

# Using the EI index with personal network structural data as a measure of acculturation

**Chris McCarty**

University of Florida

**Jose Luis Molina**

Universitat Autònoma de Barcelona

**Miranda Lubbers**

Universitat Autònoma de Barcelona

**Juergen Lerner**

Universität Konstanz

*XXVII International Sunbelt Social Network Conference. Corfu, 1-6 May, 2007*

**National Science Foundation, Award No. BCS-0417429**

Acculturation : The outcome of cultures coming into contact

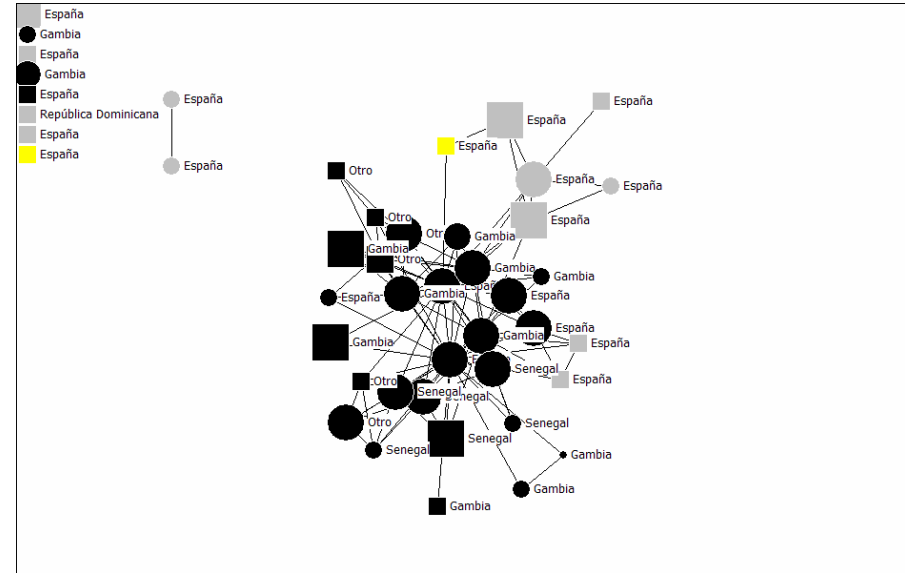
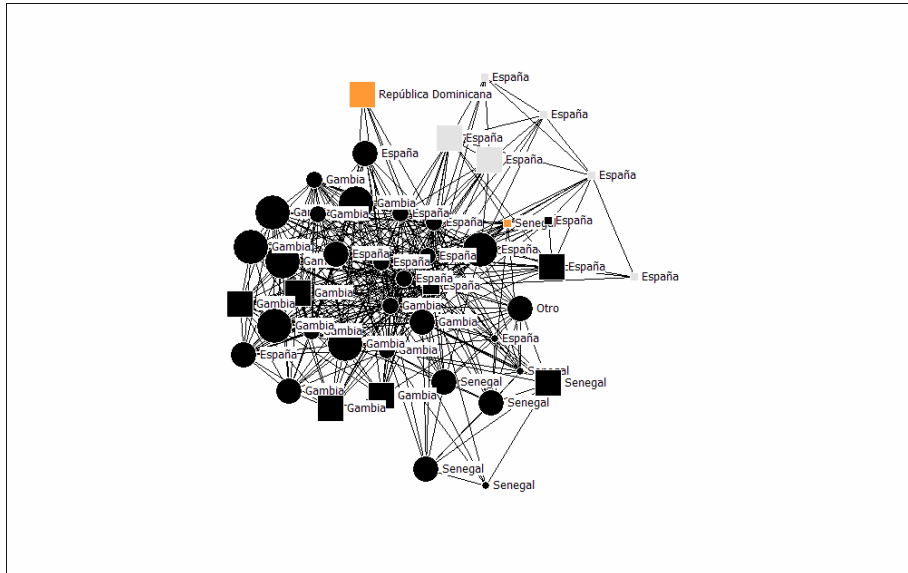
What is the best way to measure acculturation?

## AR SMA II (Cuellar, Arnold, Maldonado 1995)

- I speak Spanish
- I speak English
- I enjoy speaking Spanish
- I associate with Anglos
- I associate with Mexicans and/or Mexican Americans
- I enjoy listening to Spanish-language music
- I enjoy listening to English-language music
- I enjoy Spanish-language TV
- I enjoy English-language TV enjoy English-language movies
- I enjoy Spanish-language movies
- I enjoy reading in Spanish
- I enjoy reading in English
- I write letters in Spanish
- I write letters in the English language
- My thinking is done in the English language
- My thinking is done in the Spanish language
- My contact with Mexico has been...
- My contact with the USA has been...
- My father identifies or identified himself as "Mexicano"
- My mother identifies or identified herself as "Mexicano"
- My friends, while I was growing up, were of Mexican origin
- My friends, while I was growing up, were of Anglo origin
- My family cooks Mexican foods
- My friends now are of Anglo origin
- My friends now are of Mexican origin
- I like to identify myself as an Anglo American
- I like to identify myself as a Mexican American
- I like to identify myself as a Mexican
- I like to identify myself as an American

*1=Not at all, 2=Not very often, 3=Moderately, 4=Very often, 5=Almost always*

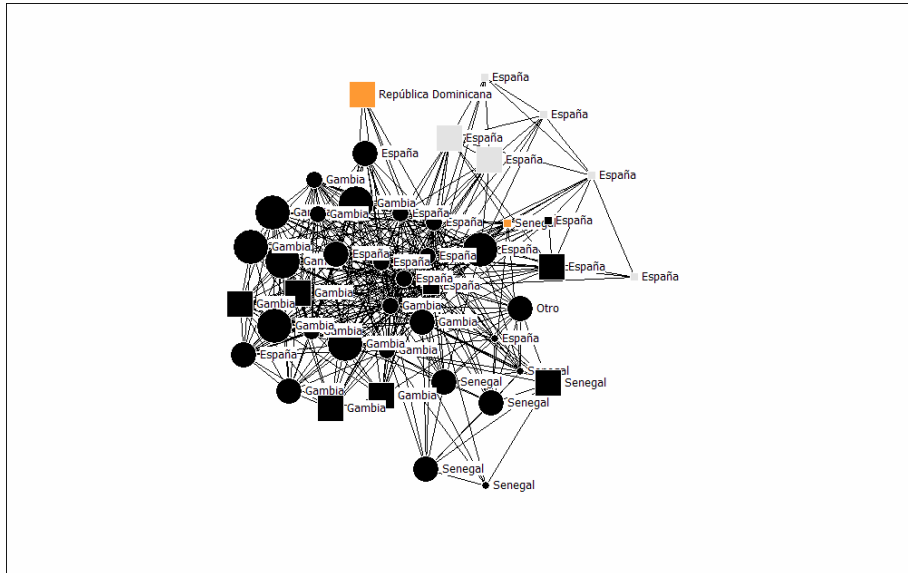
# Two Sisters



- Mercedes is a 19-year-old second generation Gambian woman in Barcelona
- She is Muslim and lives with her parents and 8 brothers and sisters
- **She goes to school, works and stays home caring for her siblings. She does not smoke or drink.**

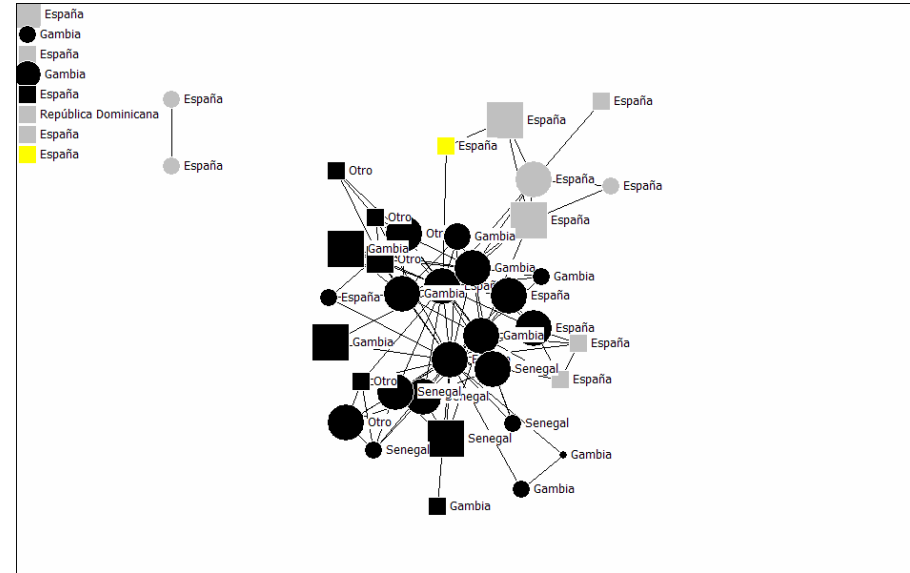
- Laura is a 22-year-old second generation Gambian woman in Barcelona
- She is Muslim and lives with her parents and 8 brothers and sisters
- **She works, but does not like to stay home. She smokes and drinks and goes to parties on weekends.**

# A Tale of Two Sisters



**Acculturation Score=0.18**

**High Bicultural**



**Acculturation Score=0.48**

**High Bicultural**

The acculturation scale (range -4 to 4) would predict similar health outcomes for these two sisters.

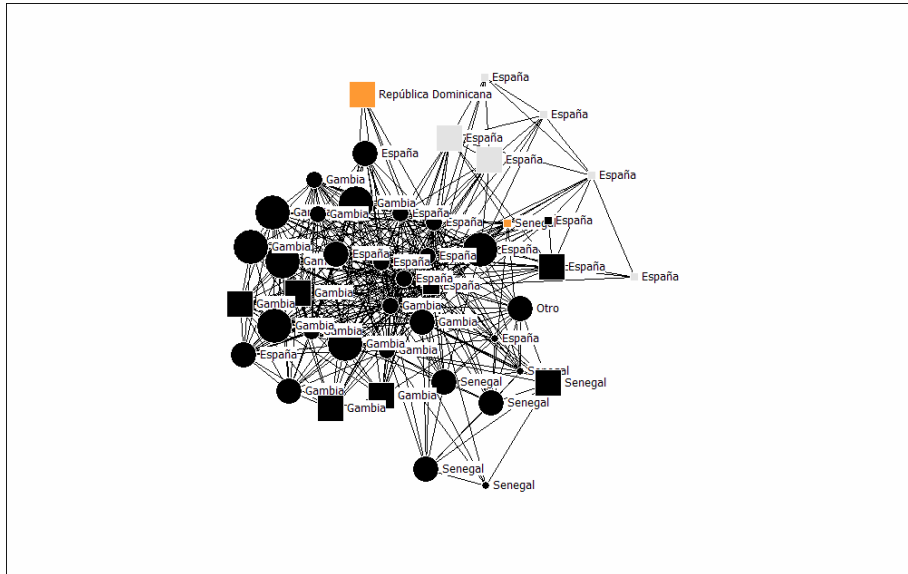
# What is different about these sisters?

- From Acculturation Scale
  - Mercedes does not identify herself as Spanish while Laura does
  - Mercedes says her friends growing up were not from Spain, while Laura says her friends were from Spain
- From Visualization
  - Mercedes' pattern of social interaction is somewhat compartmentalized while Laura's is not

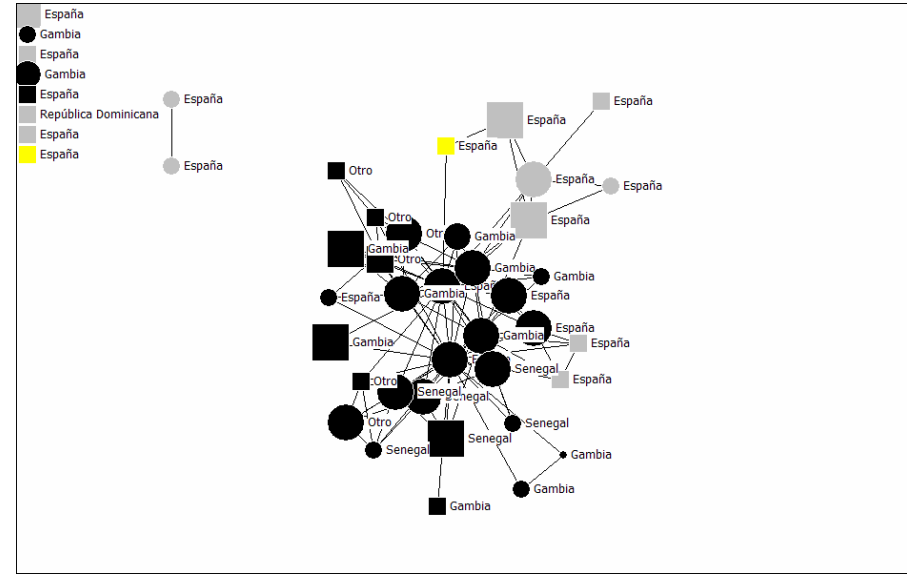
# Proposition

- A big part of acculturation is determined by who you know (network composition)...
- ...and How they know each other (network structure).
- What is the best way to measure this?

# Percent of alters from host country



36 Percent Host Country

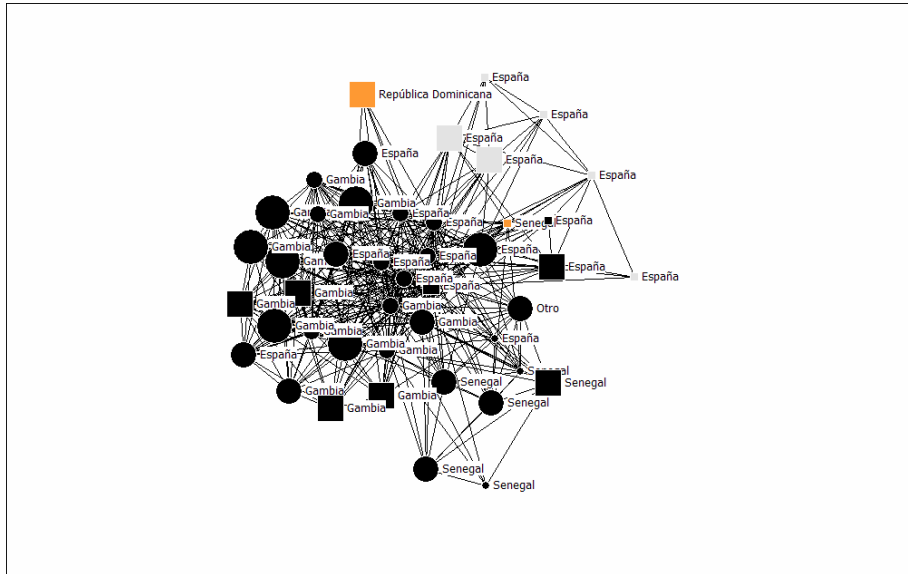


44 Percent Host Country

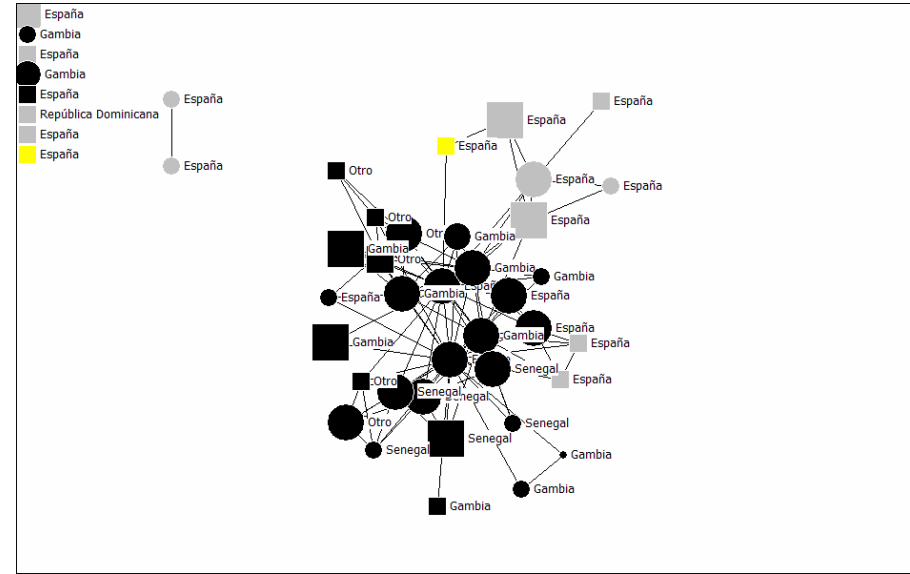
- Percent from host country captures composition
- Does not capture structure



# Components



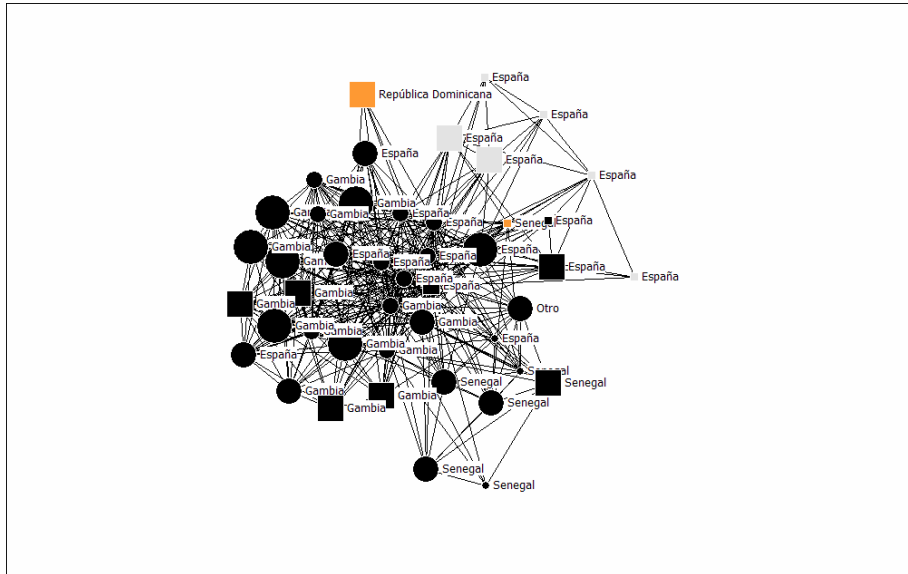
Components 1



Components 10

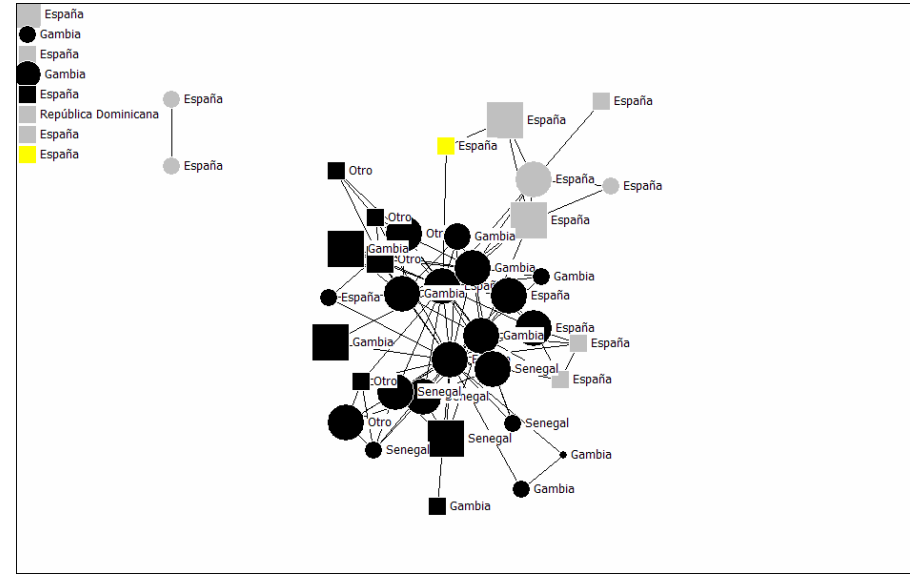
- Components captures separately maintained groups
- It does not capture type of groups

# Average Betweenness Centrality



Average Betweenness 12.7

SD 26.5



Average Betweenness 14.6

SD 40.5

- Betweenness centrality captures bridging between groups
- It does not capture the types of groups that are bridged

Acculturation =  
Composition (Type of group)  
+  
Structure (Group interaction)

We propose using the EI Index

Formula from Krackhardt and Stern (1986)

Assuming two groups based on some attribute, one defined as internal and the other as external:

$$\text{E-I index} = \frac{EL - IL}{EL + IL}$$

where

*EL* = the number of external friendship links

*IL* = the number of internal friendship links

# Interpretation

- Score of +1.0 = All links external to subunit
- Score of 0 = Links are divided equally
- Score of -1.0 = All links are internal to subunit

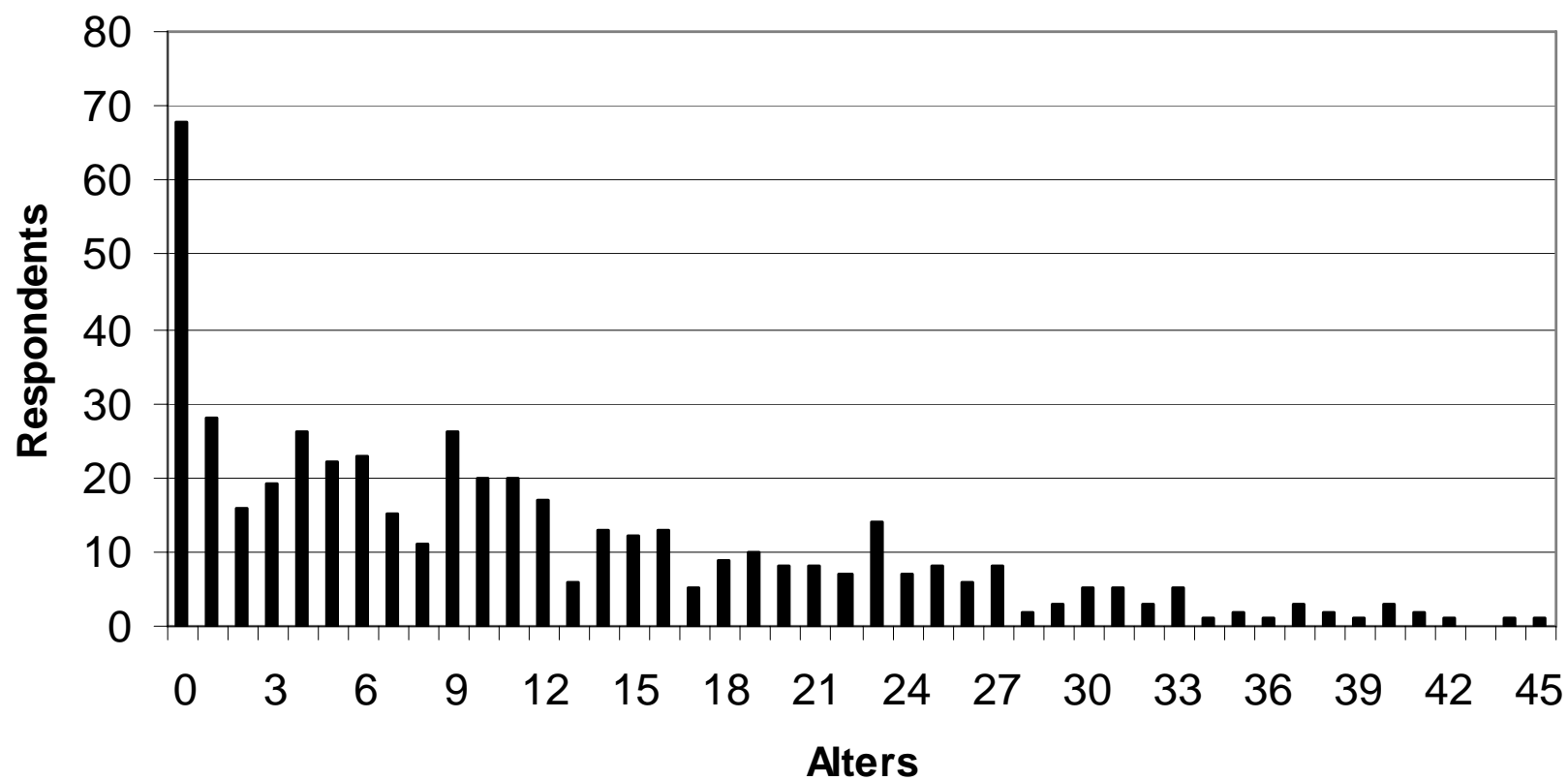
# Hypotheses

- EI index will be positively related to smoking
- EI index will be negatively associated with levels of depression
- EI index will be negatively associated with the number of children
- EI index will be positively associated with self-assessment of health

# Problems

- Group definition
  - Internal as those from sending country
    - This includes people living in host country and in sending country
  - Internal as those from host country
- Comparing EI indexes
  - Not designed for comparing across networks
  - Number of alters from host country varies a lot

## Number of alters from host country

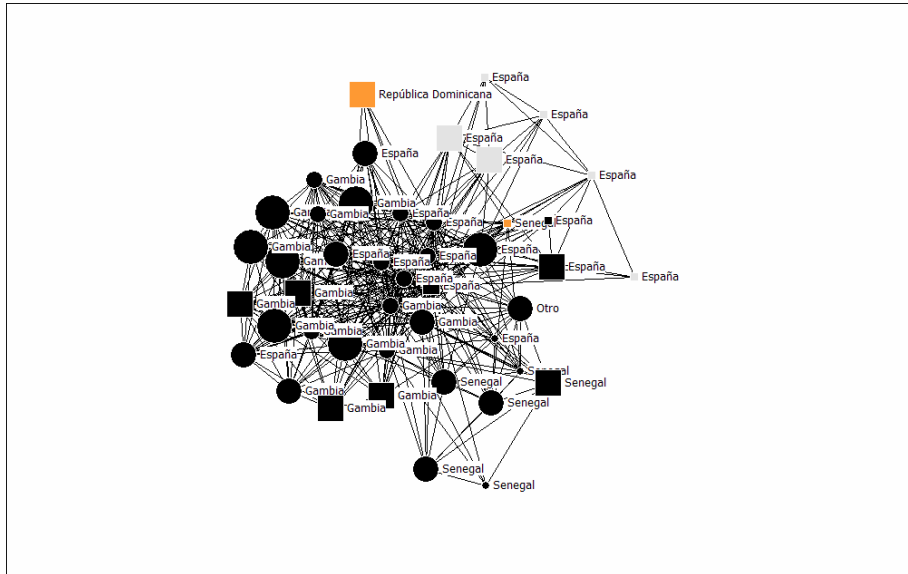




# Solution

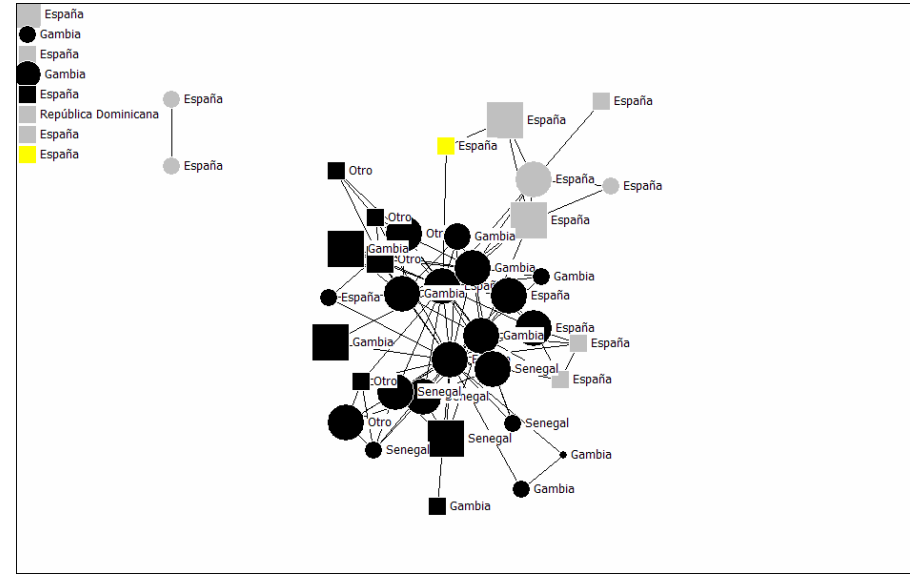
- Exclude from analysis those respondents with less than two alters from the host country
- Normalize by dividing EI index by possible external ties (Mariolis 1985)

# EI Index



EI Index -0.549

Normalized -0.0118



EI Index -0.185

Normalized -0.0037

- Captures both composition and structure
- Represents the interaction between two types of nodes

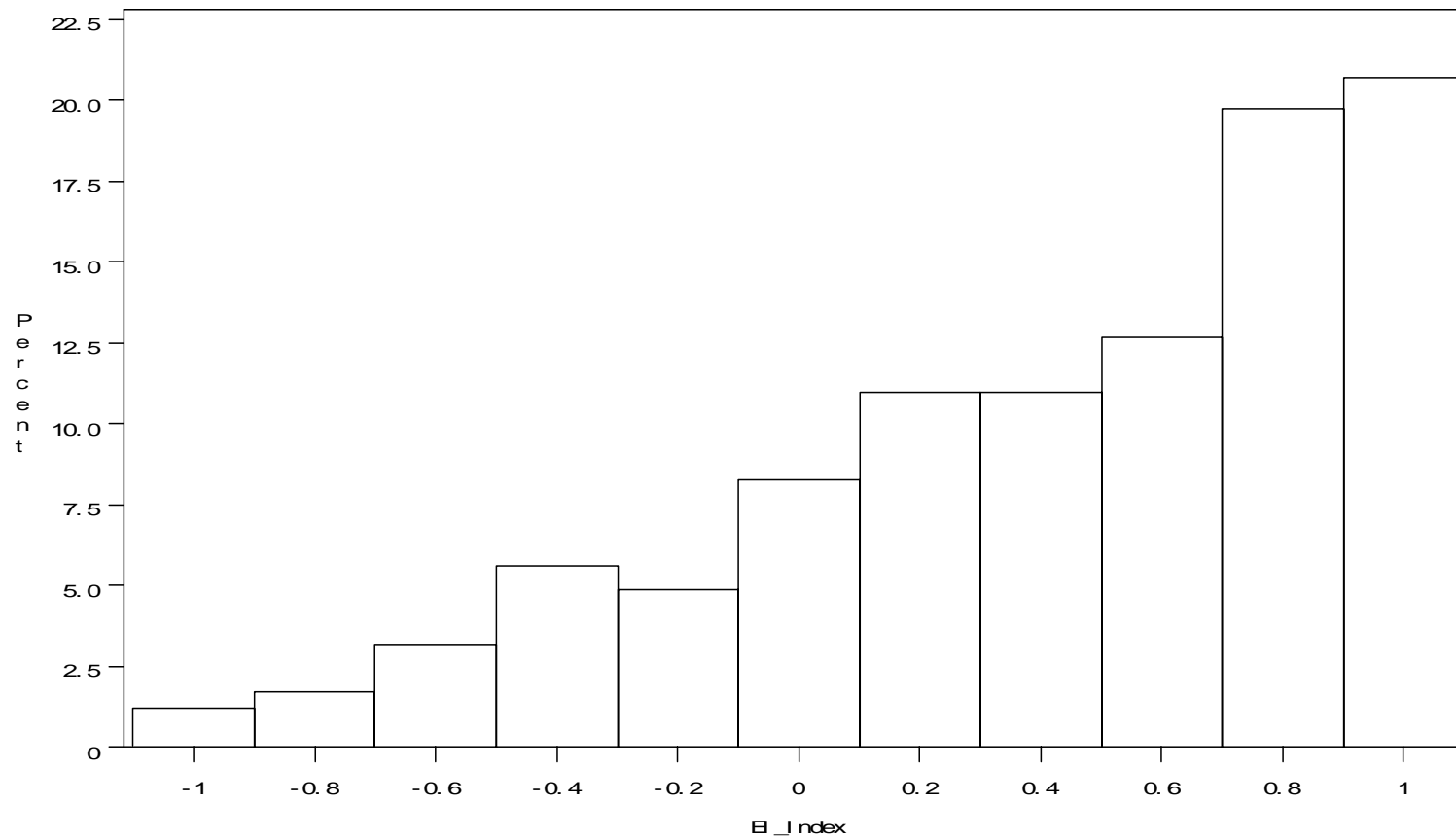
# Results for all respondents

	Depression	Smoking	Number of Children	Health assessment
Acculturation scale	.1165 +	.2142 +	<b>.0001</b> -	.8325 -
Host country alters	.9018 -	.3185 +	<b>.0218</b> -	.7743 -
Number of components	<b>.0144</b> +	.1848 +	<b>.0025</b> -	<b>.0298</b> -
Betweenness centrality	.9132 -	.5114 +	.2055 -	.1568 +
EI index	.5943 +	<b>.0330</b> -	<b>.0358</b> +	.4998 -
Normalized EI index	.5601 -	.1301 -	.2833 +	.2505 -

# Limited to respondents with at least two host country alters

	Depression	Smoking	Number of Children	Health assessment
Acculturation scale	.3380 +	.7893 +	<b>.0001</b> -	.7938 +
Host country alters	.4463 -	.1017 +	<b>.0076</b> -	.4062 -
Number of components	<b>.0047</b> +	.1459 +	<b>.0058</b> -	<b>.0295</b> -
Betweenness centrality	.4692 -	.2932 +	<b>.0371</b> -	.4954 +
EI index	.5283 +	<b>.0305</b> -	<b>.0242</b> +	.7193 -
Normalized EI index	.4825 -	<b>.0086</b> -	<b>.0229</b> +	.7552 -

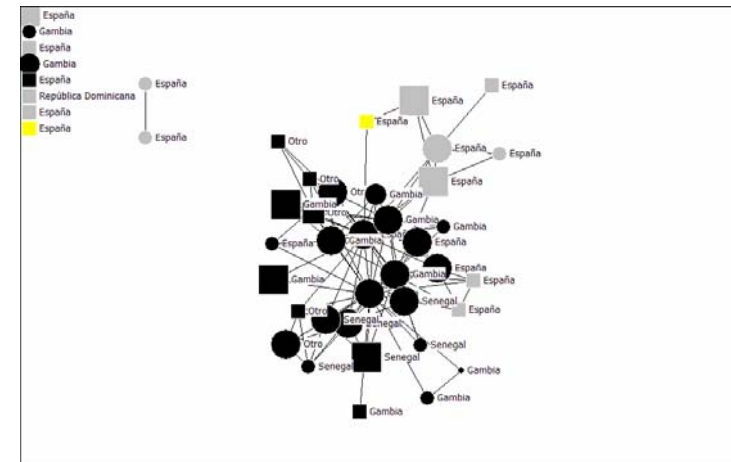
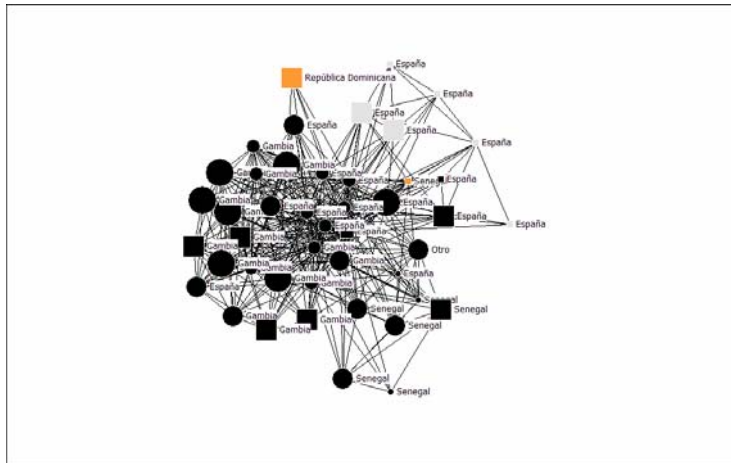
# Distribution of EI index



# What is going on?

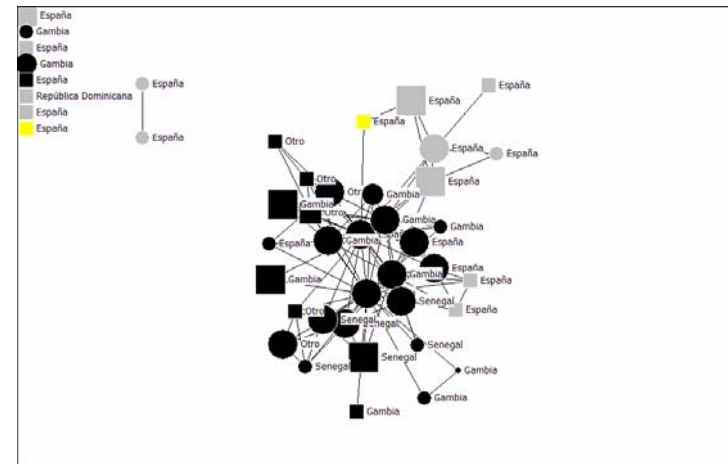
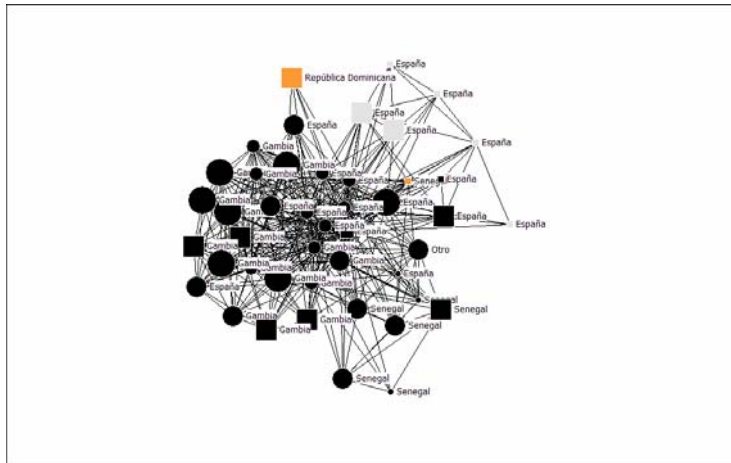
- Krackhardt and Stern suggest that positive EI values would be rare in whole networks because there would be a tendency for friendships within the group rather than external to it
- Would we expect this with personal networks where the groups are migrants and non-migrants?

# Ways non-migrant group could form



- Non-migrants could be individual ties the respondent met directly (isolates)
- These would force the EI value closer to 0
- The correlation between the EI index and isolates is -0.05 (p=0.2641)

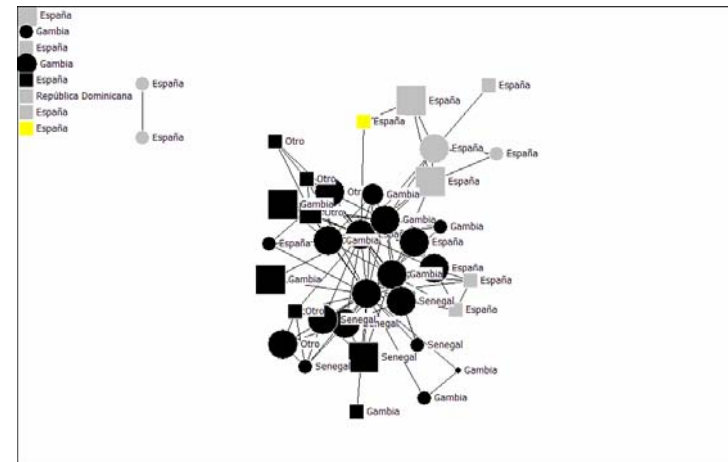
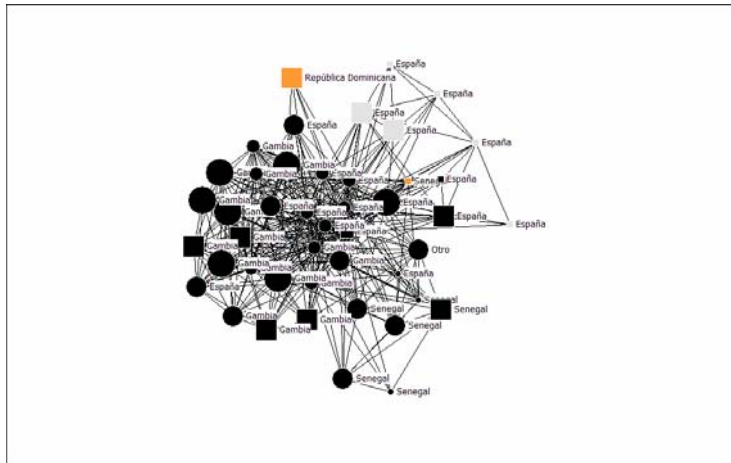
# Ways non-migrant group could form



- Non-migrants could be individual ties met through other people
- This would generate positive EI values



# Ways non-migrant group could form



- Non-migrants could be encountered by migrant as a group
- This would generate negative EI values

# Is this the beginnings of a model?

- We observe high EI values
- We explain those values by describing how migrants and non-migrants must have been met to accommodate that

# Conclusions

- The EI index does explain some outcome variables
- In some cases the sign is not what we expected
- This does not mean it is wrong
- The studies using acculturation scales could be incorrect
- Or the EI index captures something that the acculturation scales do not