

[Paper Symposium Summary; Word count = 500; Rating = 5.0]

Symposium Title: What Makes Us Sick? Naïve Theories and Biological Reasoning

### **Children's Biological Explanations and Predictions**

In this research we address the development of naïve biological reasoning, specifically children's understanding of contamination. Naïve biological reasoning demonstrates several theory-like features, such as the recruitment of unobservable "theoretical" entities and processes to predict and explain more overt phenomena. Given this background the current research has two general aims: to better examine children's reasoning about biological phenomena, specifically contamination, and to better understand the role of explanation, as compared with prediction, in children's developing theories.

Research in the psychological domain has found that preschool children provide explanations much more readily than predictions. Explanation is a form of postdiction and therefore includes an additional piece of relevant information over prediction (information about the outcome). Thus, Wellman & Liu (2006) argue that explanation may often be easier than prediction. We predict that this is generally true and is not confined to theory of mind reasoning. In order to test this, we examined children's biological understanding concerning contamination. More generally, children's biological explanations deserve expanded research. For example, with regard to children's understanding of contamination, almost all prior research has used tasks eliciting predictions but not explanations.

The present studies investigate the relative accuracy and complexity of providing explanations and predictions for everyday biological contamination phenomena. Classic research on the development of contamination sensitivity using prediction tasks has shown that young

children show little understanding of contamination; however, we predict they will demonstrate much greater understanding given appropriate explanation tasks.

In Study 1, preschool children (M age=3.9, N=14) were given examples of contamination (concerning illness and behavior) and were required to provide an explanation. We found that even 3-year-olds readily gave biological contamination based explanations and a majority of children mentioned a specific unseen mechanism (germs, contact through bodily fluids). The description of invisible, unmentioned mechanism in their explanations is especially interesting as it provides evidence for the theory-like structure of their understanding of contamination. In Study 2, preschool children (M age=4.3, N=48) were given identical vignettes, and were asked either to make a prediction, or to provide an explanation. Interestingly, children were significantly more accurate with their explanations than their predictions, especially when predicting contamination-related behavior.

In Study 3, participants (M age=4.2, N=24) received two different kinds of vignettes: *same-desirability* (2 identical items, one of which gets contaminated) and *different-desirability* (as in Study 1 and 2, the preferred option gets contaminated and the less-preferred option does not). Overall, as in Study 1, children gave significantly more accurate explanations than predictions, for both kinds of vignettes. This result shows that even when the prediction task is simplified, explanations are easier than predictions.

Overall, these data demonstrate that children's explanations provide new insights into their biological understandings. By 3-4 years of age, children readily provide biological explanations for contamination, and most children appeal to invisible substances to do so. These patterns contrast with prior work using prediction tasks. Moreover, when predictions and

explanations are directly contrasted, children provide explanations more readily than predictions.

We discuss implications of explanatory reasoning for children's knowledge construction.