

The Role and Optimization of Feedback Mechanism in Game Assisted Psychological Rehabilitation

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Abstract: With the deep integration of psychology and game therapy techniques, game therapy, as an innovative psychological rehabilitation method, is gradually demonstrating its unique advantages in promoting mental health, especially for children with psychological and behavioral disorders such as autism, with significant therapeutic effects. Feedback mechanism, as an essential core element in game design, plays a crucial role in enhancing players' gaming immersion and improving therapeutic effects. This article delves into the multiple roles of feedback mechanisms in game assisted psychological rehabilitation. Through real-time, accurate, and engaging feedback, games can continuously stimulate children's interest in participation, help them establish positive emotional experiences, and promote the comprehensive development of cognitive function, social skills, and emotional management abilities. Meanwhile, this article also focuses on optimization strategies for feedback mechanisms. Propose personalized feedback design ideas for children of different age groups and different medical conditions, ensuring that the feedback content not only meets the psychological characteristics of children, but also effectively promotes the achievement of rehabilitation goals.

Keywords: Feedback mechanism, game assistance, psychological rehabilitation.

1. Introduction

In the vast realm of human emotions and cognition, autism (ASD) is like an unexplored secret that affects the life trajectories of children and their families in a unique and complex way [1]. Autism, a neurodevelopmental disorder characterized by social interaction disorders, communication difficulties, and limited behavioral patterns, has long been a focus of attention in the fields of medicine, psychology, and education [2]. As research deepens, we gradually realize that although the cause of autism is still a mystery, its close connection with abnormal brain development provides us with a new perspective for intervention and treatment [3]. The challenges faced by children with autism are multidimensional, ranging from basic language communication barriers to deep-seated social integration issues, all of which test the patience and perseverance of the children and their families [4]. Language barriers make it difficult for children to express themselves and understand others; Social communication barriers make them feel confused and lonely in interpersonal communication; The repetitive and stereotyped behavior further exacerbates the difficulty of adapting to the environment.

In the face of these challenges, simple drug therapy often fails to reach the core of the problem. Therefore, comprehensive rehabilitation intervention is particularly important, especially psychological rehabilitation intervention, which has become a key link in improving the quality of life of children and promoting their comprehensive development [5]. In recent years, with the rapid development of gaming technology, its application in medical and educational fields has become increasingly widespread, and game assisted psychological rehabilitation is one of the shining stars [6]. Games, with their unique interactivity, fun, and personalized features, provide a safe and controllable social and learning environment for children with autism [7]. In this virtual and challenging world, sick children can gradually explore themselves, learn social rules, and improve

their emotional management abilities through role-playing, task completion, teamwork, and other methods [8]. And all of this cannot be achieved without the core role of feedback mechanisms. Instant and positive feedback can quickly capture the attention of the child, stimulate their curiosity and curiosity.

In the gamified rehabilitation process, whenever a child completes a task or makes some progress, the system will give immediate rewards or recognition. This immediate positive feedback mechanism greatly enhances the child's sense of participation and achievement. Through gamification, children can experience success and failure in a relaxed and enjoyable atmosphere, and learn to handle different emotions. Encouragement and guidance in the feedback mechanism help children establish positive emotional coping patterns, gradually enhance self-confidence and stress resistance. Feedback in games often accompanies the transmission of knowledge and the training of skills. Through continuous experimentation and feedback loops, children can unconsciously improve their attention, memory, thinking ability, and problem-solving skills, thereby promoting the comprehensive development of cognitive function. In summary, feedback mechanisms play a crucial role in game assisted psychological rehabilitation. By continuously optimizing feedback strategies, we can create a rehabilitation environment that is more conducive to the growth and development of children with autism, helping them overcome obstacles and embrace a better future.

2. The Role of Feedback Mechanism in Game Assisted Psychological Rehabilitation

2.1. Provide a Positive Emotional Experience

The real-time and clear feedback mechanism in the game is like a patient mentor, always paying attention to every subtle movement of the child and providing quick and

accurate responses [9]. This immediacy is not only reflected in the real-time display of operational results, but also in the immediate recognition and encouragement of the efforts made by the patient. Whenever a child successfully crosses an obstacle, solves a puzzle, or completes a task, the game responds with colorful rewards, cheerful sound effects, or uplifting visual effects, making the child deeply feel that their actions are valued and seen [10]. This immediate positive feedback, like warm sunlight penetrating through clouds, illuminates the hearts of the sick children and inspires their inner happiness and satisfaction.

It allows children to find their own value and sense of achievement in the virtual world of the game. The accumulation of this sense of achievement is like a small stream converging into a river, gradually washing away anxiety and depression in the real world, bringing peace and tranquility to their hearts. Meanwhile, the positive feedback in the game also promotes a virtuous cycle of emotions in the affected children. The joy brought by every success has become a source of motivation for them to continue moving forward. They began to explore and try more actively, enjoying the joy of challenges, and this positive attitude

further promoted the development of their cognitive, emotional, and social abilities. In this process, the sick children not only learned how to face difficulties and setbacks, but also learned how to cherish and enjoy the joy of success, laying a solid foundation for their growth path.

2.2. Promote Cognitive and Behavioral Change

Under the feedback mechanism of the game, the child experienced inspiring journeys of cognitive and behavioral change. Taking puzzle games as an example, these carefully designed challenges not only test the logical thinking ability of children, but also serve as a valuable platform for them to learn new behavioral patterns and coping strategies (as shown in Figure 1). In the game, facing intricate puzzles, the sick child has to mobilize all their intelligence and patience, trying and reflecting time and time again. Every time they fail, the game will provide feedback in a gentle and clear manner, prompting them to adjust their strategy or rethink. This "trial and error feedback adjustment" cycle not only exercises the problem-solving ability of children, but more importantly, teaches them how to remain calm in difficult situations, how to effectively engage in self reflection and strategic adjustment.

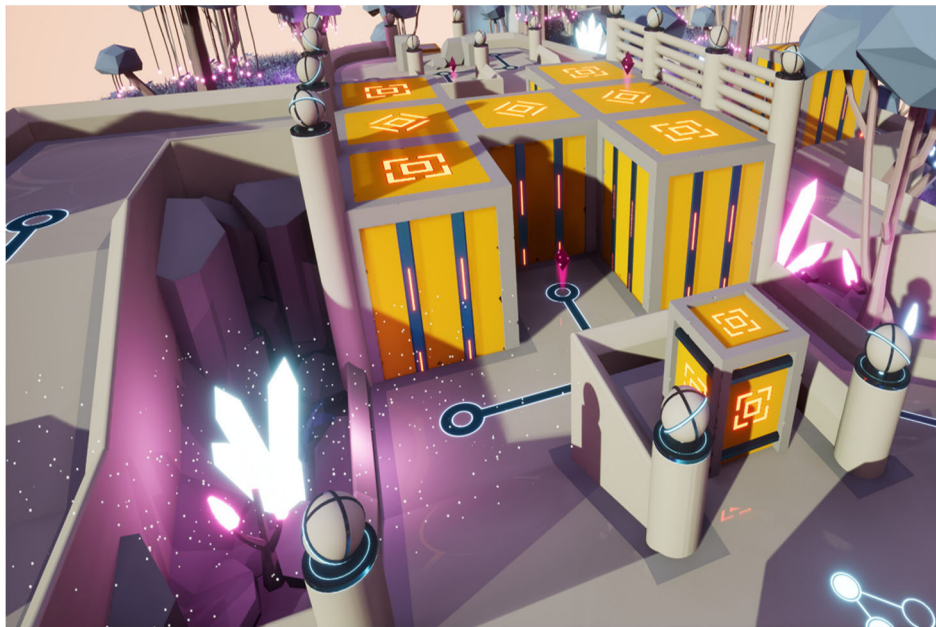


Figure 1. Puzzle game

Over time, the affected children unconsciously develop more flexible and efficient problem-solving paths, and their ways of thinking become more open and diverse. This transformation is not only reflected in games, but also gradually permeates into their daily lives, enabling them to better cope with challenges and difficulties in reality. In addition, the feedback in the game also encourages the affected children to adopt more positive and proactive behavior patterns. They began to realize that through continuous effort and experimentation, they had the ability to overcome obstacles and achieve their goals. This increase in self-efficacy further stimulates their internal motivation, prompting them to exhibit a more positive and confident attitude in various aspects such as learning and socializing.

3. Optimization of Feedback Mechanism

3.1. Personalized Feedback Design

Personalized feedback design plays a crucial role in the rehabilitation process of autism and its accompanying psychological problems. It requires us to deeply understand the individual differences of each patient, including age, gender, psychological status, and specific rehabilitation goals, in order to customize the feedback mechanism that best meets their needs (as shown in Figure 2). Firstly, for patients with anxiety disorders, personalized feedback design should focus on creating a relaxed and soothing atmosphere. These patients often hold a highly tense attitude towards unknown or challenging situations, therefore, feedback in games should be gentle and warm, avoiding excessive stimulation. For

example, when a child successfully completes a task, games can provide gentle music, warm colors, and encouraging

words such as "You did a great job, keep relaxed" to help them relieve tension and enhance inner peace and stability.

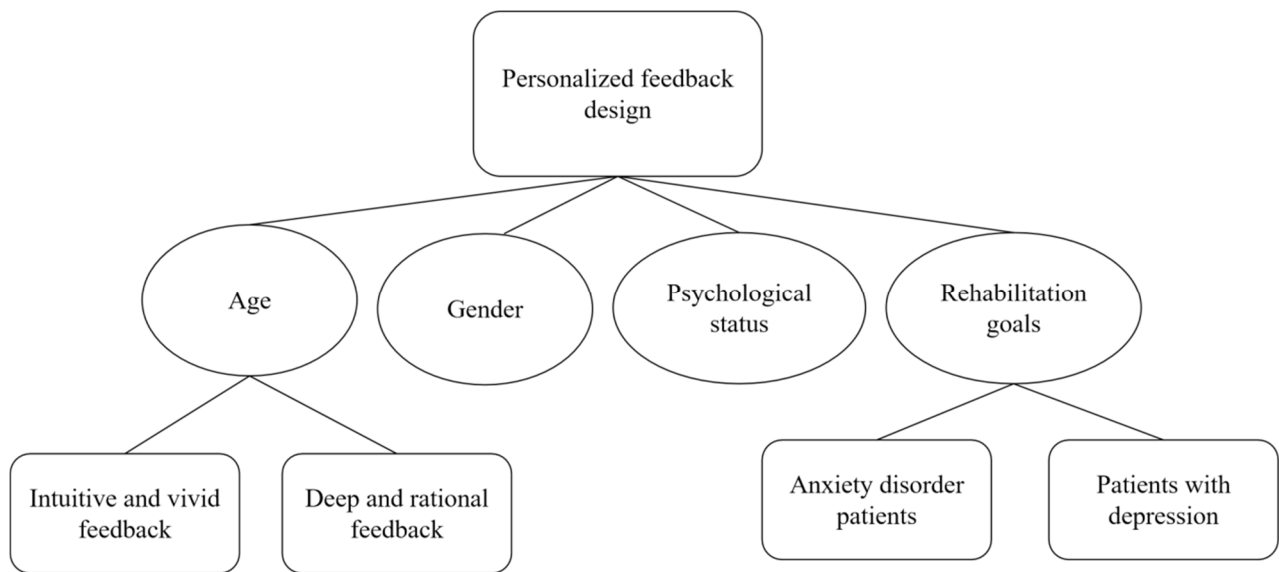


Figure 2. Personalized feedback mechanism

For patients with depression, personalized feedback focuses more on stimulating positive emotions. These patients may be in a low mood for a long time, lacking confidence and motivation. Therefore, feedback in the game should frequently and clearly acknowledge their efforts and achievements, and enhance their emotional state, confidence, and happiness through rich reward mechanisms and positive language. In addition, personalized feedback design also needs to consider the age characteristics of patients. For younger children, feedback should be more intuitive and vivid, such as using cartoon characters, bright colors, and lively sound effects to attract their attention; For older patients, feedback can be more in-depth and rational, focusing on inspiring their thinking and self reflection abilities.

3.2. Combining Other Rehabilitation Methods

Although a single feedback mechanism has its unique advantages, if it can be closely integrated with other psychological rehabilitation methods, it will be able to build a more comprehensive and efficient rehabilitation system. The combination of cognitive-behavioral therapy (CBT) and psychological counseling, as traditional and effective psychological rehabilitation methods, with game feedback mechanisms undoubtedly brings patients a more diversified rehabilitation experience. CBT emphasizes alleviating psychological problems by changing patients' thinking patterns and behavioral habits. Incorporating the principles of CBT into games, such as setting tasks to challenge and change patients' negative thinking, combined with feedback mechanisms to provide immediate positive guidance, can accelerate the reshaping of patients' cognitive structures. At the same time, psychological counseling provides professional theoretical and emotional support for game rehabilitation. Psychological counselors can guide patients to correctly interpret feedback in games, deepen their self-awareness and emotional management abilities.

The advantage of this comprehensive rehabilitation program is that it can address the psychological needs of patients in multiple dimensions and all aspects. The game

feedback mechanism attracts patients to participate with its fun and interactivity, while CBT and psychological counseling use professional theories and methods to delve into patients' hearts and help them fundamentally solve problems. The three complement each other and work together to promote the psychological rehabilitation process of patients. In addition, as the patient's rehabilitation progresses and the gaming experience deepens, we also need to continuously optimize and iterate the rehabilitation plan. This requires us to continuously collect and analyze patient feedback data, understand their real needs and feelings, in order to promptly identify and solve problems. Through a data-driven decision-making process, we can more accurately adjust game difficulty, feedback content and form, ensuring that rehabilitation plans always match the actual situation of patients, thereby achieving the best rehabilitation results.

4. Conclusions

Autism, a complex and variable neurodevelopmental disorder, undoubtedly casts a heavy shadow over the affected children and their families due to its mysterious etiology, prolonged course, and limitations in current medical methods. The significant differences and delays exhibited by children with autism in perceiving the world, understanding information, focusing attention, and exercising imagination deeply affect their daily quality of life and learning outcomes, and further restrict their comprehensive development of social skills and emotional expression. In the face of this challenge, we have found a hopeful and promising solution - using rehabilitation training as a solid foundation and cleverly integrating game therapy to build a bridge to rehabilitation and growth. Game therapy, with its unique creativity and interactivity, creates a fun and educational world for children with autism. Here, children can learn through games, play while learning, and enjoy the joy of every attempt and success. More importantly, game therapy continuously ignites the learning enthusiasm and participation motivation of children with autism through real-time, precise, and engaging feedback mechanisms. These feedbacks are not only

recognition and encouragement of their efforts, but also key to guiding them to gradually establish positive emotional experiences, promote cognitive function improvement, strengthen social skills, and optimize emotional management abilities. In such a virtuous cycle, children with autism can grow up in happiness, progress in challenges, and move towards a brighter and more independent future.

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