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Understanding the Difficulties in Communication with Down Syndrome

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ABSTRACT

The goal of this study was to identify the phonological difficulties a 19-year-old Down syndrome individual faced in her daily communication. The research method employed a qualitative descriptive approach using a case study design. A 19-year-old female with minor Down syndrome served as the research subject. Data was gathered using subject observation, interviews, and conversation recordings. The data was analyzed through some steps: first, transcribing the data; the recorded data is transcribed, the transcription process by writing the words spoken by the subject. Second, interpretation; the data was analyzed using relevant phonological process theory. The examination was conducted on the characteristics of language difficulties faced by subjects based on phonological theory. The result showed that the phonological difficulties faced by individuals with Down syndrome included the processes of assimilation, dissimilation, monophthongs, anaptyxis, substitution, apocope, and deletion of weak syllables.

Keywords: *Case Study, Down Syndrome, Phonology*

Introduction

Down syndrome is a genetic abnormality. According to Cleveland Clinic (2023), Down syndrome is a genetic disorder caused by an excess of chromosomes; typical chromosomal counts are 46, but in cases with Down syndrome, there are 47. It can influence the development of their brain and body. Chromosomes, as DNA molecules, contain genetic information for an organism (Pathak I, 2023).

This genetic abnormality causes various problems such as a higher risk of heart attack, hearing loss, low muscular tone, thyroid issues, and impaired intellectual development (Orlin Nancy A, et. al (2014). Apart from that, Down syndrome also has characteristics of cognitive deficits, impaired concentration, memory, ability to carry out tasks, motoric development or body control and communication disorders (Irwanto, et al 2019).

According to Dewi (2014) in Lubis (2019), children with Down syndrome have several physical disorders such as hearing problems, heart defects, vision problems, obesity and the immune system. Physical abnormalities in DS children cause differences in the shape of their speech organs. For example, the tongue is large and protruding, making it difficult for the upper and lower lips to stick together. This condition also makes it difficult for Down syndrome children to vibrate their tongue and bring their upper and lower teeth together, as well as difficulty moving their jaw. Weak tongue and jaw muscles as well as thyroid problems are the main obstacles for DS children when pronouncing several sounds.

As a result, one of the communication disorders in Down syndrome is the inability to produce sounds of language phonetically correctly. According to Seeandlearn.org, (2024) children with Down syndrome produce speech sounds later than typically developing children and have difficulty producing clear speech. They master speech sounds in the same order as other children but much more slowly and less accurately. Their speech skills influence their language development - the rate at which they understand and say words. Their speech difficulties make their spoken language more difficult to understand, often throughout their lives. The reasons for their speech difficulties are not fully understood but include: anatomical differences making speech sounds and words more difficult to produce, a high incidence of conductive hearing loss in the early years which affects hearing in the speech sound range, difficulties storing the precise phonological (sound) patterns of words.

However, the ability to use sounds correctly in language is very necessary for creating effective interaction because it can make the message conveyed can be understood clearly by the listener. This is the scope of phonology, a branch of linguistics that investigates a language's sound

system, covering the identification and creation for sounds in words and sentences. Therefore, phonological theory plays an essential role because it describes the sound structure of language, which is crucial to comprehending problems with communication in individuals with Down syndrome.

According to Verhaar (1999) in Fawzi (2023), phonology is a science that examines certain speech sounds according to their functions. By understanding how phonology plays a role in the formation of language sounds, it can better understand how Down syndrome sufferers have difficulty conveying thoughts and feelings through speech. Therefore, it is hoped that this research can contribute to creating more appropriate interventions to help improve communication skills in Down syndrome.

Moreover, significant research has been conducted on language ability problem in Down syndrome. Two notable studies are by Ali (2024), the title is "A Study of Phonological Deficit in Children with Down Syndrome", and the result is the phonology of children with Down syndrome is different from normal children, Down syndrome children tend to replace or switch consonant sounds, vowels, and consonant clusters, he/she tends to replace or switch consonant sounds, vowels, and consonant clusters. Further Sinaga, et al (2024), by the title "Phonological Acquisition of Indonesian in Down Syndrome Children at SLB E Negeri Pembina Level North Sumatra Province, Medan (Psycholinguistic Studies)" and the results show that children with Down syndrome can produce several vowel sounds and consonants in Indonesian. They can produce the vowel sounds [i], [u], [e], [o], and [a], as well as some consonants such as [b], [p], [t], [d], [l], [k], [s], [m], [n], [d], [t], and [c]. There were changes in speech sounds, such as the completion of sounds (Omission) and the addition of sounds (Substitution).

Therefore, this research was conducted to understand the difficulties in phonology of individuals with Down syndrome. Unlike the previous research, this research focuses on late teens and the previous research is focused on children. This research could be a continuation of learning from previous research. Besides, the considering choose age 19 because it represents a crucial age for language development and the transition to adulthood. During this period, individuals are preparing to manage complex social relationships, obligations and responsibility, which necessitates effective communication skills.

This research integrates the phonological process. The phonological process is a rule used by language to regulate how sounds are arranged and pronounced in words. This process helps in understanding how a word or sound in a language is formed and pronounced. According to Kreidler (1993) in Yule (2014) in Finegan (2015), phonological rules processes are the way to pronounce differently of a particular sound in the different phonemes. In addition, according to Muslich, (2024), there are assimilation, dissimilation, vocal modification, neutralization, zeroization, metathesis, diphthongization, monophthongisation, anaptyxis. The explanation is as follows:

According to Lass' (1984) in Ambalegin (2022), assimilation is resembling its nearby sounds more and more. Besides, according to Nordquist (2020), "assimilation is the influence of a sound on a neighbouring sound so that the two become similar or the same". For example, in the word "that page" the pronunciation is [ðaep peɪdʒ] rather than [ðaet peɪdʒ]. Those are regressive, progressive, and reciprocal assimilation. Regressive assimilation happens when the last sound of a word or syllable becomes the same as, or similar to, the first sound of the word or syllable that follows (Dardjowidjoyo, 2009) . For example, in the word "that page" the sound /t/ is changed to /p/ [ðaep peɪdʒ]. The last sound of "that" is affected by the word "page", making them both identical. Then, progressive assimilation is the opposite of regressive assimilation. It happens when the second word or syllable's initial sound starts to resemble or sound the same as the word or syllable that came before it Dardjowidjoyo (2009). For example, "kill him" is pronounced [kɪl lɪm] rather than [kɪl hɪm]. Since the word before it ends with /l/, the sound /h/ in him changes to /l/. Furthermore, reciprocal assimilation; if the two phonemes influence each other, reciprocal assimilation takes place. The last sound of the word or syllable before and the first sound of the word or syllable after influence one another to create a new sound. For example, I can play is pronounced [aɪ kæm ple] instead of [aɪ kaen ple]. As they interact, the sounds /n/ and /p/ produce new sounds. /m/

Additionally, dissimilation. According to Dardjowidjoyo (2009), dissimilation is the act of changing or eliminating a sound as a result of difficult word repetition. For example, in the word "Surprise" is pronounced [sə'praɪz] rather than [sərpraɪz]. Since there is already a sound /r/ in the following syllable, /praɪz/, the sound /r/ within syllable /sər/ is omitted.

Furthermore, metathesis. Metathesis is a pattern in language where two sounds appear in one form of a word in one order, but in a different form of the same word in a different order (*Metathesis in Language 2.0*, 2019). For example: ask become aks

Therefore, diphthongization. Diphthongization is the process by which a single vowel sound (monophthong) transforms into two vowel sounds or double vowels (diphthongs). The two vowel sounds are still heard at one loudness peak, despite the shift in sound, and are therefore still regarded as one syllable Muslich (2024). For example: face become faIs.

Further, monophthongisation. Monophthongisation is the process of reducing a diphthong or triphthong to a simple vowel sound (Merriam-Webster.com). Moreover according to (Fawzi, 2023), "Monophthongization is the change of two vowel sounds or double vowels to become a single vowel". For example: house [haʊs] become has [hɑːs]

As well as, anaptyxis. Anaptyxis is the insertion of a short vowel between consonants to make a word more easily pronounceable (Collins Dictionary). For example: Athlete become ath-leet Apart from this, according to Ingram (1989) in Irawati & Maulia (2022), two of the phonological process are substitution and syllable structure. Substitution is the phonological process consists of backing, fronting, gliding, stopping, vowelization, affrication, deaffrication, alveolarization, depalatalization, and labialization. The stopping process occurs when the consonant produced by a continuous flow of air (example: "s," "z," "sh," or "th") with a consonant sound produced by cutting off the air flow completely, as in the sound "p" or "d". For example, if a child says the letter "f" but sounds with a "p" as in the word "flamingo" which is pronounced, "pamingo". Process Gliding occurs when the "l" or "'r" sound is replaced by the "y" or "w" sound. In Indonesian word "merah" is often pronounced as "mewah" or "melah". Backing happens when the alveolar sounds [t,d] are replaced by the sounds [k,g]. for example, the words "cubit" and "sehat" is pronounced as [cubik] and [sehak]. Fronting occurs when the velar sounds or palatal ("k", "g", "sh") are replaced by sounds ("t, "d", "s"). Vocalization occurs when. The "l" sound is replaced by a vowel sound. For example, the word "apple" is pronounced as [apo]. Affrication occurs when a nonfricative sound is replaced by an affricative sound "ch" and "j". Alveolarization occurs when nonalveolar sounds are replaced by sounds alveolar. Depalatalization occurs when palatal sounds are replaced by nonpalatal sounds. Meanwhile, Labialization occurs when labial sounds are replaced by nonlabial sounds.

Besides, syllable Structure. This is process consists of several sub-processes namely cluster reduction, initial consonant deletion, final consonant deletion, weak syllable deletion and epenthesis. In the cluster reduction process, clusters are removed consonants leaving one consonant remaining. For example, the word "ikan" pronounced "ika". Meanwhile, apheresis, initial consonant deletion occurs consonant sound at the beginning of a word. On the other hand, apocope or final consonant deletion, the consonant sound at the end of the word is removed. An example is the word "kupas" which is spoken to be "kupa". Another process is syncope, removing a phoneme from a word in the middle. Then weak syllable deletion. In this process occurs removal of weak syllables from a word. For example, the word "lihat" is spoken becomes a "hat". In this process the word "li" at the beginning of the word is lost. When epenthesis occurs adding a sound between two consonants. Usually it's an "uh" sound.

Furthermore, applying these theories in this research can be an instruction to understand the difficulties in speech of a 19-Year-Old Individuals with Down Syndrome especially in Phonology. Therefore, the statements of problem in this research are: what are phonological difficulties in a 19-year-old individual with Down syndrome in her speech? What types of phonological errors are commonly observed in her speaking? The objective of this research is to explore the delay in the development of phonological skills in 19-year-old with Down syndrome, to analyses the specific phonological rules used by a 19-year-old with Down syndrome during verbal conversation, and to investigate the frequency and patterns of phonological errors in the speech of 19-year-olds with Down syndrome, including assimilation, dissimilation, insertion, and deletion.

This research has a significant contribution to understanding specific language development in Down syndrome, especially in producing the sound of language. In the hope, it would become a starting point for applying appropriate intervention, supporting parents, teachers, other researchers, and medical professionals to care for and support people with Down syndrome because Down syndrome is not a condition that only impacts childhood, but affects an individual's lifelong development.

Method

This research used a qualitative descriptive approach and focused on the case study design. According to (Cresswell, 2012), qualitative includes investigating a topic, creating a deep understanding of a phenomenon, gathering data according to words, evaluating the data and description utilizing text analysis forms, and determining what is the most significant aspects of the results. Then, descriptive research is concerned with characterizing events and settings in order to characterize them in a study report (Arikunto,

2010). Besides, case study is defined as research which examines a program, an event, an activity, a process, or one or more individuals truly to acquire a comprehensive understanding of the action being explored (Creswell, 2009 in Mohajan, 2018).

Besides, the subject of this research is woman in 19-year-old with Down syndrome. The subject will identify as D. From the results of the medical examination, she was classified as mild Down syndrome. It should be note that Down syndrome has three levels: mild, medium, and heavy. The mild category has symptoms such as cognitive limitations, delayed language development, and slow motor skills, but they can adapt to the environment and do not have serious health problems, while the medium category is characterized by symptoms that affect daily life more significantly and the category heavy is characterized by more limitations, such as difficulty in moving, interacting socially and having serious health problems; need lifelong support in living daily life. D was studying at Special Needs School at grade XII high school.

Therefore, this research was done from September 1, 2023, until the end of December 2023. The instruments used in this research include observation and interview. A research instrument is a device used for data collection, observation, and measurement (Creswell, 2008). There are three methods used in qualitative research, among others, listening methods (observations), surveys and conversation/interview (Mahsun, 2017). By using observation and interview instruments, this research can investigate in depth the phenomena observed and understand the viewpoints and direct experiences of respondent.

Furthermore, the data collection of this research consists of several steps: first, observation. The subject was observed in natural situations to collect data in the form of speech produced in everyday communication. It aims to characterize the subject and gain a deeper understanding of communication patterns used in everyday contexts. In this way, research can provide valuable insight into a subject's communication behavior without significantly influencing her interactions. Second, approaching the subject. Attempts are made to interview with the subject and learn as much as possible about the possibilities and characteristics of the natural language disorder she suffers from. Third, recording the subject's speech. During the observation, the subject's speech was recorded to avoid missing data. Third, the subject's words are recorded to ensure that the data collected is valid.

Then, to analyses the data, this research used some steps: first, transcribing the data. The data that has been recorded is transcribed, the transcription process by writing the words spoken by the subject. Second, interpretation; the data was analyzed using relevant phonological process theory. Examination was conducted on the characteristics of language difficulties faced by subjects based on phonological theory.

Then, in qualitative research, data can be categorized good data if the data are valid. Moreover, this study used triangulation to validate the data. According to Carter, et al. (2014), ttriangulation is a strategy to test validity through the convergence of information from different sources. Therefore, according to Denzin (1978) and Patton (1999) in Carter, et al (2014), there are four types of triangulation: (a) method triangulation; this type of triangulation, frequently used in qualitative studies, may include interviews, observation, and field notes. Moreover according to Polit, D.F., & Beck (2012), method triangulation is the process of gathering data on the same phenomenon using several different approaches, (b) investigator triangulation; the participation of two or more researchers in the same study to provide multiple observations and conclusions. This type of triangulation can bring both confirmation of findings and different perspectives, adding breadth to the phenomenon of interest (Denzin,1978 in Carter, et al 2014)), (c) theory triangulation; using different theories to analyse and interpret data. With this type of triangulation, different theories or hypotheses can assist the researcher in supporting or refuting findings, and (d) data source triangulation; data source triangulation involves the collection of data from different types of people, including individuals, groups, families, and communities, to gain multiple perspectives and validation of data (Carter, et al, 2014). This research used method triangulation.

Findings and Discussion

The phonological difficulties observed in a 19-year-old individual with Down syndrome in speaking included various errors in pronunciation, these errors are categorized into various phonological processes, including assimilation, dissimilation, monophthongization, anaptyxis, substitution, apheresis, apocope, and deletion of weak syllables. As follows:

Table 1. Assimilation

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1		Tangan	/taŋgan/	ngangan	/ˈŋaŋan/
2		Singa	/ˈsiŋga/	nganga	/ˈŋaŋa/
3		Monyet	/monjɛt/	nyonyet	/ˈɲoɲjɛt/

4		Jamu	/dʒɑ:mu	Mamu	/ˈmamu/
5		Sapi	/Sɑ:pi:/	Papi	/ˈpapi/
6		Kuda	/ku:dɑ:/	Duda	/ˈduda/
7	Regressive Assimilation	Bebek	/Bɛbɛk/	beke	/ˈbɛkɛ/
8		Kerupuk	/Kɛru puk/	pupuk	/ˈpupuk/
9		Sedikit	/Sɛˈdɪkɪt/	kiki	/ˈkɪki/
10		Ikut	/I:kʊt/	ikuk	/ˈiku:k/
11		Ayam	/ɑ:jɑm/	Yayam	/ˈjajam/
12		Celana	/tʃɛˈlɑ:nɑ/	nana	/ˈnana/
13		Tipi	/ˈtipi/	pipi	/ˈpipi/
14		Nyamuk	/ɲɑmuk/	mamuk	/mamuk/
15		Minum	/bɛbɛk/	mimum	/ˈmimum/

Regressive assimilation is the process by which phonemes within a word change to accommodate neighboring phonemes. A phoneme in a word undertakes this process when it aligns itself more closely with an adjacent phoneme. It usually happens because the phoneme that is changing is being affected by the phonemes around it. In the data above, it can be seen that the back sound /ŋ/ appears at the beginning of words or syllables that should have the front sound /t/. For example, the word "tangan" which should be pronounced /ˈtaŋgan/ is pronounced as "ngangan" /ˈŋaŋan/. It shows that there is regressive assimilation because the sound /ŋ/ which is a back sound replaces the sound /t/ which should be a front sound. It also occurs in the word “singa” becomes “nganga”. Then, for the word "monkey" the front sound /m/ in word "monkey" is replaced by the back sound /ɲ/ so it becomes "nyonyet". Further, for the word “jamu”, the front sound /j/ in the word "jamu" is replaced by the back sound /m/ so it becomes "mamu". Also, in the word “sapi” becomes “papi”, the front sound /s/ in the word "sapi" is replaced by the back sound /p/ so it becomes "papi". Furthermore, in the word “kuda”, the front sound /k/ in the word "kuda" is replaced by the back sound /d/ in the word "duda". The word "bebek" is replaced by the back sound /k/ in the word "beke". Besides, in words “kerupuk”, the /k/ sound in the word "kerupuk" changes to /p/ in the word "pupuk", which is a lip sound and in word “sedikit” changes become /k/ in the word "kiki", which is a back sound. Next, in the word "ikut" changes to /k/ become "ikuk", which is a back sound and the /k/ sound. Moreover, the /a/ sound in the word "ayam" changes to /j/ become "yayam", which is a palatal sound, the /c/ sound in the word "celana" changes to /n/ become "nana", which is a nasal alveolar sound, the /t/ sound in the word "tipi" changes to /p/ become "pipi", which is a lip sound, the /n/ sound in the word "nyamuk" changes to /m/ in the word "mamuk", which is a lip sound, and the last in /n/ sound in the word "minum" changes to /m/ in the word "mimum", which is a lip sound.

In each of the above cases, can be concluded that there is a shift in sound from the front to the mouth to the back of the mouth in following word. This is because people with Down syndrome have limitations in their motoric skills, as explained by Irwanto (2019) above.

Table 2. Dissimilation

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1		Rumah	/ˈrumafi/	Emah	/ˈɛmafi/
2		Nyala	/ˈɲala/	Nala	/ˈnala/
3		Baim	/baım/	Beem	/bi:m/
4	Dissimilation	Tutup	/ˈtutup/	Kukup	/ˈku:kup/
5		Cape	/ˈʧapɛ/	Empe	/ˈɛmpɛ/
6		Dede	/ˈdɛdɛ/	Gege	/ˈgɛgɛ/
7		Meja	/ˈmɛdʒa/	Beka	/ˈbɛka/
8		Duduk	/ˈdudʊk/	Guguk	/ˈguguk/

Dissimilation is the process of altering a word's sound to make it seem distinct from nearby sounds. This procedure modifies sounds that are initially comparable to nearby sounds. In the data above, from observation found 9 words. First, in word “rumah”, the /m/ sound is changed to /ɛm/ to make it different from the /r/ sound at the beginning of the word. Similarly, in the words "nyala" and "baim", the sounds /n/ and /b/ are also changed to /n/ and /b/ to reduce the sound similarity with adjacent words. Moreover, in the word "tutup", the sound /t/ is changed to /k/ so that it becomes the "kukup" and "cape" becomes "empe', "dede" becomes "gege" and "meja becomes "beka”, duduk become “guguk.

In each of the above cases, can be concluded that it is challenging for individuals to make the appropriate sounds by process due to motoric constraints, such as trouble controlling lip and tongue movements.

Table 3. Monophthong

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1		Berdiri	/bɛrˈdiri/	Bili	/ˈbili/
2		Makasih	/mɑˈkasih/	Makih	/ˈmakiʔ/
3		Matahari	/mɑˈtahari/	Tahai	/ˈtahai/

4		Jeruk	/ˈdʒɛruk/	Jeuk	/ˈdʒeuk/
5	Monophthong	Assalamu'alaikum	/ˌɑsːɑlɑˈmu ʔaːˈlajkum/	Mamikum	/ˈmamikum/
6		Biru	/ˈbiru/	Biu	/ˈbiu/
7		Belajar	/bɛˈladʒar/	Blaka	/ˈblaka/

Monophthong is pronouncing a single vowel sound in a constant mouth position without experiencing any discernible changes in quality during pronunciation. In the table above there are seven words monophthong, such as "berdiri" become "bili", "makasih" become "makih", "matahari" become "tahai", "jeruk" become "jeuk", "assalamualaikum" become "mamikum", "biru" become "biu", "belajar" become "blaka". It means a person with Down syndrome has difficulty retaining the original vowel sound in words, the originally complex vowel sound becomes a simple single vowel sound because it is distorted.

Table 4. Anaptyxis

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonem Insertion
1	Anaptyxis	Pink	/pɪŋk/	Ipink	/I/

Anaptyxis is a vowel sound is added to a word, usually in between two consonants, through the phonological process, which helps make the word easier to say or comprehend. In the table above there are one word of anaptyxis; the subject adds the vowel sound /i/ before the consonants /p/, /i/ and /ŋ/ so the word becomes "Ipink".

Table 5. Substitution

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1		Nel	/nɛl/	Mel	/mɛl/
2		Jum	/dʒum/	Sum	/sum/
3		Dulu	/ˈdulu/	Gulu	/ˈgulu/
4		Dua	/ˈdua/	Gua	/ˈgua/
5		Sapi	/ˈsapi/	Papi	/ˈpapi/
6		Mandi	/ˈmandi/	Magi	/ˈmagi/
7	Substitution	Duit	/ˈduit/	Guik	/ˈgwik/
8		Piring	/ˈpiring/	Piling	/ˈpiliŋ/
9		Ada	/ˈada/	Aga	/ˈaga/
10		Diah	/ˈdiah/	Giah	/ˈgiaɦ/
11		Piring	/ˈpiring/	Piling	/ˈpiliŋ/
12		Ada	/ˈada/	Aga	/ˈaga/
13		Teko	/ˈtɛko/	Teto	/ˈtɛto/

Substitution is the process of changing a word's first sound or set of initial sounds to a different sound. It happens when someone replace an easier sound for the sound that should be in a word because they are having trouble pronouncing the original sound. There are thirteen words of substitution, such as "nel" become "mel": the /n/ sound is replaced by the /m/ sound. This indicates the substitution of the nasal consonant /n/ with the nasal consonant /m/. "Jum" becomes "Sum", the /d͡ʒ/ sound is replaced by the /s/ sound. This indicates the substitution of the alveolar sibilant consonant /d͡ʒ/ with the alveolar sibilant consonant /s/, "dulu" become "gulu", the /d/ sound is replaced by the /g/ sound; this indicates the substitution of the alveolar plosive consonant /d/ with the velar plosive consonant /g/. In word "dua" become "gua"; the /d/ sound is replaced by the /g/ sound. This indicates the substitution of the alveolar plosive consonant /d/ with the velar plosive consonant /g/. The word "sapi" become "papi", The /d/ sound is replaced by the /g/ sound. This indicates the substitution of the alveolar plosive consonant /d/ with the velar plosive consonant /g/. "Mandi" becomes "magi"; the /n/ sound is replaced by the /g/ sound. This indicates the substitution of the nasal consonant /n/ with the velar plosive consonant /g/. The word "duit" become "guik", the /d/ sound is replaced by the /g/ sound. This indicates the substitution of the alveolar plosive consonant /d/ with the velar plosive consonant /g/. The word "piring" become "piling"; /r/ sound is replaced by /l/ sound. This indicates the substitution of the alveolar plosive consonant /r/ with the alveolar plosive consonant /l/. The word "ada" become "aga"; the /d/ sound is replaced by the /g/ sound. This indicates the substitution of the alveolar plosive consonant /d/ with the velar plosive consonant /g/. Then, the last is "teko" become " teto"; /k/ sound is replaced by the /t/ sound. This indicates the substitution of the velar plosive consonant /k/ with the alveolar plosive consonant /t/. Dissimilation is the process of changing two sounds to reduce their similarity, whereas substitution is the replacement of one sound with another. Substitution has similarities with dissimilation, the difference is that substitution involves replacing one sound, while dissimilation involves changing two sounds to reduce the similarity between them.

Table 6. Apheresis

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1		Rasya	/raʃja/	Asya	/ˈaːs. ja/
2		Baso	/ˈbaso/	Aso	/ˈaː.so/
3		Bola	/ˈbola/	Ola	/ˈoː.la/
4		Sepeda	/sɛˈpɛda/	Peda	/ˈpɛ.da/
5		Sepatu	/sɛˈpatu/	Patu	/ˈpa.tu/
6		Nasi	/ˈnasi/	Asi	/ˈaː.si/
7	Apheresis	Hape	/ˈhapɛ/	Ape	/ˈaː.pɛ/
8		Baju	/ˈbadʒu/	Aju	/ˈaː.dʒu/
9		Sekolah	/sɛˈkolah/	Ola	/ˈoː.la/

Apheresis is one or more sounds at the start of a word are eliminated or altered. The table above shows nine words of apheresis, such as “rasya” become “asya”; apheresis occurs with the removal of /r/ sound at the beginning of a word, “baso” becomes “aso”; apheresis occurs with the removal of /b/ sound at the beginning of a word, “bola” become “ola”; apheresis occurs with the removal of /b/ sound at the beginning of a word, “sepeda” become “peda”; apheresis occurs with the removal of /s/, /ɛ/, sound at the beginning of a word so does the word “Sepatu” become “patu”, Then, “nasi” become “asi”; apheresis occurs with the removal of /n/ sound at the beginning of a word, “hape” become “ape”; apheresis occurs with the removal of /h/ sound at the beginning of a word, “baju” become “aju”; apheresis occurs with the removal of /b/ sound at the beginning of a word, “sekolah” become “ola”; apheresis occurs with the removal of /s/, /ɛˈ/, /k/, sound at the beginning of a word. Apheresis is easier for individuals with Down syndrome to use, especially if they have difficulty understanding or remembering more complex word structures.

Table 7. Apocope

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1		Nel	/nɛl/	Mel	/mɛl/
2		Jum	/dʒum/	Sum	/sum/
3		Dulu	/ˈdulu/	Gulu	/ˈgulu/
4	Apocope	Dua	/ˈdua/	Gua	/ˈgua/
5		Sapi	/ˈsapi/	Papi	/ˈpapi/
6		Mandi	/ˈmandi/	Magi	/ˈmagi/
7		Duit	/ˈduit/	Guik	/ˈgwik/
8		Piring	/ˈpiring/	Piling	/ˈpiliŋ/

Apocope is a phonological process in which the sound at the end of a word is removed. The table above shows seven words of apocope, such as “motor” becoming “moto”; apocope occurs by removing the /r/ sound at the end of a word. “Tidur” becomes “tidu”; apocope occurs by removing /r/ sound at the end of a word. “Bubur” becomes “bubu”; apocope occurs by removing /r/ sound at the end of a word. “Main” becomes “mai”; apocope occurs by removing /n/ sound at the end of a word. “Sisir” becomes “sisi”; apocope occurs by removing the /r/ sound at the end of a word. “Ikan” becomes “ika”, apocope occurs by removing /n/ sound at the end of a word. “Air” becomes “ai”; apocope occurs by removing /r/ sound at the end of a word. Individuals with Down syndrome have limitations in pronouncing /r/ and /n/, this is due to weak motoric coordination.

Table 8. Weak Syllable Deletion

No	Types	Word	Phonetically Transcribed	Subject Pronunciation	Phonetically Transcribed
1	Weak syllable deletion	Kupu – kupu	/kuˈpu kuˈpu/	pupu	/ˈpu.pu/

Weak syllable deletion is a phonological process in which a word loses one or more weak syllables. There is one word of weak syllable deletion, such as “butterfly” which becomes “pupu” because the syllable “ku” is pronounced softly and found at the beginning and middle of the word.

From the analysis, several prominent error patterns were found in the subject's sound production. The first is assimilation, there are three types of assimilation, they are reciprocal, regressive, and progressive assimilation but what appears is regressive assimilation. This type of assimilation dominates over another phonological process. Regressive assimilation is when the subject tends to adjust the sounds in his words so that certain sounds become more similar to adjacent sounds. For example, the word "tangan" is pronounced as "ngangan", the phoneme /t/ is replaced by /ŋ/, then "chicken" is pronounced as "yayam, the phoneme /a/ is replaced by /j/. Furthermore, another type of phonological error observed is substitution; the subject adds a phoneme or sound that shouldn't be in the term in place of one that is already there. Substitution is the act of a subject pronouncing a word in a way that deviates from the relevant language rules by substituting a

different sound or phoneme for one of the word's sounds or phonemes. For example, the word “dua” is pronounced as “gua”, phoneme “d” is changed by “g”, and word “teko” is pronounced as “teto”.

From the findings, it can be concluded that the subjects faced challenges in achieving the expected level of fluency in speaking. The pattern of phonological errors found indicates a gap between the subject's sound production abilities and normative language. This gap can affect the subject's ability to communicate effectively with other people, especially in a communication context.

This difficulty is caused by motoric limitations; Down syndrome has motoric limitations, including in the control of the muscles needed for proper sound production. This limitation can cause difficulty in producing the correct sounds and lead to regressive assimilation, that is sounds in a word become more similar to adjacent sounds. Then cognitive limitations; cognitive limitations in Down syndrome can affect an individual's understanding of language structure and phonological rules. As a result, she makes substitutions, replacing sounds in a word with other sounds that are easier for her to produce sound. This explanation is by the theories or literature mentioned above.

Therefore, understanding this is also crucial to designing effective teaching programs that improve students' ability to communicate in a subordinate manner in the field of phonology. Thus, it can be inferred that the subject's phonological deficit is a crucial aspect of their language learning journey, and understanding the nature of this deficit is a crucial first step in designing an effective intervention program.

Discussion

This study has identified two main issues: what are the phonological challenges in the speech of a 19-year-old person with Down syndrome? And what kinds of phonological faults do you typically see in her speech? The results show that the difficult phonological processes that Down syndrome sufferers face include assimilation, dissimilation, monophthong, anaptyxis, substitution, apocope, and weak syllable deletion. Moreover, difficulties with diphthongizes, metathesis and cluster reduction are not observed during the observation process. In assimilation, the subject carries out regressive assimilation; the process by which phonemes within a word change to accommodate neighboring phonemes totaling fifteen words, among the examples are "tangan" pronounced "ngangan" and "ayam" pronounced "yayam". Then the subject performs dissimilation; the process of altering a word's sound to make it seem distinct from nearby sounds, totaling eight words, for example, "tutup" pronounced "kukup" and the subject also does monophthong; pronouncing a single vowel sound in a constant mouth position without experiencing any discernible changes in quality during pronunciation of eight words, for example "biru" becomes "biu". Apart from that, the subject also performs anaptyxis; vowel sound is added to a word, usually in between two consonants, through the phonological process, which helps make word easier to say or understand, as many as one words, for example, "pink" becomes "Ipink". Moreover, the subject also made substitutions; the process of changing a word's first sound or set of initial sounds to a different sound totaling thirteen words. For example, "teko" becomes "teto" and "ada" becomes "aga”. Furthermore, subject made apheresis; one or more sounds at the start of a word are eliminated or altered totaling nine words, the example “nasi” pronounced “asi, and “baso” pronounced “aso”. In addition, subject made apokop; the sound at the end of a word is removed totaling eight words, for example “motor” pronounced “moto” and “tidur” pronounced “tidu”. The last, weak syllable deletion; a phonological process that a word loses one or more weak syllables totaling one word. For example, “kupu-kupu” become “pupu”.

Then, phonological errors commonly observed are regressive assimilation and substitution. This is because individuals with Down syndrome have low muscle tone; This condition causes the muscles around the mouth, tongue, and jaw to become weak or less responsive. For example, a large, protruding tongue and weak jaw muscles can make it difficult for people with Down syndrome to bring their upper and lower teeth together or to move their jaw smoothly. This makes it difficult for them to produce clear sounds and organize the movements needed for proper articulation. This is by the opinions of Orlin et al (2014), Irwanto (2019) and Dewi (2014) in Lubis (2019)as explained above.

Furthermore, these findings have significant clinical implications in the development of intervention or therapy programs for individuals with Down syndrome. By understanding the dominant phonological error patterns, practitioners can design more targeted and effective therapeutic approaches to improve the individual's speaking abilities. Appropriate intervention approaches may include specific exercises to improve motor control and phonological understanding, as well as the use of alternative communication techniques if necessary.

Besides, in this study, a pattern of phonological errors was found that was similar to the findings reported by Ali (2024). These findings

suggest that individuals with Down syndrome tend to face difficulties in producing consonant and vowel sounds correctly. This aligns with the research conducted by Sinaga, et al. (2024), demonstrating that children with Down syndrome can articulate various vowel and consonant sounds in Indonesian. However, a more comprehensive comparison with other studies in the field could provide additional insights into the specific challenges faced by individuals with Down syndrome in phonological development.

However, it should be noted that there are important differences. Research by Sinaga, et al (2024) highlighted that although children with Down syndrome can produce some vowel and consonant sounds, there are often changes in these sounds, such as deletion or replacement of sounds. These findings provide additional insight by demonstrating specific phonological error patterns experienced by individuals with Down syndrome, such as assimilation, substitution, and deletion of weak syllables.

Thus, a comparison of the results of this study with previous research provides a deeper understanding of the phonological difficulties faced by people who have Down syndrome. This information can help in designing more targeted and effective intervention programs to improve their speaking abilities. It is important to note that this study emphasized subjects aged 19 years, whereas previous studies, such as those conducted by Sinaga, et al., focused more on children who had Down syndrome. Therefore, this study provides a more specific understanding of phonological error patterns in the older age group with Down syndrome.

Although this study provides valuable insight into phonological difficulties in individuals with Down syndrome, there are several limitations that need to be acknowledged. The study's relatively small sample and focus on one individual may limit the generalizability of the findings. In addition, this research was also limited to observing oral sound production only, while individual comprehensive and expressive language abilities were not thoroughly explored.

For the future research could expand this research by including larger samples and variations in age and developmental level of individuals with Down syndrome. Longitudinal research can also provide valuable insight into the development of phonological difficulties over time. In addition, further research could dig deeper into the environmental and genetic factors that influence the speech development of individuals with Down syndrome.

By expanding this research in this direction, it is hoped that it will provide a more holistic understanding of the challenges that individuals with Down syndrome face in mastering speaking skills, as well as provide a basis for the development of more effective interventions in the future.

Conclusion

This study has identified a predominant pattern of phonological errors in speech in a 19-year-old individual with Down syndrome. These findings provide a deeper understanding of the challenges individuals with Down syndrome face in developing their speaking abilities. Based on the results of this research, several conclusions can be drawn: Assimilation and substitution regression are the two most dominant phonological error patterns in the subjects of this study. This indicates difficulty in producing appropriate sounds and using appropriate words. Phonological difficulties experienced by individuals with Down syndrome can be caused by motor and cognitive limitations. Motoric limitations can hinder the muscle control necessary for proper sound production, while cognitive limitations can affect understanding of language structure and phonological rules.

Thus, these findings have important implications in the development of intervention or therapy programs for individuals with Down syndrome, especially in an educational context. a personalized and targeted approach directly influences teaching strategies in the educational environment. Teachers can use these findings as a basis for designing more focused and adaptive teaching strategies. For example, by understanding the phonological error patterns that are common in Down syndrome, teachers can develop more effective teaching methods to improve speaking abilities, such as: 1) Repetition: Provide lots of opportunities to practice and repeat the pronunciation of difficult words and sounds. 2) Visual and Text Support: Include visual support, such as picture cards or written words, to assist them in understanding phonological concepts and linking them to visual symbols. 3) Articulation Exercises: Provide exercises specifically designed to improve motor control and fluency in sound articulation. For example, targeted mouth movement exercises to strengthen the muscles needed for voice formation

Although this study provides valuable insight, several limitations need to be acknowledged, including the relatively small sample and focus on a single individual. Besides, Further studies could expand this research by involving larger samples and variations in age and developmental level of individuals with Down syndrome. Longitudinal research may also provide

deeper insight into the development of phonological difficulties over time.

Taking these conclusions into account, it is hoped that this research will make a valuable contribution to the understanding and management of phonological difficulties in individuals with Down syndrome, as well as pave the way for further research in this area.

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