



S1 Fig. Graphical Model of Multivariate Categories.

Shown here is a Directed Acyclic Graphical (DAG) model of our multivariate categories in the context of our vector of phenotypes \mathbf{Y} (e.g. $\mathbf{Y} = \{\mathbf{Y}_U, \mathbf{Y}_D, \mathbf{Y}_I\}$) and their connections with the variant of interest \mathbf{g} . The relationships described in-text can be seen here. \mathbf{Y}_U , our unassociated phenotypes, have no connection with \mathbf{g} . \mathbf{Y}_D , our directly associated phenotypes, have a direct connection with \mathbf{g} . And \mathbf{Y}_I , our indirectly associated phenotypes, have a connection with \mathbf{g} only by going through \mathbf{Y}_D first. Note that if \mathbf{Y}_D were not observed, \mathbf{Y}_I would appear as a direct connection.