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Analysis of the Importance of Emotional Cognition Processing in Inside Out

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Abstract. In the current social environment where pressure continues to escalate, emotion recognition and regulation skills have become essential abilities, particularly for children and adolescents. Unmanaged emotional responses to stress not only lead to behavioral issues in adolescents but also cause physiological conditions that inhibit learning and potentially increase the risk of future illnesses. Using Inside Out as a case study, this paper employs a case analysis method to explore perspectives on and approaches to enhancing children's and adolescents' emotion recognition and regulation skills. The research finds that children's emotions are highly complex, further highlighting that the awakening of self-awareness makes emotions even more intricate. Simultaneously, the film demonstrates how memory biases are influenced by emotion regulation. Studies indicate that learning emotion management skills during childhood can establish healthier physiological response patterns, thereby benefiting both learning and long-term health. This research provides practical references for emotional education targeting children and adolescents.

Keywords: Inside Out, emotion recognition, emotion regulation, memory bias

1. Introduction

In today's high-pressure and fast-paced social environment, emotional recognition and regulation abilities have become core elements of individual mental health and social adaptation. Children and adolescents are in a critical stage of emotional socialization, where the development of their emotional competence relies not only on biological instincts but is also profoundly influenced by social environments such as family and school. The Inside Out film series provides a concrete research framework for understanding emotional cognitive processing through its personified emotional characters. By anthropomorphizing the emotions of the young girl Riley, Inside Out depicts the emotional cognitive processing challenges a child may encounter during their growth from childhood to adolescence. For example, in Inside Out 1, when a golden memory ball is touched by Sadness and turns blue, it symbolizes how past happy memories can take on a tinge of sadness after certain experiences. In Inside Out 2, Anxiety forms an orange storm at the brain's control console, representing Riley experiencing a panic attack, thereby highlighting the importance of emotional cognitive processing for children and adolescents. Therefore, this paper uses Inside Out as a case study to explore the theme of the significance of emotional cognitive processing. Employing methods such as case analysis, this study fills the research gap in understanding children's and

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adolescents' emotional cognitive processing through Inside Out by analyzing film segments that demonstrate the importance of emotional recognition and regulation abilities, offering practical references for safeguarding the mental health of children and adolescents.

2. Literature review

Emotional cognitive processing encompasses emotion recognition and management as well as memory biases. In contemporary society, the emotional intelligence development of children is increasingly valued. Freud pointed out that emotional experiences before the age of six have a lasting impact on a person's entire life. Effective emotional cognitive processing plays a crucial role in helping children develop a sound personality and attain higher emotional intelligence.

2.1. Emotion recognition and management concepts

Emotion recognition refers to an individual's ability to identify their own and others' emotions. In multiple studies, emotion recognition has been categorized into three types: facial emotion recognition, vocal emotion recognition, and contextual cue emotion recognition, with facial emotion recognition being the primary focus of research [1-2]. Facial emotion recognition is associated with the ventrolateral prefrontal cortex. Current research on emotion recognition remains insufficient, and further investigation is needed into emotion recognition methods beyond facial expressions.

Emotion management refers to the ability to recognize, monitor, and regulate one's own emotions, as well as the capacity to identify and appropriately respond to surrounding situations. Emotion management can be understood from three perspectives: first, the adaptability of emotion management; second, its efficacy; and third, its trait-like characteristics [3]. Increasing evidence demonstrates that our emotions profoundly influence behavior, cognitive processes, and health, underscoring the importance of learning practical emotion management skills from an early age [4]. The theory of "emotional intelligence" supports this notion, positing that an individual's overall success and well-being throughout life depend more on conflict resolution, emotion management, interpersonal interactions, and similar factors than on intelligence alone. However, few formal studies have substantiated these outcomes, nor has research examined the physiological effects of such programs on children.

2.2. Memory bias definition

Memory bias is a psychological phenomenon that refers to people filling in memory gaps or replacing parts of their memories through fabrication or imagination due to various reasons. Research on memory bias is highly diverse, such as studies on the influence of suggestibility on children's memory. To date, the mechanisms underlying the influence of suggestibility on children's memory remain an ongoing topic of investigation, generally explored from three aspects: cognitive and social motivation, and biological factors [5].

3. Case analysis

3.1. Age-related characteristics of emotional development in childhood

In the film, Riley's five core emotions (Joy, Sadness, Anger, Disgust, and Fear) are personified through interactive characters, vividly illustrating the essence of emotional recognition. Certain scenes in Inside Out 1 reveal how emotional traits are influenced by age. For instance, when Disgust

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says, "That is not brightly colored or shaped like a dinosaur. Hold on, guys. It's broccoli!" and then covers her mouth with a disgusted expression, it becomes evident that all five emotion characters in Riley's mind are quite childish during her early childhood, aligning with the emotional characteristics typical of that age.

During Riley's childhood, her emotions were predominantly governed by Joy until the family moved. The relocation event triggered a shift from Joy's dominance to an intersection of multiple emotions, reflecting the transition and regulation of emotions from early childhood to adolescence. When Riley arrived at the new home, the stark contrast between reality, such as the shabbiness of the house, the cramped space, and lost belongings, and her expectations led to a transformation in her emotional landscape. The initial dominance of Joy began to wane as the other four emotions surged: Riley felt deeply disappointed upon seeing the new house. Although Joy attempted to console her by saying, "Maybe it's nice on the inside," the interior proved equally disheartening, prompting immediate reactions from the other emotions. Disgust remarked, "It smells like something died in here," and a memory representing disgust entered the memory track. The successive activation of Disgust, Fear, Anger, and Sadness, along with their competition for control over the emotional console, illustrated the impact of negative emotional memories on Riley. Throughout this process, Joy struggled to regain emotional dominance, such as by recalling, "All through the drive, Dad talked about how cool our new room is." This segment of the moving narrative was marked by a dynamic interplay between Joy and the other four emotions, with the latter gaining increasing control. Despite Joy's persistent efforts to regulate emotions by emphasizing the room's potential and proposing decoration ideas, the accumulation of negative events gradually weakened her dominance. This reflects the limitations of emotional regulation strategies in early adolescence when confronting significant life events, as well as the developmental pattern of heightened emotional complexity.

3.2. Family influences on emotional socialization during childhood

Research indicates that parents continue to influence their children's emotional regulation throughout childhood by engaging in emotion-related conversations and responding to their children's emotions [6]. Emotional regulation is acquired through early socialization and can be learned through various pathways, such as interactions with teachers, parents, and other children. In most studies, researchers have examined the role of mothers in caregiver emotional socialization. Mothers serve as one of the primary socialization agents, assisting children in regulating negative emotions during early childhood and providing emotional guidance as children encounter increasingly complex social and emotional demands during middle childhood.

Mothers primarily guide their children in developing the skills to recognize, understand, and manage emotional expressions through three main approaches [6]. First, a mother's emotional expressions serve as a model for her child. By observing their mother's emotional reactions in specific situations, children internalize the acceptability of expressing or suppressing emotions. Second, feedback is provided through direct responses to the child's emotional displays. For instance, supportive reactions may encourage future emotional expressions in children. Lastly, when recalling emotion-related events, mothers teach their children about emotion regulation, thereby fostering adaptive coping skills. In her conversation with Riley, Riley's mother primarily employed the first and third techniques.

In the film, when the mother enters Riley's room to deliver the bad news, the emotion character Anger takes over the dominant position from Joy, reflecting a child's instinctive emotional response under stressful circumstances. However, when Riley's mother tells her, "Thank you. Through all this

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confusion, you've stayed our happy girl," hoping they could both keep smiling to alleviate pressure on Riley's father, her emotionally supportive words immediately calm Riley down. Joy regains emotional dominance, and the other emotion entities once again accept Joy's emotional guidance, ultimately achieving rebalancing of the emotional system.

However, the mother's neglect of the second technique in the film foreshadows Riley's subsequent series of emotional issues: Riley's mother fails to recognize her genuine emotional needs and further pressures her to keep smiling to alleviate her father's stress, thereby depriving Riley of the opportunity to express her true feelings. The consequences of this neglect become evident in the later plot. With Sadness and Joy missing from Headquarters, only Fear, Disgust, and Anger are left to handle all events in Riley's life. Lacking coordination and guidance, they begin to chaotically dominate Riley's emotions, causing her to become irritable, aggressive, and emotionally unstable, nearly losing her ability to manage her emotions.

Mothers' supportive socialization responses to children's emotional expressions are based on the belief that children's emotions have value and should be expressed. Research findings indicate that mothers' supportive socialization responses promote children's adaptive emotion regulation, likely because this approach provides children with ample opportunities to process and respond to their own emotional displays, thereby preparing them to constructively respond to emotional arousal in the future. In contrast, unsupportive socialization responses to children's emotions are associated with negative psychosocial outcomes.

3.3. Emotional personality emergence and the awakening of adolescent self-consciousness

In the sequel to the narrative framework of Inside Out, as the central character Riley enters the stage of adolescent development, her emotional processing mechanisms undergo a significant transformation. This psychological shift during the developmental stage is concretely manifested in the film through the emergence of new anthropomorphized emotional entities: Anxiety, depicted as an orange-skinned, anxiety-ridden female character, embodies the heightened sensitivity of adolescents to potential risks. Envy, designed as a light-blue-skinned young girl, symbolizes the periodic manifestation of jealousy, reflecting the developmental intensification of social comparison tendencies in teenagers. Embarrassment is reimagined as a pink, large, and tall bashful boy, with his exaggerated shyness corresponding to adolescents' heightened focus on social evaluation during the awakening of self-awareness. Lastly, the introduction of Ennui, portrayed as a deep-purple figure of weariness, captures the potential psychological states characteristic of this age group. The symbolic construction of these new emotional entities essentially mirrors the psychological developmental traits of adolescence, illustrating the adaptive adjustments in emotional regulation mechanisms triggered by the awakening of self-awareness.

The emergence of these emotional characters reflects Riley's emotions becoming more complex and sensitive. Additionally, a new mechanism appears in Riley's mind in the second film—Riley's self-awareness, born from beliefs formed by memories. The film explains: "Her (personality) islands aren't the only things made by memories. Way down, at the root level, these memories were also creating beliefs." Its appearance also signifies that emotions can not only control Riley's behavior but can, in turn, be regulated by Riley's self-awareness, reflecting her growing maturity.

3.4. Memory deviation

Memory bias refers to the phenomenon where human memory, during its formation, retention, or recall, can be influenced by emotions, leading to discrepancies between remembered content and

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actual events. For instance, emotional characters may amplify certain memories or cause distortions. Both films in the Inside Out series depict "memory bias." In Inside Out 1, Riley's childhood features significantly more joyful memory orbs than those tied to other emotions, illustrating the psychological mechanism of optimistic memory bias. After Riley moves, the scene where Sadness touches a golden core memory orb, turning it blue, demonstrates how memories can be "recolored" by current emotions. This "emotional coloring" mechanism of memory essentially reflects the regulatory role emotions play in the encoding and retrieval processes of memory.

When Anxiety dominates the cognitive system, a large number of anxiety-related memories are injected into the Lake of Beliefs, solidifying the negative self-perception of "I am not good enough." These two types of biases are essentially emotionally driven, selective retention and reinforcement of memories. The former constitutes self-cognitive filtering under positive bias, while the latter represents cognitive distortion caused by negative bias. This corresponds to the mood-congruent bias in psychology, where individuals tend to recall past experiences consistent with their current emotional state, for example, being more likely to retrieve negative memories when depressed. In Inside Out 2, memory bias is also depicted: At the end of each day, Joy, Fear, Disgust, Sadness, and Anger select memories, discarding the "bad" memory orbs into the back-of-mind region while retaining positive ones in long-term memory, allowing Riley to construct a self-perception of "I am good enough." However, when Anxiety takes over the cognitive system and drives out the five emotions, it floods the Lake of Beliefs with numerous anxiety-laden memory orbs, leading Riley to develop a self-perception of "I am not good enough." These two biases fundamentally stem from the emotionally driven selective retention and reinforcement of memories. The former constitutes self-filtering under positive bias, while the latter results in cognitive distortion due to memory negativity bias. Yet, both biases negatively impact Riley: The former, while fostering a positive self-perception, is artificially curated by discarding many memory orbs, meaning Riley never forms a genuine self-awareness. The latter not only lacks authenticity but also harms Riley. The film ultimately offers a solution through the reconstruction of the memory system. As Joy and the others return to Headquarters, all discarded memory orbs flow into the Lake of Beliefs, whether it is the angry memory of slamming a door or the sad and frustrated memory of losing a game, Riley recalls them all. Based on her complete memories, she develops a flexible and adaptive self-perception. The formation of such an adaptable and dynamic self-cognition provides a metaphorical solution for psychological adjustment to memory biases. This narrative reveals the dynamic interplay between emotion regulation and memory processing.

4. Discussion

While Inside Out has indeed provided a comprehensive and accessible psychological interpretation for children and adolescents, there remains room for addressing contemporary issues. Today's world has entered the information age, with social media being immensely popular among young people. Adolescents, who are already highly attuned to peer relationships, find the social component of many of these platforms especially compelling: 76% of teenage respondents in a recent Pew Research Center survey reported that they use social media [7]. The impact of social media on adolescents has not been reflected in Inside Out, and in this regard, the film overlooks the portrayal of contemporary characteristics.

Inside Out portrays Riley's emotional changes as a grand "adventure" in her mind through an accessible storyline and personification techniques. The film not only vividly demonstrates the diversity and dynamic balance of emotions in children and adolescents, but also highlights the influence of family care and peer relationships on emotional regulation. From Joy's acceptance of

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Sadness in childhood to Anxiety's impact on self-awareness during adolescence, the film consistently revolves around the theme of "emotional regulation," using an edutainment approach to showcase psychological concepts such as emotion recognition, expression, and integration. However, the film's limitations also indicate that education must evolve with the times. In an era where social media profoundly influences children's and adolescents' emotional expression and self-perception, interpreting these issues solely from a traditional perspective is no longer sufficient. Future creative works and research could focus on emotional challenges faced by youth in the new media age, such as fear of missing out (FOMO) and related anxieties. Regardless, the value of Inside Out lies in prompting audiences of all ages to re-examine the nature of emotions, learn to embrace their complexity, and cultivate stable self-awareness, rather than simply pursuing "eternal happiness."

5. Conclusion

This study systematically reveals the complexity of children and adolescents' emotions, the importance of emotion recognition and management, and the positive and negative impacts of emotions on memory biases through case analysis of the Inside Out film series. It demonstrates that in today's society, children and adolescents' mastery of emotion recognition and management skills has a crucial impact on their mental health development, and that emotion regulation affects memory processing.

However, this paper has a relatively singular case selection and lacks in-depth integration with real-world cases. The theoretical aspect is relatively weak, without deep integration with relevant disciplinary theories. Future research could further explore the integration paths between film media and psychological theories to provide more contemporary solutions for adolescents' emotional health.

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