Overview of Research on Dyslexia Assessment and Identification in China

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Abstract: Dyslexia can affect students' academic performance, self-esteem, mental health, social and emotional development, career and life prospects. Currently, there is a lack of scientifically unified methods and tools for dyslexia assessment and identification in China, resulting in a lower incidence rate of Chinese dyslexic students being discovered. Scientifically and accurately assessing and identifying dyslexic students and providing them with corresponding support and intervention measures are key issues in dyslexia research. This paper aims to analyze the progress of research on dyslexia assessment and identification in China, evaluate its current status, and summarize inspirations for dyslexia assessment and identification for future reference.

1. Introduction

Reading is a complex cognitive skill that involves learning how to interact with text, and it involves decoding and interpreting related fields. Reading can help students move from low-level understanding to high-level comprehension, and it plays an important role in students' aesthetic literacy, quality of life, and the diversity and variety of society. Currently, there are many students with reading difficulties in different language environments around the world, with the characteristics of the inability to read text accurately and fluently, and their reading efficiency is significantly lower than that of normal children [1]. Reading-disabled students are often divided into acquired reading disabilities and developmental reading disabilities [2]. Acquired reading disabilities refer to reading difficulties caused by congenital deficiency or acquired injury, while developmental reading disabilities refer to individuals with normal intelligence but significant discrepancies between their reading level and their intelligence or physiological age. Reading disabilities not only affect students' academic performance, but also have long-term, negative impacts on their emotional development, mental health, social interactions, career and life prospects [3]. Due to the lack of a scientifically unified method and tool for assessing and identifying reading disabilities in Chinese students, the detection rate of Chinese reading-disabled students is relatively low [4]. Therefore, it is crucial to scientifically and accurately assess and identify reading-disabled students and provide them with corresponding early support and intervention measures. This article reviews the assessment and identification research on reading disabilities in China, explores the mechanism and characteristics of assessment and identification research, and discusses the significance of assessment and identification for reading-disabled students.

2. The Progress of Dyslexia Assessment and Discrimination Research in China

2.1. Differentiation Assessment Models Based on Foreign Exclusionary Definitions

The foreign exclusionary definition model considers that children with dyslexia have no significant differences in nonverbal intelligence, educational opportunities, social environment, economic conditions, learning motivation, and emotional conditions compared to other children, but their reading scores are significantly lower than those of children with similar intelligence [5]. The exclusionary definition model clarifies the essential nature of students with dyslexia, and defines dyslexia as unrelated to intelligence factors, organic pathology, and educational conditions. The domestic differentiation assessment model draws on the advantages of the exclusionary definition and first excludes the relationship between students with dyslexia and impaired intelligence, adverse situations, and psychological disorders, and then identifies students with dyslexia through their data position in standard tests. Wu Sina's differentiation assessment model first determines the level of literacy for students in each grade, and selects students with dyslexia whose literacy level is less than 1.5 grades below that of their peers based on their group word ability, with an accuracy rate of less than 20% compared to the actual reading ability of students.
to normal children [6]. Zhou Xiaolin's differentiation assessment model considers the relationship between intelligence and achievement, and the identified students with dyslexia must meet two criteria: the student's reading score is in the bottom 15%, and the student is above the average level in the Raven intelligence test [7]. Liu Jing established a regression difference diagnosis model with statistical rationality and consistent with ICD-10 and DSM-II-R diagnostic criteria. The equation established by the difference assessment model can calculate the expected reading scores at a certain IQ level, which not only excludes reading lag caused by low intelligence but also prevents missed diagnosis of high IQ but dyslexia. This method enriches the research of exclusion and difference assessment models [8]. The difference assessment model has a wide range of applications but has been criticized in recent years for its theoretical and practical shortcomings, such as unclear understanding of students' learning experiences and lack of guiding significance for intervention plans. Therefore, research has shifted to evaluation with the intervention response model based on judgment and teaching reactivity or evaluation tools based on cultural and educational environments.

2.2. Localized Dyslexia Assessment Tools

Based on considerations of China's specific cultural and language environment, domestic researchers have conducted a series of localized dyslexia assessment and discrimination studies and developed evaluation tools and methods suitable for Chinese dyslexia. In 1997, Yang Zhiwei developed the Chinese Reading Skill Diagnostic Test (CRSDT), based on cognitive psychology and neurolinguistics theories and dyslexia symptomatology, and the test results showed that the reliability and validity of CRSDT initially met the requirements of psychological measurement and were clinically practical [9]. In 2016, Wu Hanrong developed the Dyslexia Check List for Chinese Children (DCCC) based on the description and diagnostic criteria of dyslexia in the International Statistical Classification of Diseases and Related Health Problems (ICD-10) and Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), and combined with clinical and behavioral characteristics of children with dyslexia. Wu validated the reliability and validity of DCCC through a questionnaire survey of parents, showing that DCCC was well-designed with reliability and validity meeting the requirements of the scale development [10]. DCCC is one of the more frequently used scales in China's dyslexia research. In addition, research on dyslexia assessment and identification also emphasizes China's educational background, linguistic characteristics, and cultural factors. In 2021, Fan Yimin developed the Dyslexia Behavior Screening Parent Questionnaire for Primary School Students through project analysis and confirmatory factor analysis. The questionnaire content includes eight dimensions: word recognition, Chinese character writing, writing, oral expression, verbal memory, motivation and attitude, attention, and mathematics. This parent questionnaire can be used for early self-assessment by parents, and when the results indicate abnormalities, timely medical screening or cognitive diagnosis is necessary, making it an effective evaluation tool [11]. Another study developed the Dyslexia Scale for Chinese Children, which assesses eight dimensions, including oral disorders, writing disorders, poor reading habits, attention deficit, visual-perceptual disorders, writing disorders, auditory-perceptual disorders, and meaning comprehension disorders, with a total of 55 items [12]. The content covered by domestic scales has gradually become more comprehensive and can reflect the differences in student cultural backgrounds and educational situations, but the existing tools have limited applicability, and the above scales mainly measure the linguistic aspects. Therefore, research has begun to focus on the cognitive processing level of the development of Chinese dyslexia, making it another criterion for evaluating and discriminating dyslexia.

2.3. Multidimensional Integration Assessment Combining Cognitive and Sensory Abilities

Reading disabilities have multidimensional characteristics, involving cognitive factors such as language, attention, working memory, and sensory factors such as visual and auditory abilities. The cognitive ability tests for reading disabilities assessment mainly include phonological skills, morphological skills, and orthographic skills [13]. Phonological skills refer to the evaluation of phonological awareness, rapid naming, and phonological memory. Morphological skills measure the ability of children to recognize and manipulate different levels of morphological units, such as compound word awareness, homophone morphemes, and homograph morphemes. Orthographic skills measure children's awareness of whether parts and combinations conform to the rules of Chinese character construction, such as orthographic judgment, etc. Analyzing research related to the developmental reading disabilities of Chinese over the past 40 years, it is found that the main theoretical models of Chinese developmental reading disabilities include the theory of phonological processing impairment, orthographic processing impairment theory, and visual-spatial attention deficiency theory [14]. In the theory of phonological processing impairment, Zeng Zhilang and others believe that phonological analysis ability predicts the reading achievement of children with dyslexia, and children with poor sensitivity to Chinese phonemes have difficulty maintaining phonological elements in working memory, leading to phonological memory errors [15]. In the orthographic processing impairment theory, Wang Xiaochen's experimental research shows that children with dyslexia lag significantly behind ordinary children in their ability to process orthographic rules, and orthographic processing has a direct and significant predictive and explanatory effect on word recognition and dictation in Chinese [16]. In the visual-spatial attention deficiency theory, Huang Xiushuang believes that there are significant differences
3. Review of Reading Disability Assessment and Identification Research

3.1. Review of Reading Disability Assessment Tools and Methods

Domestic reading disability assessment and identification tools include standardized tests and non-standardized methods. Standardized tests are various types of reading disability assessment scales that have been validated and have high reliability and validity. They can be used for rapid assessment of large samples. However, these tests were developed early on and their generalizability needs to be considered due to the vast territory and cultural diversity of our country. Non-standardized methods refer to parent questionnaires, behavioral observation, and other personalized assessment and screening methods. They lack scientific comparative benchmarks. There are also screening methods that combine cognitive function assessment and EEG technology, which are more quantitative and visual. However, they are based solely on the cognitive function and EEG characteristics of reading disability patients, lacking unified standards. Overall, the existing reading disability assessment and identification in our country lacks unified, scientific standards and a complete set of tools, and the assessment results have certain limitations.

3.2. Evaluation of the Effectiveness and Accuracy of Reading Disability Identification Research

Based on existing research findings, research on reading disability identification in our country has made significant progress in providing effective and accurate assessment. However, there are the following issues: firstly, there is a lack of comprehensive application of multiple assessment indicators and methods, and the accuracy of reading disability identification needs to be improved, and the applicability of assessment results needs to be expanded; secondly, there is a lack of a systematic and comprehensive screening system. Domestic reading disability assessment has not yet integrated medical diagnosis with educational assessment and has not formed a three-party linkage between families, schools, and hospitals. Therefore, there is still a need to establish a complete, scientific, accurate, and effective diagnostic assessment process, including clinical observation, tests of reading ability and cognitive ability, screening for comorbidities, etc.

4. Insights from the Assessment and Identification of Reading Disabilities

4.1. Exploring Improvements and Innovations in Reading Disability Assessment Methods

By improving and innovating assessment methods, we can enhance the accuracy and effectiveness of assessments and provide more targeted intervention.
measures for children's reading development. Firstly, by introducing new technologies and methods, such as existing brain imaging techniques and eye-tracking technology, we can gain a more objective understanding of the cognitive processes and brain activity patterns of children with reading disabilities. Secondly, combining multidimensional assessment indicators, such as language ability, attention, and working memory, can provide a more comprehensive understanding of the causes and characteristics of reading difficulties.

4.2. Strengthening the Connection between Reading Disability Identification and Intervention

Assessment and identification should be closely linked to and support the implementation of intervention measures. During the assessment process, the unique needs and individual differences of children should be considered, and individualized educational plans and strategies should be developed. The assessment results should also provide guidance and recommendations to teachers, parents, and professionals, helping them formulate effective intervention plans. By strengthening the connection between identification and intervention, we can better promote children's reading development and improve the effectiveness and sustainability of interventions.

4.3. Proposing Comprehensive and Effective Strategies for Reading Disability Assessment

Assessment strategies should comprehensively consider children's individual characteristics, educational backgrounds, language environments, and cultural factors. Attention should be given to the influence of cultural and language factors on reading disabilities, and assessment and intervention strategies should be developed to adapt to different backgrounds and environments. At the same time, assessment strategies should also consider standardization and popularization, improve the consistency of assessment results, and be widely applied in practice to enhance specificity and operability.

4.4. Enhancing Support Systems for Teachers, Schools, and Families

Research on the assessment and identification of reading disabilities has a certain guiding value for educational policies and practices. Policy makers can draw on research findings to formulate corresponding policies and measures to support and promote the development of children with reading disabilities. For example, teacher training can be strengthened to improve their awareness and assessment abilities regarding reading disabilities. Additionally, schools and educational institutions can establish comprehensive support systems to provide personalized educational plans and support measures for students. Policies can also encourage collaboration between schools and families, strengthening parental involvement and support, thus jointly promoting children's reading development.

The assessment and identification research of reading disabilities holds important significance and prospects for education and child development. Through assessment and identification, reading difficulties in children can be detected and identified early, allowing for early intervention. Assessment results can also provide guidance to teachers, parents, and professionals, enabling the development of more individualized and effective educational programs and strategies. In addition, the assessment and identification of reading disabilities guides improvements in educational policies and practices, providing a basis for policy makers to promote the development and integration of children with reading disabilities. Future research can further explore and improve assessment methods and tools, strengthen the connection between assessment and intervention, and propose more effective assessment strategies. Through these efforts, better support for the development of children with reading disabilities can be provided, enhancing their reading abilities and overall development.

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References


