∆ Ankle and Foot Biomechanics

∆ Footwear Properties

c

b

d

∆ (Energy from) Spring-mass characteristics

∆ Running Economy

a

**Figure 1. Directed Acyclic Graph showing the total causal effect of changing footwear properties on running economy (RE) for a given runner. The total effect is measured in laboratory studies. However, the total effect is the sum of two distinct pathways. Pathway (a) represents the direct effect of changing footwear properties on the change in energy cost resulting from the change in spring-mass characteristics. The change in energy cost resulting from changes in spring-mass characteristics are proportional and directly related to changes in RE (pathway d). The mediated effect (via changes in ankle and foot biomechanics) is pathway (b) + pathway (c). Note that the mediated effect comprises a direct effect of changing footwear properties on the changes in ankle and foot biomechanics (pathway b) and a direct effect of the changes in ankle and foot biomechanics on the changes in energy cost associated with spring-mass characteristics (pathway c).**