

Nonmonotone missing data arise routinely in empirical studies of social and health sciences, and when ignored, can induce selection bias and loss of efficiency. In practice, it is common to account for nonresponse under a missing-at-random assumption which although convenient, is rarely appropriate when nonresponse is nonmonotone. Likelihood and Bayesian missing data methodologies often require specification of a parametric model for the full data law, thus a priori ruling out any prospect for semiparametric inference. In this paper, we propose an all-purpose approach which delivers semiparametric inferences when missing data are nonmonotone and not at random. The approach is based on a discrete choice model (DCM) as a means to generate a large class of nonmonotone nonresponse mechanisms that are nonignorable. Sufficient conditions for nonparametric identification are given, and a general framework for fully parametric and semiparametric inference under an arbitrary DCM is proposed. Special consideration is given to the case of logit discrete choice nonresponse model (LDCM) for which we describe generalizations of inverse-probability weighting, pattern-mixture estimation, doubly robust estimation and multiply robust estimation.