

## **Literature Review**

### **Population Distance and Non-Metric Traits**

Population distance analyses use phenotypic data from the cranium or dentition to estimate genetic similarity among regional or continental populations to reconstruct patterns of gene flow, population origins, or long-distance migrations (Buikstra *et al.*, 1990; Larsen, 1997). When choosing these variables (phenotypic data), one assumes that they are (1) largely under genetic control and (2) minimally affected by environmental or nutritional conditions (Corruccini 1974). The theoretical model for population distance analyses is relatively straightforward. Populations that exchange mates become more phenotypically similar over time and those that do not become more dissimilar at a rate determined by their effective population size (Stojanowski and Schillaci, 2006).

**Discussion of metric vs. non-metric data will be included here.** The primary benefits of phenotypic approaches are the availability of larger sample sizes, methodological and analytical efficiency, non-destructive sampling, and the ability to include ancient populations (Stojanowski and Schillaci, 2006).

#### **Genetic Basis of Non-metric Traits**

Nonmetric traits are often referred to as quasi-continuous variables. Meaning that the variables are either present or absent, but when present they have a range of expression. This range is generally scored from the lowest level of expression to highest. The

accepted model of quasi-continuous variation is based on the idea that there is a combination of genetic and environmental factors at work. A quasi-continuous trait has an underlying, continuously distributed liability for the expression of the traits, and the liability is both genetic and environmental in origin (Falconer 1960, Gruneberg 1963). This combination of factors determines the level of expression on the underlying threshold scale. The author explains that the character is absent in individuals below the threshold level and present in those above it. A quasi-continuous character can therefore be regarded as a continuous variable whose expression has a “visible” and a “nonvisible” range (Sofaer 1970).

### **Animal Studies**

**Section will also have addition of Gruneberg (1963)**

Howe and Parsons (1967) tackle the question of how the genotype is affected by environmental factors when considering minor skeletal variants. Since human studies utilizing heterogeneous material for factors causing these variants can be very difficult to sort out; the authors chose to use inbred strains and crosses of the mouse. Studies of this nature have been performed and Gruneberg (1963) has concluded that much of the variation is of genetic origin, although certain factors such as maternal age, parity, maternal weight, and maternal diet can be of environmental importance. In the study, the

authors use C.A.B. Smith's Mean Measure of Divergence to assess the variation of the 25 minor skeletal variants and their relationship to the decided upon environmental factors.

The authors found significant variation within inbred strains for certain variants for some of the environmental factors, although there are no significant mean measure of divergence considering all the variants together. This means that the genotype, or underlying genetic factors, and more important in the determination of minor skeletal variants than any environmental factors considered. A discussion of the relationship between the minor skeletal variants and somatotype is also included in this research. The authors found that there is a correlation between many skeletal variants depending on the size and structures correlated with body weight. They conclude that some of these skeletal variants are partially associated with body size and partially under genetic control. While this remains difficult to study in man, the authors leave it open as a field of future investigation.

### **-Human Studies**

Include Berry and Berry studies

#### **Age**

*This section will discuss the standard methods used for age estimation; and will also discuss the methods used in this particular study. It will also include a discussion of the reliability of these methods in relation to the fragmented remains associated with CA-CCO-548.*

**Sex**

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**Inter Trait Correlation****Intra Observer Error**

*My intra observer error study has not yet been completed, but the results will be presented in this section. An inter- observer error study will not be possible for my research since I will not be going back and re-doing the data collection that was previously done for the comparative populations.*

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