

Ego-network analysis with R (Part 1)

R basics

Raffaele Vacca, University of Florida (r.vacca@ufl.edu)

June 22, 2018

Contents

1	Overview	1
2	Data and R code	2
3	Starting R	2
3.1	Console vs scripts	3
3.2	Getting help	3
4	Objects in R	5
4.1	Creating objects: Basic concepts	5
4.2	The workspace	5
4.3	Saving and removing objects	5
4.4	Vector and matrix objects	6
4.5	Data frames	7
5	Arithmetic, statistical, and comparison operations	9
5.1	Arithmetic operations	9
5.2	Comparison operations and logical vectors	9
5.3	Basic arithmetic and statistical functions	12
5.4	Missing and infinite values	12
6	Indexing	12
6.1	Indexing and subsetting data frames	13
7	Pipes and the %>% operator	21
8	Types and classes of objects	21
8.1	Main classes/types of objects	22
8.2	Special and complex classes/types	22
8.3	Relevant functions	22
9	References	24

1 Overview

This document covers some of the basics of the R language. While this obviously can't be a comprehensive and exhaustive introduction to R, we'll demonstrate some essential R notions and tools that are commonly used in social science data analysis, including egocentric network analysis.

The document covers the following topics:

- Starting R, getting help with R.
- Creating and saving objects.

Ego-network analysis with R (Part 2)

One ego-network

Raffaele Vacca (r.vacca@ufl.edu), University of Florida

June 22, 2018

Contents

1	Overview	1
2	Data and R code	1
3	Ego-level vs alter-level data	2
4	Networks in R	5
4.1	The <code>igraph</code> package	5
4.2	The <code>statnet</code> suite of packages	17
5	Measures of ego-network composition	22
6	Measures of ego-network structure	26
7	Writing R functions	31
8	References	36

1 Overview

After learning some basics of the R language, we will now focus on R tools for egocentric network data. To make things simpler we start by analyzing just one egocentric network.

This document covers the following topics:

- Importing ego-level attribute data and alter-level attribute data into R.
- Joining (merging) ego-level and alter-level data frames.
- Importing alter-alter tie data into R.
- Storing and manipulating an ego-network as an `igraph` or a Statnet `network` object.
- Visualizing an ego-network.
- Calculating measures of ego-network composition and structure.
- Writing general R functions to calculate compositional and structural measures, which can then be applied to any other ego-network in the data.

2 Data and R code

This document shows and discusses several pieces of R code. The script `R02_one_egonet.R` includes all the code shown in these pages. You can access and run the code by opening that `.R` file in your R GUI (e.g. RStudio).

See the workshop Part 1 handout (“Data and R code” section) for information about the data used in this script.

Ego-network analysis with R (Part 3)

Many ego-networks

Raffaele Vacca (r.vacca@ufl.edu), University of Florida

June 22, 2018

Contents

1	Overview	1
2	Data and R code	1
3	Lists	2
4	Storing data on many ego-networks as data frames and lists	4
5	Split-apply-combine with ego-networks	8
5.1	Composition: grouping and summarizing with <code>dplyr</code>	9
5.2	Structure: running a function on every element of a list with <code>purrr</code> and <code>plyr</code>	14
6	A case study: Sri Lankan immigrants' embeddedness in Italian society	20
7	References	30

1 Overview

Now that we've learned how to import, store and analyze one ego-network, we're ready to scale these operations up to a *collection* of many ego-networks.

This document covers the following topics:

- R lists and how they can be used to store many ego-networks.
- Storing data from multiple ego-networks as data frames or lists.
- *Split-apply-combine*: Running the same operation on many ego-networks and combining results back together.
- Analysis of ego-network composition: Split-apply-combine on a data frame of alter attributes (`dplyr` package).
- Analysis of ego-network structure: Split-apply-combine on a list of `igraph` objects (`purrr` and `plyr` packages).

2 Data and R code

This document shows and discusses several pieces of R code. The script `R03_many_egonets.R` includes all the code shown in these pages. You can access and run the code by opening that `.R` file in your R GUI (e.g. RStudio).

See the workshop Part 1 handout (“Data and R code” section) for information about the data used in this script.