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# Applying a creativity framework to animal cognition

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## Abstract

In the field of creativity, psychologists typically only study humans and biologists or ethologists usually focus either on animal problem solving or consider creativity to be an evolutionary adaptation. Yet a fuller application of creativity principles to animal behavior may both shed insight into animal cognition and expand current notions of creativity. We propose a framework for animal creativity based both on animal behavior research and creativity theories. The framework proposes different creative capabilities required for each level—i.e., one does not have to complete level 2 to reach level 3, however one does have to possess higher creative abilities. The first level is the simple ability to recognize novelty. Next is observational learning, which raises questions about imitation, intention of behavior, and the cultural transmission of creative behaviors. At the peak is creating a tool or a behavior with the specific understanding that is new and different.

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## 1. Introduction

Ever since Guilford's (1950) call to arms for more research on creativity, there have been dozens of outstanding theories of creativity proposed. Some theories focus

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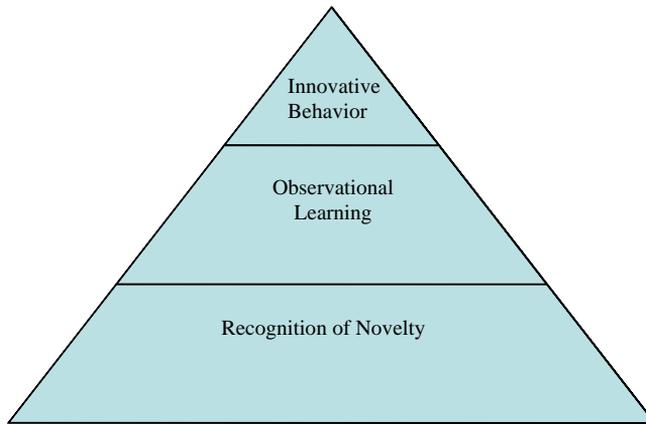


Fig. 1. Framework of animal creativity.

on the creative person—such as Amabile’s (1982, 1996) Componential model, in which an individual’s motivation for the task at hand intersects with both domain-relevant skills (such as knowledge) and creativity-relevant skills (such as being able to generate novel ideas). Theories can also focus on the creative product—such as Sternberg, Kaufman, and Pretz’s (2002) Propulsion theory, which proposes eight different types of creative contributions that can advance a field. Other theories focus on the creative process, such as Csikszentmihalyi’s (1990) theory of “Flow,” a state of intense engagement that often is associated with creative performance.

Yet although these many theories are expansive and cover most imaginable facets of creativity, they focus solely on humans. This focus is not surprising, as most creativity researchers are psychologists, not biologists, and in strictly biological terms, creativity is very hard to describe (Greenberg, 2003). Biologists or ethologists who have studied creativity have often focused on animal insight or problem solving—narrow aspects of creativity theory—or examined innovative behavior as an evolutionary adaptation in an individual species. Yet a fuller application of some psychological creativity theories and principles to animal behavior may serve two purposes: it may shed additional insight into animal cognition, and it may expand current notions of creativity.

In this paper, we propose a framework for animal creativity based both on animal behavior research and creativity theories. We hope that this framework will prove helpful in future studies of advanced animal cognition (Fig. 1).

## 2. Basic definitions

Most definitions of creativity include two components. First, in order for something to be considered creative, it must represent something different, new, or innovative (Baer, 1997). In addition, a creative response is useful and relevant. A

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