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Pair Analysis and Joint Action Theory: A Research Protocol to Study Cognition and Interaction in Visual Analytics

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Abstract: Visual analytics, the "science of analytical reasoning with interactive visual interfaces," calls for the development of new models of human cognition in analytic interaction with information technology. While foundational work brings traditional cognitive science models to address interaction with visualization environments, research protocols to empirically test these models in "the wild" are lacking. We combine a research protocol called "Pair Analysis" with H.H. Clark's Joint Action Theory as a theory-methods package for studying cognition and interaction in visual analytic environments. Pair Analysis, an observed analytic interaction by a subject matter expert and a visual-analytic tools expert, provides a unique empirical window into the cognitive process of analytical reasoning and the social processes of interaction. We use JAT's operational concepts to characterize analytic dyads' thought processes and joint use of visualization technology. Our main hypothesis is that sustaining rhythmic interactions in Pair Analysis is indicative of sustaining cognitive flow.