LATENT CONSTRUCTS IN DECISION MODELING  
  
Abstract/Outline

Parametric model fitting is quite common; the parameters  correspond to latent cognitive constructs. We provide a comprehensive analysis of these constructs in risky choice, by studying correlations between parameters of numerous models. We find:  
1. Parameters of different models are correlated, indicating that different models often map onto the same latent construct. Sometimes this is expected (e.g. curvature parameters of different models are correlated), but sometimes not (e.g. ??).  
2. Parameters within a model are also often correlated, making interpretation of these parameters difficult. This is typically the case with noise parameters that correlate with non-linear utility parameters. Most prominent for curvature and scaling, as found in prior work.   
3. We analyze this systematically by decomposing parameter space based on parameter covariance across subjects. This yields latent construct space, which reveals interesting patterns, such as the fact that curvature/scaling parameters map onto same construct, probability weighting parameters have their own construct(sometimes with scaling parameters), and noise parameters in linear models  (heuristic models?) have their own construct (all are highly correlated with each other, and uncorrelated with other parameters).  
4. We analyze the amount of variation in parameters that can be explained by our decomposition, and find that 60% of the variance can be explained by 6 or less factors. We can use elbow method here. This suggests that there are 6 key latent constructs, which are XXXX.   
5. How well do these latent constructs describe model fits? This can tell us the degree to which these constructs are expressed in behavior --- an important construct will predict model fit well (indicating that a model that has parameters that map onto that construct will fit well). We test this with regression and find that the most important is curvature/scaling, and that others matter less. Overall, we can explain 30% of variance in model fits with 6 constructs.

Overall, our paper provides a new way of describing the psychological determinants of decision making. Using a holistic approach it is able to track relationships across different theories/models. This approach can be applied to other domains as well