Abstract: Fragile X syndrome (FXS) is the leading inherited genetic cause of intellectual disability and the most common known single-gene cause of autism spectrum disorder (ASD). Individuals with fragile X syndrome (FXS) characteristically struggle with spoken language throughout the life course. First words do not appear until around 26 months in FXS, a substantial delay in comparison to typically developing children who produce their first words significantly earlier around 12 months. Pre-linguistic communication skills, the use of eye-gaze, vocalizations, and gestures to communicate needs and wants to another person precede spoken language, but the extant studies in FXS have not examined this link prospectively, as first words are emerging. For children with FXS, gesture use is a particularly important pre-linguistic skill to explore. Existing research in FXS has revealed impairments in child gesture use, but no studies to date have examined the link between gesture use and the onset of first words prospectively. When children gesture at objects, adults commonly label the objects, creating rich opportunities for word learning. Child word learning is also supported by mother’s inclusion of a gesture, which provides a clear connection between the word and its referent. One particularly effective strategy to support word learning may be maternal gesture use combined with follow-in commenting, high quality input guided by the child’s attentional focus. However, the extent to which child and maternal gestures improve spoken vocabulary growth in toddlers with FXS is not known. Thus, we propose to (1) determine the association between child gesture use and maternal language input in toddlers with FXS, (2) determine the association of maternal gesture and language input with child word use in toddler with FXS, and (3) determine the unique contribution of child gesture and responsive maternal language input on child spoken vocabulary growth in toddlers with FXS over a 1-year period. Toddlers with FXS and their biological mothers will complete three assessments over a 1-year period starting when the child is between 18 and 24 months. Both a structured examiner-administered observation and a naturalistic mother-child free play will be administered to measure child gesture use, child vocabulary, and maternal gesture use and language input. The long-term goal is to develop early language interventions for these children. The data generated from this project will provide the empirical support for the development of an intervention proposal that will provide parents with instruction on how to (a) increase the frequency of their gestures, and (b) align gesture use with language input in ways that promote children’s word learning, production practice, and spoken vocabulary growth. Ultimately, this knowledge will positively impact long-term communication outcomes for individuals with FXS.