R and GeoDa Results with Code and QGIS Development

Childhood Obesity, 2010 (Albuquerque/ Bernalillo Co. Block Groups)

Larry Spear 3/21/2016

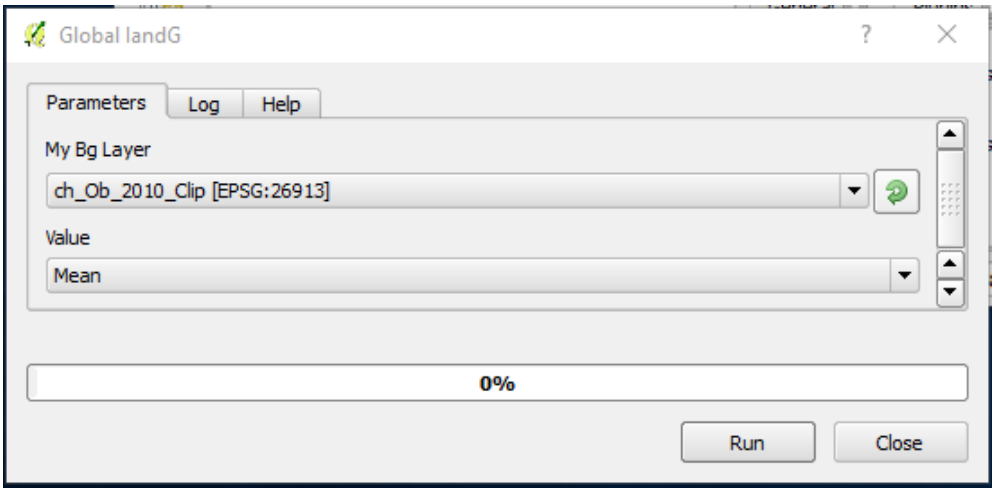
Global Moran's I Results:

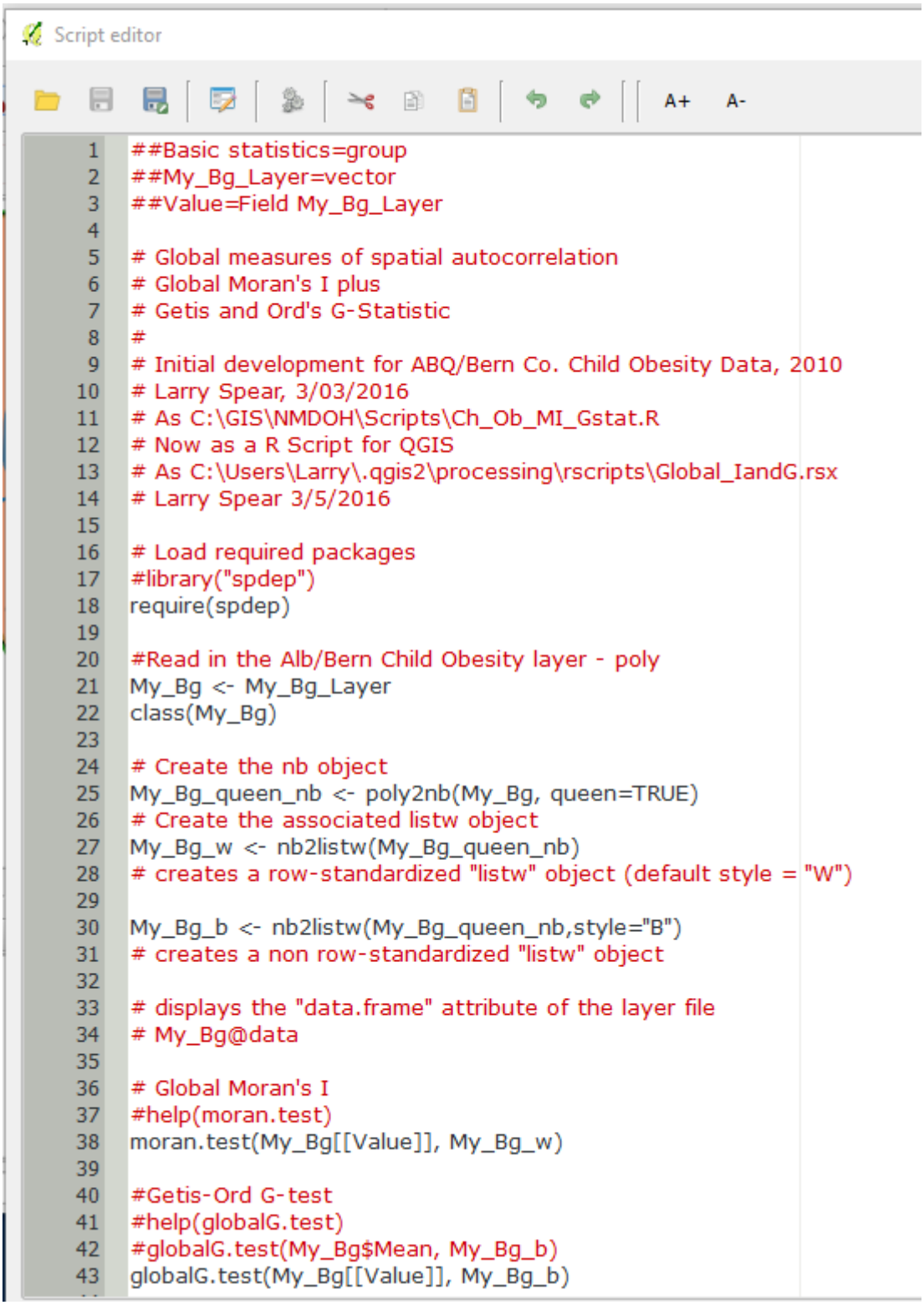
```
Moran's I test under randomisation

data:  Abq_Bg$Mean
weights: Abq_Bg_w

Moran I statistic standard deviate = 21.223, p-value
< 2.2e-16
alternative hypothesis: greater
sample estimates:
Moran I statistic       Expectation          Variance
     0.5742882498     -0.0023584906      0.0007382346
```

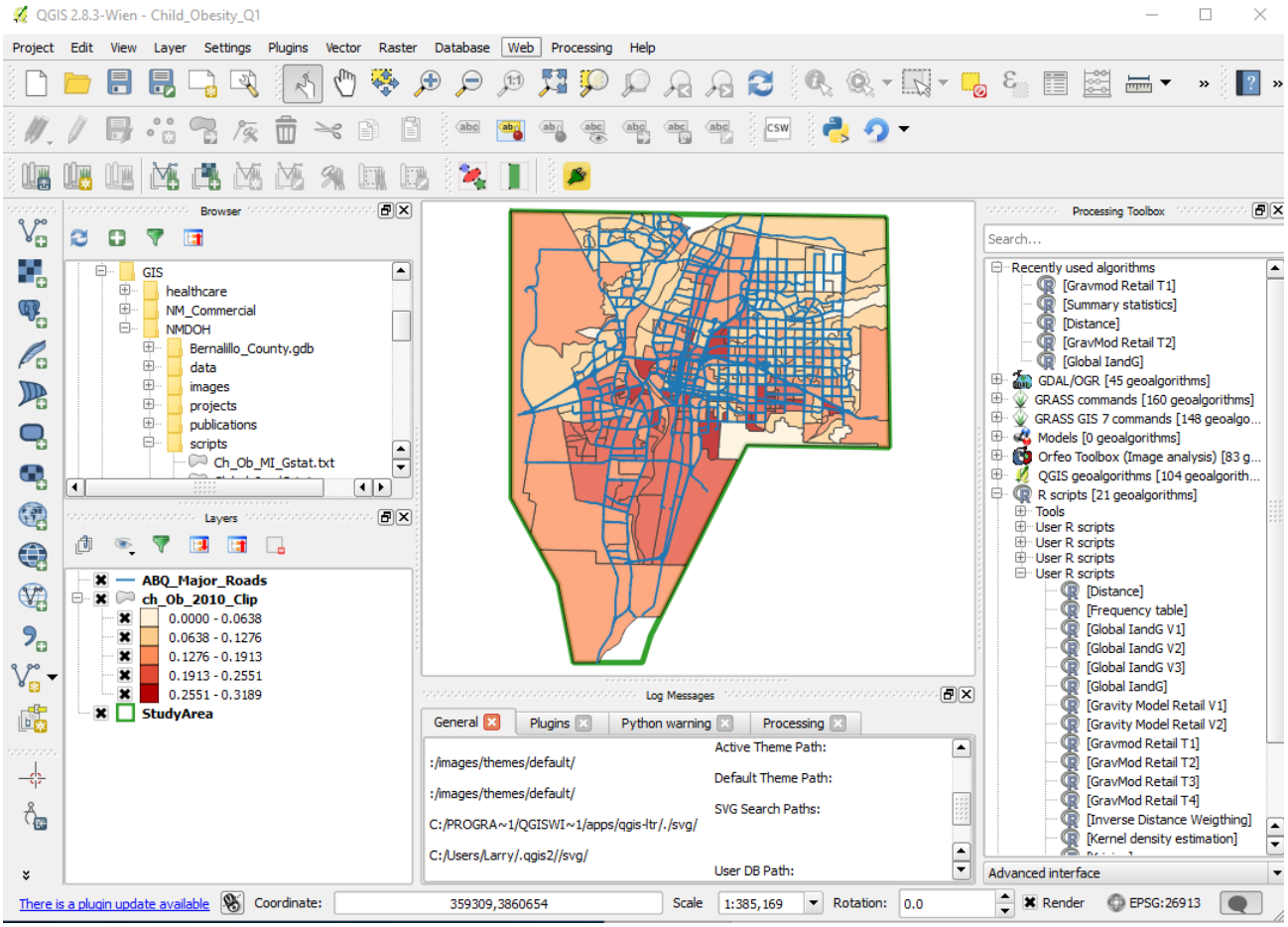
Getis and Ord's G Statistic Results:

```
Getis-Ord global G statistic

data:  Abq_Bg$Mean
weights: Abq_Bg_b

standard deviate = 6.7017, p-value = 1.03e-11
alternative hypothesis: greater
sample estimates:
Global G statistic        Expectation           Variance
      1.689900e-02       1.556049e-02       3.989056e-08
```

QGIS R Script:

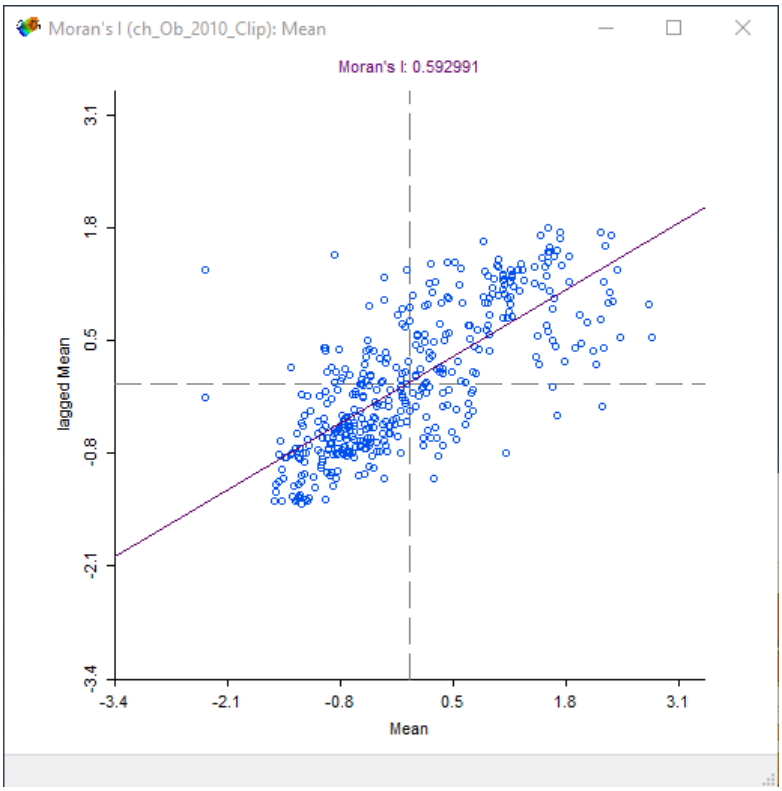


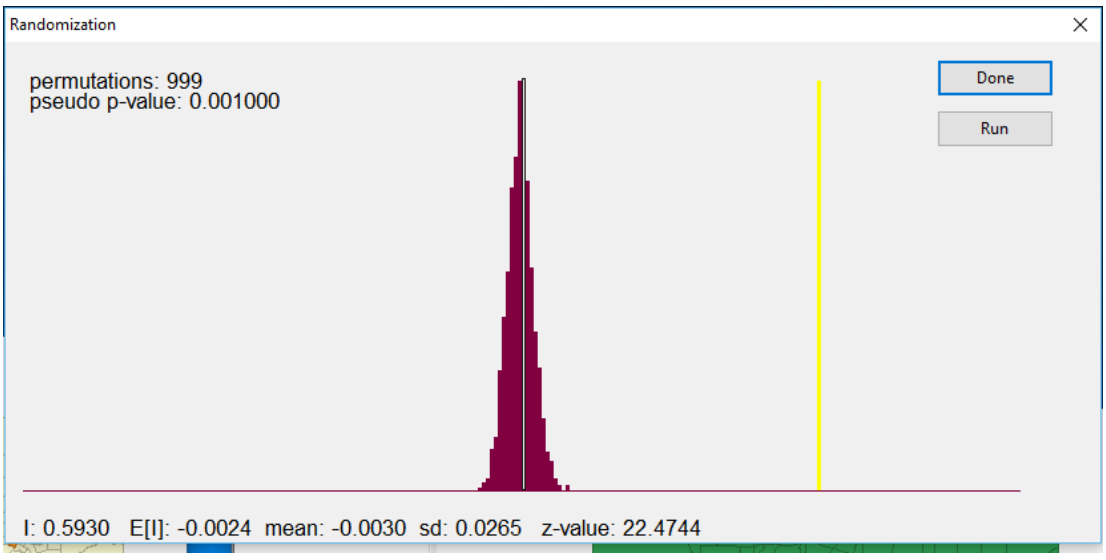

Script editor
A+
A-
##Basic statistics=group
##My_Bg_Layer=vector
##Value=Field My_Bg_Layer
Global measures of spatial autocorrelation
Global Moran's I plus
Getis and Ord's G-Statistic
#
Initial development for ABQ/Bern Co. Child Obesity Data, 2010
Larry Spear, 3/03/2016
As C:\GIS\NMDOH\Scripts\Ch_Ob_MI_Gstat.R
Now as a R Script for QGIS
As C:\Users\Larry\.qgis2\processing\rscripts\Global_IandG.rsx
Larry Spear 3/5/2016
Load required packages
#library("spdep")
require(spdep)
#Read in the Alb/Bern Child Obesity layer - poly
My_Bg <- My_Bg_Layer
class(My_Bg)
# Create the nb object
My_Bg_queen_nb <- poly2nb(My_Bg, queen=TRUE)
# Create the associated listw object
My_Bg_w <- nb2listw(My_Bg_queen_nb)
# creates a row-standardized "listw" object (default style = "W")
My_Bg_b <- nb2listw(My_Bg_queen_nb,style="B")
# creates a non row-standardized "listw" object
# displays the "data.frame" attribute of the layer file
# My_Bg@data
# Global Moran's I
#help(moran.test)
moran.test(My_Bg[[Value]], My_Bg_w)
#Getis-Ord G-test
#help(globalG.test)
#globalG.test(My_Bg$Mean, My_Bg_b)
globalG.test(My_Bg[[Value]], My_Bg_b)


QGIS 2.8.3-Wien - Child_Obesity_Q1
Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help
Browser
GIS
healthcare
NM_Commercial
NMDOH
Bernalillo_County.gdb
data
images
projects
publications
scripts
Ch_Ob_MI_Gstat.txt
Layers
ABQ_Major_Roads
ch_Ob_2010_Clip
0.0000 - 0.0638
0.0638 - 0.1276
0.1276 - 0.1913
0.1913 - 0.2551
0.2551 - 0.3189
StudyArea
Log Messages
General
Plugins
Python warning
Processing
Active Theme Path:
:/images/themes/default/
Default Theme Path:
:/images/themes/default/
SVG Search Paths:
C:/PROGRA~1/QGISWI~1/apps/qgis-ltr/./svg/
C:/Users/Larry/.qgis2//svg/
User DB Path:
Processing Toolbox
Search...
Recently used algorithms
[Gravmod Retail T1]
[Summary statistics]
[Distance]
[GravMod Retail T2]
[Global IandG]
GDAL/OGR [45 geoalgorithms]
GRASS commands [160 geoalgorithms]
GRASS GIS 7 commands [148 geoalgo...
Models [0 geoalgorithms]
Orfeo Toolbox (Image analysis) [83 g...
QGIS geoalgorithms [104 geoalgorith...
R scripts [21 geoalgorithms]
Tools
User R scripts
User R scripts
User R scripts
User R scripts
[Distance]
[Frequency table]
[Global IandG V1]
[Global IandG V2]
[Global IandG V3]
[Global IandG]
[Gravity Model Retail V1]
[Gravity Model Retail V2]
[Gravmod Retail T1]
[GravMod Retail T2]
[GravMod Retail T3]
[GravMod Retail T4]
[Inverse Distance Weigthing]
[Kernel density estimation]
Advanced interface
There is a plugin update available
Coordinate:
359309,3860654
Scale
1:385,169
Rotation:
0.0
Render
EPSG:26913

GeoDa Results:

For Moran's I similar results were obtained from GeoDa (positive Moran's I 0.592 and p-value = 0.001 and z-value =22.474) confirm that both high and low values tend to cluster near each other (see the abundance of observations in the LL and HH quadrants of the scatter plot). Note that a slightly different method (k-Nearest Neighbors) was used in creating a spatial weights matrix than the default methods used in ArcGIS and R.





R Code (using R Studio**):**

```
# Global measures of spatial autocorrelation
# Global Moran's I plus
# Getis and Ord's G-Statistic
#
# See
#(http://isites.harvard.edu/fs/docs/icb.topic923307.files/R%20code%20for%20Lab%20Ex%206.txt)
#
# For ABQ/Bern Co. Child Obesity Data, 2010
# Larry Spear, 3/03/2016
# As C:\GIS\NMDOH\Scripts\Ch_Ob_MI_Gstat.R

# Load required packages
require(maptools)
require(spdep)
#require(rgdal)
#require(GISTools)

#Read in the Alb/Bern Child Obesity shapefile - poly
Abq_Bg  <- readShapePoly("C:/GIS/NMDOH/shapefiles/ch_Ob_2010_Clip.shp")
# Specify projection information
proj4string(abbg.chob.2010.poly.spdf)
      <- "+proj=utm +zone=13 +datum=NAD83 +units=m +no_defs +ellps=GRS80 +towgs84=0,0,0"
class(Abq_Bg)

# Plot the ABQ/Bern Co. block groups
plot(Abq_Bg)

# Create the nb object
Abq_Bg_queen_nb <- poly2nb(Abq_Bg, queen=TRUE)
# Create the associated listw object
Abq_Bg_w <- nb2listw(Abq_Bg_queen_nb)
# creates a row-standardized "listw" object (default style = "W")

Abq_Bg_b <- nb2listw(Abq_Bg_queen_nb,style="B")
# creates a non row-standardized "listw" object

# displays the "data.frame" attribute of the shape file
Abq_Bg@data

# Global Moran's I
#help(moran.test)
moran.test(Abq_Bg$Mean, Abq_Bg_w)

#Getis-Ord G-test
#help(globalG.test)
globalG.test(Abq_Bg$Mean, Abq_Bg_b)
```