Mixed-mode designs have become increasingly common in survey data collection. However, different modes may have different measurement properties, which need to be accounted for when analyzing mixed-mode data. This dissertation investigates the presence of mode effects in means and interviewer variances in both cross-sectional and longitudinal studies, and it develops methods to incorporate mode effects when making inferences. Specifically, Study 1 proposes three approaches to detect and address potential mode effects in cross-sectional data. We applied this work to analyze data collected from a randomized mixed-mode (face-to-face [FTF] versus telephone [TEL]) experiment conducted in Wave 6 of the Arab Barometer Study (ABS). Study 2 examines whether interviewer variances remain consistent across different modes (e.g., FTF versus TEL) in two mixed-mode studies (the ABS and the Health and Retirement Study [HRS] 2016), representing different interviewer assignment schemes. Study 3 investigates mode effects in a longitudinal study when different mixed-mode designs are used across waves. This study focused on the 2016 and 2018 waves of the HRS, motivated by the introduction of a sequential WEB-TEL mixed-mode design in the HRS 2018, in contrast to the standard FTF and TEL modes used in the HRS 2016.