

## **Quantitative Trait Linkage Analysis for Different Human Family Types**

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Data from extended families is often useful for assessing the genetic effect on a potentially heritable numerical (quantitative) response (trait). However, accounting for relatedness complicates a statistical analysis because it requires specialised mixed-effects modelling. In addition, families in a study group may differ in size, further complicating the modelling. The statistical theory underlying the genetic linkage analysis model is not easily understood and has not been comprehensively documented, creating confusion about why this data cannot be modelled using standard statistical software. We introduce the necessary genetic terminology and concepts, then explain the genetic linkage analysis mixed-effects model for progressively more complex family types.

**Key Words:** Genetic association, variance components, extended families