In this paper the theoretical solution for the correlation function matrix of the random response of a structural system is re-visited. It is shown that using the classical definition of the correlation functions, the row space is defined by the mode shapes of the system, whereas the column space is defined by the modal participation vectors. This means that only the rows can be used for unbiased modal identification in operational modal analysis and if the columns are used for identification, then bias will be introduced on the mode shape estimates. It is pointed out that the mode shape bias is strongly dependent on the frequency distance between the modes, i.e. bias will significantly increase in case of closely spaced modes. The identification errors on the estimated biased and unbiased mode shapes are studied in a simulation example.