



Recalling the language skills of children with childhood disintegrative disorder (CDD)

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ABSTRACT

This study aimed to examine the effectiveness of Discrete Trial Training (DTT) intervention in restoring expressive language abilities in a child diagnosed with Childhood Disintegrative Disorder (CDD), a rare neurodevelopmental condition. Recalling language behavior in children with CDD is essential to understanding regression and potential recovery mechanisms. A single-subject experimental method using an A1-B-A2 design was applied, involving three phases: initial baseline (A1), intervention (B), and follow-up baseline (A2). The subject was a 5-year-old child who experienced severe language and behavioral regression. Language skills were assessed through observation sessions and analyzed descriptively using intra- and inter-condition comparisons. The intervention phase consisted of ten DTT sessions focusing on attention, matching, identification, imitation, and labeling skills. The findings demonstrated positive, consistent improvements in expressive language behavior, with trends showing increased scores and stable performance across phases. Notably, the overlap in data between conditions was 0%, indicating a high level of intervention effectiveness. The results also showed behavioral generalization post-intervention, with increased engagement and adaptive functioning. This study concludes that DTT is an effective intervention for recalling expressive language skills in children with CDD. The improvement was marked not only by the return of verbal abilities but also by gains in behavioral regulation and social interaction. Further research involving larger populations and long-term monitoring is recommended to generalize findings and enhance intervention strategies for CDD.

Keywords: childhood disintegrative disorder (CDD), discrete trial training (DTT), language behavior, autism spectrum disorder (ASD)

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INTRODUCTION

Language encompasses all forms of communication in which human thoughts and feelings are symbolized to convey meaning to others. It serves as a tool for building relationships and acquiring knowledge about the surrounding world. Through communication, children can form and develop an understanding of new concepts, which in turn supports their self-confidence in entering a new environment. In other words, language plays a crucial role in children's development. It facilitates interpersonal communication, organizes thoughts, and aids learning. The development of communication skills is therefore essential in the context of language acquisition.

Childhood is the optimal period for acquiring a language (Han & Odlin, 2006). Children's ability to recognize messages directed at them may improve with age and the maturity of their physical organs. Language development depends on the proper maturation of the mouth, upper respiratory tract, tongue, lips, and respiratory mechanisms. Crucially, normal hearing and vision also play important roles. As the nervous system continues to develop, so too does a child's capacity for expressive language.

Language development is a key indicator for early identification of special needs in children. Many cases of special needs conditions are initially signaled by speech delays. A survey conducted across 14 preschool institutions in Malang City, Indonesia, revealed that language development was the most reported developmental issue (23%). This was followed by delays in independence (21%), social interaction (21%), fine motor skills (20%), and gross motor skills (15%). These developmental challenges are generally attributed to internal factors, often related to disorders such as ASD, ADD, HD, ADHD, or Down syndrome. Reduced name orientation and diminished social attention are potential potential early markers of ASD, helping distinguish affected children with typical development or other developmental delays (Zwaigenbaum et al., 2015). Numerous studies that assess language abilities at a specific developmental stage have shown that language development in children with ASD tends to be delayed. The most reported delays occur in expressive language, which involves producing and articulating speech, which is often referred to as expressive language (Gernsbacher et al., 2016). Although not all children with speech delays have special needs, atypical language development is often one of the earliest and most noticeable warning signs. Early intervention is thus essential to address gaps in development and support improved language outcomes.

Autism Spectrum Disorder (ASD) comprises a diverse group of conditions. WHO (2023) estimates that around 1 in 100 children are affected by autism. To date, no single definite cause for ASD has been identified. However, scientific evidence suggests that ASD is influenced by multiple factors, including genetic factors, environmental influences, and neurobiological mechanisms (Swensen et al., 2007), and the interaction of these variables (Lord et al., 2006). ASD significantly affects a child's life, particularly in terms of social communication deficits, which are a hallmark feature of the disorder. Individuals with ASD often struggle with interpreting social cues and maintaining interpersonal interactions (Torrens & Ruiz, 2021).

Although individual variations exist, most children with ASD experience language development that follows the same pattern and is qualitatively like that of typical children at the same developmental stage. This suggests that, to some degree, children with ASD can achieve language development milestones like those of typical children. Nevertheless, they frequently encounter challenges in various language domains, including verbal and non-verbal communication, comprehension, and the pragmatic use of language in social contexts.

Common typical characteristics of language development in children with ASD include echolalia, speech delays, language loss, difficulties with language use, and problems with language pragmatics (Gernsbacher et al., 2016). They also show a limited range of morphological and syntactic forms in spontaneous speech. Compared to typically developing children, children with ASD exhibit less detailed and integrated word meanings across lexical domains. Nevertheless, individuals with ASD tend to perform well on vocabulary assessment and show fewer impairments in the grammatical and semantic components of language (Torrens & Ruiz, 2021).

Children with ASD often exhibit greater delays in language comprehension than in language production, affecting their overall communication skills. Therefore, early intervention is considered very important for children with ASD to overcome core deficits and improve long-term outcomes (Swensen et al., 2007). Early intensive behavioral intervention has been shown to significantly improve communication and social skills in children with ASD (Torrens & Ruiz, 2021). Early intervention for ASD should be tailored to each child's specific needs, considering their strengths and challenges to maximize effectiveness (Zwaigenbaum et al., 2015). Early intervention is expected to be able to reduce the impacts arising from autism spectrum disorders. Helping them develop language skills, which will ultimately support improvements in social communication skills and adaptation to their environment. Common early intervention strategies include Applied Behavior Analysis (ABA), speech and language therapy, visual support, and augmentative and alternative communication (AAC) tools.

Childhood Disintegrative Disorder (CDD) is a rare neurodevelopmental condition characterized by severe mental regression occurring in early childhood (Mouridsen, 2003). The developmental disorder CDD has similar characteristics to ASD. CDD and ASD share core features but differ in severity and symptoms. CDD regression is faster with more mental health

symptoms (Mehra et al., 2019). This rare condition makes CDD difficult to identify and understand due to its low prevalence in the population. A definite medical or neurological cause has not been identified as the main cause of CDD cases (Shirazi et al., 2016). The low prevalence of CDD presents significant challenges in timely diagnosis, often leading to delays in obtaining an accurate clinical picture (Ellis et al., 2022). However, emerging research has begun to uncover potential neurobiological abnormalities linked to this disorder.

Studies suggest that CDD may involve abnormalities in the neurobiology of the brain, such as abnormal electroencephalograms (EEG) findings and associations with seizures in some cases (Charan, 2012). These findings point to the complexity of the neural workings of brain circuits, which may be disrupted in individuals with CDD. Genetic investigations have identified rare candidate genes in individuals with CDD, such as *TRRAP*, *ZNF236*, and *KIAA2018*, which are involved in transcription processes. These genetic features overlap with those found in ASD, suggesting shared molecular mechanisms (Ellis et al., 2022).

These findings underscore the complex interplay between multiple genetic elements in the development of neurodevelopmental disorders like CDD (Sullivan et al., 2024). Further associated the genetic factors causing CDD with the chromosomal abnormalities, such as the duplications in the 15q11.2 microdeletion and 1q21.2q2q.2 duplications. Nonetheless, much remains unknown about CDD. Further research is critical to elucidate the complex network of genetic, neurobiological, and environmental factors that contribute to the development of CDD. Due to its rare and multifaceted nature, unraveling the riddle of CDD requires interdisciplinary collaboration across genetics, neuroscience, psychology, and developmental pediatrics.

CDD is characterized by acute to subacute profound regression in language, social behavior, and adaptive functioning during early childhood (Sullivan et al., 2024). Individuals with CDD may experience loss of language, diminished interest in the environment, sleep disturbances, and episodes of agitation. CDD Symptoms may include psychosis, anxiety, obsessive-compulsive disorder, autism spectrum disorder features, ADHD impulsivity, and sleep disorders. Children with CDD often experience sudden and severe decline in both cognitive and language skills after a period of seemingly normal development (Di Luzio et al., 2023). Manifestations include marked deficits in language and social functioning, along with the emergence of restricted interests and repetitive behaviors. There is often a substantial loss of previously acquired skills in language, social interaction, and adaptive functioning, accompanied by qualitative impairments in communication.

Because of its profound impact on language, social behaviors, and daily functioning, CDD presents significant challenges for both children and their families. Symptoms such as language loss, sleep disturbances, and comorbid psychiatric conditions, including psychosis, anxiety, and ADHD, highlight the complex and severe nature of the disorder. CDD also affects cognition and language skills, causing sudden and severe decline after a period of seemingly normal development. This emphasizes the importance of early diagnosis and intervention to help manage symptoms and improve the quality of life for individuals with CDD.

Early intervention is vital in mitigating the impact of CDD conditions. This typically includes speech therapy, occupational therapy, and behavioral interventions (Ellis et al., 2022). Additionally, enhancing parental knowledge and support around symptom management plays a crucial role in care and treatment. Such support can assist in managing sleep disorders and other symptoms associated with regression. In the case of CDD, intervention may involve pharmacotherapy and cognitive behavioral therapy to address regression symptoms and psychotic features (Di Luzio et al., 2023). An integrated approach combining pharmacotherapy and psychotherapy interventions tends to be more effective than using either intervention alone for severe symptoms, including psychotic symptoms and behavioral dysregulation. Interventions may include intensive behavioral and educational interventions, as well as psychopharmacotherapy targeting managing symptoms related to mood, agitation, sleep, anxiety, obsessive-compulsive disorder, and ADHD symptoms.

Currently, treatment for CDD is primarily focused on symptomatic management (Sullivan et al., 2024). Symptomatic management refers to an approach to treatment or care that aims to reduce or control the symptoms of a medical condition without directly affecting the cause. It

focuses on managing symptoms that arise because of certain medical conditions, with the aim of improving the patient's quality of life.

In the context of neurological or psychiatric disorders such as autism, symptomatic management may include a variety of strategies, including the use of medications to treat symptoms such as anxiety, sleep disturbances, or impulsivity. Additionally, non-drug approaches such as behavioral therapy or speech therapy can also be used to help manage and reduce the impact of symptoms on the patient's daily life. The goal is to improve the patient's function and well-being while not eliminating the direct cause of the condition.

The basic difference between ASD and CDD is the history of development and onset. Children with CDD typically exhibit normal physical and psychological developmental milestones until approximately five years of age, after which regression and loss of skills become apparent. CDD differs from typical autism in that periods of normal development are followed by regression. They have a later mean age at onset compared with typical autism (Malhotra & Gupta, 2002). Mouridsen (2003) explains that CDD manifests with severe mental regression between the 3rd and 4th years of life after normal mental development, while autism spectrum disorder (ASD) is characterized by challenges with social skills, repetitive behaviors, and communication. CDD individuals tend to have lower functioning, more withdrawn behavior, and a greater incidence of comorbid epilepsy, leading to a more adverse course compared with classic autism. CDD differs from classic autism in mode of presentation, with prolonged periods of normal development followed by marked loss of skills, while some children with classic autism may develop normally before experiencing regression

Other research shows the differences between CDD and ASD through differences in IQ and intellectual function (Kurita et al., 2004). CDD children with CDD tend to show more variability in intellectual functioning and show greater abnormalities in auditory responses compared to their peers with autism. Children with CDD tended to have higher average IQ scores and lower rates of severe intellectual disability and mutism, in contrast to other comparative studies involving CDD and ASD.

CDD is a rare neurodevelopmental condition in which children experience significant regression in language, social skills, and adaptive behavior after a period of normal development. By contrast, ASD is a broader condition that includes a variety of neurodevelopmental disorders characterized by challenges with social skills, repetitive behaviors, speech, and nonverbal communication (Shirazi et al., 2016). CDD is distinctly characterized by the regression of previously acquired intellectual, language, behavioral, social, relational, and adaptive abilities, typically occurring after at least 2 years of normal development.

Children with CDD show more severe symptoms and a different symptom profile compared with ASD. This includes a period of apparently normal development followed by faster regression, more pronounced affective symptoms, and broader developmental impairment (Mehra et al., 2019). CDD is characterized by regression in developmental and adaptive skills, along with the onset of autistic symptoms, in children with apparently typical development for at least the first 2 years of life, distinguishing it from ASD. CDD is associated with impairments in a broader set of domains than ASD, such as adaptive skills, emotions, and behavioral regulation.

Di Luzio et al. (2023) explains that there are at least three key distinctions between CDD and ASD. First, CDD is characterized by acute regression after 2 years and before 10 years, whereas ASD usually involves gradual regression before 2 years. Second, CDD involves a rapid decline in acquired developmental skills, distinguishing it from ASD cases with more gradual regression. Third, CDD can present with affective disturbances, hallucinations, and severe regression in developmental skills, features that are uncommon in ASD.

In summary, the differences between autism spectrum disorder (ASD) and Childhood Disintegrative Disorder (CDD) include the history of development and onset, as well as the characteristics of symptoms and their impact. Children with CDD typically develop normally until age five, after which they experience a sudden and dramatic regression in language, social behaviour, and adaptive functioning. Key differences between CDD and ASD include the speed of onset of regression, different levels of IQ, intellectual functioning, and the presence of additional symptoms such as affective disturbances that are more frequently seen in CDD. CDD

is a rare clinical syndrome characterized by dramatic regression after a period of normal development, while ASD encompasses a wide range of developmental disorders characterized by challenges in social skills, repetitive behavior, and communication. A clear understanding of the differences between CDD and ASD is essential for accurate diagnosis and management of affected individuals. Referring to Sullivan et al. (2024), findings that treatment for CDD is mainly focused on symptomatic management. This research seeks to test the effectiveness of DTT on language skills in children with CDD by mapping out an intervention program and implementing it with research subjects.

METHOD

This research is single-subject research. Single-subject research (SSR) is considered appropriate for studies with low subject availability. This method allows for the examination of behavior patterns and enables detailed, critical, and rigorous analysis of the effects of an intervention on a single participant (Becker, 2023). It also facilitates personalized treatment decisions and reveals dynamic relationships between variables within the same individual (Zuidersma et al., 2020). However, there are several things that need to be considered in applying this research method, namely, limited generalization to a larger population or only valid at the individual level (Logan et al., 2008). And there is a large possibility of bias and confounding variables (Scruggs & Mastropieri, 1998).

This research focuses on behavioral changes that occur in individuals in response to certain interventions or manipulations. A key characteristic of single-subject research is the use of an experimental design designed to monitor behavioral changes in a single subject or group of subjects before, during, and after administration of an intervention. Such a design is considered appropriate to facilitate analysis of effects at the individual level, monitoring behavior changes, developing specific interventions, controlling variability between subjects, and monitoring responses to changes. In this research, the A1-B-A2 design was used.

In the initial stage of the research, baseline-1 measurements were carried out to determine the position of language skills in children with CDD. The baseline-1 measurement instrument was developed based on the Denver II language development indicators. Denver II is a child development measurement tool used to identify the development of children aged 0-6 years. It is designed to assess five main areas of development, namely personal, social, gross motor, fine motor, language, and cognitive. The data analysis used is descriptive data analysis, which includes analysis within conditions and between conditions.

Each baseline phase (A1 and A2) involved five sessions, totaling 7.5 hours of observation per phase. The intervention (B) phase consisted of 10 sessions, amounting to 15 hours in total.

The research subject was a boy with the initials EA who was 5 years, 10 months 13 days old. He has experienced regression since he was 4 years old. Characterized by language and behavioral regression. The child shows similar behavior to ASD. The most visible behaviors are flapping, babbling, barriers to expressive and receptive language, and difficulty controlling the urge to urinate. Children also experience quite intense anxiety disorders, which cause excessive itching in certain areas of the skin, such as the hands and feet.

FINDINGS AND DISCUSSION

Findings

The description of the visual analysis is in Table 1. First, the length of the conditions carried out in this study consisted of five sessions carried out in baseline-1 conditions (A1), ten sessions carried out in intervention conditions (B), and five sessions carried out in conditions. Second, the estimated trend direction shows an increase in baseline-1 (A1), intervention (B), and baseline-2 (A2) conditions. This shows that treatment or intervention in the form of DTT can restore language skills in children with CDD (Figure 1). Third, the stability trend shows that baseline-1 (A1) and baseline-2 (A2) conditions obtained 100% results, and intervention (B) was 90%. Thus, these three conditions show that the data is classified as stable. Fourth, the trace data is equated with a directional trend, namely that in the baseline-1 (A1), intervention (B), and baseline-2 (A2)

conditions it increases, which means that there is a positive influence in the intervention condition using DTT on the return of the language skills of children with CDD. Fifth, the level of stability and range shows that in the baseline-1 condition (A1) it is said to be stable with a range of (46.15% - 56.41%), in the intervention condition (B) it is said to be stable with a range of (61.54% - 71, 79%), and in baseline-2 (A2) conditions it is said to be stable with a range of (71.79% - 82.05%). Sixth, changes in levels in this study show that the baseline-1 (A1) condition increased by (+5.13), the intervention condition (B) increased by (+10.26), and the baseline-2 (A2) condition also increased. experienced an increase of (+10.26).

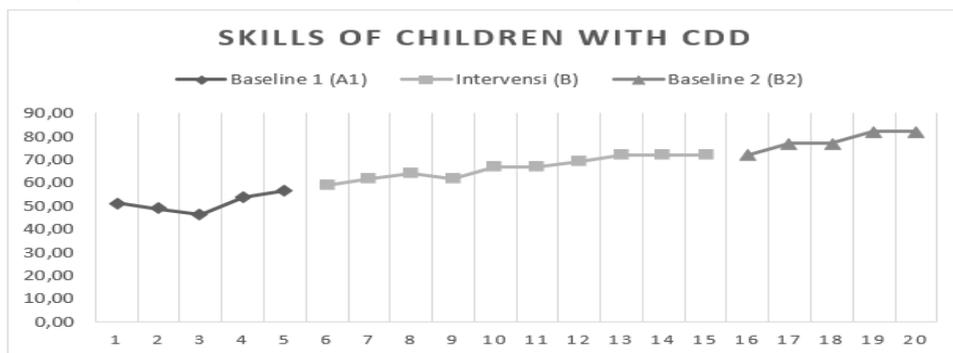


Figure 1. Graph of language skills of children with CDD

Table 1. Summary of visual analysis result in conditions

Condition	A/1	B/1	A/2
1. Condition length	5	10	5
2. Estimate trend direction			
3. Trend stability	(+) Stable (100%)	(+) Stable (90%)	(+) Stable (100%)
4. Data trace			
5. Stability level and range	(+) Stable (46,15% - 56,41%)	(+) Stable (61,54% - 71,79%)	(+) Stable (71,79% - 82,05%)
6. Level change	56,41% - 46,15% (+5,13)	71,79% - 61,54% (+10,26)	82,05 - 71,79 (+10,26)

Table 2. Summary of analysis results between language ability conditions

Comparison of condition	B/A1	A2/B
1. The number of variables changed	1	1
2. Changes in direction and their effects		
	(+) (+)	(+) (+)
3. Stability change	Stable to stable	Stable to stable
4. Level change	58,97% - 56,41% (+2,56)	71,79% - 71,79% (0)
5. Percentage overlap		0%

An explanation of the results of the analysis between conditions is in Table 2. First, there was one variable that was changed, namely from baseline-1 (A1) to intervention condition (B) and from intervention condition (B) to baseline-2 condition (A2), on the language abilities of children with CDD. Second, the change in the direction of the trend between baseline-1 (A1) conditions and intervention conditions (B) and baseline-2 (A2) conditions is increasing. This shows that the language skills of children with CDD have improved after intervention through DTT sessions. Third, the change in stability from baseline-1 (A1) to intervention condition (B) is

a change from stable to stable, as well as from intervention condition (B) to baseline-2 condition (A2). This means it has a positive effect (+). Fourth, the change in level from baseline-1 (A1) to intervention condition (B) increased (+), meaning that there was a change in level in the data of (+2.56) with a value from baseline-1 (A1) of 56.41% to the intervention condition (B) of 58.97%. Because there is an influence from the intervention given to the subject. The intervention consisted of providing DTT sessions to CDD children. Meanwhile, the intervention condition (B) to the baseline-2 conditions (A2) showed no change. This could mean that the language skills of CDD children who return have the possibility of remaining after being given DTT sessions. With the value of the intervention condition (B) and baseline-2 (A2) of 58.97%. Fifth, the data overlap in this study shows that there is a data overlap of 0%. The smaller the overlap percentage obtained, the more effective the intervention provided. From baseline-1 (A1) to intervention (B), this means that there is no data in the intervention condition (B) in the range of baseline-1 (A1) conditions. Therefore, providing intervention has an influence on target behavior.

Discussion

Language ability of children with Childhood Disintegrative Disorder (CDD) in baseline 1 (A1) condition

Language regression in children with CDD is an important phenomenon to understand in the context of rare neurodevelopmental disorders. This language regression occurs after the child reaches a language milestone in his development (Malhotra & Gupta, 2002). The manifestation of language regression in CDD is also expressed as part of an overall mental regression (Mouridsen, 2003). As explained by Kurita et al. (2004), one form of language regression in CDD is through mutism behavior, children lose the ability to speak or express themselves verbally. The presence of mental regression in children with CDD is directly related to a significant decline in various other aspects of development, especially language development. Children with CDD lose expressive and responsive language functions dramatically. This causes a break in the two-way communication abilities they had achieved during the previous normal development period.

Further research by Charan (2012) shows that language development in CDD experiences regression, especially in language comprehension and speaking skills. Language regression is also the main diagnostic criterion for CDD (Patel & Samani, 2018). Echolalia and mutism are manifestations of language regression in children with CDD (Mehra et al., 2019). This is like the previous explanation that language development can be the simplest indicator that can actually be observed to determine the potential for special needs in a child. In this case, parents play a very important role in the process. If it is known that language development is not appropriate to chronological age, early intervention can be carried out immediately to minimize the impacts that may arise in the future.

Language regression in CDD occurs gradually after a period of apparently normal development, often beginning after at least 2 years of age. This creates uncertainty regarding the recovery of language skills in children with CDD and poses challenges in the management of the condition (Ellis et al., 2022). Language regression also involves the child's inability to express needs and desires with minimally responsive language, as explained by Sullivan et al. (2024). Therefore, a better understanding of this language regression is key to effective diagnosis and intervention efforts for children with CDD. With a better understanding of this phenomenon, it is hoped that better support can be provided for children affected by it.

These findings then underline several studies regarding appropriate interventions for children with CDD. Instead of looking at causes, the treatment of children with CDD focuses more on symptomatic interventions. This is done to reduce the impact arising from the mental regression experienced by them. Children with CDD show characteristics similar to ASD, so treatment in a similar manner may be more necessary.

To determine the level of language skills in children with CDD, baseline observations and measurements were carried out on 5-year-old children with CDD. The observation results show that the child's receptive language is quite good. Even though you don't want to express your wishes verbally, you can just pull the hands of people around you to direct them to the desired object. Children show appropriate, simple responses, such as answering questions with a clear yes

or no. The language used to communicate is Indonesian. However, in identifying several letters and numbers, children understand the pronunciation in English, such as (A, E, B, and the number 1). The child is quite expressive; he laughs and hits the wall or table when he is happy. Shows a sad face and furrows his eyebrows when he is annoyed. The volume and intonation of the child's voice is quite varied; he can whisper, speak at a normal volume, and scream loudly when he is happy. The intensity of the child's babbling/or mumbling has begun to decrease. Children can imitate syllables.

In the baseline-1 (A1) condition, it was found that the subjects' language ability was 46.15% to 56.41%, with a mean level of 51.28%. The results show positive improvements even though no intervention has been carried out. This probably happens because the subject needs an adaptation process to the presence of new people around the subject. This adaptation process influences the subject's level of compliance with the instructions given. The tendency of the stability of this phase towards the subject's language ability shows a value of 100%. The trace data shows an increase (+). This is proven by an increase in language skills of +5.13%.

Language ability of children with Childhood Disintegrative Disorder (CDD) in baseline 2 (A2) condition

Baseline-2 (A2) condition is the post-intervention condition for research subjects. This aims to determine whether there is an influence in the form of an increase or decrease in the subject's condition. In this study, the intervention given to improve the language skills of children with CDD was discrete trial training (DTT).

Discrete Trial Training (DTT) is one of the main methods in the realm of Applied Behavior Analysis (ABA), renowned for its effectiveness in teaching individuals with ASD (Rohrer et al., 2021) or other developmental disorders. Rooted in the principles of behaviorism, one-on-one teaching sessions are structured where specific skills are broken down into discrete components and taught systematically (Sandoval-Norton et al., 2021). This intervention is based on the behaviors used in ABA to target specific skills through structured and repeated trials (Tincani & Travers, 2019).

At the center of DTT are several main principles originating from behaviorist theory. Principles such as the use of simple cues, punishment, reinforcement (Radley et al., 2015), prompts, and shaping. DTT sessions usually involve providing clear and concise instructions (stimuli) to elicit specific responses from the individual. Reinforcement is then given based on correct responses, thereby increasing the likelihood that the desired behavior will reappear in the future. Through systematic shaping and the use of prompts, individuals are guided to master the target skill gradually. In addition to teaching new behaviors, discrimination, and advanced skills, DTT can also be a method for managing disruptive behavior (Smith, 2001).

DTT uses a variety of techniques to facilitate learning and skill acquisition. These techniques include task analysis, prompting strategies, error correction procedures, and data collection methods. Task analysis involves breaking down complex skills into smaller, more manageable components, allowing for systematic teaching and mastery of each component. Prompting strategies, such as physical, verbal, or visual prompts, are used to help students provide correct responses. Error correction procedures are implemented to effectively handle incorrect responses, provide feedback to students, and provide opportunities for correction. Data collection methods, such as trial-by-trial recording or frequency counts, allow for ongoing assessment of progress and adjustment of teaching strategies as needed.

DTT finds wide application in a variety of fields, including language development, social skills training, and academic instruction. In the realm of language development, DTT is used to teach receptive and expressive language skills, including vocabulary, syntax, and pragmatics. Social skills training through DTT focuses on teaching appropriate social behavior, such as taking turns speaking, initiating conversations, and interpreting nonverbal cues. Additionally, DTT is used in academic settings to teach basic skills such as reading, writing, and mathematics by adapting instructional methods to meet the learner's individual needs.

In this phase, the observation results showed that the subject was able to point (using his index finger) to his desires, such as toys or snacks. He introduced a lot of new vocabulary both in

Indonesian and English. Comprehensively, children experience quite significant improvements in language aspects. Children begin to pronounce various meaningful syllables. He wanted to try to imitate every word said by the researcher. Apart from sounds and words, children also imitate movements made by researchers, such as cupping their hands and placing them on one cheek (making a sleeping gesture), forming their hands like binoculars (looking for something), and covering their face with their palms (peek-a-boo). The child is ready to point to the desired object or food. He is also able to order numbers correctly.

The results of the baseline-2 (A2) measurements on the subjects showed an increase in language skills between 71.79% to 82.05%, with a mean of 77.95%. The baseline-2 measurement results showed a relatively constant increase from the intervention condition (B) with a mean of 66.41%. The stability level in this phase shows 100%, which means stable. In addition, there was an increase compared to the intervention phase (B), with a stability level of 90%. The estimated trend shows an increasing direction (+). This is proven by the level of change reaching +10.26%.

The effect of Discrete Trial Training (DTT) on the language ability of Children with Childhood Disintegrative Disorder (CDD)

Language has several main functions. In general, language has functions which include instrumental functions, regulatory functions, representational functions, interactional functions, personal functions, heuristic functions, and imaginative functions (Halliday, 1975). The instrumental function refers to the function of environmental manipulation, which means that language can trigger an event. The regulatory function includes the use of language to control or regulate situations. The representational function is defined as the function of language used to convey facts and knowledge, explaining an event that can be proven to be true. The instructional function emphasizes supporting human existence as social creatures. The personal function is its application as a medium for describing emotions. The heuristic function refers to a function aimed at gaining knowledge and studying the surrounding environment. Meanwhile, the imaginative function is the function of language used to create fictitious things or events.

The main function of language is a means of conveying messages or information from humans to other humans, which will ultimately lead to communication activities. Communication is important in child development. Along with this development, attention is needed from parents and teachers to optimize children's development, especially language development. Parents have a complex role in educating their children. One of the obligations that must be carried out is to provide stimulus as needed to support the child's growth and development. Erikson's psychosocial development theory explains that developmental tasks across the life span must be carried out well (Aini & Alifia, 2022)

The role of parents in providing stimulus to children is a factor that plays an important role in optimizing developmental aspects before children are ready to enter the school environment. By helping them complete their developmental tasks through providing stimulus. Developmental tasks that are not completed well will have an impact on future life development. Reflecting on the characteristics of early childhood, they need to learn about various things, including developing motoric, cognitive, language, and socio-emotional abilities, so that providing the right stimulus can influence each aspect of development (Mandas et al., 2021).

Stimuli can be given in various forms and ways; in this case, researchers are trying to determine the effect of these stimuli on the language skills of children with CDD through DTT intervention. Based on the results of the descriptive analysis, it is known that there has been a significant increase in language skills in children with CDD. This improvement has a positive impact on the return of language skills to children with CDD.

The DTT program was developed based on the basic principles and concepts of applied behavior analysis (ABA), which focuses on stimulus and response. Generally, DTT is used for children with ASD to control behavior. Then, in this study, the DTT program was tested on children with CDD, who showed behavior similar to ASD. Significant changes in language skills are very visible, as evidenced in Figure 1. Therefore, the DTT program may be an option for treating children with CDD. However, it is important to know that the needs of everyone with

special needs may be different from one another. Therefore, a thorough examination is needed before designing the program and monitoring developments periodically.

The results of the research have explained several key points. First, DTT is considered effective for recalling the expressive language skills of children with CDD. This is based on the return of the child's language skills based on the results of the descriptive analysis presented. The language abilities of children with CDD show relatively constant improvement.

Second, it is consistent and helps children with CDD establish real order. Implementing routine and order in language learning can help strengthen their neural connections and speed up language development.

Third, appropriate consequences will help children with CDD increase their motivation to learn. A strong interest in a particular topic or motivation to communicate can accelerate language development.

Fourth, active social interaction can give children space to develop their language behavior. A child's first language acquisition begins when he is born and continues until puberty. In the first three years of a child's life, he will be exposed to the language in his environment (Birdsong, 2005). At that time, he initially exercised his language skills by having direct contact. Direct contact means that children blend into a particular linguistic environment, so that they can continue to hear, interact, and communicate in that language. Interaction with adults and fellow children facilitates language learning. An environment rich in conversation and opportunities to talk can support language development.

Fifth, appropriate modeling by providing examples of appropriate language behavior can encourage children to want to speak. Having a good model in an environment that supports language development can provide a strong example for someone to emulate.

CONCLUSION

Based on the research results, the conclusion that can be drawn is that intervention using DTT shows significant changes in the language behavior of children with CDD. The intervention program provided for 10 intervention sessions showed significant changes. It is characterized by increased imitation skills in children, which continues with the return of skills to label pictures and concrete objects using English. The skills program provided during the intervention includes attention skills, matching skills, identification skills, imitation skills, and labeling skills. In addition to the return of language behavior, children also show improvements in adaptive behavior such as toileting skills, putting on clothes, and getting dressed.

This study is constrained by the research methods utilized. These limitations include effects at the individual level (Becker, 2023), which would then hinder generalization to larger populations (Logan et al., 2008). Therefore, further research is needed to provide a broader and deeper picture of the effects of intervention on the language development of children with CDD. Another limitation is the long period required (Zuidersma et al., 2020). To ensure that the effects arising from the intervention are permanent.

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