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Language Production in A Parkinson's Disease Patient in Banjarnegara: A Psycholinguistic Analysis

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Abstract: Parkinson's Disease (PD) is a condition caused by damage to the nervous system, which impacts speech functions and is marked by slow movement and speech (bradykinesia). This condition relates to the brain's ability to process speech functions and linguistic information. Parkinson's affects both motor and cognitive abilities, which are integral to speech production and linguistic processing. The research was conducted in Banjarnegara on a 70-year-old patient suffering from Parkinson's Disease. This study employs a qualitative descriptive method, followed by field observations and interviews using audiovisual recording and note-taking techniques. The aim is to analyze the language production produced by a Parkinson's patient as an initial step to identify what language disorders appear. So it is hoped that the results of this identification can be used to follow up on what stage of speech therapy should be given. The data is in the form of language production, consisting of speech in the form of words and sentences. The results of the study found that a Parkinson's patient experienced a decrease in cognitive abilities, which was indicated by difficulty in producing speech when answering questions. Patients try to remember by repeating the words "what is that", "anu", "what is it" at the beginning and in the middle of each utterance. In addition, the speech is not perfectly structured in its syntax, so it requires careful attention to what is conveyed. For example, "So if I think it's stiff, my legs feel tight, my hands trembled too. So I can't, I can't think anymore. Maybe it's the brain's nerves, yes, it's the brain's nerves". The results of the study showed that language production in a Parkinson's patient experienced a decrease in cognitive ability in the process of uttering words and sentences. However, there has been no decrease in pronunciation in the form of phonological phonemes.

Keywords: Language production; Parkinson's; Psycholinguistics; Syntax

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Introduction

Language as a means of communication has an important role in conveying information from the speaker as the information provider to the listener who is the recipient of the information (Zulfa et al., 2023). It is related to humans as social beings who use communication to interact and socialize with other humans. Therefore, humans are born with language skills through the system they have. Humans are born with a language ability device called LAD (Language Acquisition Device), which is later related to language production skills (Nurharyani & Nugroho, 2020), (Nurharyani et al., 2022). Language is a complex communication process requiring the functioning of various organs influencing speech mechanisms, thinking, and language production, as well as mental modalities revealed during speech (Indah, 2017). Language production is also used to express ideas and human emotions, involving the brain, particularly the left hemisphere, which plays a dominant role in language production. In contrast, the right hemisphere is involved in emotional expression. Apart from the hemispheres, there is also an essential part of the cerebrum called the cortex. The cortex and hemispheres are parts of the brain, but have different functions. The hemispheres are parts of the brain that are divided into two, namely the right brain and the left brain, while the cortex is the outermost layer of the brain that functions to regulate high-level cognitive abilities, namely the ability to think, speak, reason, memory, and problem-solving. The description explains that the cortex is responsible for controlling human speech or speech organs, including the tongue, jaw, lips, teeth, and vocal cords (Anisah, 2019).

These parts of the brain are related to how humans are able to produce language (Anisah, 2019). Language production is optimal when brain and nerve functions are intact. In normal human conditions, the language produced can be understood through its linguistic structure; however, this is different when language production is seen in patients who experience a decline in brain and nervous system function, one of these patients is someone who suffers from Parkinson's. Parkinson's Disease, first described by James Parkinson in 1817. This disease is a chronic, progressive disease, and has typical motor symptoms in the form of tremors, bradykinesia, rigidity, and postural instability, and usually occurs at the age of 65 to 70 years (Suharti, 2020), (Zein, 2023). Other symptoms that appear related to non-motor symptoms include decreased cognitive abilities (Zein, 2023). Parkinson's is a disease related to the nervous system, which is indicated by the use of less than optimal nervous system functions. The symptoms that appear are not only in the nervous system that does not work optimally, but also cause mental and psychiatric disorders such as depression and anxiety. If that happens, it will have a negative impact on the production of language or speech produced by Parkinson's sufferers (Alia et al., 2022).

Related to the explanation above, language production is also related to the ability to perceive speech. If the perception of speech is not optimal, it will impact language production. Language production that is not optimal can affect how other people or speech partners perceive speech. Conversely, if there is a disturbance in the ability of cognitive function regarding perceiving speech, it will have an impact on speech production. The point is that the ability to produce language affects how humans convey messages and affects how partners receive or

perceive and understand the speech (Anisah, 2019). Cognitive functions, including thinking, remembering, learning, and using language, are conscious mental activities (Pradnyaning et al., 2020). Cognitive impairment in PD is categorized into mild cognitive impairment (PD-MCI) and severe cognitive impairment (Parkinson's Disease Dementia, PDD). Therefore, it is necessary to conduct an analysis of language production in Parkinson's sufferers, as one of the initial steps in identifying language symptoms that appear and have the potential to become language disorders.

This study aims to describe the language production of a Parkinson's patient in Banjarnegara through his utterances. The subject of this study was a 70-year-old Parkinson's patient who had been medically diagnosed with Parkinson's for 8 years. This study took place in Banjarnegara because the researcher received recommendations from neurologists. A Parkinson's patient in Banjarnegara was recorded as one patient, although it is possible that those who are not medically recorded may appear; however, tracing patients requires time and a definite medical diagnosis. Based on this condition, the researcher identified symptoms of speech changes experienced by Parkinson's patient that varied, for example, speaking in a soft tone, speaking too fast, or hesitating before speaking. However, this study focused on language production in lingual units in the form of words and sentences. The data produced is used as a reference for speech therapy treatment given to patients through the occupational stage first. Utterances are analyzed using psycholinguistic, syntactic, and semantic approaches.

Methods

The method in this study uses a qualitative descriptive method with the aim of describing the existing facts and focusing on the meaning, description of clarification, and placement of data in its context in the form of words. The study was conducted through direct observation using interview techniques and face-to-face conversation techniques. Audiovisual recording techniques were used during the interview process. Then the language production obtained from Parkinson's sufferers was transcribed in writing. This transcript was then analyzed using the Psycholinguistic theory approach, syntax, and semantics to determine the correlation between words or sentences that appear with the intent or purpose of the conversation.

The data collection technique used in this study is the listening technique, by directly listening to the speech produced by the patient. Listening was done through field observation with direct interviews with research subjects. In addition to listening, this study also used a recording technique to record the speech production of Parkinson's patient. Then continued with the note-taking technique to record all transcription results.

The data sources in this study are primary data and secondary data. Primary data in this study are in the form of utterances produced or produced by Parkinson's sufferers in Banjarnegara, which are transcribed in the form of words and sentences. Secondary data used in this study are theoretical books and scientific journals. The study focuses on the utterances produced by a 70-year-old Parkinson's sufferer in the form of words and sentences. The research

subject has been diagnosed with Parkinson's for 8 (eight) years, as evidenced by the medical records of a neurologist and an internist. The data analysis technique is to observe and analyze the results of language production both during the interview and when the transcription is carried out. After that, it is seen how the structure of the words and sentences meets the rules of language, one of which is through the delivery of their meaning. After the data is transcribed, the language production data is consulted with several related parties, namely a neurologist and a speech therapist. The initial diagnostic results given through the results of the language production will be followed up for analysis by a speech therapist, to determine whether the patient needs further action to carry out the speech therapy stage, through the initial stage, the occupational stage. In addition, the language production data and information obtained by researchers were also provided to neurologists for an initial diagnosis of whether the patient needed further treatment related to the ability of the nervous system, especially in the ability to perceive and produce language.

Results

This study examines language production in Parkinson's patient in Banjarnegara, seen from the syntax and semantic aspects. This study also proves that the role of language in conveying information is one of the most important and primary things in communication. However, due to the emergence of degenerative diseases, Parkinson's, language skills in terms of competence and performance have decreased. The language or speech production obtained was identified as having imperfections in speech. The emergence of tremor and muscle stiffness symptoms in Parkinson's patient affects cognitive abilities, so that the ability to produce language is disrupted and decreases. This was proven in the interview process, a 70-year-old Parkinson's patient in the first 10 minutes was still able to respond to questions well, even though obstacles had arisen when answering questions, namely the frequent use of the words "apa ya,itu mba, apa ya" (what is it, that's mba, what is it). The interview only lasted for 40 minutes because of the patient's condition who was experiencing tremors. This resulted in obstacles in receiving the questions asked. During the interview process, a patient needs time to think and answer questions, which requires calmness and good cognitive abilities. However, in the process, a Parkinson's patient experiences these obstacles which are shown through the speech or language production produced. One of the data points that appears is the following speech:

"Jadi kalau mikir itu kenceng, kakinya kenceng, tangannya ndredek. Jadi ngga boleh, sudah ngga bisa mikir. Mungkin saraf otak si ya, udah saraf otak."

The utterance shows an imperfect syntactic structure. The researcher tried to reconfirm the answer given by the patient. It turned out that the meaning intended by the patient was that the patient was not allowed to do high daily physical activities. In addition, it is not allowed to think too hard, which will later result in muscle stiffness and tremors. This shows how the correlation of the nervous system, especially the cortex's ability, which is responsible for the language process, has decreased in function. This is evidenced by several studies and interviews

with related parties, namely neurologists. It was found that humans diagnosed with Parkinson's had nervous system disorders. However, it has not been proven whether the patient has speech disorders or not because of Parkinson's. The disease is rare because in Banjarnegara, only one patient has been found.

This study proves that speech or language production helps to identify the ability of the nervous system, one of which is the left hemisphere, which is responsible for language production. The process of data collection gets the expected results. When tremors appear, it turns out that the patient's cognitive ability when answering experiences a decrease, which ultimately results in the resulting speech finding several words that are repeated. However, the meaning conveyed has not appeared directly and must be reconfirmed. The data obtained can then be used to follow up on whether or not a speech therapy stage is needed. This is confirmed by researchers and consulted with related parties, including speech therapy. In addition, the data in the study showed that there were phonological language disorders in several phonemes that appeared in the language production of Parkinson's sufferers, including the elimination of phonemes. Other results are syllabication disorders in several words that appear, including as [*di-a-nu*], [*n-dak*], [*a-nu*], [*se-kre-ri-at*], [pen-si-on], [*mo-no-lo-gi*], [*si-lu-li-tis*], [*se-ku-lin*]

Discussion

Parkinson is a disease related to disorders of the nervous system, and the nervous system is related to movement in the organs of the body. Medically, some symptoms that appear in Parkinson's sufferers include tremors, slow movement, and muscle stiffness. These symptoms apparently indirectly affect the work of the nervous system in the organs of the body, one of which is the speech organ. These symptoms appeared in the subject of this study, which was shown through symptoms of tremors in both hands, especially the left hand. Tremors appeared when sitting and chatting. In addition, Parkinson's sufferers in this study had also experienced slowness in carrying out daily activities, one of which was walking and talking. Muscle stiffness also appeared in sufferers, which resulted in difficulty in moving and speaking. When the research was taking place, tremors and muscle stiffness in sufferers were relapsing, so that during the interview stage, patient experienced difficulties and even showed less than optimal cognitive abilities when perceiving speech and producing speech.

Some symptoms that appear in sufferers have an impact on the emergence of disorders when producing language. This is shown through a decrease in cognitive ability when perceiving speech and a decrease in motor skills when producing speech. The tremors that appear result in obstacles when producing speech. This study revealed that some symptoms that appear in Parkinson's sufferer such as tremors and muscle stiffness result in a decrease in the ability to perceive speech and produce speech. Here are the results of this study.

1. Speech Production in Parkinson's Patient

a. *Jadi kalau mikir itu kenceng, kakinya kenceng, tangannya ndredek. Jadi ngga boleh, sudah ngga bisa mikir. Mungkin saraf otak si ya, udah saraf otak.*

"So if I think it's stiff, my legs feel tight, my hands trembled too. So I can't, I can't think anymore. Maybe it's the brain's nerves, yes, it's the brain's nerves."

The utterance shows that PD patient struggle with systematic sentence construction, indicating cognitive decline in concept description and word selection. The repeated use of "so" at the beginning of sentences shows a tendency to repeat initial words, affecting subsequent word choice.

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction. Parkinson's patient experience difficulties in producing speech, including decreased cognitive abilities in describing concepts to be conveyed by selecting words into sentences. The speech production above the selected word is "so". The word "so" is a clause conjunction that should not be used at the beginning of a sentence. The function of conjunction "so" is to connect two ideas that have a cause-effect relationship. Parkinson's patient tends to repeat the conjunction "so" at the beginning of sentences. The usage of the word shows the tendency of Parkinson's patient to repeat the initial words produced, but the initial words produced are not correct. It influences the patient's choice of subsequent words to describe concepts. Apart from that, there are phoneme pronunciation disorders that appear when producing speech, as shown in the Table 1.

Table 1. Analysis of phonemes that do not match words

Speech Vocabulary	Phonetic Transcription	Meaning
ndredek	ndr≅d≅k	trembling
kenceng	k≅nc≅N	stiff
ngga	Nga	not

b. *Dari dulu saya rasa ngga ada. Kalau adik saya lah lupa. Itu adik saya juga sakit, tapi ngga Parkinson. Anu.. Zheimer.*

"In the past, I don't think there has been any. My younger sibling is forgetful. My younger sibling is also sick, but not Parkinson's. Um... Zheimer's."

The utterance shows the difficulty in systematic sentence construction, with cognitive decline affecting word selection. The use of "um" indicates difficulty in word choice for conveying information.

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction. Parkinson's patient experience difficulties in producing speech, including decreased cognitive abilities in describing concepts to be conveyed by selecting words into sentences. The speech production above the selected word is "of". The word "of" is a coordinating conjunction that should not be used at the beginning of a sentence. The function of conjunction "of" is to show a logical relationship between the elements being

combined, but the speech produced by Parkinson's patient does not show a rational relationship between sentences. Apart from that, the use of the word "anu" appears, which shows that the sufferer is having difficulty choosing words to convey something. The usage of the word shows the tendency for Parkinson's patient to not to be able to choose good initial words to convey concepts. These data show that decreased cognitive speaking abilities influence patient's subsequent choice of words to describe concepts. Apart from that, there are phoneme pronunciation disorders that appear when producing speech, as shown in Table 2.

Table 2. Analysis of phonemes that do not match words

Speech Vocabulary	Phonetic Transcription	Meaning
ngga	Nga	not

The data above shows that there are phoneme deletions and phoneme changes in the word "not". The pronunciation of "ngga" should be pronounced "tidak", apart from that, the data above shows that speech production in Parkinson's patient does not show good systematic sentence construction.

c. *Itu sekali saya terapi, langsung saya bisa jalan normal. Trus saya main di Banjar, padahal masuknya kan jauh udah 100 meter. Itu saya jalan enak saja, ngga pakai tongkat. Lupa ngga bawa tongkat. Lah terus yang kedua kalinya kok tambah kencang, kencang, karena saya ngga boleh mikir.*

"That once I had therapy, I could walk normally. Then I went in Banjar, even though it was far, 100 meters. That I walked easily, without a cane. Forgot to bring a cane. Then the second time it got worse, worse, because I shouldn't think."

The utterance shows the difficulty in systematic sentence construction, with cognitive decline affecting word selection. The use of "that" indicates difficulty in word choice for conveying information.

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction. Parkinson's patient experience difficulties in producing speech, including decreased cognitive abilities in describing concepts to be conveyed by selecting words into sentences. The speech production above the selected word is "that". The word "that" is a demonstrative pronoun. The word "that" is included in the category of demonstrative pronominal pronouns, which function to designate a place or an object. The usage of the word shows the tendency for Parkinson's patient to not to be able to choose good initial words to convey concepts. These data show that decreased cognitive speaking abilities influence patient' subsequent choice of words to describe concepts. Apart from that, phoneme pronunciation disorders appear when producing speech, as shown in Table 3.

Table 3. Analysis of phonemes that do not match words

Speech Vocabulary	Phonetic Transcription	Meaning
trus	trUs	then
ngga	Nga	not

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction.

d. *Oh udah berhenti, karena saya terapi 5 kali itu ngga ada bedanya. Yang pertama tok terus sembuh. Palah ini pada dibawa jalan sakit karena kan luka-luka kena tusuk jarum. Kalau gatal saya pegang, pegal gitu. Jadi saya akhirnya ngga usah berobat kayanya yang penting hati saya bahagia. Harus seperti itu.*

"Oh, I stopped because I had therapy 5 times with no difference. Only at the first time I recovered. But this time, walking was painful due to needle wounds. If it itches, I scratch, it hurts. So I finally stopped treatment, it seems that as long as I'm happy. It should be like that."

The utterance shows the difficulty in systematic sentence construction, with cognitive decline affecting word selection. The use of "oh" indicates difficulty in word choice for conveying information.

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction. Parkinson's patient experience difficulties in producing speech, including decreased cognitive abilities in describing concepts to be conveyed by selecting words into sentences. The speech production above the selected word is "oh". The word "oh" is an interjection. The word "oh" is used to express feelings of disappointment, emotion, confidence, etc. It shows the tendency for Parkinson's patient to not to be able to choose good initial words to convey concepts. These data show that decreased cognitive speaking abilities influence patient's subsequent choice of words to describe concepts. Apart from that, phoneme pronunciation disorders appear when producing speech, as shown in Table 4.

Tabel 4. Analysis of phonemes that do not match words

Speech Vocabulary	Phonetic Transcription	Meaning
palah	palah	just
kayanya	kayanya	seem

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction.

e. *Kalau duduk lama itu kenceng, tegang gitu. Lah di rumah sakit kan tadi pakai kursi roda, kakinya ditaruh di tempat kaki. Dia trus begitu kan lama-lama kakinya kenceng- kenceng gitu. Trus dokter dan perawat juga pada tahu saya kaya gini (tangannya gemetar) banter sekali tadi. Kalau mau pulang dulu, kesana dulu. Perawatnya dua-duanya keluar yang rawat di saraf, keluar.*

"If sitting for a long time, it stiffens, tenses. At the hospital, I used a wheelchair, legs on the footrest. It stiffened over time. Then the doctor and nurse knew that I was like this (hands trembling) very fast. If I want to go home, go to the hospital first. Both nurses left, the ones treating the nerves, left."

The utterance shows the difficulty in systematic sentence construction, with cognitive decline affecting word selection. The use of "if" indicates difficulty in word choice for conveying information.

The speech data above shows that speech production in Parkinson's patient does not show good systematic sentence construction. Parkinson's patient experience difficulties in producing speech, including decreased cognitive abilities in describing concepts to be conveyed by selecting words into sentences. The word "if" is a conjunction or conditional conjunction. The word "if" is included in the category of conditional subordinating conjunctions or conjunctions, which function to connect language elements that have a conditional element. The usage of the word shows the tendency for Parkinson's patient to not to be able to choose good initial words to convey concepts. These data show that a decrease in cognitive speaking abilities influences patient's subsequent choice of words to describe concepts. Apart from that, phoneme pronunciation disorders appear when producing speech, as shown in Table 5.

Tabel 5. Analysis of phonemes that do not match words

Speech Vocabulary	Phonetic Transcription	Meaning
trus	trUs	then
ngga	Nga	not

The data above shows that speech production in a Parkinson's patient has not shown a good systematic sentence structure.

The language production that appears in the Parkinson's patient above shows that the arrangement of words to express concepts in Parkinson's patient is not in accordance with syntactic rules. The results of the Parkinson's patient language production above show that there is indeed a cognitive decline seen from the choice of vocabulary and sentence production that are not appropriate in expressing concepts. Through the language production data produced, it is indicated that there is an emergence of language disorders in speaking competence, one of which is phoneme disorders. This is evidenced by the speech production in Parkinson's patient, the patient experienced phoneme deletions and irregularities in the pronunciation of syllables in words. The following is a table of phonological disorders that appear, Table 6.

Table 6. Phonological Language Disorders in Parkinson's Patient's Speech

Types of disorder	Utterances
Phoneme deletion	Vocal: [e], [a] Consonant:

	[s], [r]
Phoneme substitution	
Irregularity	Syllables [di-a-nu] [n-dak] [a-nu] [se-kre-ri-at] [pen-si-on] [mo-no-lo-gi] [si-lu-li-tis] [se-ku-lin]

The language production in PD patient shows that word selection for expressing concepts does not follow syntactic rules. The findings indicate a cognitive decline in word choice and sentence production, leading to phoneme articulation disorders, such as phoneme omission and irregular syllable pronunciation.

Conclusion

Language production data in Parkinson's patient shows that language reflects the functioning of the nervous system and cognitive abilities. The study in Banjarnegara reveals that word selection is suboptimal, affecting sentence production and concept expression. Initial word choice impacts sentence construction, indicating cognitive decline and nervous system impairment.

The data shows the use of conjunctions and interjections at the beginning of sentences, such as "so", “of”, "um”, "that”, "oh”, and "if". These words function to connect sentences for coherent structure, but their use at the beginning of sentences in PD patient leads to ambiguity. Phoneme disorders include omission of /e/, /a/, /s/, /r/, and irregular syllable pronunciation, such as [di-a-nu], [n-dak], [a-nu], [se-kre-ri-at], [pen-si-on], [mo-no-lo-gi], [si-lu-li-tis], [se-ku-lin]. These findings will inform subsequent speech therapy interventions after occupational therapy. The study demonstrates the relevance of linguistic theories in medical contexts, particularly in speech therapy for nervous system disorders.

Author Contribution Statement

Octaria: The first author is responsible for coordinating and being responsible for the entire research process, including theoretical and literature studies, compiling research instruments, compiling research methods, compiling research reports and research outputs, and being responsible for data analysis.

Bivit: Responsible for the development of research instruments, reviewer of theoretical frameworks and literature, and responsible for conducting interviews with resource persons.

Nila: Responsible for operational and research outputs, publication planning, and creating teaching materials

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