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2008

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Bruce, Katherine, "Determining the Significance of Honors" (2008). *Honors in Practice -- Online Archive*. 82.

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KATHERINE E. BRUCE

Determining the Significance of Honors

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(What follows is a somewhat revised version of the presidential address that Kate Bruce delivered on November 3, 2007, at the annual NCHC conference in Denver, Colorado.)

The title of my address is “Determining the Significance of Honors.” That’s a hefty title. This summer I was reading the “numbers” issue of the *JNCHC* and thinking about how we measure impact and effects related to honors education when Hallie Savage asked me what the title of my presidential address would be. Given my academic discipline and my current thoughts about assessment centered on that *JNCHC* issue, I thought that the title *Determining the Significance of Honors* would be illustrative of my interests and focus.

I don’t presume for a minute to have a complete answer to this question, but I do have some thoughts I want to share with you about what appear to be some of the critical elements of significance and how they may apply to honors.

To do this, I would like to tell you a bit about what I study. We all come to honors with unique interests, experiences, skills and talents—especially those related to our own academic disciplines. Our academic interests shape who we are, and in almost all cases our academic interests are the reasons that we are in honors in the first place; we are teachers of honors classes in chemistry or literature, for example, or we are students enrolled in honors classes or participating in independent scholarship in those disciplines.

By academic training, I am a psychologist; no, not one of *those* psychologists, but an experimental psychologist. Experimental psychologists study behavior, as all psychologists do, and focus on conducting research to gather data to understand causes of behavior. Personally, I have studied mostly non-human animal behavior—social interactions and mate choice—in rodents, primates, and fish, but more recently I have turned to researching the effects of evolutionary constraints on non-human animal cognition.

While this may not be your area of academic interest, it is a subject close to many people’s hearts. You may have wondered about how your old dog learns new tricks; you may have even wondered if your pet thinks the same way you do. You may recall one of our former NCHC speakers, Sally Boysen from Ohio State, who gave a plenary address on this general topic. This past September, you probably heard that Alex the famous African gray parrot died at

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the age of thirty-one. His obituary was in the *New York Times*, no less! Although I don't have a famous parrot named Alex, I do have rats with names such as J6 and I24. Even though they have not been featured in the *New York Times*, they do have a spot on YouTube.

What my students, my colleague Mark Galizio, and I study with these rats is whether they show us with their behavior that they can form associations and concepts. Much like the research with Alex the parrot, we are finding that even rats seem to be able to show us complex learning, and we are testing to see how far this goes. Does their behavior show us that they can form abstractions? Experiments such as those conducted in my lab and the ones with Alex are critical because the ability to form complex abstractions can lead to the use of symbols and is vital for language. The combination of symbol use and language is thought to be the hallmark of what is unique about human animals.

In our lab, we are finding that rats show some types of concept learning, but only if we know how to ask them what they know. We ask them to demonstrate what they know with odor detection using common household spices, which is an innovative approach since most previous work on concept learning in non-humans has used visual cues; after all, since that's what humans usually use, it seemed the way to go.

For example, Alex the parrot demonstrated counting, shape and color recognition, and an understanding of what objects are made of. He could even explain associations between objects. For example, if presented with four blue objects all of different shapes and asked "what's the same?" he could answer "color." But Irene Pepperberg, his trainer, found that he needed to touch or mouth the objects before he could vocalize the answer to a problem; that was part of the learning process.

Animal behaviorist Robert Bolles described this phenomenon when he noted that animals are "prepared"—biologically, instinctively—to be able to learn certain associations and that, if we allow them to show us what they know in a "prepared" environment, we will see a depth to their learning. For example, having Alex the parrot "say" an answer related to visual cues is a prepared response but asking my rat I24 to "say" or even "squeak" a response is not a prepared behavior. In fact, Bolles would say that I24 is contra-prepared to do this. A rat squeaks when in danger or running away! This behavior would be contrary to our experimental setup; typically we ask the rat to make a response to obtain a preferred food reward, a little sugar pellet, based on his recognition of a spicy smell; we don't want him to vocalize and run away. To learn about behavior that leads to a treat, rats are prepared to do something like "dig" (not squeak), so that's what we ask the rats to do. They dig in scented sand, and we ask them to learn about odors, not visual cues. Odors are to rats what colors and shapes are to parrots and humans. These are examples of evolutionary constraints.

Back to significance. Most psychologists and, I assume, those of you who know about him think that Alex the parrot was remarkable. Many people went

so far as to attribute human emotions to the words that Irene Pepperberg taught Alex. That “I love you” was one of Alex’s last phrases to his trainer was mentioned in his *NYT* obituary. Maybe Alex meant “I love you” the same way you mean it when you say it to a parent or friend, but maybe not. That is hard to test.

Yet, Alex and even I24 are remarkable. What they show us is significant. “Significant” is a term we use in special ways in psychology, one that has a myriad of meanings. In psychology, as in many of your disciplines, when we set up an experiment, we have a hypothesis about what the results will be. We collect data and use statistics to help us determine whether the results we find in our study are significant. In this statistical sense, “significant” means that what was observed was unlikely to have just happened by chance and that, if we repeated our study, we’d be likely to find the same results, not some other random answer.

Significant—not random, not by chance, but something unique. Something that is different from the norm. And that is part of the significance of honors: that honors education looks different from other types of education.

There is another level to significance, though. Sometimes we find statistically significant results—that is, we are confident that the results did not occur by chance—but also need to ask whether the results are theoretically significant. Do they mean anything? Do they make a difference? Are they important with a capital “I”?

Back to Alex the parrot. Why is what Alex was capable of learning and “telling” us significant? Why do we find it important?

One answer is that we did not think it possible that a non-human could show this level of problem solving, that the kind of learning Alex showed is something we thought only humans, *Homo sapiens sapiens*, could do.

We learned something we did not expect. But, in fact, symbolic communication has now been demonstrated in several species beside humans: by Alex; by Koko the gorilla, who uses sign language to communicate and show some abstract concepts; by several chimps, such as the famous Washoe, who was taught sign language back in the 1960s to communicate as well (Washoe died four days ago, and her obituary also made the *NYT* this past week) and also Lana, Austin, and Sherman, chimps who use a computer to answer questions about what they’ve learned; by Rocky, the sea-lion who appears to be able to learn to categorize new symbols and organize them into groups that we label “numbers” and “letters”; and maybe even by I24, who behaves as if he can understand abstract concepts like “sameness.”

All these results were unexpected. They remain controversial. They are exciting. They push our comfort zone.

They are *significant*, something that we know does not happen by chance, something that is important.

Again, how can we relate this to honors? I would argue that some of these very features are what we define as significant or meaningful about honors.

We find that an honors experience can change us in ways that we did not anticipate and the effect feels meaningful. Honors classes and independent

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scholarship push us to test limits and to stretch our selves creatively and to learn how to ask the right questions, whether we are teachers or students. Honors pushes our comfort zones, and that is certainly not by chance; that's exactly what honors pedagogy is about.

Part of the significance of honors is that we look for ways to stretch our boundaries. Honors challenges us to learn in unexpected places, to learn in unexpected ways. My comments echo those made by our plenary speaker Ellen Winner yesterday, and they reflect what *City as Text™* is about and what *Partners in the Parks* is about. Honors challenges us to find the significance in those experiences, to see connections we never thought of, to be open to new ideas.

And that relates to one other hallmark of what we value about honors education, which is interdisciplinary learning. I think we sometimes forget that when we come to the annual conference, we all bring our disciplinary perspectives. These perspectives about the topics we love to study can bring fresh insights when we discuss ideas with one another. All around us, we have a remarkable group of individuals—students of physics, math, psychology, literature, geology, business, biology, education, the arts, just to name a few. When we speak to each other about—and from the perspectives of—our academic disciplines, we are open to the fresh ideas and connections all around us.

Unexpected, unanticipated, interdisciplinary: these features, once we have homed in on how to ask a question correctly, help us determine the significance of honors.

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