# UC Merced
## Proceedings of the Annual Meeting of the Cognitive Science Society

**Title**

Using Bayesian Hierarchical Modeling and DataShop to Inform Parameter Estimation with the Predictive Performance Equation

**Permalink**

**Journal**

**Authors**

Collins, Michael
Gluck, Kevin

**Publication Date**

2018

# Using Bayesian Hierarchical Modeling and DataShop to Inform Parameter Estimation with the Predictive Performance Equation

**Michael Collins**

Air Force Research Laboratory, Wright Patterson Air Force Base, Ohio, United States

**Kevin Gluck**

Air Force Research Laboratory, Wright-Patterson AFB, Ohio, United States

## Abstract

The Predictive Performance Equation (PPE) is a mathematical model of learning and retention that uses regularities seen in human learning to predict future performance (Walsh, Gluck, Gunzelmann, Jastrzembski, & Krusmark, in press). To generate predictions, PPEs free parameters must be calibrated to historical performance data, with generally inaccurate predictions for initial performance events. Prior research (Collins, Gluck, Walsh, Krusmark & Gunzelmann, 2016; Collins, Gluck, & Walsh, 2017) explored the use of aggregate prior data to inform PPEs free parameters for initial performance predictions. Here we report an extension of our prior research, using Bayesian hierarchical modeling to integrate information from the historical performance of both prior data and an individual student to generate future performance predictions over an entire instructional period. Data are sourced from DataShop an online educational data repository (Koedinger et al. 2010). Adding Bayesian hierarchical modeling to the PPE will improve PPEs application in both education and training scenarios.