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Paying More Attention to What (Some) Nonhuman Animals and (Some) Humans Can Do: An Introduction to the Special Issue on Individual Differences in Comparative Psychology

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In 2009, there was a paper session at the annual meeting of the Southeastern Psychological Association entitled "Animal Minds: Sea Lions and Voles and Bears (and Dolphins and Monkeys), Oh My!" The goal of this session was to present a broad perspective on current research in animal cognition, and in particular to present to the SEPA audience some of the variety of species and tasks that are being used in comparative cognition research today. Beyond accomplishing this goal, however, the session revealed something else that provided the basis for the current special issue. Many of the papers in that session basically had two messages – first, that some species of nonhuman animals could succeed on tests that required abilities such as numerical competence, episodic memory, face perception, and concept formation, and second, that in many of those tests there were clear individual differences within species. In fact, this second point was so striking that immediately after the session the authors of those papers began talking about exactly those differences. Within a few minutes, the conversation turned to how it would be beneficial to the field to pay more attention to individual differences while also pursuing evidence about the cognitive capacities of species more generally. Stan Kuczaj and Michael Beran were in that session, and that post-session conversation was the genesis of this special issue. The resulting contributions provide a good beginning in our call for more attention to the extent and nature of individual differences in comparative psychology.

As would be expected of papers in the *International Journal of Comparative Psychology*, there are diverse species represented, but also represented are a variety of tests and paradigms for investigating individual differences.

First, Mercado provides an alternative approach to understanding individual differences in learning capacity in humans and other animals. Rather than focusing on small numbers of behavioral traits that might account for such differences, Mercado presents a two-dimensional self-organizing feature map that emerges from performances of intact and cortically-lesioned rats that are given a number of learning tasks. This approach relates performance differences in learning with the degree of brain damage across individuals, and the correspondence of patterns of learning with prototypical performance profiles indicated by the map suggests that this technique can provide a new way of looking at what an individual organism is likely (or unlikely) to be able to learn.

Matzel et al. note that in the past, research on animal learning and memory has focused principally on the mechanisms which regulate single domains of learning, and ignored the features of learning which are common across more than one domain. Conversely, research on human learning and memory has focused more on an underlying "general" intelligence. Matzel et al. suggest combining these two approaches to better understand general intelligence and individual differences. Here they present a meta-analysis of a number of learning tasks performed with genetically heterogeneous laboratory mice. They describe a wide variety of tests and paradigms, such as a novel Stroop-analog and fast-mapping tasks. They compare their findings to the descriptions of human intelligence.

Leighty et al. focus on an important question for those who use computerized tests with animals – namely, how best to train them to use such apparatus. Although there are some resources for such training routines (e.g., Evans, Beran, Chan, Klein, & Menzel, 2008; Iverson & Matsuzawa, 2001; Washburn & Gulledge, 1995; Washburn & Rumbaugh, 1992), one issue that everyone recognizes is that such training can take dramatically different periods of time across animals of the same species, and so it is important to understand what might contribute to the differences observed. Leighty et al. documented the training of mandrill monkeys on touchscreens while focusing on how dominance hierarchy and certain aspects of the testing environment impacted acquisition of mastery of the touchscreen.

Of course, individual differences are well-known in human behavior and in tests of learning, memory, and cognition. And, such differences are intensively studied with the aim of accounting for not only what humans can and cannot do, or even how they do things, but also when (and when not) and who can (and who cannot) do such things. It is, therefore, nice to have some reflection of this interest in individual differences in humans in the present special issue. Young, Sutherland, and Cole present an assessment of the individual differences that occur in performance of a computerized game designed to assess causal knowledge. Here, the focus was on differences between women and men, as well as an investigation of the role of past experience with video games on the individual differences that occurred in the present test.

Next, Stevens et al. explore individual differences within a delayed gratification paradigm. They use an accumulating rewards task to examine how uncertainty of events, such as experimenter reliability, may influence delay of gratification behavior in bonobos. As recognized in Leighty et al., training of the task varied across individuals. Of the two individuals who met the training criterion, there were interesting differences between their responses. Specifically, the individuals differed on their ability to generalize reliability across experimental tasks. In light of these individual differences, Stevens et al. examine the distinction between capacity and strategy and their relation to dominance hierarchies and personality.

The idea that group living may be adaptive *because* of individual differences is not one that is often considered. However, Kemp and Kaplan explore this notion by examining individual differences in response to predators in a group of captive common marmosets. They present predator-based visual and auditory stimuli, both individually and simultaneously. As you may expect, they report

individual differences in the responses of the marmosets. They specifically examine the possibility of sex and age differences in variable responses, and provide support for other factors such as temperament or personality traits.

Finally, Vonk and Povinelli present a meta-analysis of a large array of cognitive studies conducted with seven chimpanzees over a number of years. More than 100 cognitive tasks were designated as either social or physical reasoning problems. Overall, interesting individual differences between individuals are reported. The authors explore the possibility of a general intelligence within chimpanzees, such that subjects who excel on physical tasks also excel on social tasks, and furthermore, who acquire tasks quickly also demonstrate better transfer and initial performance. Alternatively, the authors explore whether it is feasible to postulate the existence of specific domains of cognitive skill or task performance in chimpanzees.

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