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# On Family Tutoring from the Perspective of Reconstructive Memory: A Review Analysis of the "Empirical Completion" Phenomenon in Middle Childhood Children

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**Abstract:** Children in middle childhood often produce comprehension errors in the context of family tutoring, and these errors cannot be explained merely by carelessness, insufficient practice, or simple forgetting. This paper provides a retrospective conceptual analysis and names such biased error phenomena "empirical completion". It aims to illustrate that when children experience such phenomena, they unconsciously fill the information gaps formed during memory encoding with existing empirical schemas in their minds. Then, in the process of memory reconstruction, the incorrectly filled information is mistaken by children as part of the original memory, thus outputting an incorrect overall memory that is inconsistent with the original reality. By integrating literature on reconstructive memory, schematic processing, source-monitoring framework, retrieval practice, and corrective feedback, this study clarifies the exact definition, scope, and exclusion criteria of the concept of "empirical completion", summarizes its main manifestations in the family tutoring environment, and analyzes four possible intervention paths suitable for family tutoring, including information source cueing, multi-context memory encoding support, guided retrieval practice, and scaffolded corrective feedback.

**Keywords:** Empirical completion; Reconstructive memory; Middle childhood children; Family tutoring

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## 1. Introduction

Family tutoring is an important supplement to children's school education, especially in the primary school stage, where family elders usually undertake the role of tutoring individual children. In the context of family tutoring, children often fail to fully acquire knowledge, but this does not mean that the child is unintelligent. To be precise, when the input of information, such as knowledge, is incomplete, the recorded details are insufficient, or the understanding of information is inadequate, they will unconsciously borrow existing experience to rationalize the entire input information. From the perspective of cognitive psychology, previous studies have largely verified the validity of theories such as reconstructive memory, schematic processing, and

the source-monitoring framework, indicating that memory is not a verbatim reproduction of input content, but usually outputs a reconstructed memory result under the influence of the individual's existing experience and the accuracy of current memory cue retrieval. In this regard, this paper takes middle childhood children as the target group, focuses specifically on the context of family tutoring, puts forward a comprehensive discussion based on existing literature studies, and combines these theories from different research perspectives to explain this false memory phenomenon, and names this phenomenon "empirical completion".

## 2. Conceptualization of reconstructive memory and "empirical completion"

### 2.1. Core theory of reconstructive memory

The concept of memory should not be understood as the mechanical reproduction of past information by the brain, but as a reconstruction process affected by the individual's existing experience, current environmental needs, and retrieved detail cues. According to Bartlett's classic exposition, memory is not the literal retrieval of fixed information traces in the mind, but an active reconstruction process [1]; this process is affected by the individual's experience and the degree of understanding of the original information. According to current research analysis, memory can be understood as a constructive process including three closely related stages: encoding, storage, and retrieval/reconstruction. In the encoding stage, the received information is affected by factors such as current attention and the degree of understanding of the information, so that complete replication of the input information cannot be achieved. In the storage stage, the encoded information is not retained as a literal copy of the original situation but transformed into fragmented detail cues or schematic representations. In the retrieval stage, these stored detail cues are selectively extracted and then reconstructed to form an explicit recall response that meets the needs of the current situation [2].

### 2.2. Core viewpoints of schematic reasoning and source-monitoring framework

A key mechanism in the process of memory reconstruction is the operation of schemas. A schema describes a type of thinking or behavior; schemas affect attention and the absorption of new knowledge, meaning that individuals are more likely to notice things that conform to their existing schemas. Among children, schemas can be metaphorically regarded as a "filter", which directs children's attention to information elements that conform to their psychological expectations or are relatively familiar, while abnormal details in things are more easily ignored by children, and these ignored details may include some information elements that are more critical in objective reality. The problem is not only that children incorrectly fill in the missing information, but more deeply, children may be unable to distinguish the different sources of information that constitute the schemas [3].

### 2.3. Definition, scope and exclusion criteria of the "empirical completion" phenomenon

The term "empirical completion" is used to describe a specific memory phenomenon: when there is a lack of details in the input information or insufficient understanding of the input information during the memory encoding process, the individual will unconsciously use the existing empirical schemas to inferentially fill in the missing parts of the information, and then retell the result mixed with incorrectly filled content as a complete memory, and firmly believe that this biased memory is the same as the originally input information. "Empirical completion" does not refer to general forgetting, insufficient exposure to information, or conscious random guessing, but specifically refers to the individual's unconscious use of existing experience to fill information gaps, and regard the reconstructed memory result as a true reflection of the original information.

Accordingly, the concept of "empirical completion" should be regarded as a restrictive term for analyzing memory reconstruction deviations under specific circumstances, rather than being universally used to summarize all inaccuracies in the memory process [4].

## 3. Main manifestations of the "empirical completion" phenomenon in the context of family tutoring

### 3.1. Schematic content completion

Schematic content completion means that when children receive incomplete information or have insufficient understanding of information, leading to insufficient encoding of memory details, they will prioritize using familiar empirical schemas in their minds to fill the originally missing information into a "seemingly reasonable" complete memory. In this process, children do not intentionally fabricate non-existent information, but unconsciously complete a psychological completion of the entire memory based on existing experience.

The reason why such completed results are easily mistaken by children as "normal understanding" is that such results usually have strong internal coherence. In other words, the answers given by children are not groundless, but conform to operational logic in their subjective experience system. From the perspective of reconstructive memory, this shows that children are not simply misremembering information, but reorganizing incomplete information into a new, complete memory with the help of schemas. If parents only interpret such errors as inattention and do not investigate what key information children initially ignored, the effect of correction is often limited [5].

### 3.2. Analogical transfer and overgeneralization

Analogical transfer refers to children transferring rules or understanding paths learned in certain past situations to the current situation; overgeneralization means that such transfer exceeds the original applicable scope, so that empirical ideas that are only valid locally are inappropriately generalized into "universal ideas". The combination of the two easily promotes the further occurrence of "empirical completion".

From the perspective of cognitive development, middle childhood children have a certain degree of organization and classification ability, which is an important manifestation of the development of learning ability. However, the problem is that children's mastery of rules is still highly context-dependent. They may remember that "similar problems were solved this way before" or "the teacher said this can be understood this way before", but have not really grasped the conditions and boundaries for the establishment of rules [6].

### 3.3. Confusion of information sources

One of the most important manifestations of "empirical completion" in family tutoring is that children often show high confidence when retelling wrong answers, and even firmly believe that what they say is exactly what they have learned, heard, or seen. This manifestation shows that the problem is no longer just "what content the child filled in the memory", but further involves the child's judgment on "where the content one knows comes from". In other words, children not only make mistakes in reconstructing memory but also may have cognitive deviations in judging the source of information.

## 4. Intervention paths for "empirical completion" in the context of family tutoring

### 4.1. Information source cueing

In response to the problem of information source confusion, one of the primary interventions for parents in

tutoring is to help children clearly distinguish where different information comes from. Because the original textbook content, parental explanations, children's associations, and daily experience are often intertwined in the family learning context, children can easily mix these contents into a whole for memory. Therefore, in the tutoring process, parents need to consciously trace the "information source" of children [7]. For example, when a child gives a biased answer, parents can not rush to judge it wrong directly, but first ask questions such as "Did the book originally say this?" "Did the teacher teach this, or did you think of it from the previous example?" "Is the part you are saying originally in the homework answer, or did you add it yourself?" Such questions can prompt children to re-examine the source composition of their current answers, so that they may realize that some parts of the memory are not actually from the original materials.

## 4.2. Multi-context memory encoding support

The occurrence of "empirical completion" is often related to children's insufficient retention of key information in the initial memory encoding stage. Therefore, the second important path in family tutoring is to provide more sufficient support for children in the encoding stage, reducing the possibility of relying on empirical inference to fill gaps later. For middle childhood children, if a certain knowledge point is input in only a single way, such as only hearing it verbally once or just glancing at a question in a hurry, the memory trace formed by the child is often vague [8]. Once entering the recall and application stage, they are more likely to make inferential filling based on familiar experience. Multi-context memory encoding can be implemented in some relatively simple ways in family tutoring. For example, for confusing concepts, parents can ask children to read the original sentences in the book first, then explain them to the children in another way, and then ask the children to restate them in their own words.

## 4.3. Guided retrieval practice

Studies on retrieval practice have shown that, compared with simply repeated learning, letting learners actively recall and say or write what they have learned is often more helpful to consolidate their memory of relevant information and improve subsequent retention effects [6]. For the phenomenon of "empirical completion", the value of retrieval practice lies not only in strengthening memory, but also in allowing children to expose the originally incorrectly filled parts during recall, so that parents can identify the problem on time [9]. The key to guided retrieval practice is that parents guide children properly to show their thinking paths when retrieving memories. For example, parents can first ask children to recite the content without looking at the book, and then ask them to check against the original text to see which parts of what they just said are consistent with the original text and which parts are added by themselves. In this way, children not only find their own memory gaps during retrieval, but also gradually learn to take more active internal checks before outputting.

## 4.4. Scaffolded corrective feedback

The core of scaffolded feedback is to "correct along the child's current cognitive position". This means that parents need to first judge the nature of the child's current error, that is, where the child missed key conditions or mistook their inferences for the original text. Only by judging the approximate location where the error is formed can feedback really work. Such a feedback method helps children gradually discover and correct errors in memory by themselves through small-step prompts. This is consistent with the idea of the zone of proximal development in scaffolding teaching [10].

## 5. Conclusion

In summary, the "empirical completion" phenomenon of middle childhood children is the result of the combined effect of the laws of memory reconstruction and the characteristics of children's cognitive development. Understanding the essence and manifestations of this phenomenon helps parents establish scientific tutoring concepts and abandon traditional tutoring modes. Through targeted intervention measures, reducing children's memory gaps and memory reconstruction problems helps improve the effectiveness of family tutoring, promotes the development of school-age children's learning and cognitive abilities, realizes the effective supplement of family tutoring to school education, and lays a solid foundation for children's growth and development. In the future, research can further combine empirical methods to test the application effects of the intervention paths proposed in this paper in different family contexts, explore the regulatory effects of factors such as emotional interaction and parent-child dialogue patterns on the "empirical completion" phenomenon, and expand the research perspective by combining neuroimaging and other technologies to provide support for family tutoring.

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