 seconds while 1 participant responded between 10.1- 15 seconds. In the posttest all 6-participant responded between 10.1 to 15 seconds.

Table 4 **indicates** cross tabulation of time of utterance for each of participants of both groups

with Pre-test and Post Test for the verb sitting. In the pretest the 4 participants with age range from 6-8 years on pre-test showed by 3 participants showed no utterance while one participant responded between 10.1 to 15 seconds.. In the posttest 2 participants with age range of 6-8 years showed responses between 5.1-10 seconds and 2 responses was between 10.1 to 15 seconds. The total of 6 participants age range from 9-12 years for the utterance of verb sitting was seen. In the pretest 6 participants with age range of 9-12 years showed by participants responded with no utterance In the posttest all 1 participant responded between 5.1 to 10 seconds and 5 responded between 10.1 to 15 seconds.

Table 4 **indicates** cross tabulation of time of utterance for each of participants of both groups with Pre-test and Post Test for the verb walking. In the pretest the 4 participants with age range from 6-8 years on pre-test showed no utterance by 4 participants. In the posttest 3 participants with age range of 6-8 years showed responses with no utterance while 1 participant responded between 5.1-10 seconds. The total of 6 participants age range from 9-12 years for the utterance of verb walking was seen. In the pretest 6 participants with age range of 9-12 years showed by participants responded with no utterance. In the posttest all 5-participant responded with no utterance while one participant between 10.1 to 15 seconds.

Table 4 **indicates** cross tabulation of time of utterance for each of participants of both groups with Pre-test and Post Test for the verb cutting. In the pretest the 4 participants with age range from 6-8 years showed no utterances. In the posttest 4 participants with age range of 6-8 years showed responses with no utterance. The total of 6 participants age ranges from 9-12 years for the utterance of verb cutting was seen. In the pretest 6 participants with age range of 9-12 years showed by participants responded with no utterance. 5 participants showed no utterance while one participant responded between 5.1 to 10 seconds. In the posttest all 4-participant responded with 5.1 to 10 seconds while two participants between 10.1 to 15 seconds.

Table 4 **indicates** cross tabulation of time of utterance for each of participants of both groups with Pre-test and Post Test for the verb throwing. In the pretest the 4 participants with age range from 6-8 years showed no utterances. In the posttest 2 participants with age range of 6-8 years showed responses with no utterance. The total of 6 participants age ranges from 9-12 years for the utterance of verb throwing was seen. In the pretest 6 participants with age range of 9-12 years showed by participants responded with no utterance. In the post-test, 5 participants showed no utterance while one participant responded between 5.1 to 10 seconds.

**Table 5** Mean, standard deviation and p-value of analysis of difference within the group (paired sample t-test) for nouns and verbs

| Phonemic Cue   |                 | N        | Mean±Std. Deviation | Sig. (2-tailed)        |      |
|----------------|-----------------|----------|---------------------|------------------------|------|
| NOUNS          | <b>Pant</b>     | Pretest  | 10                  | 2.2±0.42               | 0.00 |
|                |                 | Posttest | 10                  | 2.9±0.32               |      |
|                | <b>Moon</b>     | Pretest  | 10                  | 1.7±0.48               | 0.00 |
|                |                 | Posttest | 10                  | 2.9±0.32               |      |
|                | <b>Foot</b>     | Pretest  | 10                  | 3.0 <sup>a</sup> ±0.00 | -    |
|                |                 | Posttest | 10                  | 3.0 <sup>a</sup> ±0.00 |      |
|                | <b>Book</b>     | Pretest  | 10                  | 1.9±0.32               | 0.00 |
|                |                 | Posttest | 10                  | 2.8±0.42               |      |
|                | <b>Door</b>     | Pretest  | 10                  | 2.2±0.42               | 0.00 |
|                |                 | Posttest | 10                  | 2.9±0.32               |      |
|                | <b>Eating</b>   | Pretest  | 10                  | 2.9 <sup>a</sup> ±0.32 | -    |
|                |                 | Posttest | 10                  | 2.9 <sup>a</sup> ±0.32 |      |
| <b>Sitting</b> | Pretest         | 10       | 1.0±0.00            | 0.00                   |      |
|                | Posttest        | 10       | 2.8±0.63            |                        |      |
| VERBS          | <b>Walking</b>  | Pretest  | 10                  | 1.0 <sup>a</sup> ±0.00 | -    |
|                |                 | Posttest | 10                  | 1.0 <sup>a</sup> ±0.00 |      |
|                | <b>Cutting</b>  | Pretest  | 10                  | 1.1±0.32               | 0.00 |
|                |                 | Posttest | 10                  | 2.6±0.84               |      |
|                | <b>Throwing</b> | Pretest  | 10                  | 1.0 <sup>a</sup> ±0.00 | -    |
|                |                 | Posttest | 10                  | 1.0 <sup>a</sup> ±0.00 |      |

a. The correlation and t cannot be computed because the standard error of the difference is 0.

## DISCUSSION

The present study comprised N=10 children with Down syndrome in the age group of 6-12 years, and the results showed that noun production was better than verb production. Previous research on 14 children with Down syndrome on comprehension and production of Nouns and predicates included a chronological age of 54 months and developmental age of 34 months and a matched developmental age comparison group of typically developed children. Results concluded that comprehension and production of Nouns as compared to predicates was better in comprehension in children with DS <sup>(21)</sup>.

Another previous research report on Pre and Post-intervention for 10 preschool children with DS using letter knowledge and phonological awareness showed significant treatment effects on post-intervention. The activities used were associated with the child's speech targets. Out of 10 total participants, 9 showed increased knowledge with the intervention of initial phonemes <sup>(14)</sup>.

In the present study, children with Down syndrome received 24 therapy sessions of Phonemic Cues on 5 nouns and 5 verbs which were different than the words for pre-post testing. The results showed that the word production of nouns was better in school-aged children with Down syndrome than the verbs. They gave more nouns than verbs. In a past study, 3 Persian Speaking children with DS with ages ranging from 5 to 6 years were given therapy sessions to develop a whole-word reading protocol and to see its effectiveness in relation to language skills in these children. The data tool was made of 50 nouns depending upon the receptive lexical of each child. Each individual received 20 therapy sessions. The result indicated that the naming ability on treated items showed significant results <sup>(15)</sup>.

Another study conducted in 2018 also indicated that children having DS have fewer Verbs <sup>(16)</sup>. A previous study on 13 school-aged children having learning disability with ages ranging from 9-11 years and 13 matched vocabularies typically developed school-aged children read four narratives having 10 Nouns and 10 Verbs. The study concluded that in both groups, Verb learning was difficult compared to Nouns <sup>(17)</sup>. A latest research on 192 English speaking adults on phonological and semantic cues in noun class learning was assessed. The aim of the research was to see if phonological cues are more significant to learners than semantic cues and second, if

phonological cues are available earlier than semantic cues. Findings indicated that both cues are beneficial in learning noun class and it depends on the early availability and significance of the cue. So, both significance of cue and availability are markers for learning. The finding also suggested that there is the possibility that children rely on phonological knowledge because it is available very early than meaning to build their classification systems.

Further research is to be conducted on comparing phonemic cue therapy with semantic cue therapy. Permission from the special centres to conduct research on enrolled children with special needs was a major limitation that impacted this study's sample size.

## CONCLUSION

It was concluded there was a significant difference in Nouns production of pant, moon, book, door and Verb production of sitting and cutting in school-aged children with Down's syndrome receiving Phonemic Cue therapy.

## References

- [1]. Ahmed, K. J., Ahmed, M., Jafri, H. S., Raashid, Y., & Ahmed, S. (2015). Pakistani mothers' and fathers' experiences and understandings of the diagnosis of Down syndrome for their child. *Journal of community genetics*, 6, 47-53. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4286566/>
- [2]. Grazioplene, M. M., Downs, S. M., O'Brien, Q., & Fanzo, J. (2018). A systematic review of the design, implementation and effectiveness of mass media and nutrition education interventions for infant and young child feeding. *Public health nutrition*, 21(2), 273-287. Available from: <https://www.nutritioncluster.net/sites/nutritioncluster.com/files/2020-05/20Mass%20media%29%20Grazioplene%202017.pdf>
- [3]. Ali, A., Zahad, S., Masoumeh, A., & Azar, A. (2008). Congenital malformations among live births at Arvand Hospital, Ahwaz, Iran-A prospective study. *Pakistan Journal of Medical Sciences*, 24(1), 33. Available from: [https://www.pjms.com.pk/issues/janmar08/pdf/live\\_births.pdf](https://www.pjms.com.pk/issues/janmar08/pdf/live_births.pdf)

- [4]. Ibrahim, S.H. and Bhutta, Z.A., 2013. Prevalence of early childhood disability in a rural district of Sindh, Pakistan. *Developmental Medicine & Child Neurology*, 55(4), pp.357-363. Available from: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/dmcn.12103>
- [5]. Mahmood, A. and Gul, A., 2023. Parental Stress, Familial Burden and Quality of Life in Parents of Children with Down Syndrome. *Journal of Professional & Applied Psychology*, 4(1), pp.61-70. Available from: <https://iprpk.com/ojs/index.php/jpap/article/download/151/104>
- [6]. Rahman, S. and Obaid-ur-Rahman, M., 2005. The prevalence rate of Down's syndrome in Karachi resident women. *Pakistan Journal of pharmaceutical sciences*, 18(2), pp.61-63. Available from: <https://pubmed.ncbi.nlm.nih.gov/16431402/>
- [7]. Rahman SA, Obaid-ur-Rahman MU. The prevalence rate of Down's syndrome in Karachi resident women. *Pakistan Journal of pharmaceutical sciences*. 2005 Apr;18(2):61-3. Available from: <https://pesquisa.bvsalud.org/portal/resource/pt/emr-74137>
- [8]. Ibrahim SH, Bhutta ZA. Prevalence of early childhood disability in a rural district of Sindh, Pakistan. *Developmental Medicine & Child Neurology*. 2013 Apr;55(4):357-63. Available from: <https://www.pafmj.org/index.php/PAFMJ/article/download/4667/2737>
- [9]. Packiam Alloway T. Down Syndrome & Working Memory [Internet]. *Psychology Today*. 2016. Available from: <https://www.psychologytoday.com/us/blog/keep-it-in-mind/201605/down-syndrome-working-memory>
- [10]. Oliver B, Buckley S. The language development of children with Down syndrome: First words to two-word phrases. *Down Syndrome Research and Practice*. 1994 Jan 1;2(2):71-5. Available from: [https://www.researchgate.net/publication/215878987\\_The\\_language\\_development\\_of\\_children\\_with\\_Down\\_syndrome\\_First\\_words\\_to\\_two-word\\_phrases](https://www.researchgate.net/publication/215878987_The_language_development_of_children_with_Down_syndrome_First_words_to_two-word_phrases)
- [11]. Michael SE, Ratner NB, Newman R. Verb comprehension and use in children and adults with Down syndrome. *Journal of Speech, Language, and Hearing Research*. 2012. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22992705>
- [12]. Sheng L, McGregor KK. Object and action naming in children with specific language impairment. *Journal of Speech, Language, and Hearing Research*. 2010. Available from: <https://pubs.asha.org/doi/abs/10.1044/1092-4388%282010/09-0180%29>
- [13]. Bello A, Onofrio D, Caselli MC. Nouns and predicates comprehension and production in children with Down syndrome. *Research in Developmental Disabilities*. 2014 Apr 1;35(4):761-75. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0891422214000377>
- [14]. Steele SC. Does language learning disability in school-age children affect semantic word learning when reading? *International journal of speech-language pathology*. 2015 Mar 4;17(2):172-84. Available from: <https://www.tandfonline.com/doi/abs/10.3109/17549507.2014.979872>
- [15]. Stefanini S, Caselli MC, Volterra V. Spoken and gestural production in a naming task by young children with Down syndrome. *Brain and Language*. 2007 Jun 1;101(3):208-21. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0093934X0700017X>
- [16]. Næss K. Development of phonological awareness in Down syndrome: A meta-analysis and empirical study. *Developmental Psychology [Internet]*. 2015;52(2):177-190. Available from: [https://www.researchgate.net/publication/287797648\\_Development\\_of\\_Phonological\\_Awareness\\_in\\_Down\\_Syndrome\\_A\\_Meta-Analysis\\_and\\_Empirical\\_Study](https://www.researchgate.net/publication/287797648_Development_of_Phonological_Awareness_in_Down_Syndrome_A_Meta-Analysis_and_Empirical_Study)
- [17]. Sutton, M. How to: Cueing Hierarchy for Word Finding in Aphasia. *Tactus App Resources*, 2016. Available from: <https://tactustherapy.com/cueing-hierarchy-word-finding-aphasia/>
- [18]. Best W, Hughes LM, Shobbrook K. *WORD Therapy Guide for Clinicians*. Retrieved from: <https://www.ucl.ac.uk/csllr/resources/WORDTherapyGuideFolder.2015>
- [19]. Best W, Hughes LM, Masterson J, Thomas M, Fedor A, Roncoli S, Fern-Pollak L, Shepherd DL, Howard D, Shobbrook K, Kapikian A. Intervention for children with word-finding difficulties: a parallel group randomised control trial. *International journal of speech-language pathology*. 2018 Dec 28;20(7):708-19. Available from: <https://www.tandfonline.com/doi/full/10.1080/17549507.2017.1348541>
- [20]. Lemons CJ, King SA, Davidson KA, Puranik CS, Fulmer D, Mrachko AA, Partanen J,

- Otaiba SA, Fidler DJ. Adapting phonological awareness interventions for children with Down syndrome based on the behavioural phenotype: A promising approach? *Intellectual and Developmental Disabilities*. 2015 Aug;53(4):271-88. Available from: <https://www.aaidjournals.org/doi/abs/10.1352/1934-9556-53.4.271>
- [21]. Lanfranchi S, Baddeley A, Gathercole S, Vianello R. Working memory in Down syndrome: is there a dual task deficit? *Journal of Intellectual Disability Research*. 2012 Feb 1;56(2):157-66.
- [22]. Daunhauer LA, Fidler DJ, Hahn L, Will E, Lee NR, Hepburn S. Profiles of everyday executive functioning in young children with Down syndrome. *American Journal on intellectual and developmental disabilities*. 2014 Jul;119(4):303-18.
- [23]. Bello A, Onofrio D, Caselli MC. Nouns and predicates comprehension and production in children with Down syndrome. *Research in Developmental Disabilities*. 2014 Apr 1;35(4):761-75. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0891422214000377>
- [24]. Steele SC, Willoughby LM, Mills MT. Learning word meanings during reading: Effects of phonological and semantic cues on children with language impairment. *International Journal of Speech-Language Pathology*. 2013 Apr 1;15(2):184-97. Available from: <https://www.tandfonline.com/doi/abs/10.3109/17549507.2012.700322>