

# Cephalopods Ace Children's Cognitive Tests: A Surprising Insight

## Description

In 2021, a rigorous examination of cephalopod cognition reaffirmed the imperative for humans to eschew underestimations of animal intellect. Cuttlefish underwent a novel iteration of the marshmallow test, revealing intriguing complexities within their enigmatic cerebral architectures.

Their capacity for learning and adaptation, as articulated by researchers, may have evolved as a survival mechanism, affording cuttlefish an advantage within the ruthless dynamics of their marine ecosystem.

Common cuttlefish displaying stripes

Cuttlefish exhibit remarkable abilities to alter their color patterns for camouflage or communication. (Wirestock/Getty Images Plus)

The concept of the marshmallow test, originally devised by Walter Mischel, involves a child confronted with the choice of consuming a marshmallow immediately or forgoing it for a greater reward. This exercise elucidates cognitive capacities related to future-oriented planning.

Such a straightforward premise lends itself to adaptation for the animal kingdom. While animals cannot be explicitly promised greater rewards for deferring gratification, they can be conditioned to recognize that superior sustenance will be available if they resist immediate consumption.

Notably, species such as certain primates, canines, and corvids exhibit varying degrees of success in analogous scenarios.

In a landmark study in 2020, it was demonstrated that common cuttlefish (*Sepia officinalis*) could successfully delay gratification by abstaining from consuming crab meat in anticipation of a preferred meal—shrimp.

However, Alexandra Schnell and her team at the University of Cambridge sought to further elucidate whether this behavior stemmed from genuine self-control or was merely an adaptation to prey availability.

To this end, six common cuttlefish were subjected to an innovative experiment involving a specially designed tank featuring transparent chambers with visible yet concealed snacks.

Graphic showing experimental set up

The experimental framework. (Schnell et al., *Proc. R. Soc. B*, 2021)

The trials indicated that all participants exhibited the remarkable ability to await the arrival of their favored sustenance, the live shrimp, demonstrating a capacity for self-regulation that parallels that observed in larger-brained vertebrates, including chimpanzees and parrots.

The corollary aspect of the experiment involved assessing the cuttlefish's adaptability to learning new associations, revealing a correlation between their capacity for delayed gratification and cognitive flexibility.

This data suggests that while cuttlefish do not engage in tool use or social caching, they may have



developed a unique evolutionary strategy to enhance foraging efficiency, enabling them to forage judiciously and optimize their nutritional intake.

The implications of these findings provide a valuable perspective on the convergence of cognitive abilities across species, highlighting the intricate relationship between environmental demands and mental acuity.

## Vocabulary List:

1. **Cognition** /kɒg'nɪʃ.ən/ (noun): The mental action or process of acquiring knowledge and understanding through thought experience and the senses.
2. **Imperative** /ɪm'pɛr.ə.tɪv/ (adjective): Of vital importance; crucial.
3. **Elucidate** /ɪ'luː.sɪ.deɪt/ (verb): To make something clear; to clarify.
4. **Cognitive** /'kɒg.nɪ.tɪv/ (adjective): Relating to the mental processes of perception memory judgment and reasoning.
5. **Adaptation** /,æd.æp'teɪ.ʃən/ (noun): The process of change by which an organism or species becomes better suited to its environment.
6. **Foraging** /'fɔːrɪdʒɪŋ/ (verb): Searching widely for food or provisions.

## Comprehension Questions

### Multiple Choice

1. What did the examination of cephalopod cognition in 2021 reaffirm?  
Option: The imperative for humans to underestimate animal intellect  
Option: The simplicity of animal cognitive abilities  
Option: The need for further research on animal intellect  
Option: The imperative for humans to eschew underestimations of animal intellect
2. What did cuttlefish undergo as part of a novel iteration of the marshmallow test?  
Option: Solving puzzles  
Option: Learning new tricks  
Option: Delaying gratification  
Option: Engaging in social interactions
3. According to researchers, why may the capacity for learning and adaptation have evolved in cuttlefish?  
Option: For entertainment purposes



- Option: As a survival mechanism
- Option: To impress other cuttlefish
- Option: For competitive sports

4. What did the landmark study in 2020 demonstrate about common cuttlefish?

- Option: Their inability to delay gratification
- Option: Their preference for crab meat over shrimp
- Option: Their ability to delay gratification
- Option: Their dislike for live food

5. What did Alexandra Schnell and her team at the University of Cambridge seek to elucidate?

- Option: The color patterns of cuttlefish
- Option: Whether cuttlefish can fly
- Option: The behavior of cuttlefish in schools
- Option: Whether cuttlefish behavior stemmed from genuine self-control or prey availability

6. What ability did all participants demonstrate in the experimental trials involving cuttlefish?

- Option: Flying ability
- Option: Capacity for self-regulation
- Option: Ability to solve math problems
- Option: Invisibility skill

### **True-False**

- 7. Cuttlefish engaged in tool use and social caching in the experiment.
- 8. Cuttlefish have developed a unique evolutionary strategy to enhance foraging efficiency.
- 9. The study revealed a correlation between cuttlefish's delayed gratification capacity and social behavior.
- 10. The trials indicated that cuttlefish preferred live crab over shrimp.
- 11. Cuttlefish do not engage in social interactions.
- 12. The findings emphasize the intricate relationship between environmental demands and mental acuity.

### **Gap-Fill**

13. Cuttlefish were subjected to an experiment involving a specially designed tank featuring transparent chambers with visible yet concealed snacks to assess their adaptability to learning new associations. This



experiment took place in the year \_\_\_\_\_.

14. The capacity for delayed gratification in cuttlefish may have evolved as a survival mechanism, affording them an advantage within the ruthless dynamics of the marine ecosystem. This survival mechanism could be linked to the need for efficient \_\_\_\_\_.

15. The data from the experiment suggests that cuttlefish, despite not engaging in tool use or social caching, have developed a unique evolutionary strategy to enhance foraging efficiency, enabling them to forage judiciously and optimize their nutritional \_\_\_\_\_.

16. The study conducted by Alexandra Schnell and her team aimed to elucidate whether the cuttlefish's delay in gratification was due to genuine self-control or merely an adaptation to prey \_\_\_\_\_.

17. The ability to await the arrival of their favored sustenance showed by all cuttlefish participants in the trials demonstrated a capacity for self-\_\_\_\_\_.

18. The intricate relationship highlighted in the findings between environmental demands and mental acuity implies that cognitive abilities are shaped by the challenges posed by the \_\_\_\_\_.

## Answer

**Multiple Choice:** 1. The imperative for humans to eschew underestimations of animal intellect 2. Delaying gratification 3. As a survival mechanism 4. Their ability to delay gratification 5. Whether cuttlefish behavior stemmed from genuine self-control or prey availability 6. Capacity for self-regulation

**True-False:** 7. False 8. True 9. False 10. False 11. False 12. True

**Gap-Fill:** 13. 2021 14. foraging 15. intake 16. availability 17. regulation 18. environment

## Answer

### CATEGORY

1. Health - LEVEL6

### Date Created



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2025/01/10

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