

Preschoolers' conceptions about frogs and toads

Drawings of anatomy, habitat, metamorphosis and food web

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Introduction & Research Problem

Children at the age of 5 and 6 show a lot of interest in animals and gather a lot of information about them. Although they have partially developed concepts, they cannot explain all environmental phenomena with their limited knowledge, so they build naive conceptions. These conceptions tend to be very resistant and influence biological education^[1].

Since amphibians are an important topic in formal biology education as well as for nature conservation, different studies examined students' concepts about amphibian classification^[2]. However, there is little research about conceptions of preschoolers about amphibians. Therefore, this study explores naive conceptions about Anura (frogs and toads), the archetype of amphibians.

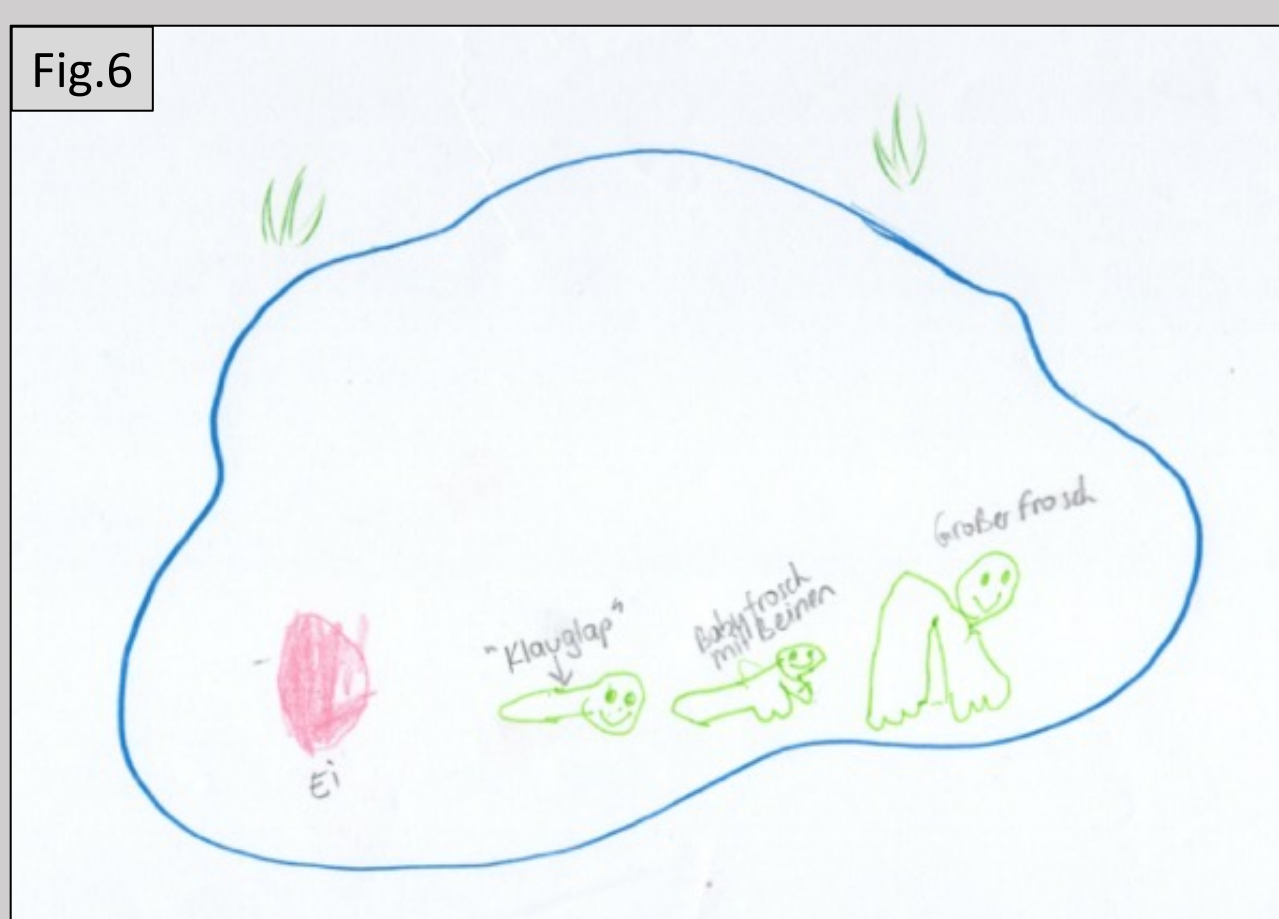
Methodology

Preschoolers between 5 and 6 were asked to create drawings according to 3 specific instructions about Anura:

1. Anatomy and habitat
2. Metamorphosis and where each phase takes place
3. The food web

Drawings (n=43) were analysed by inductive categories. Additional information was available by children's quotations mentioned on the pictures.

2. Metamorphosis drawings



Tadpoles of *Bufo bufo* (common toad, Photo: Martin Scheuch)

1. Anatomy and habitat drawings



Quote Fig.1: „I drew 2 frogs. They are in love. One frog gave the other a flower.“



Quote Fig.3: „That's a male. You can see that because of the bubble.“ In German we call a vocal sac „sound bubble“.

Results

The results show that some of the children have specific knowledge like the anatomy (webbed foot in Fig.2, vocal sac in Fig.3), German name of tadpoles and what spawn looks like (Fig.8). Eggs were always drawn inside the water and different parts of the metamorphosis were placed inside the water as well. However, the children's ideas differ widely about the look and number of frogs' eggs, the number of extremities and the look of their fingers. In some drawings it looks like the frogs and toads have claws (Fig.3, Fig.8). Most children at least partially know what Anura eat, but there are many misconceptions about their predators which include sharks (Fig.10), elephants, and cave monsters. Some children thought that frogs drink water (Fig.10), although they in fact absorb liquid through their skin.

3. Food web drawing



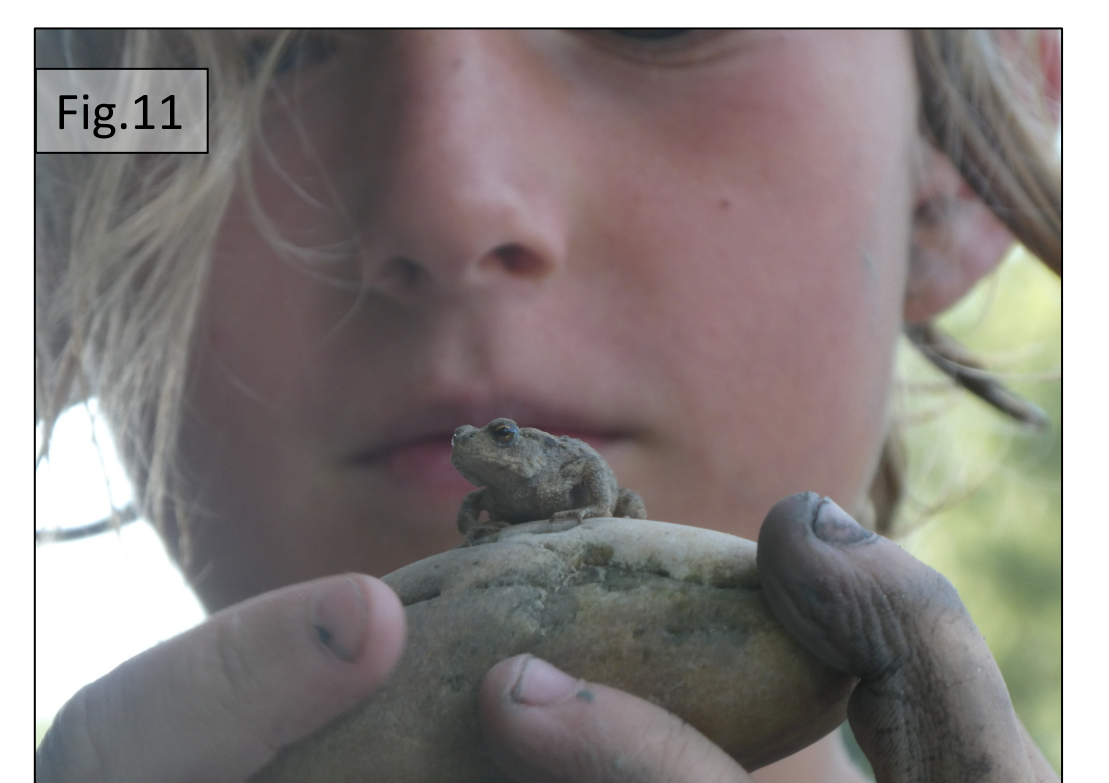
According to that drawing, frogs and toads eat:

- snails
 - grass
 - fish
 - flies
- and drink water

Quotes: „Shark eats the frog“, „Frog in stomach“

Conclusion & Outlook

The findings show some anthropomorphic ideas (smiles, eyelashes, gifts as in Fig.1) and confusions about food webs and the habitat of other animals (sharks). Nonetheless, the results also illustrate that naive conceptions are mixed with many biological correct conceptions as well. For education, this study enables to identify naive conceptions about amphibians more easily, moreover we suggest to explore habitats and amphibians whenever it is possible to allow the children authentic experiences for their learning and therefore enabling gradual development of conceptions.



Human child with young *Bufo bufo* (common toad, Photo: Martin Scheuch)

References:

- [1] Lohaus, A., & Vierhaus, M. (2010). *Entwicklungspsychologie des Kindes- und Jugendalters für Bachelor*. Berlin Heidelberg: Springer, 116.
[2] Yen, C.-F., Yao, T.-W., & Chiu, Y.-C. (2004). Alternative conceptions in animal classification focusing on amphibians and reptiles: a cross-age study. *International Journal of Science and Mathematics Education* 2, 159–174.