

# How can I detect/address spatial autocorrelation in my data?

Authored by  
**stats writer**

June 30, 2024

## RECOMMENDED CITATION

stats writer (2024). *How can I detect/address spatial autocorrelation in my data?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=161212>

Spatial autocorrelation refers to the presence of patterns or relationships between nearby observations in a dataset. It can arise when data points in a study area are not independent and are influenced by their spatial proximity. To detect spatial autocorrelation in your data, you can use various statistical methods such as Moran's I, Geary's C, or spatial correlograms. These methods help to quantify the degree and direction of spatial autocorrelation in your data. Once detected, addressing spatial autocorrelation can be achieved by incorporating spatially explicit variables in your analysis or by applying spatial regression techniques. These techniques aim to account for the spatial dependency in the data and provide more accurate results. It is important to detect and address spatial autocorrelation in your data to ensure the validity and reliability of your analysis and avoid making incorrect conclusions.

## **FAQ: How can I detect/address spatial autocorrelation in my data?**

**Commonly used statistical approaches often assume that the measured outcomes are independent of each other. In spatial data, it is often the case that some or all outcome measures exhibit spatial autocorrelation.**

**This occurs when the relative outcomes of two points is related to their distance. When analyzing spatial data, it is important to check for autocorrelation. If there is no evidence of spatial autocorrelation, then proceeding with a standard approach is acceptable. However, if**

there is evidence of spatial autocorrelation, then one of the underlying assumptions of your analysis may be violated and your results may not be valid.

Addressing spatial autocorrelation in your analysis is not impossible and leads to more robust and replicable results.

Analysis of spatial autocorrelation can be broken down into steps: detecting, describing, and adjusting/predicting.

Detecting autocorrelation

These pages demonstrate how to use Moran's I or a Mantel test to check for spatial autocorrelation in your data. Moran's I is a parametric test while Mantel's test is semi-parametric. Both will also indicate if your spatial autocorrelation is positive or negative and provide a p-value for the level of autocorrelation. Both test against the null that there is

**no spatial**

**autocorrelation. Moran's I does this with a correlation that is weighted**

**by inverse distances; the Mantel test examines the correlation between two**

**distance matrices and generating a null distribution for this correlation by**

**randomly permuting one of the matrices.**

**Describing and visualizing autocorrelation**

**These pages demonstrate how to generate a variogram for your data. A**

**variogram gives you a sense of the degree and range of spatial autocorrelation**

**in your data and how it changes over distances.**

**Adjusting for or predicting with autocorrelation**

**These pages demonstrate how to find the empirical variogram that is closest**

**to what you observe in your data and using this theoretical variogram to predict**

**your outcome at unobserved locations. Proc mixed allows you to predict**

**your outcome using both location and other predictors.**

**Kriging allows you  
to predict based completely on location.**

ARABPSYCHOLOGY.COM