**Linearity Analysis with firing rate**

Instead of using Sound modulation index, use firing rate to calculate the effects and show linearity

Epistatic test FR

Running by VIP effect FR

We also computed running and VIP activation modulation index, which also resulted in the same conclusion – VIP MI and Running MI added linearly during trials when they were both present

Run MI Linearity test

Run MI VIP MI

**Off responses –** OFF responses showed similar modulation by running as ON responses, suggesting this effect may not be response specific

Off responses

**Distance correlation figure –** (not sure what to do with this result)

Originally, I thought that this would be interesting in showing that timescale of dependency of cortical modulation, but it seems like distance correlation increases beyond a reasonable timescale , not showing a peak at a certain timescale

Running Distance Corr

**Matched sample test –** to make sure that low sound MI in running conditions are not just due to smaller trial number, we matched sitting trials selecting them at random to running trials. We consistently obtained higher sound MI in sitting condition. The figure shows a mean of 100 repetitions of selecting random samples in sitting condition (range 0.42 – 0.55).

Matched Sample Size Mean Sound MI Running