Using Visualization to Explore Common Social and Communicative Behaviors

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Problem

Technologies are providing new opportunities for psychologists to record and study human behaviors in unprecedented detail. In time, such rich and complex behavioral datasets will be collected by psychologists everywhere. As part of a large interdisciplinary research effort, we are studying the use of technologies to capture, measure, analyze and understand children's social and communicative behaviors. However, the massive amount of video/audio/sensory data collected during multimodal interactions from hundreds of participants can be difficult to explore for psychology researchers.

Why Visual Analysis?

Visual analytics is a discipline that augments computational results with human visual abilities for sense-making. It is particularly suitable for solving our problem in behavioral pattern exploration because we are superb at spotting visual patterns. In specific, we are interesting in supporting the exploration of behavioral patterns that are common among a group of subjects for psychologists.

Support Psychology Research

Psychologists do not typically use visualization for data exploration and hypotheses generation. With the increasing amount of collected video, audio and sensor-captured behavioral data, psychologists could use new tools to better explore their data. We believe visualization provides an opportunity to fulfill this emerging need to aid the understanding of human behaviors.

Example Dataset

The visualizations presented here are designed for a dataset of ~40 brief 5-minute semi-structured social play sessions between a child and an examiner. The behavioral data are from human annotations. In the future, they will be replaced with sensor-captured data that are automatically labeled with behaviors recognized by computational technologies.
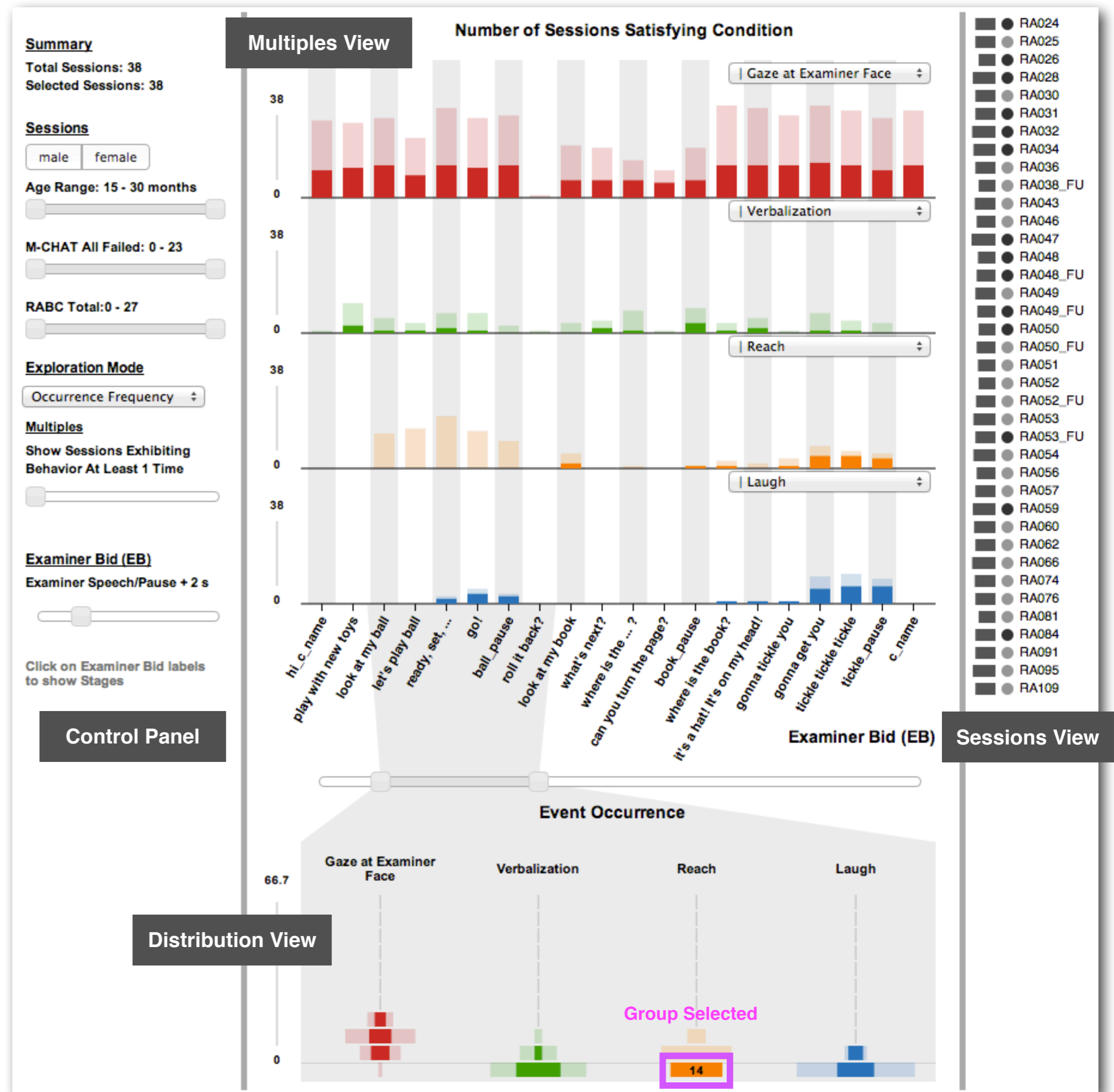
Design Requirements

- Rich visual representation of multimodal behavioral patterns
- Interactive visual exploration for insights
- Explore common behaviors among groups of subjects for further analysis
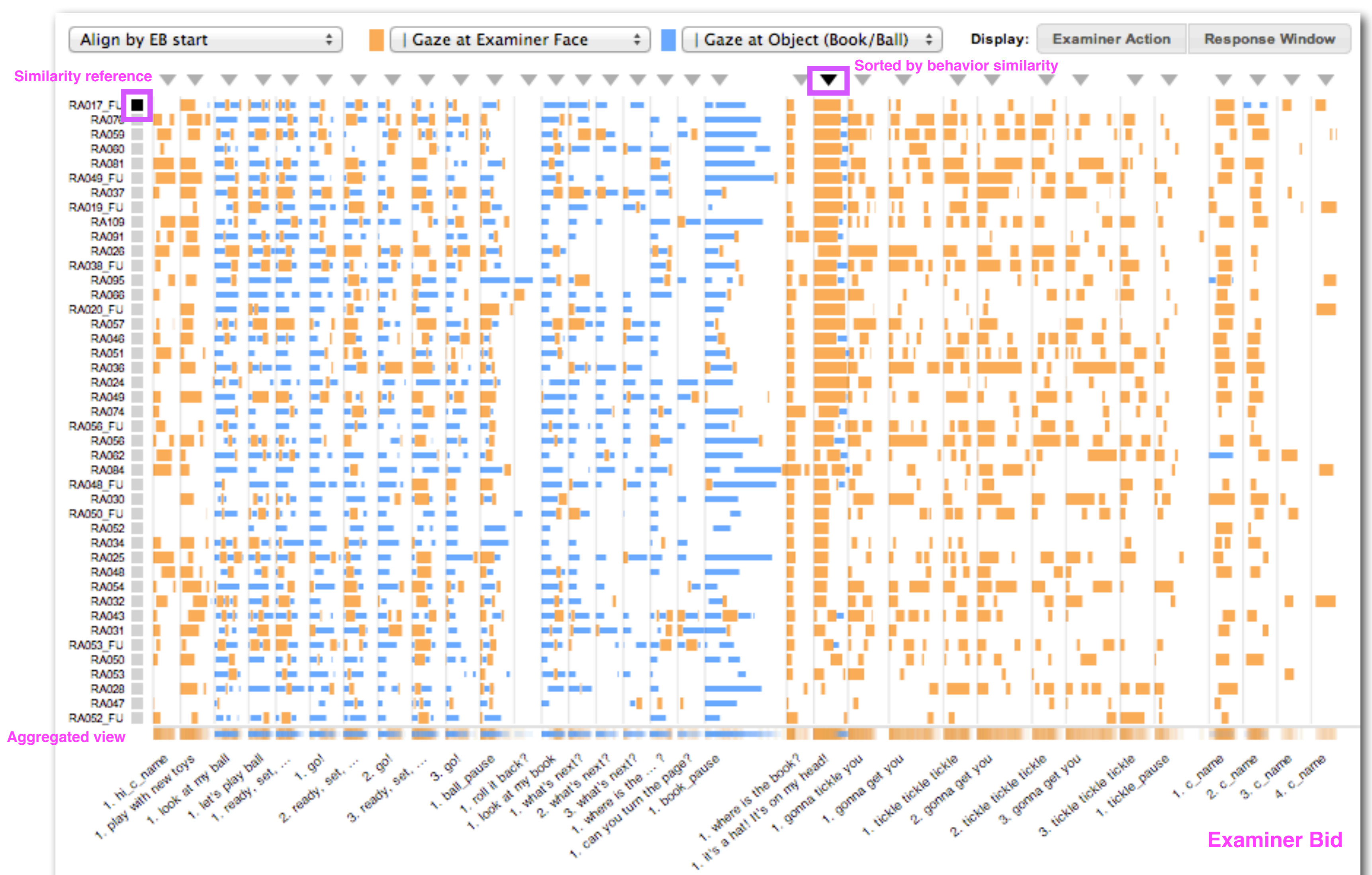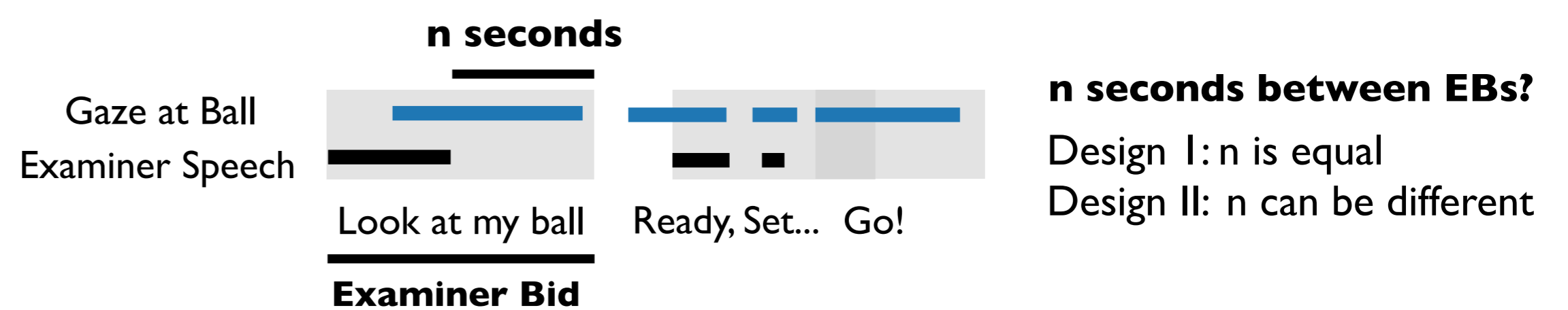
Unit of Analysis - Examiner Bid

Psychologists often examine children's responses to specific behaviors produced by their interactive partners. We define the window to the look for responses, named Examiner Bid, as the time when the examiner starts the prompt and ends a few seconds afterwards.

Acknowledgement

Design I: Explicitly presents groups of children exhibiting common behaviors in the window of examiner's social bid for response

n seconds between EBs?
Design I: n is equal
Design II: n can be different

Design II: Implicitly presents groups of children and shows higher granularity of the timing relationship of two behaviors