Abstract: In this talk, I will discuss cognitive psychometrics as a broadly applicable method for the joint analysis of multimodal data. I will introduce cognitive latent variable models, a new category of formal models that can be used to aggregate information across participants, tasks, and data modes. Latent structures are borrowed from a vast literature in the field of psychometrics, and robust cognitive process models can be drawn from the cognitive science literature. The new modeling approach is an extension of hierarchical modeling, allows model fitting with smaller numbers of trials per task if there are multiple participants, and is ideally suited for uncovering correlations between latent task abilities as they are expressed in experimental paradigms. Example applications deal with the structure of cognitive abilities underlying a semantic task, and executive functioning.