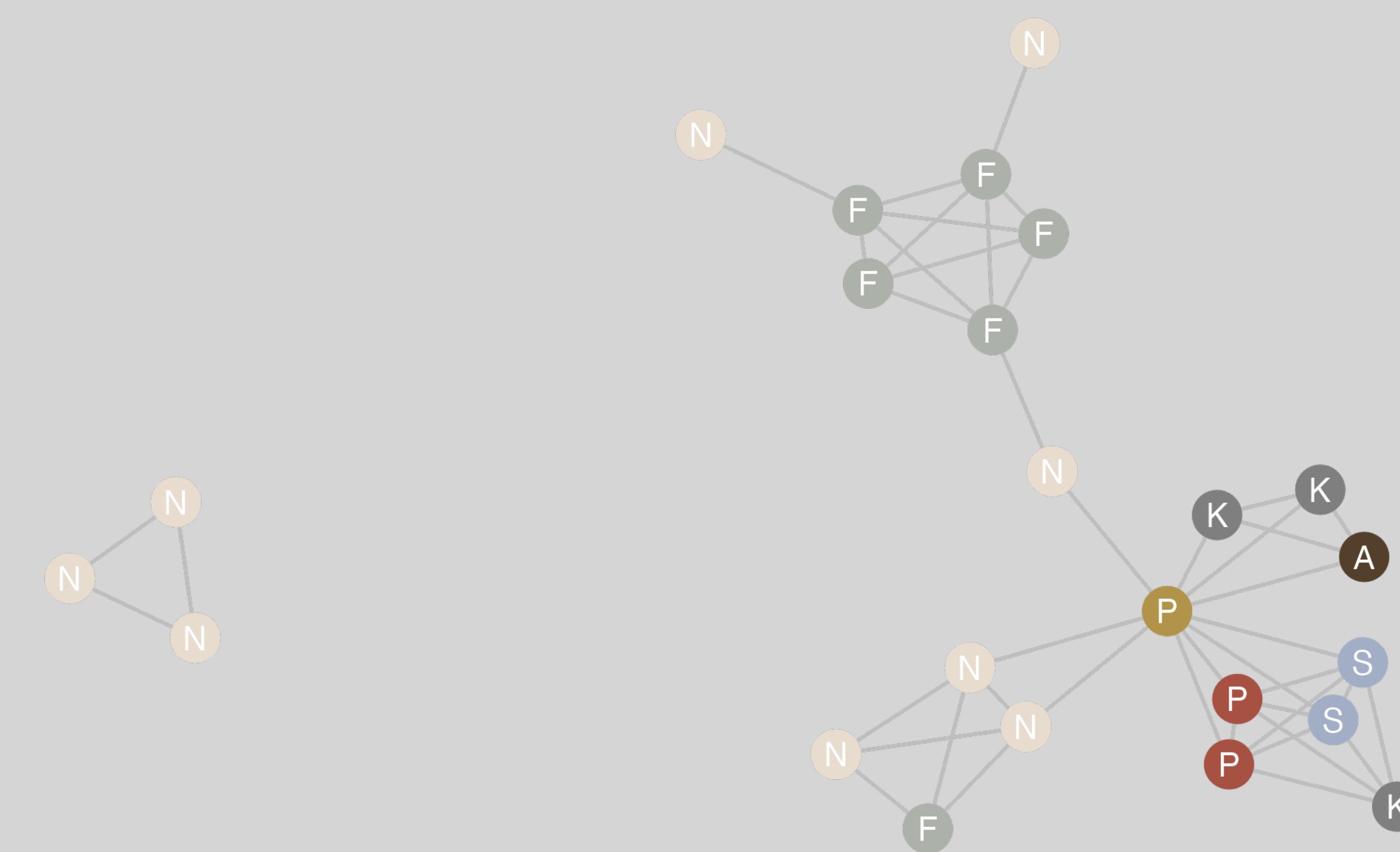
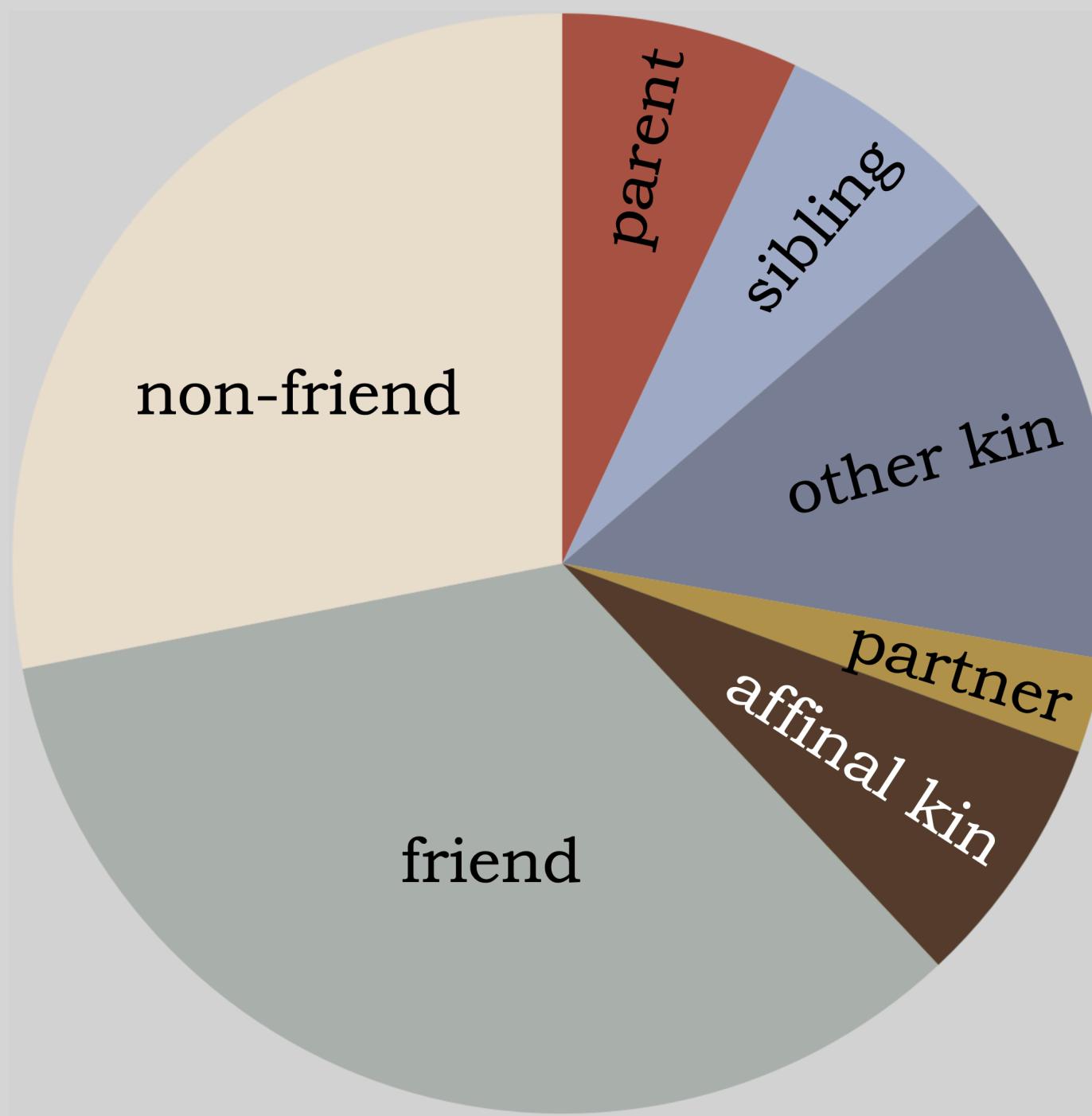
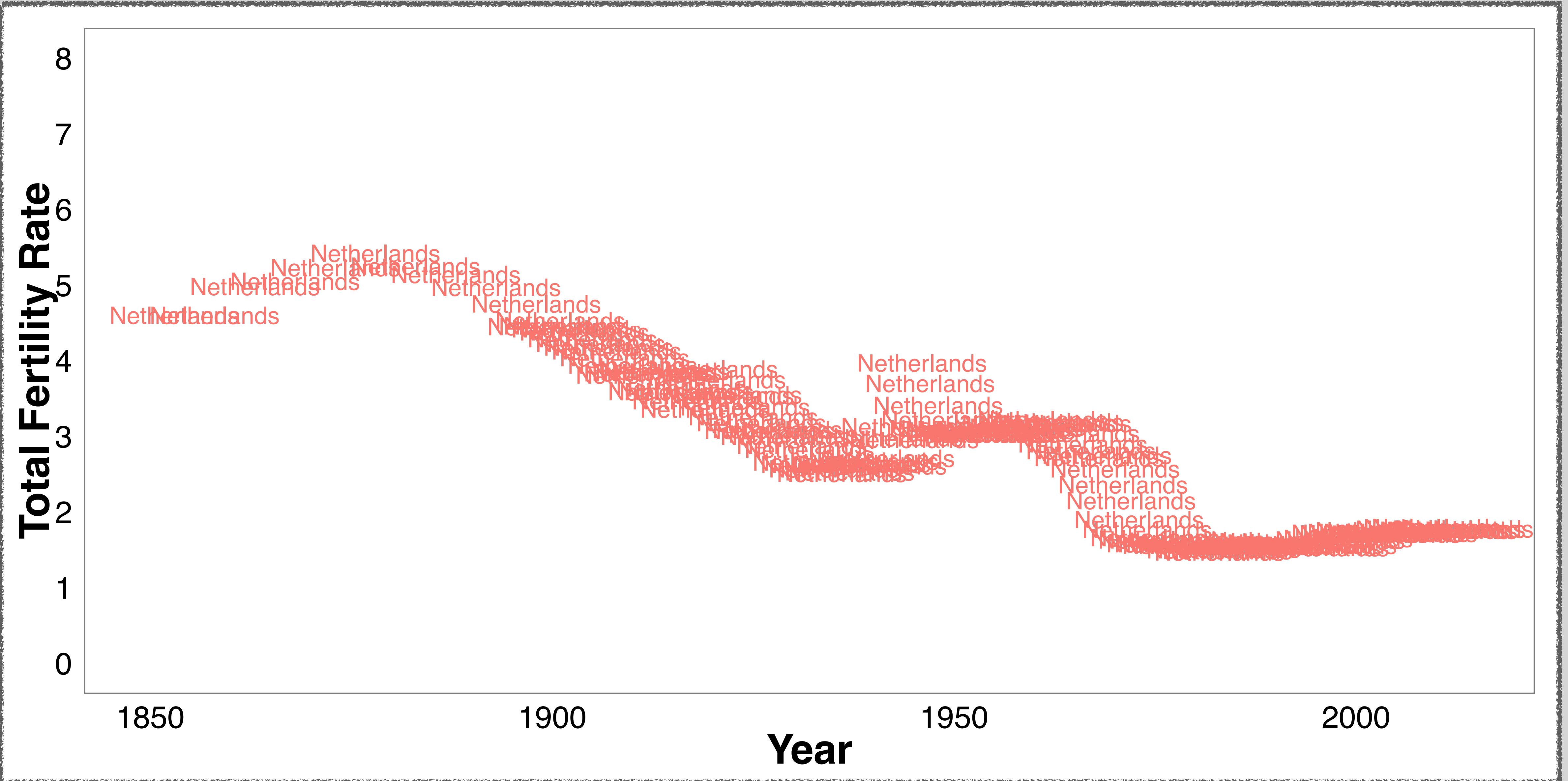
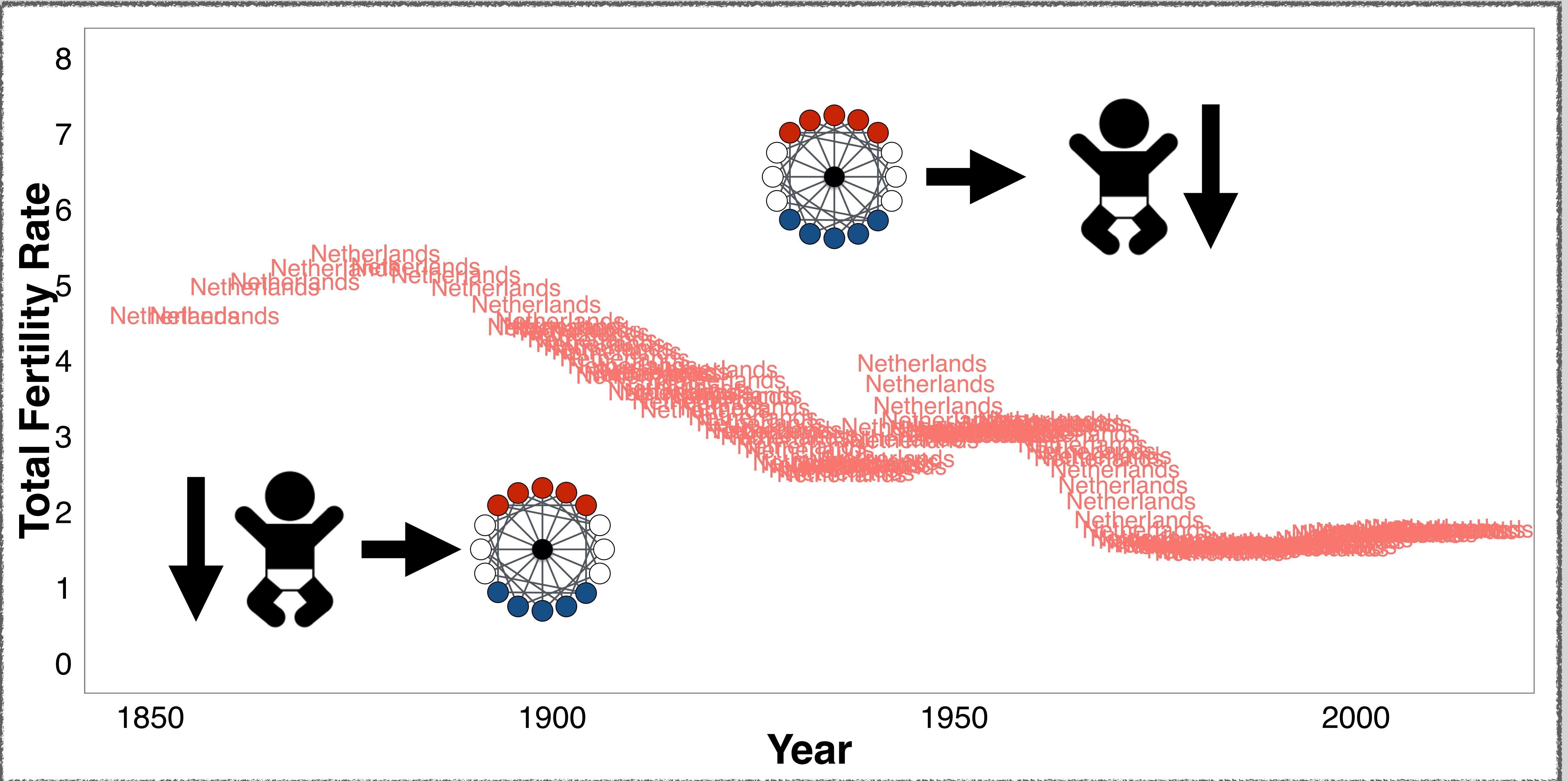


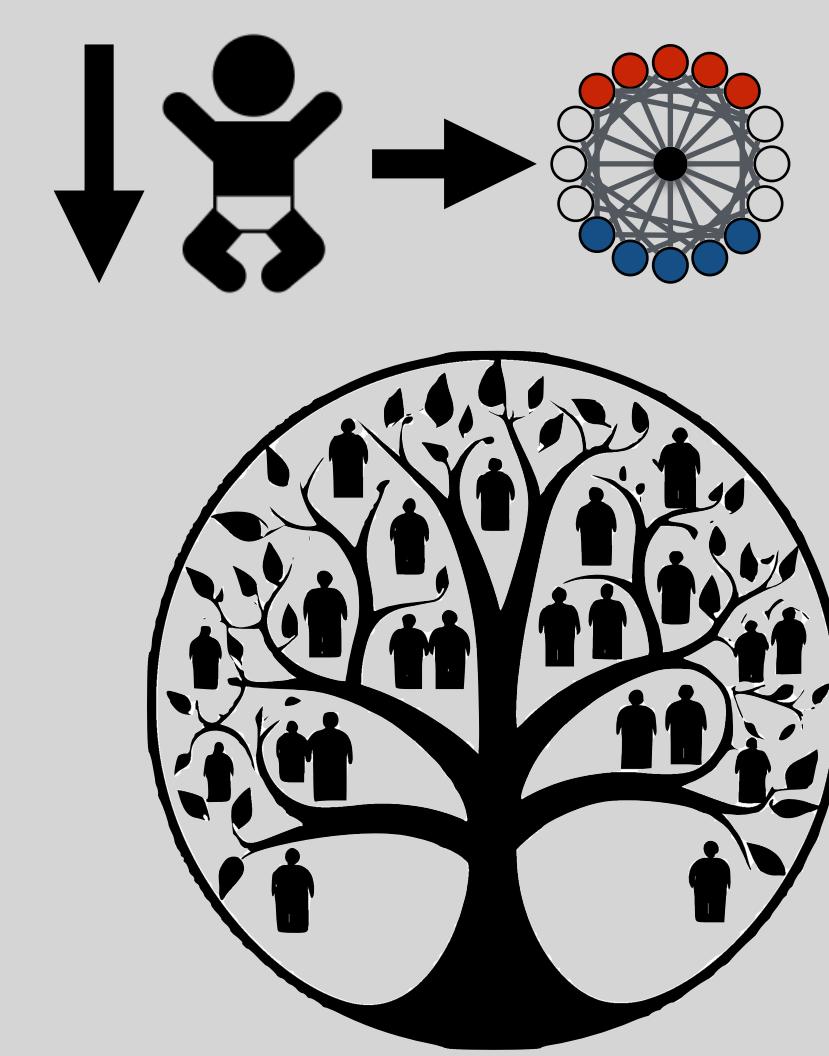


Social mechanisms underlying whether people have children





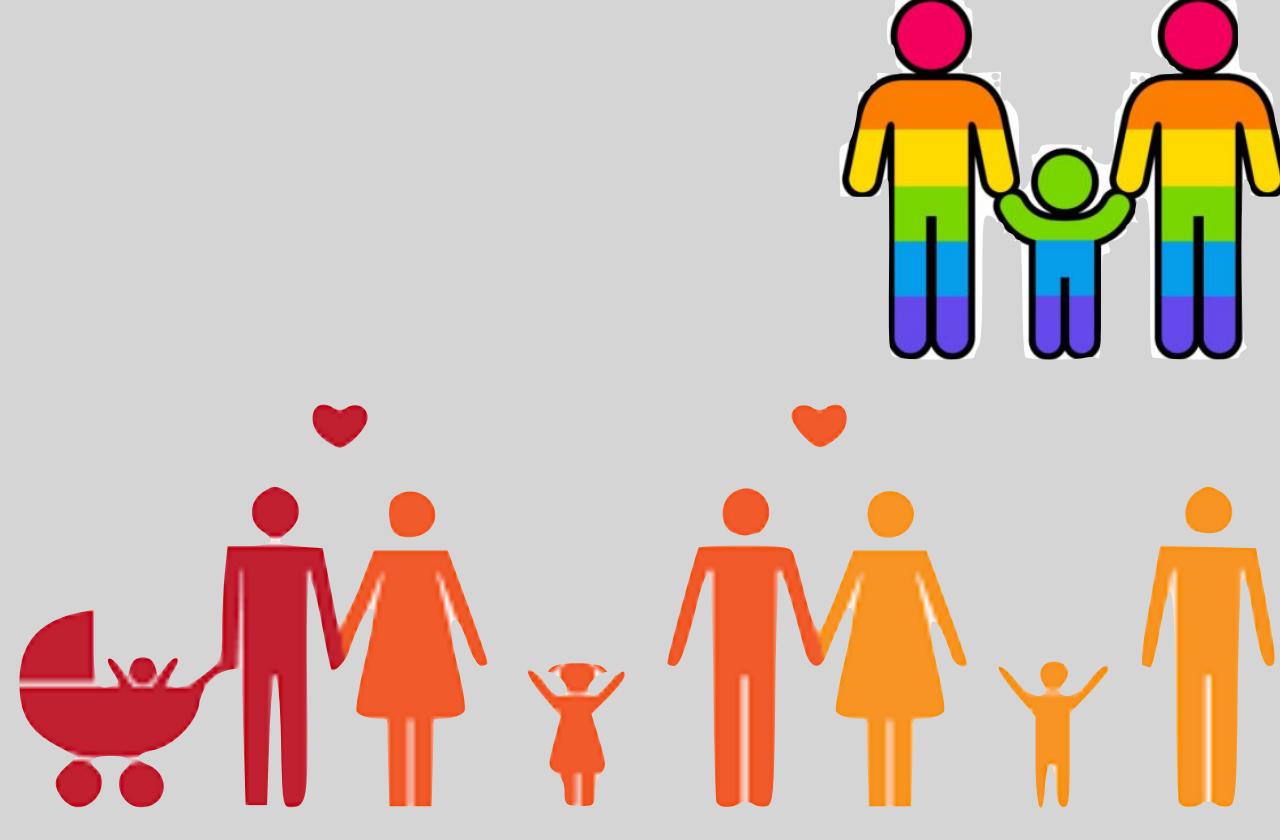


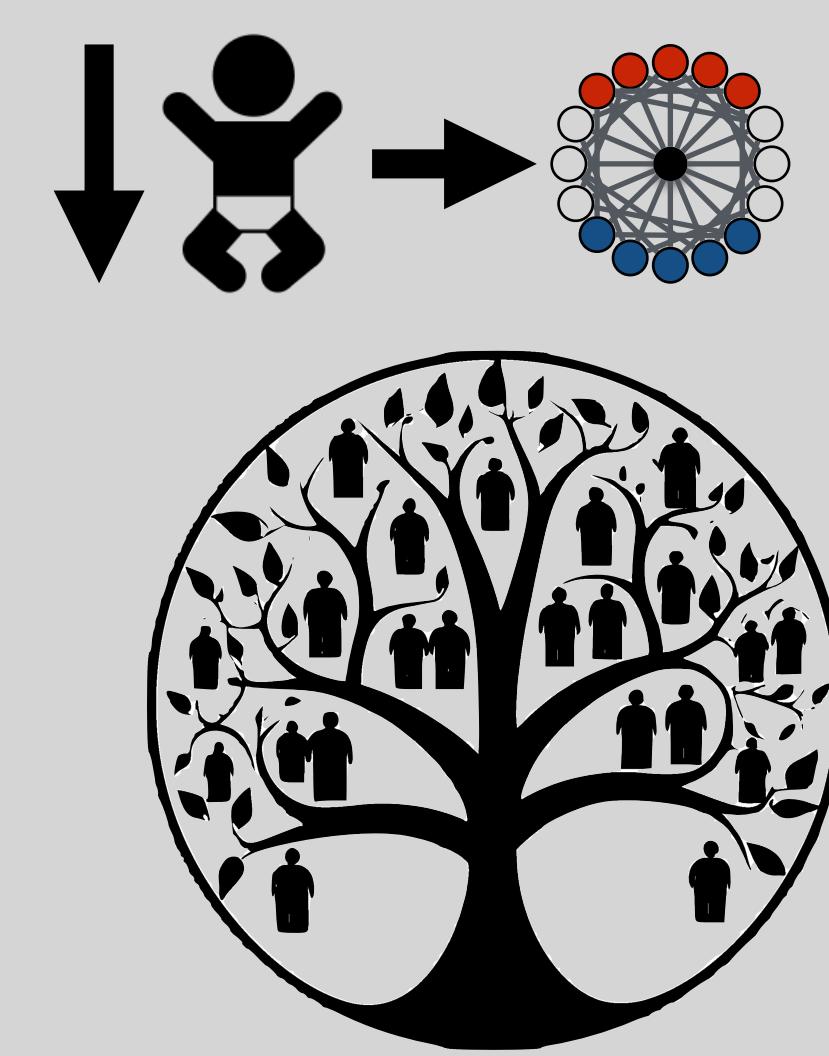


FROM
EXTENDED
KIN
NETWORKS

TO
IMPORTANCE
OF NUCLEAR
FAMILY

TO
A DIVERSITY
OF
FAMILIES





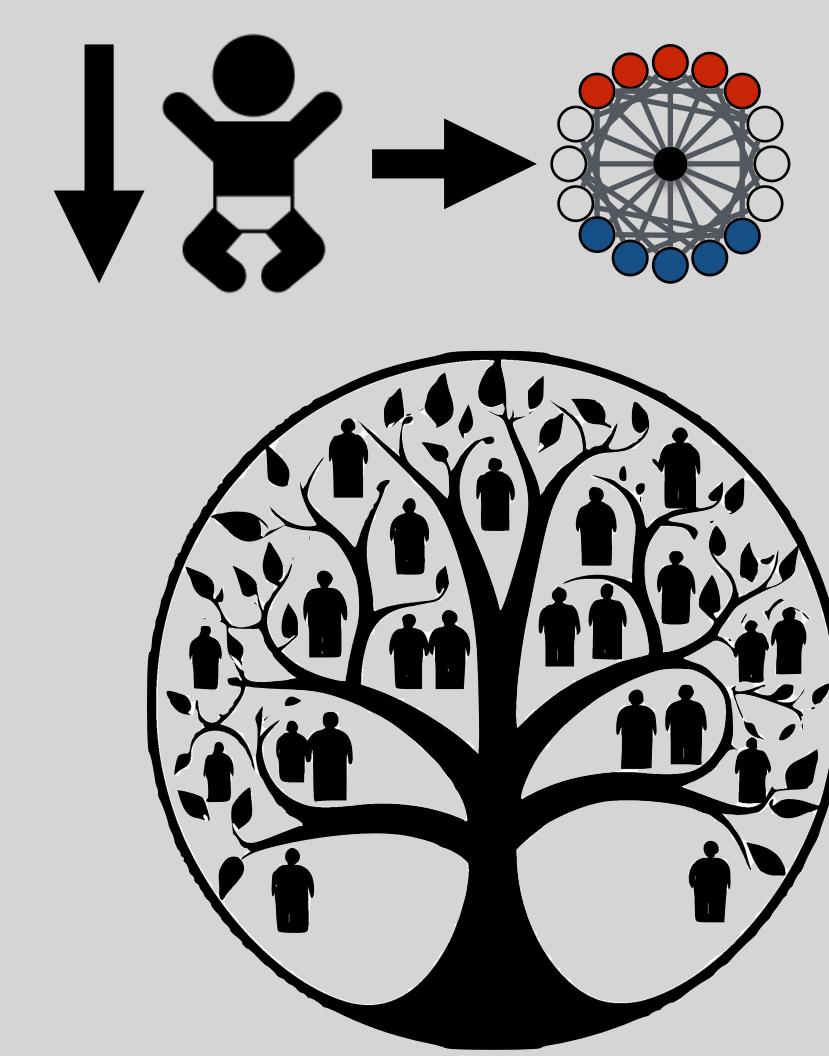
FROM
EXTENDED
KIN
NETWORKS

TO
IMPORTANCE
OF NUCLEAR
FAMILY

TO
A DIVERSITY
OF
FAMILIES

worries about social cohesion and
the general demise of civilisation





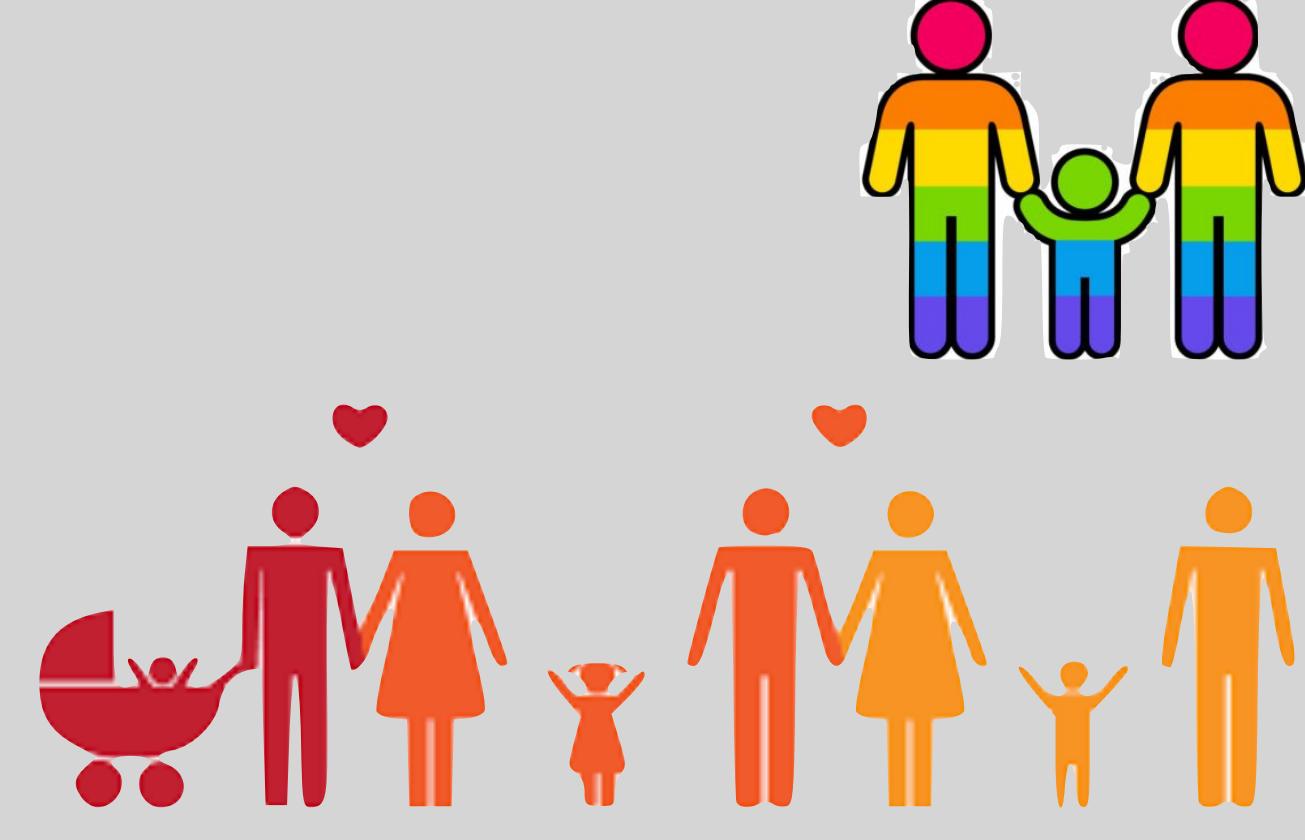
FROM
EXTENDED
KIN
NETWORKS

**custom
and
laws**

TO
IMPORTANCE
OF NUCLEAR
FAMILY

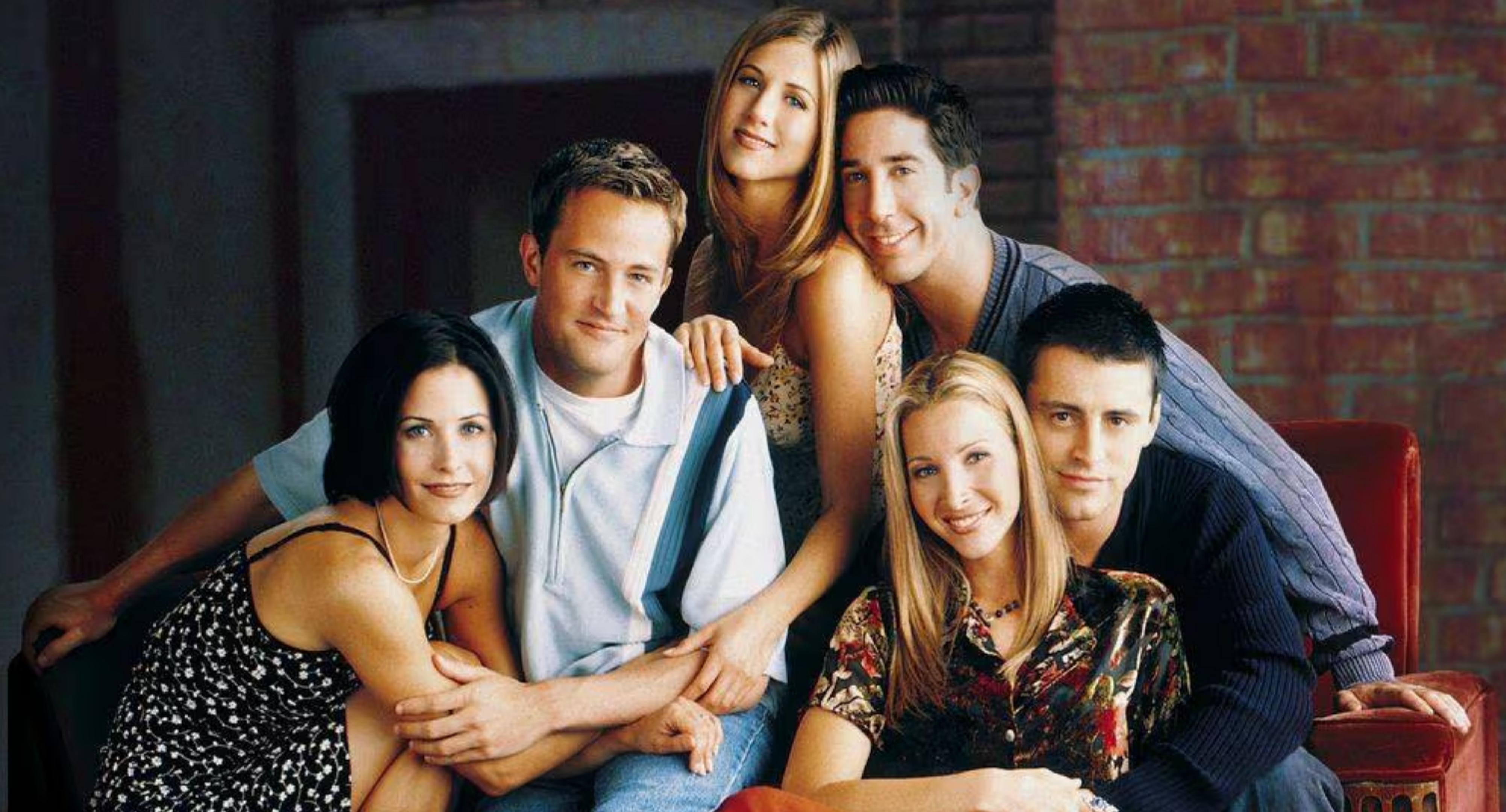


*love
and
affection*



TO
A DIVERSITY
OF
FAMILIES

F.R.I.E.N.D.S



my sister is my best friend

he is like a brother to me

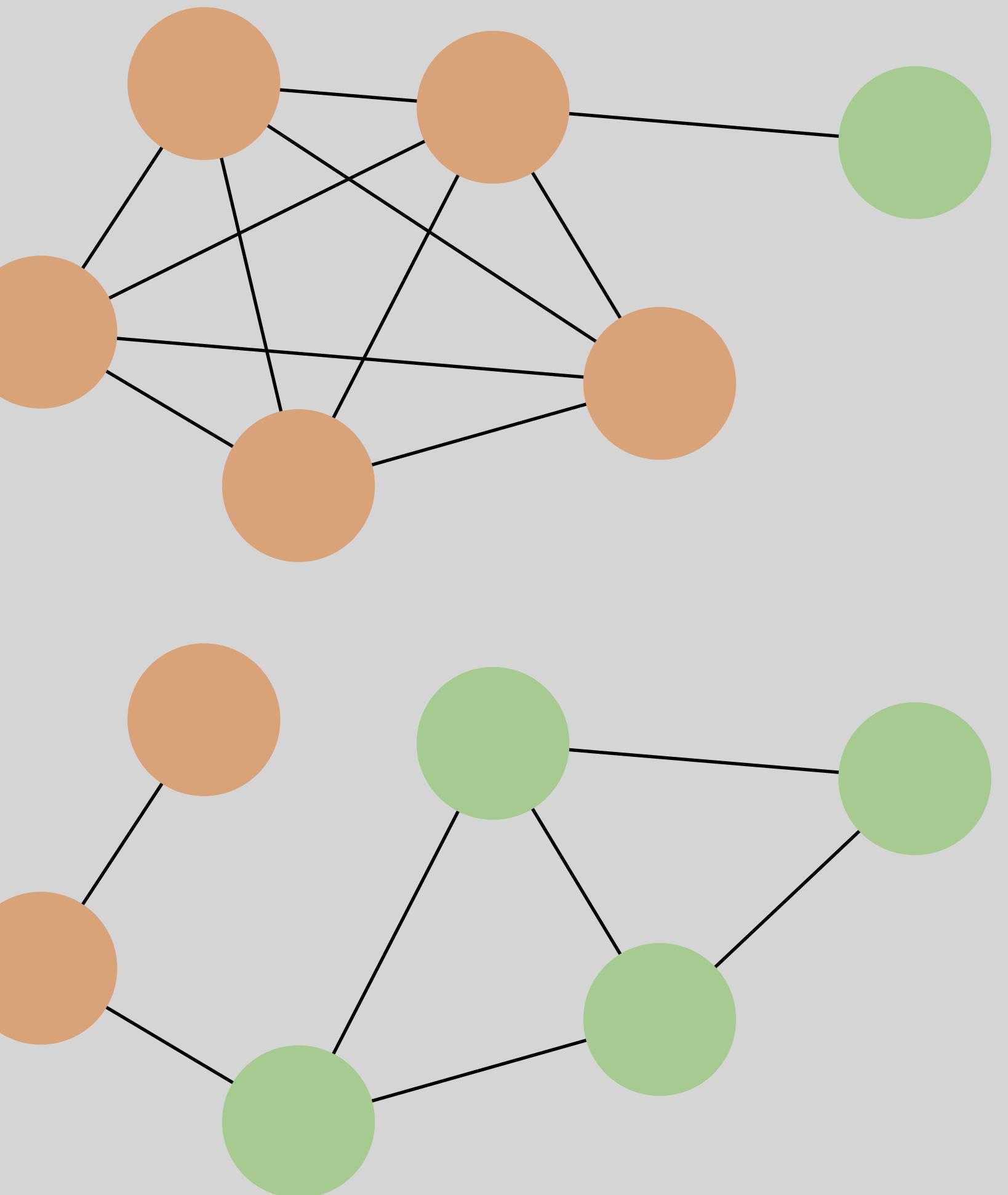
family

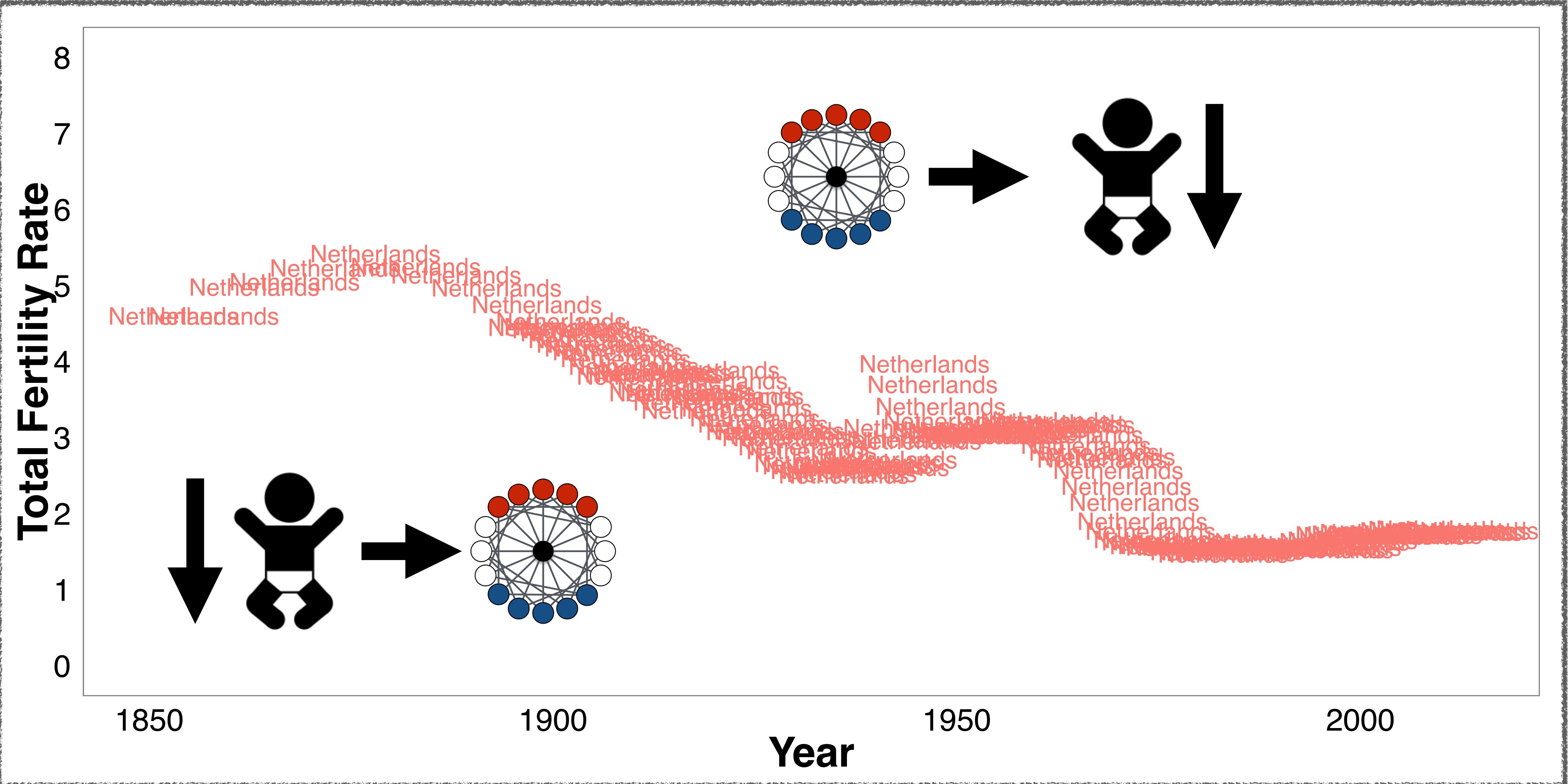
Closeness
Unconditional
Instrumental support
Reproduction

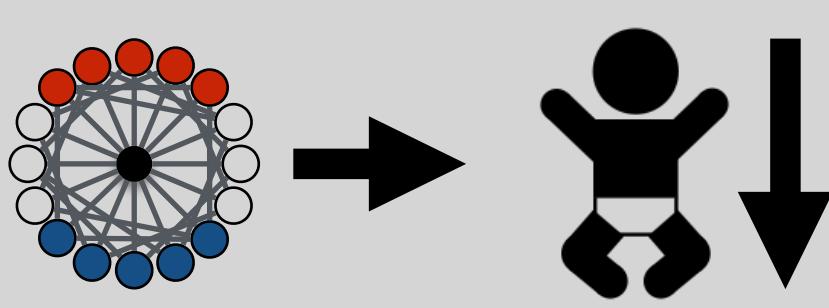
friends

Reciprocity
Shared interests
Emotional support

variation in networks
=
variation in resources







increasing modernisation,
means fewer kin around,
less support available,
fewer pro-natal sentiments,
anti-natal norms more likely

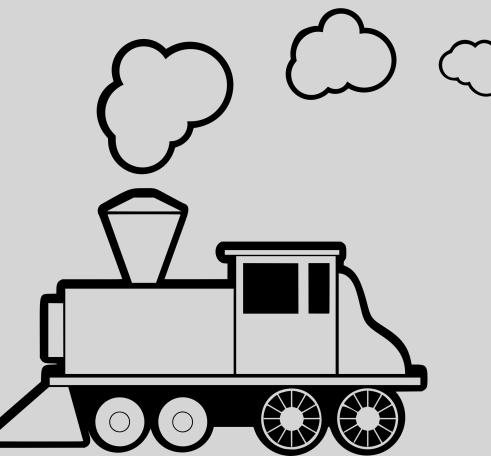


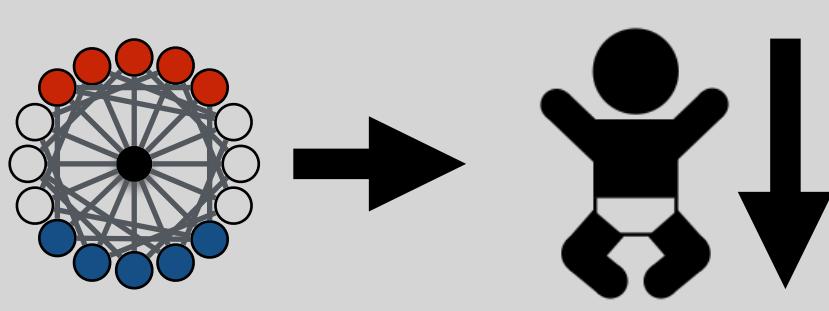
support

advice

pressure

fertility
kin in network

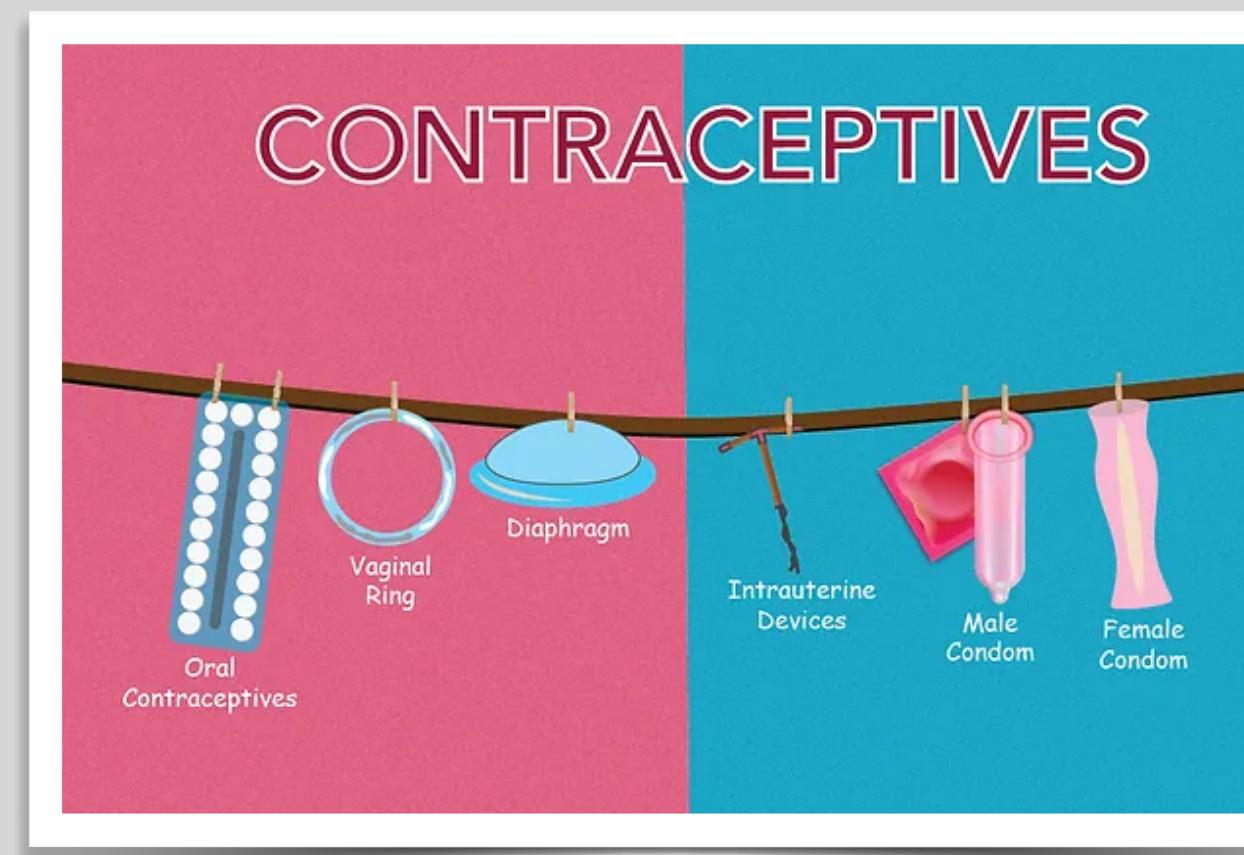




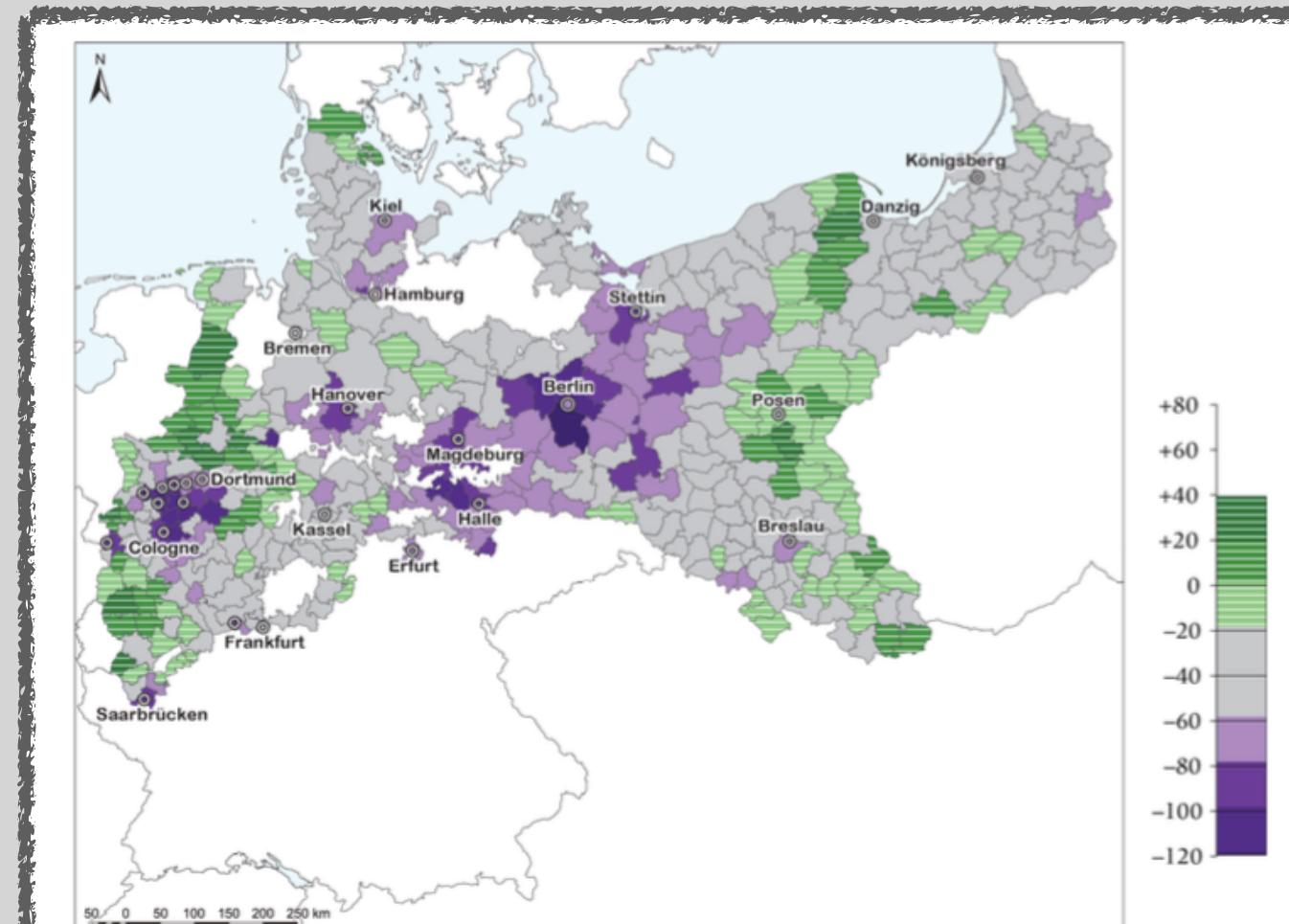
66

one kind of social interaction, informal conversations with networks of relatives, friends, and neighbours, was important for historical change in bedroom behavior

WATKINS 1995



historical
data



**Spatial Analysis of the
Causes of Fertility Decline
in Prussia**

JOSHUA R. GOLDSTEIN

SEBASTIAN KLÜSENER



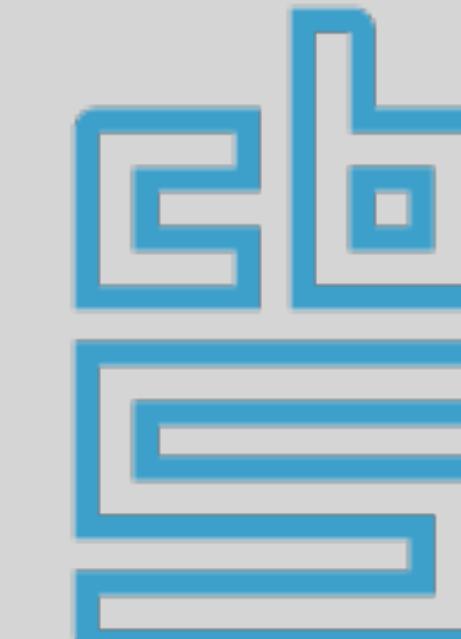
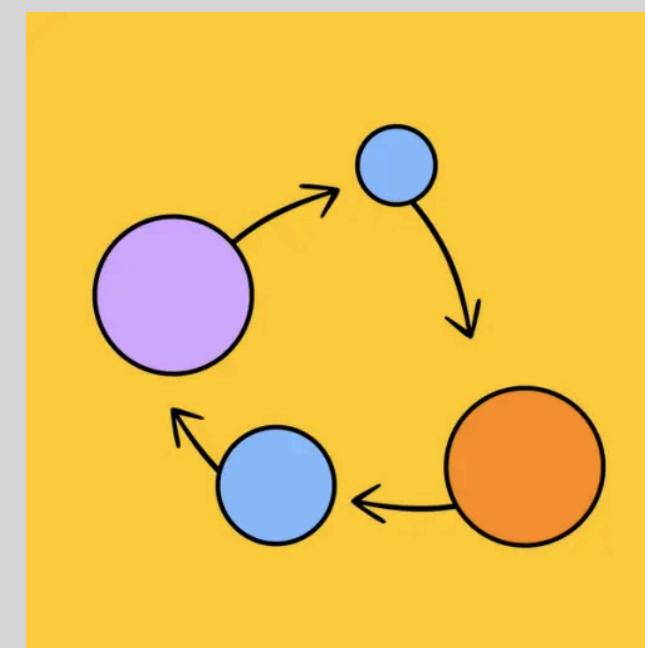
convenience
samples

**Does Fertility Behavior
Spread among Friends?**

Nicoletta Balbo^a and Nicola Barban^b

**Family, Firms, and Fertility: A Study of Social
Interaction Effects**

Zafer Buyukkececi¹ · Thomas Leopold² · Ruben van Gaalen³ ·
Henriette Engelhardt⁴

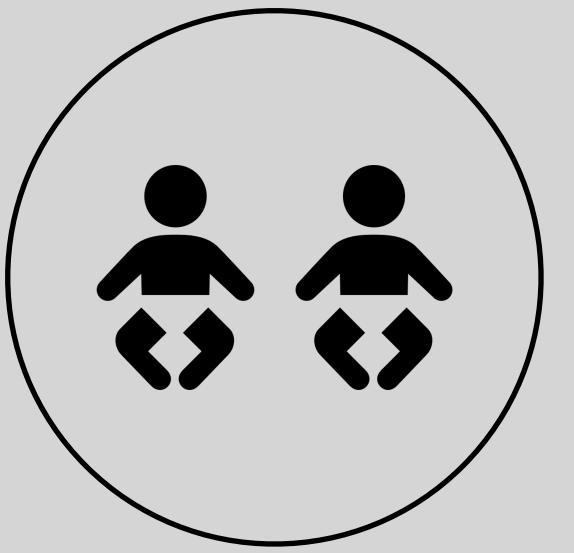


causal
design

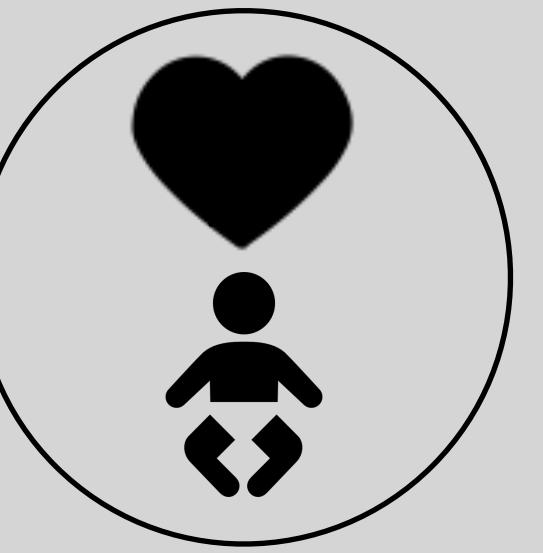
*social learning
social contagion
social pressure
social support*

qualitative
studies

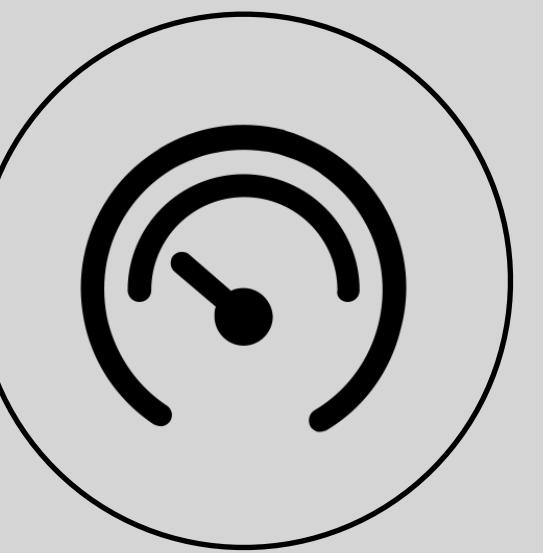
social learning



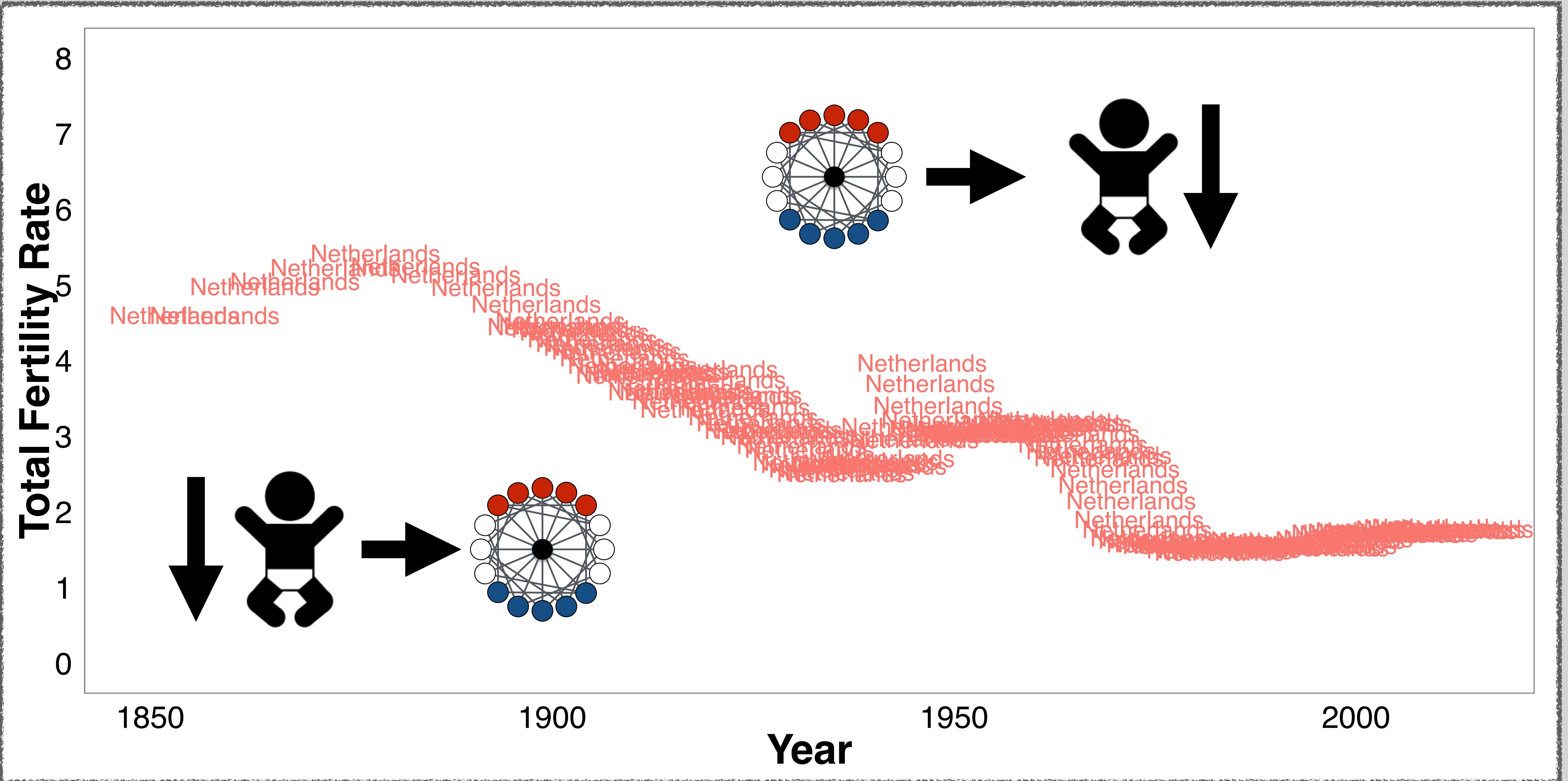
social contagion



social support



social pressure



Individualisation

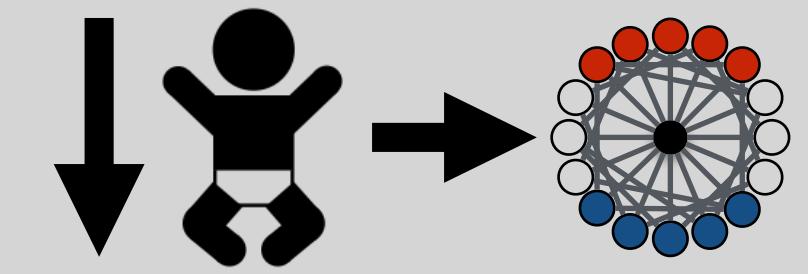
Wage Labour

Globalisation

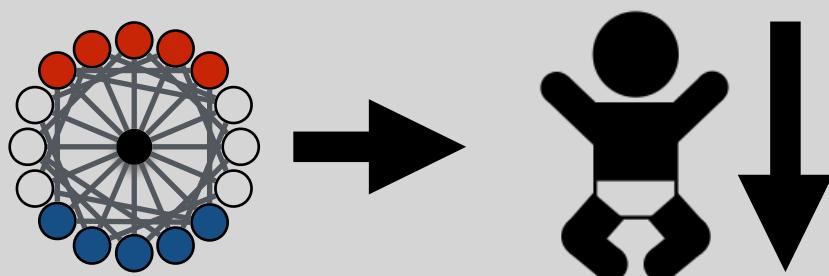
Women's Labour Force Participation

Educational Expansion

Secularisation



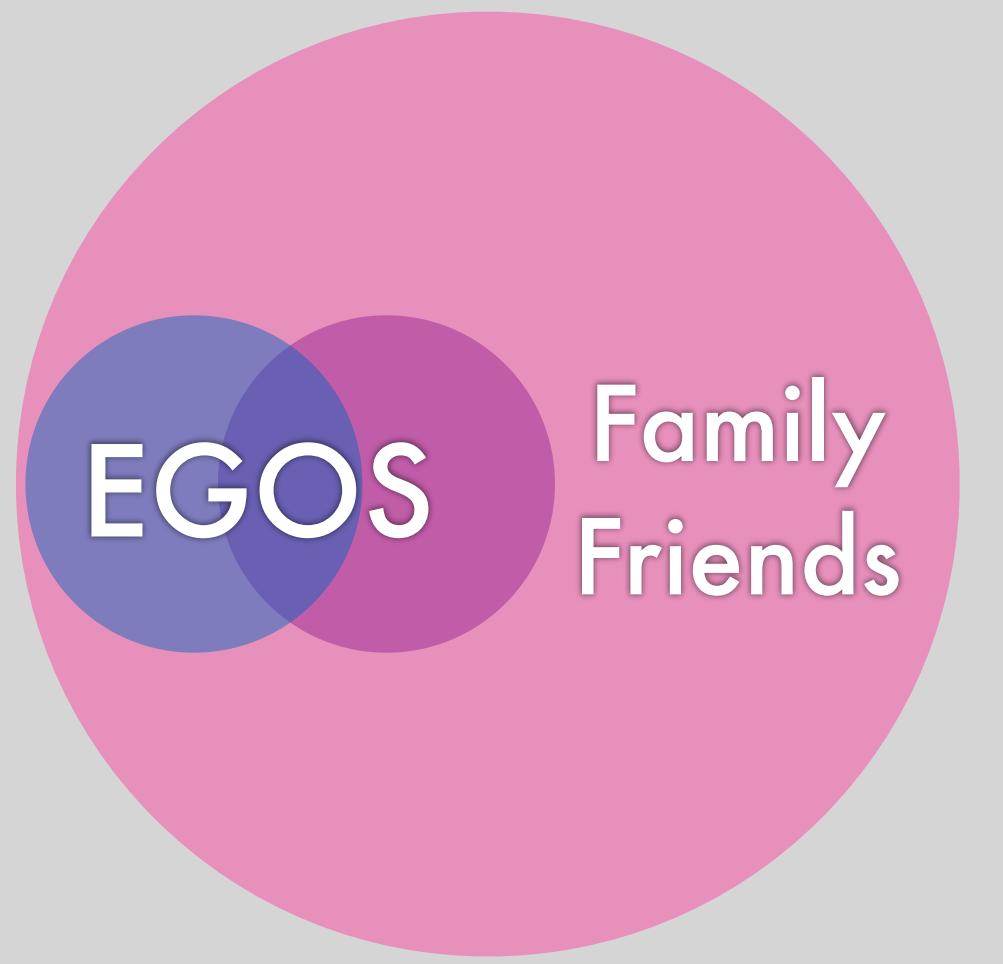
(I) characterising kin and
non-kin in networks

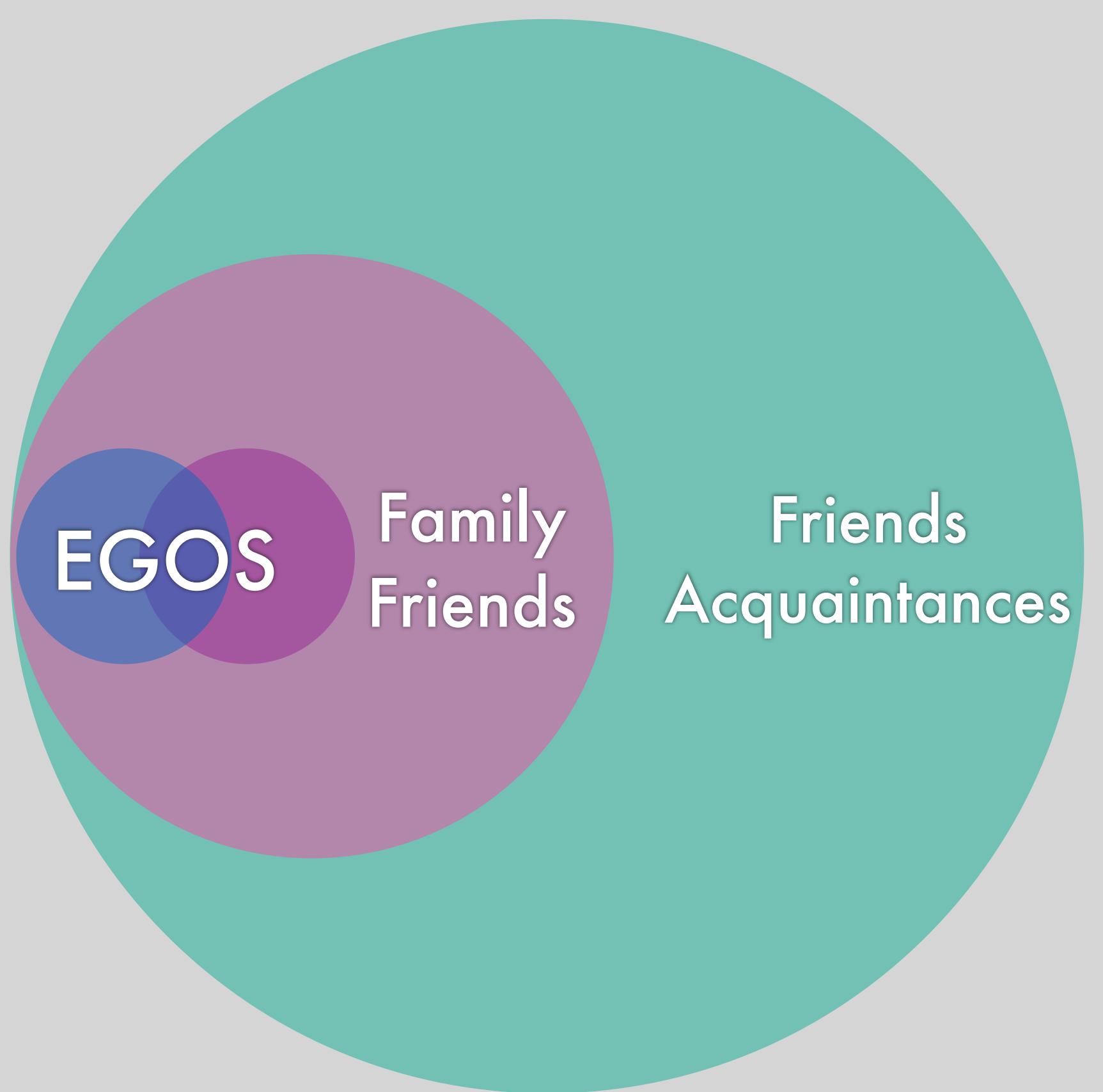


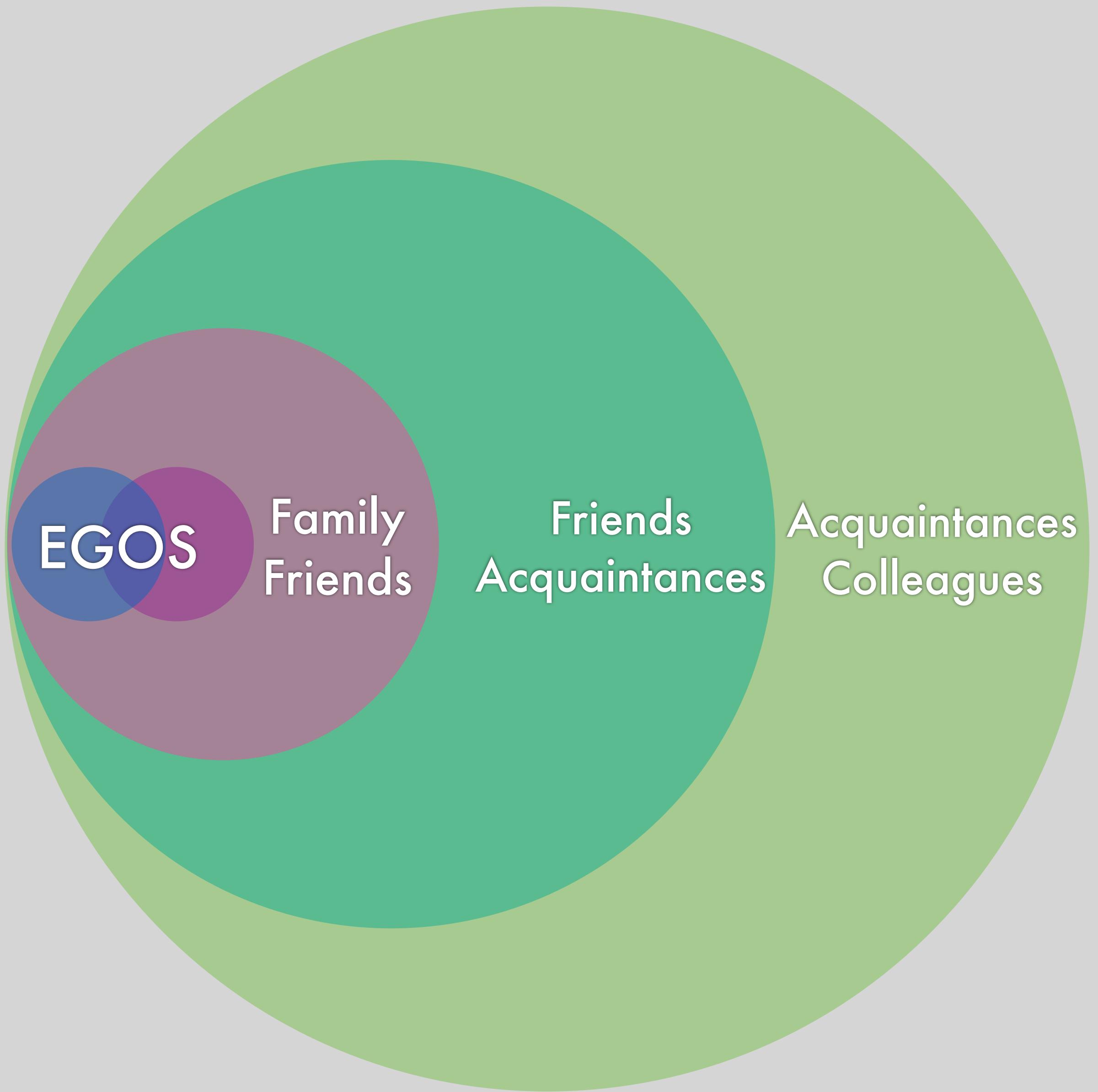
(II) quantifying social influences
on fertility behaviour
using personal network data

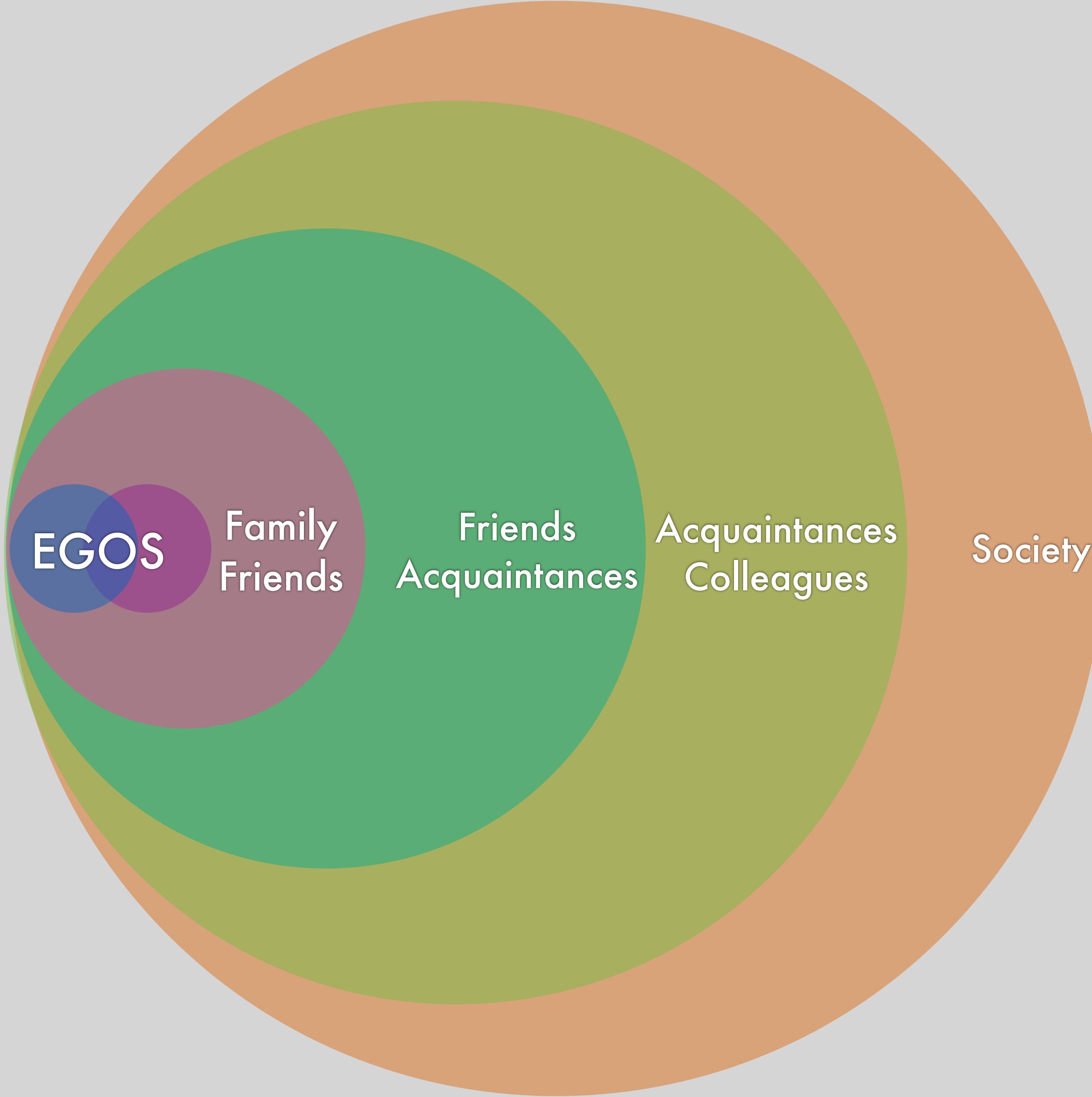
EGO

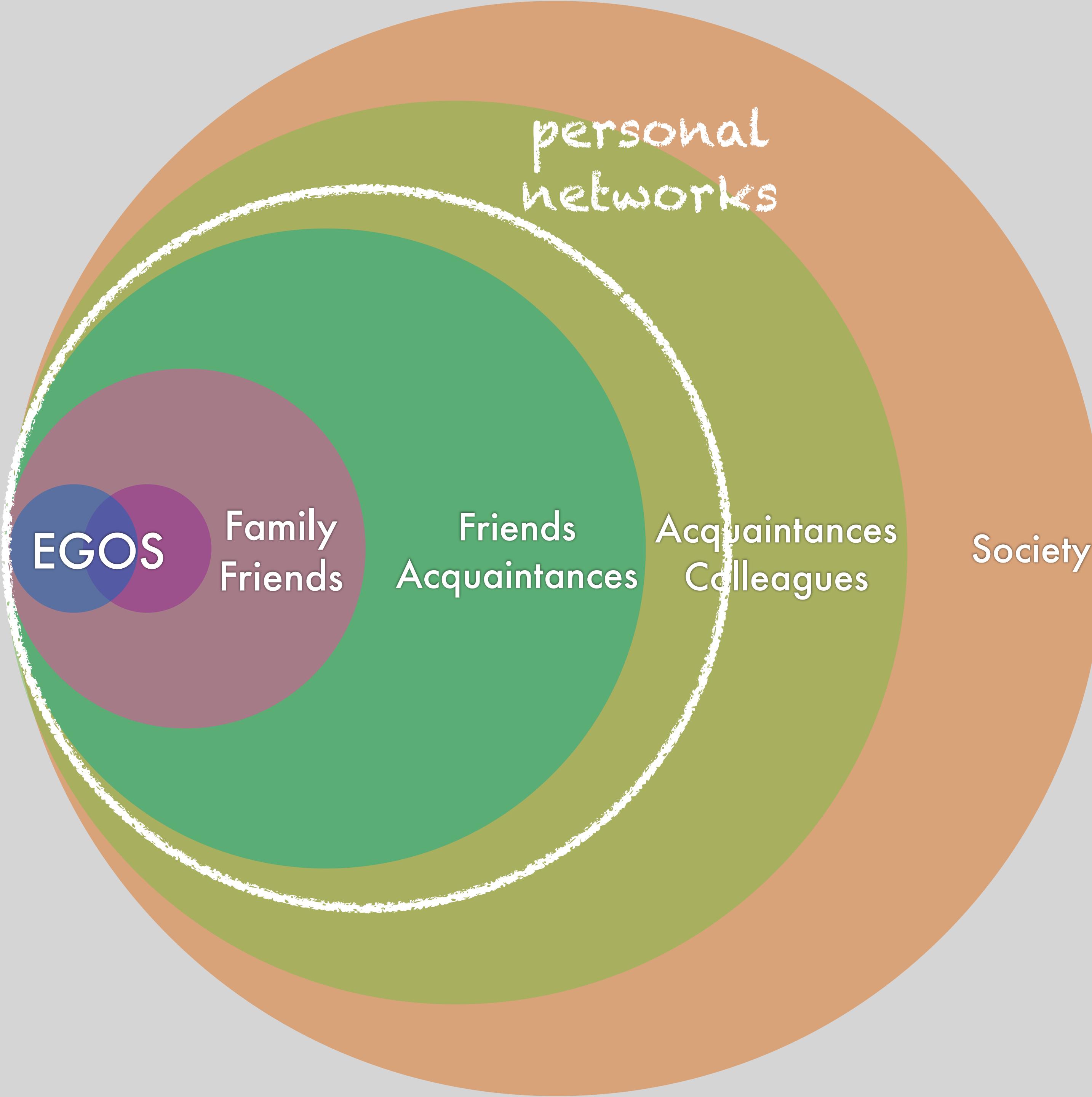






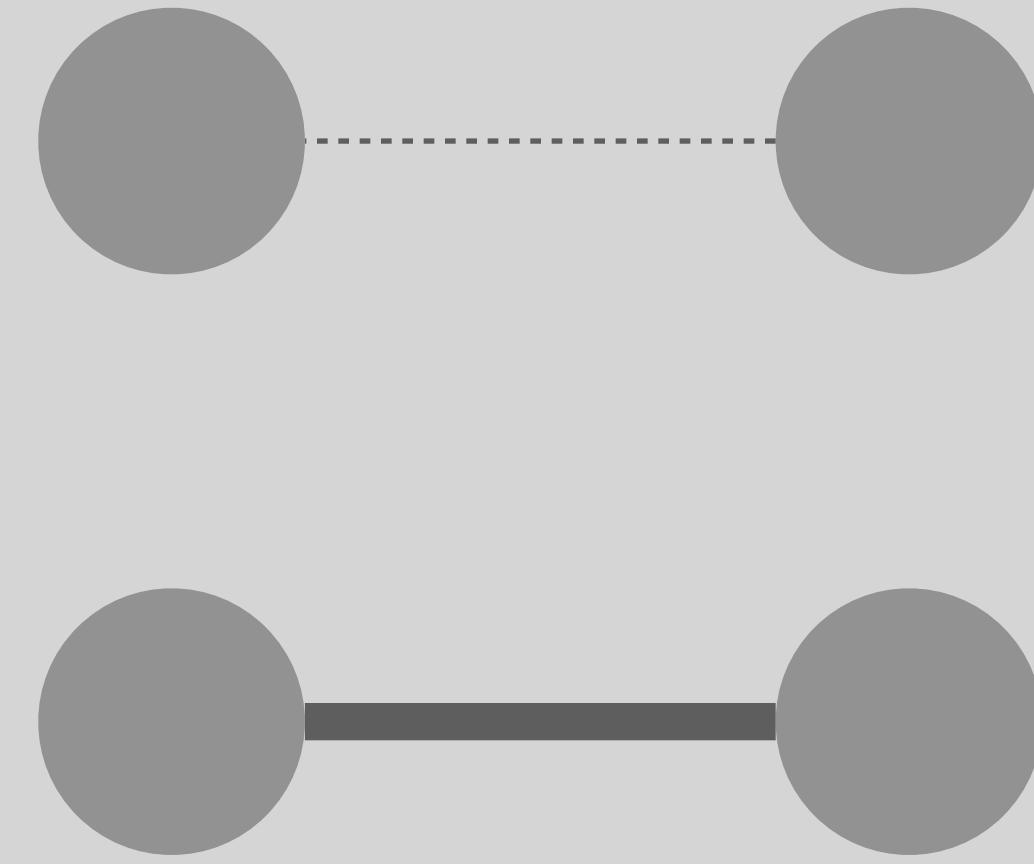






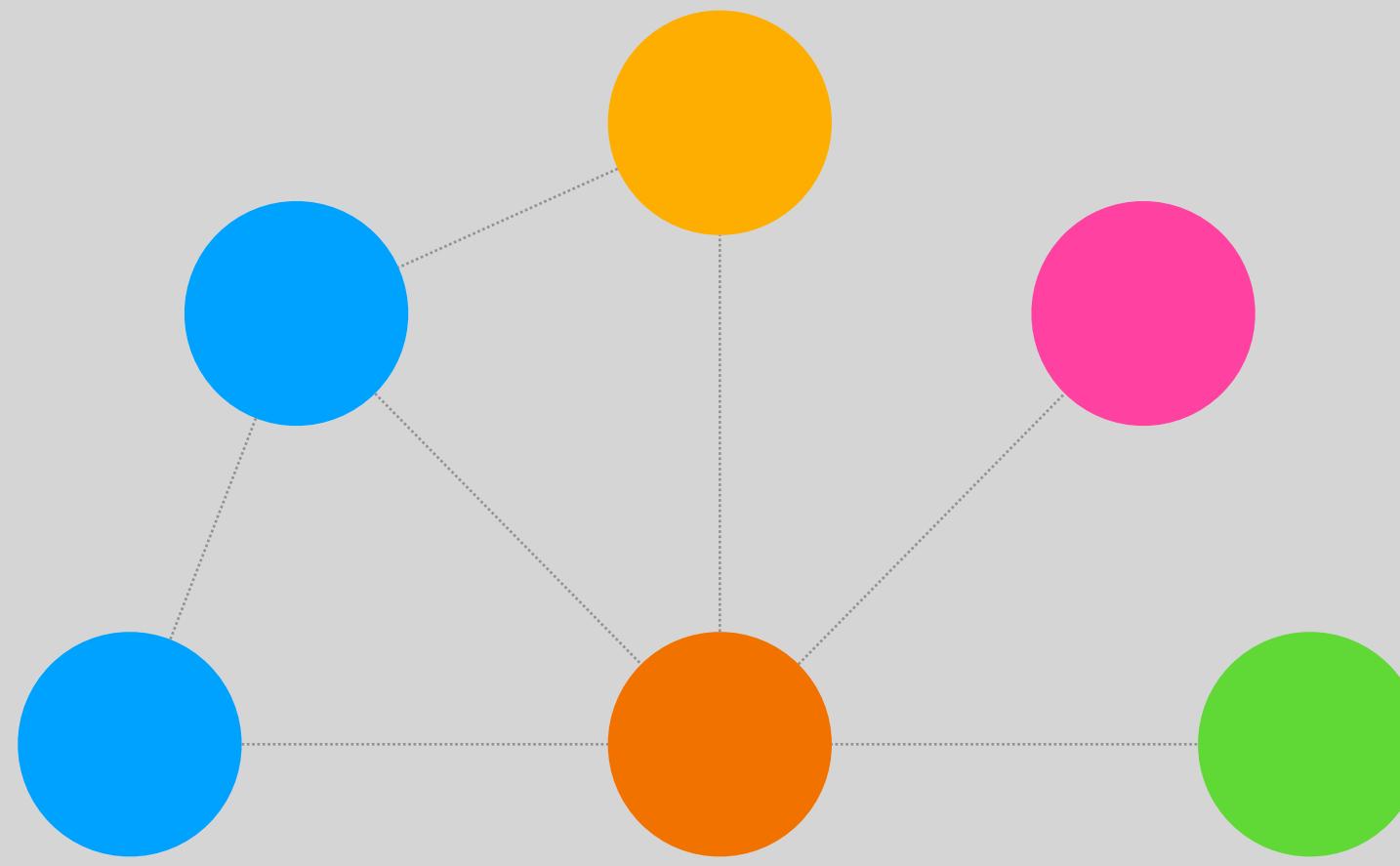
Personal Networks

tie (strength)



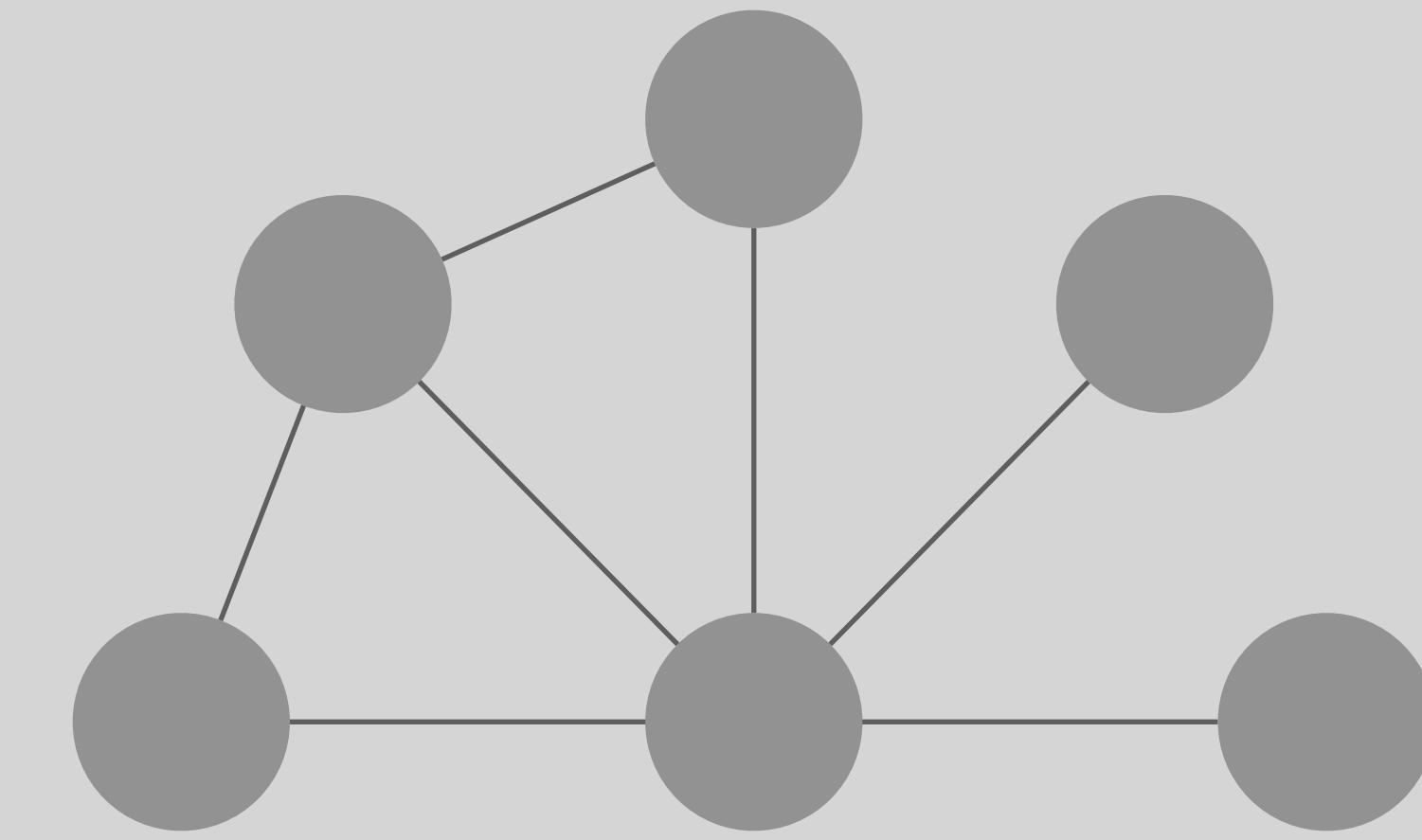
strong tie, more support/pressure
e.g., quality of relation with parent

composition



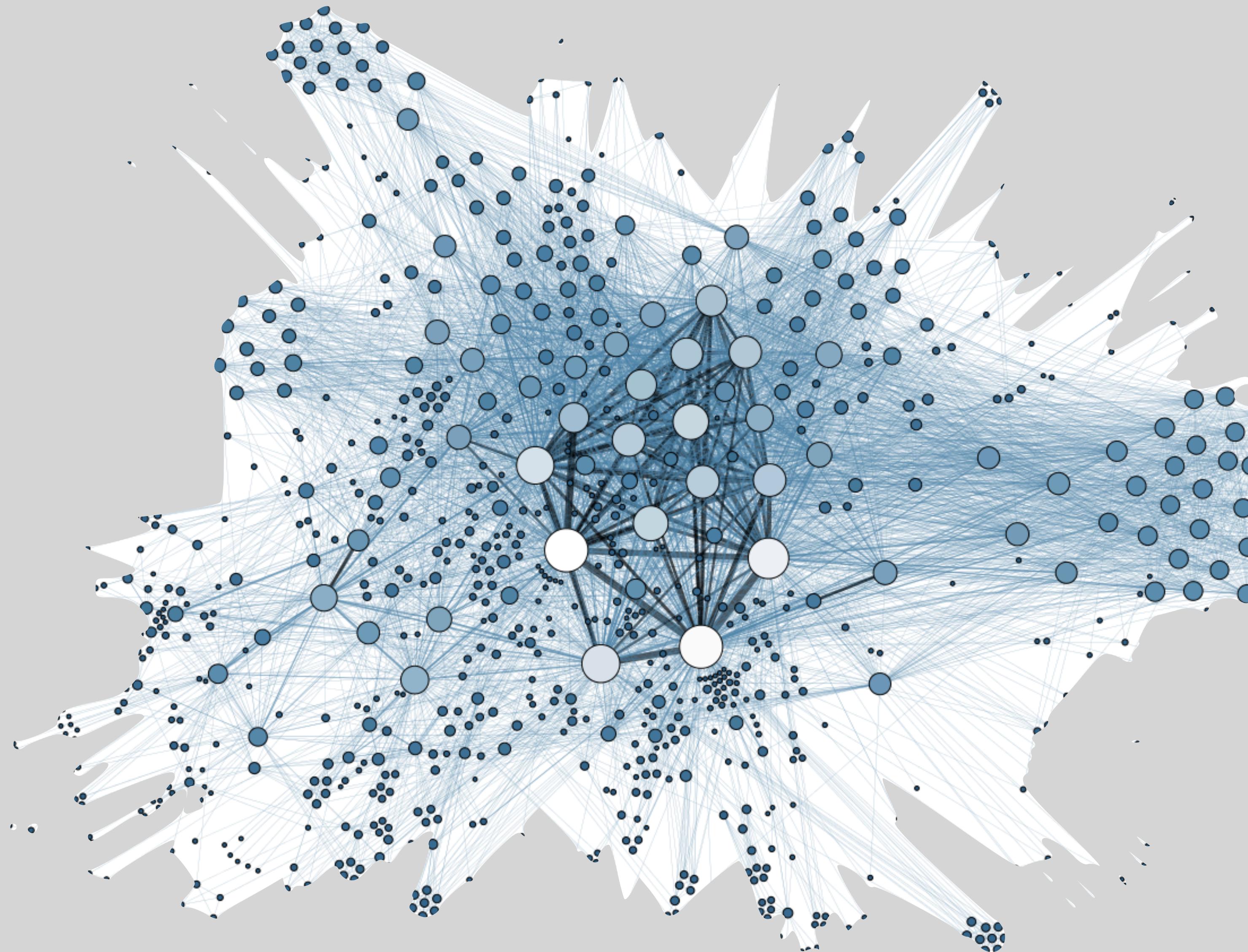
support network, diversity in ideas
e.g., # kin, # friends, # can help

structure



reinforcing norms, flow information
e.g., density, # cliques

Network size



**weak ties
structure**

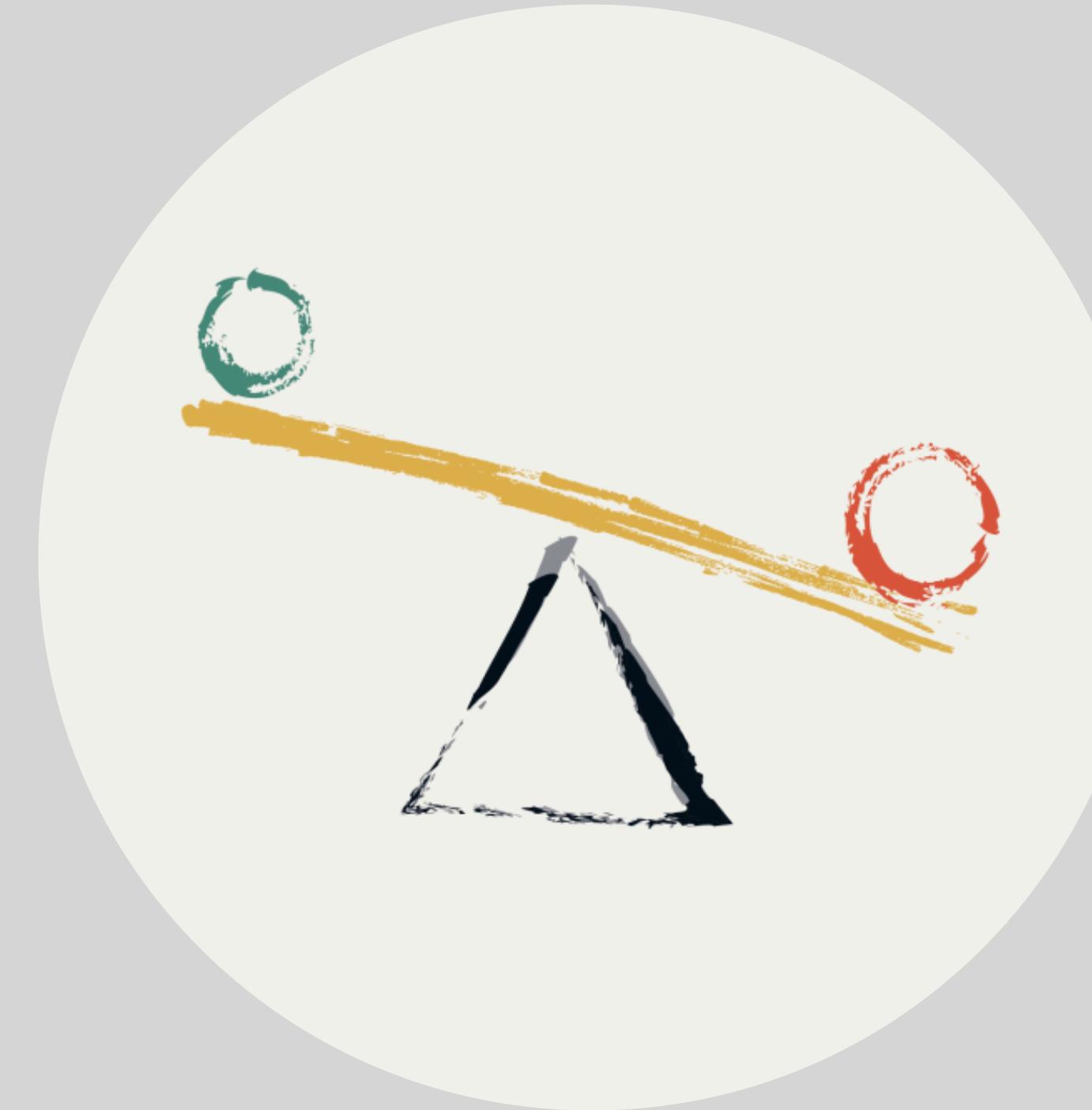
The Right Answer is 25

scientific interest

weak ties

network structure

network composition



respondent burden

time

boredom

poor(er) response

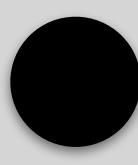
Methodology



Longitudinal Internet
Studies for the
Social sciences

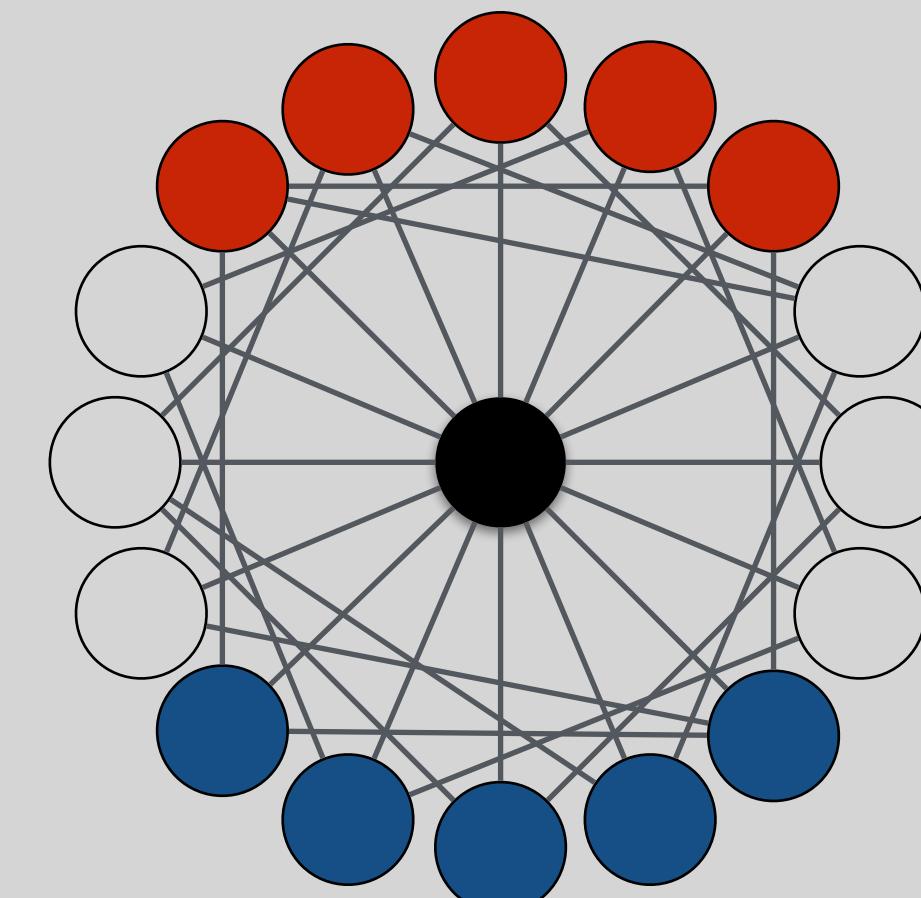
~750 women
age: 18 - 40

Ego



Age
Education
Income
Partnership status
Children
Detailed fertility preferences

Alters (25)



Sex
Age
Education
Relationship type
Closeness
Frequency of contact F2F
Frequency of other contact

Number and age of children
Friend
Wants children
Does not want children
Help with children
Talk about children
Relationship with other alters

Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.



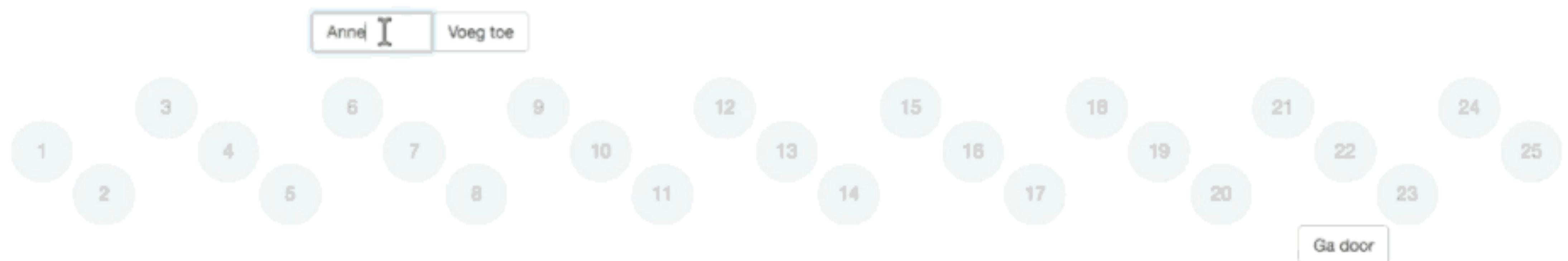
The image shows a digital form for listing contacts. At the top left are two buttons: 'Naam' (Name) and 'Voeg toe' (Add). Below them is a grid of 25 light blue circles, each containing a number from 1 to 25. The numbers are arranged in approximately five rows: row 1 (1, 2), row 2 (3, 4, 5, 6, 7, 8), row 3 (9, 10, 11, 12, 13, 14), row 4 (15, 16, 17, 18, 19, 20), and row 5 (21, 22, 23, 24, 25). At the bottom right is a button labeled 'Ga door' (Continue).

Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.

Anne!Voeg toe

12345678910111213141516171819202122232425Ga door



Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.

Voeg toe

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Ga door

Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.

Bertha

Voegt toe

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Ga door

Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.

The image shows a digital form for listing contacts. At the top left is a text input field labeled "Naam". To its right is a button labeled "Voeg toe" (Add), which has a red circle and a cursor icon over it, indicating it is the active button. Below these are 25 numbered circles arranged in a curved line. Circle 1 contains the name "Anne" and circle 2 contains the name "Bertha". At the bottom right of the list is a button labeled "Ga door".

Nummer	Name
1	Anne
2	Bertha
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.

Ymke Voeg toe

25

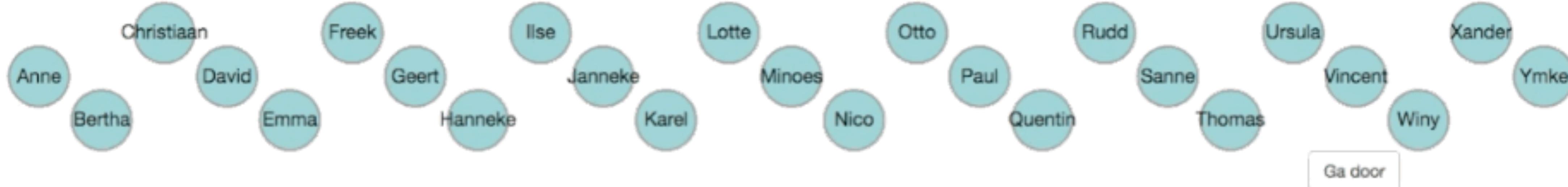
Anne Bertha Christiaan David Emma Freek Geert Hanneke Ilse Janneke Karel Lotte Minoes Nico Otto Paul Quentin Rudd Sanne Thomas Ursula Vincent Winy Xander

Ga door

Methodology

Please list 25 names of individuals 18 years or older with whom you have had contact in the last year. This can be face-to-face contact, but also contact via phone, internet, or email. You know these people and these people also know you from your name or face (think of friends, family, acquaintances, et cetera). You could reach out to these people if you would have to. Please name your partner in case you have one.

Bedankt voor het invullen van deze namen. Klik op "Ga door".



Methodology

Which of these 25 individuals could you ask for help with care for a child?

How close are you to these people?

Als het gaat om ANNE

Met wie heeft ANNE contact? Met contact bedoelen we alle vormen van contact, zoals face-to-face contact, contact via (mobiele) telefoon, post, email, sms, en andere manieren van online en offline communicatie.

Selecteer de personen die contact met elkaar hebben door met de muis op het bolletje te klikken. Er zal een lijn ontstaan die aangeeft dat de personen contact met elkaar hebben. Druk nogmaals op het bolletje om de lijn weer te laten verdwijnen, als de personen geen contact met elkaar hebben.

Heel hecht
Hecht
Een beetje hecht
Niet hecht
Helemaal niet hecht

Methodology

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Christiaan
Ymke
Bertha
Xander
Wimy
Vincent
Ursula
Thomas
Sanne
Rudd
Quentin
Paul
Lotte
Karel
Nico
Minoes
Otto
Anne
Hanneke
Ilse
Janneke
Lotte
Karel
Nico
Minoes

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Methodology

Which of these 25 individuals could you ask for help with care for a child?

How close are you to these people?

Als het gaat om ANNE

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Christiaan
Bertha
Ymke
Xander
Winy
Vincent
Ursula
Thomas
Sanne
Rudd
Quentin
Paul
Lotte
Karel
Nico
Minoes
Otto
Ilse
Janneke
Hanneke
Geert
Freek
Emma
David
Bertha
Anne

Methodology

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How close are you to these people?

Methodology

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How close are you to these people?

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Anne

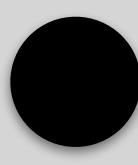
Methodology



Longitudinal Internet
Studies for the
Social sciences

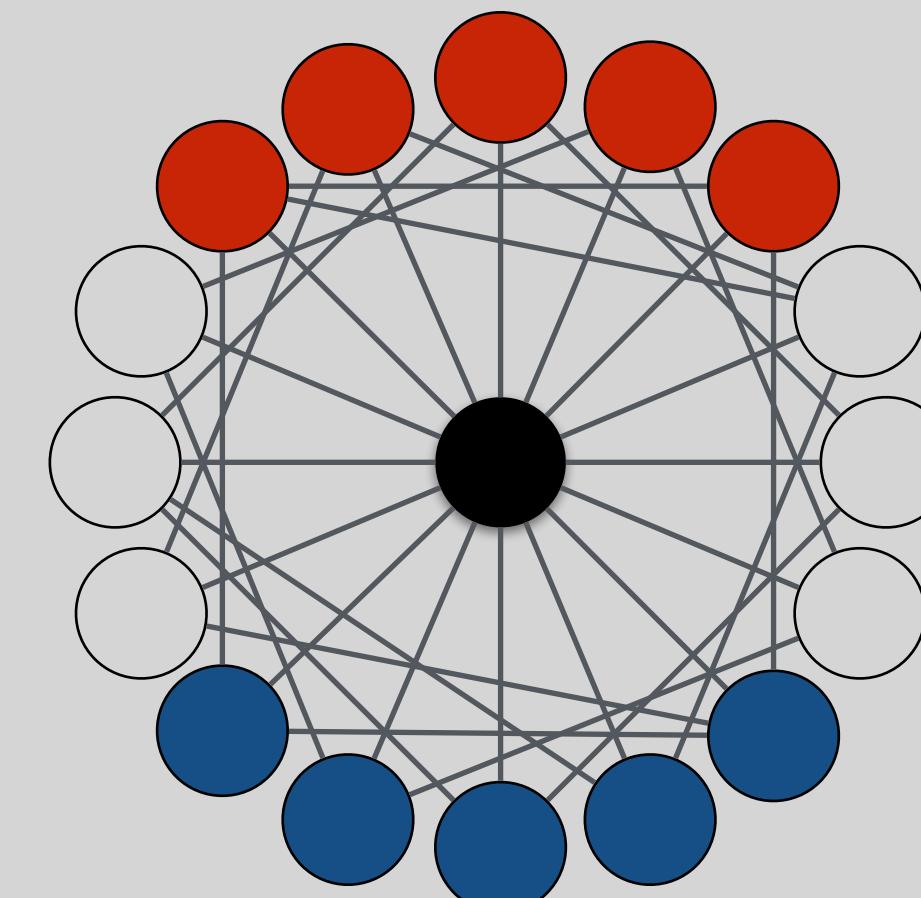
~750 women
age: 18 - 40

Ego



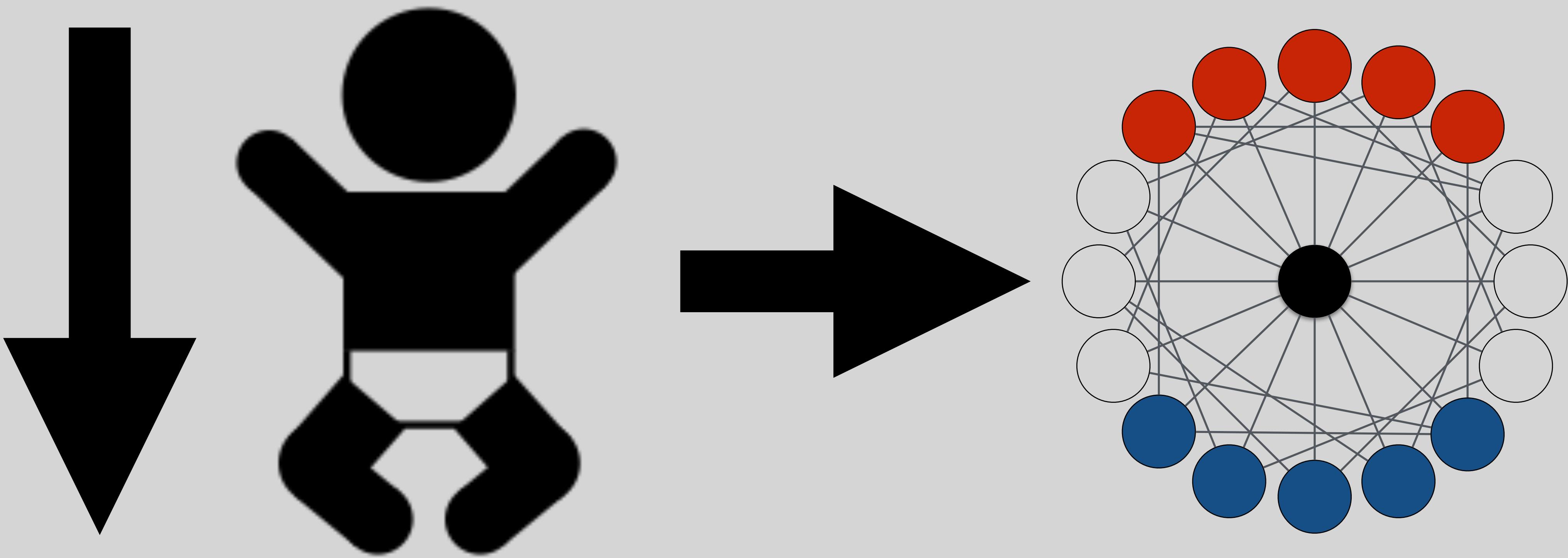
Age
Education
Income
Partnership status
Children
Detailed fertility preferences

Alters (25)

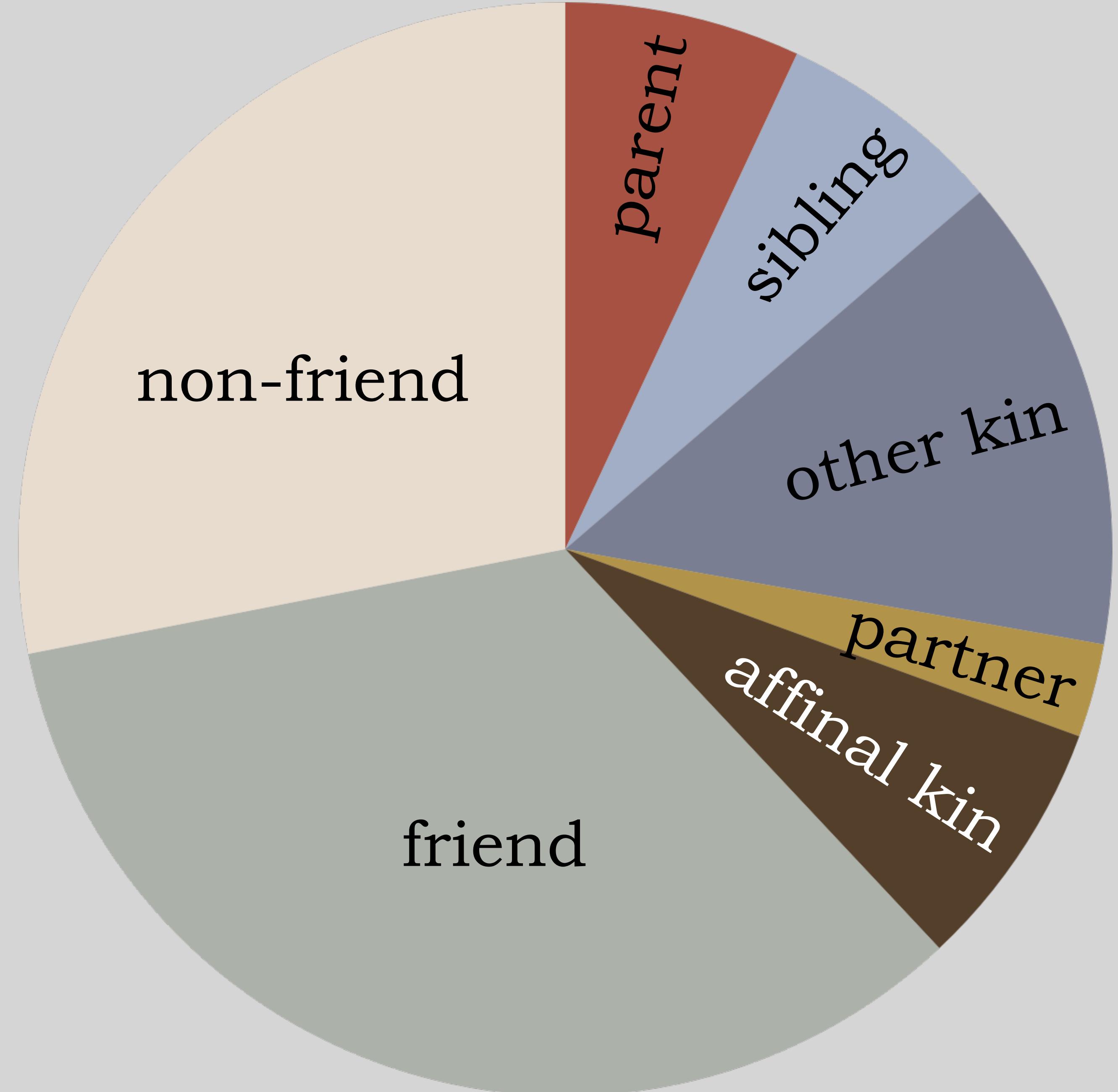


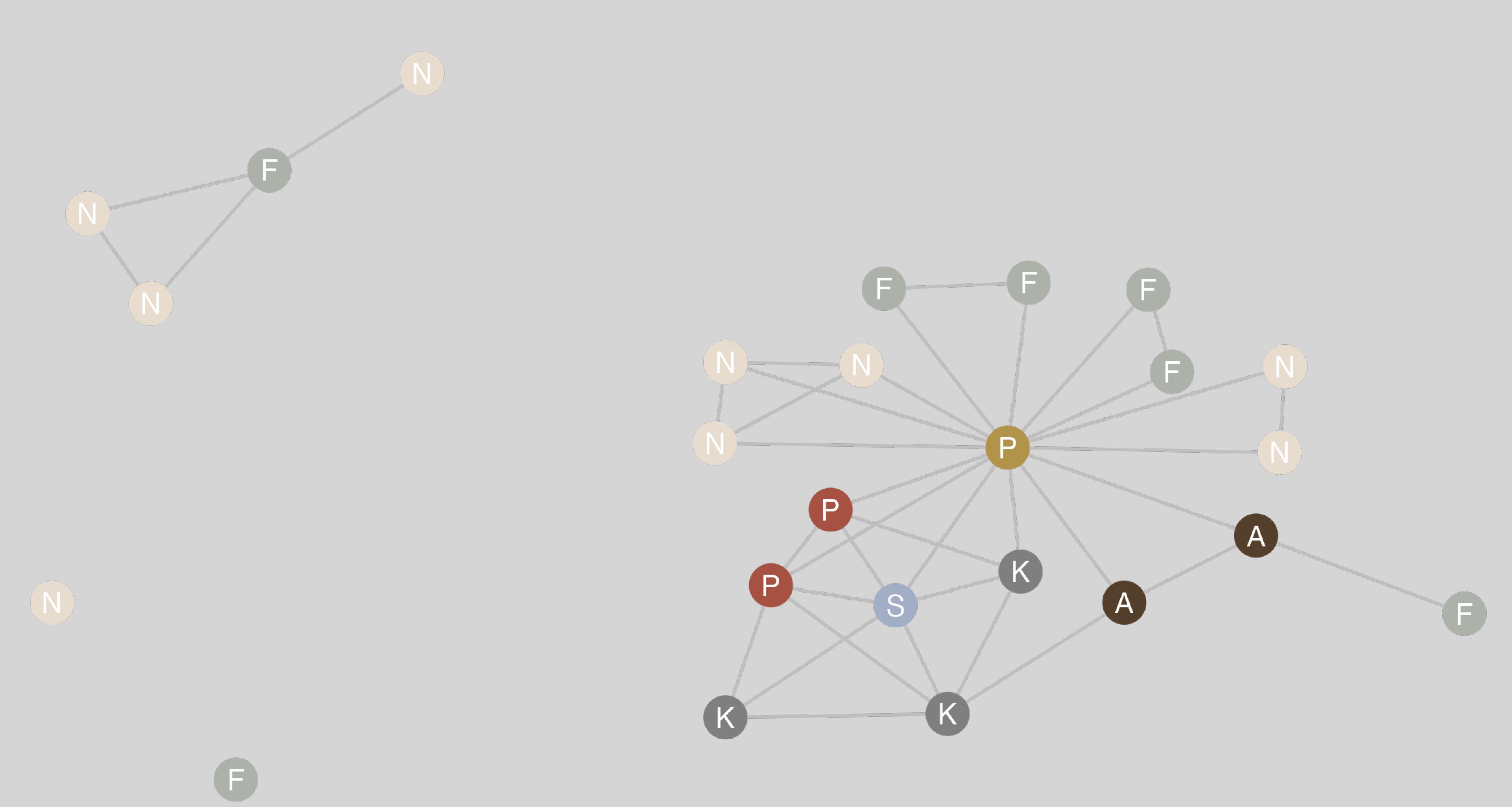
Sex
Age
Education
Relationship type
Closeness
Frequency of contact F2F
Frequency of other contact

Number and age of children
Friend
Wants children
Does not want children
Help with children
Talk about children
Relationship with other alters

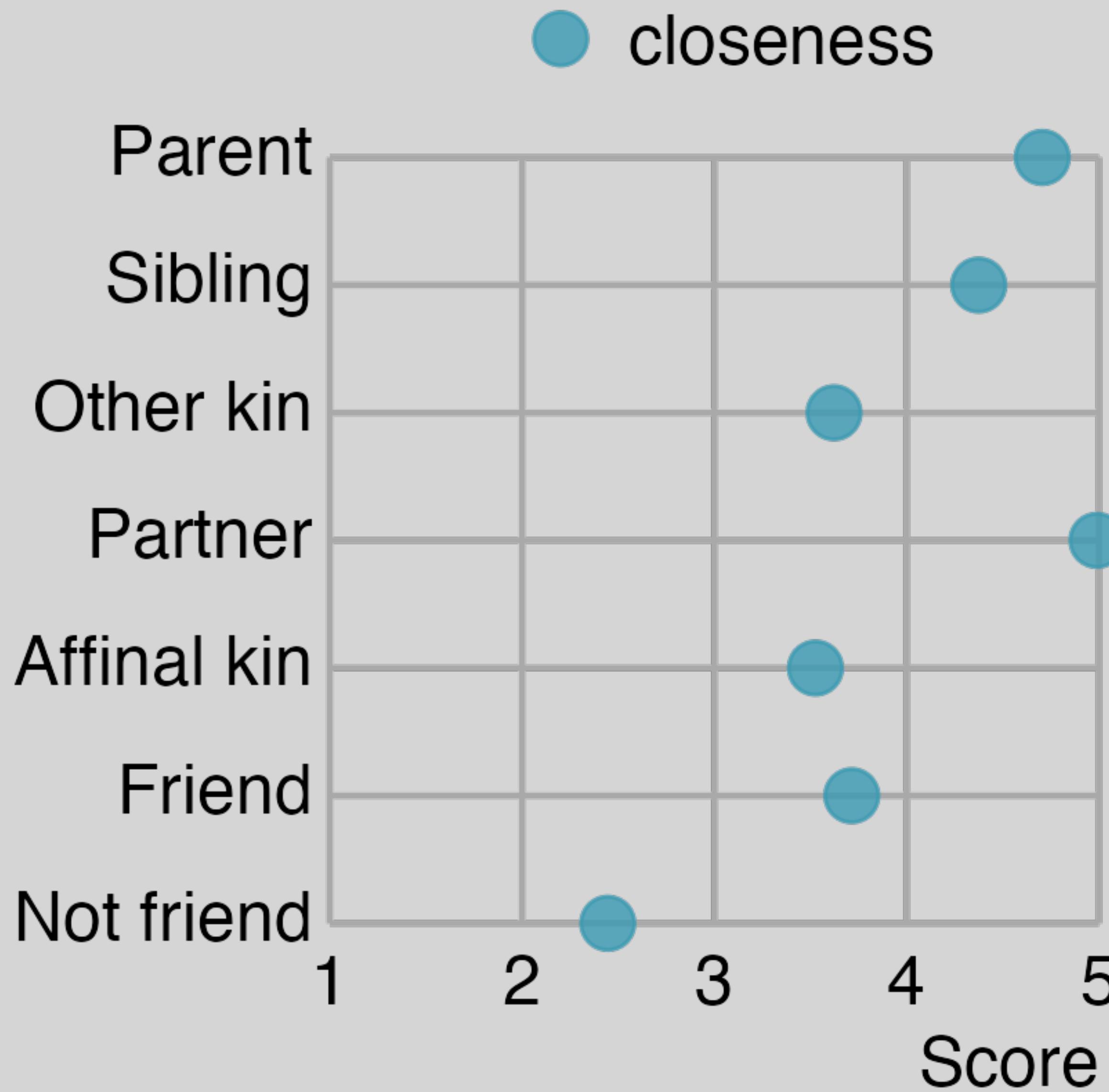


kin make up a
substantial fraction
of the network

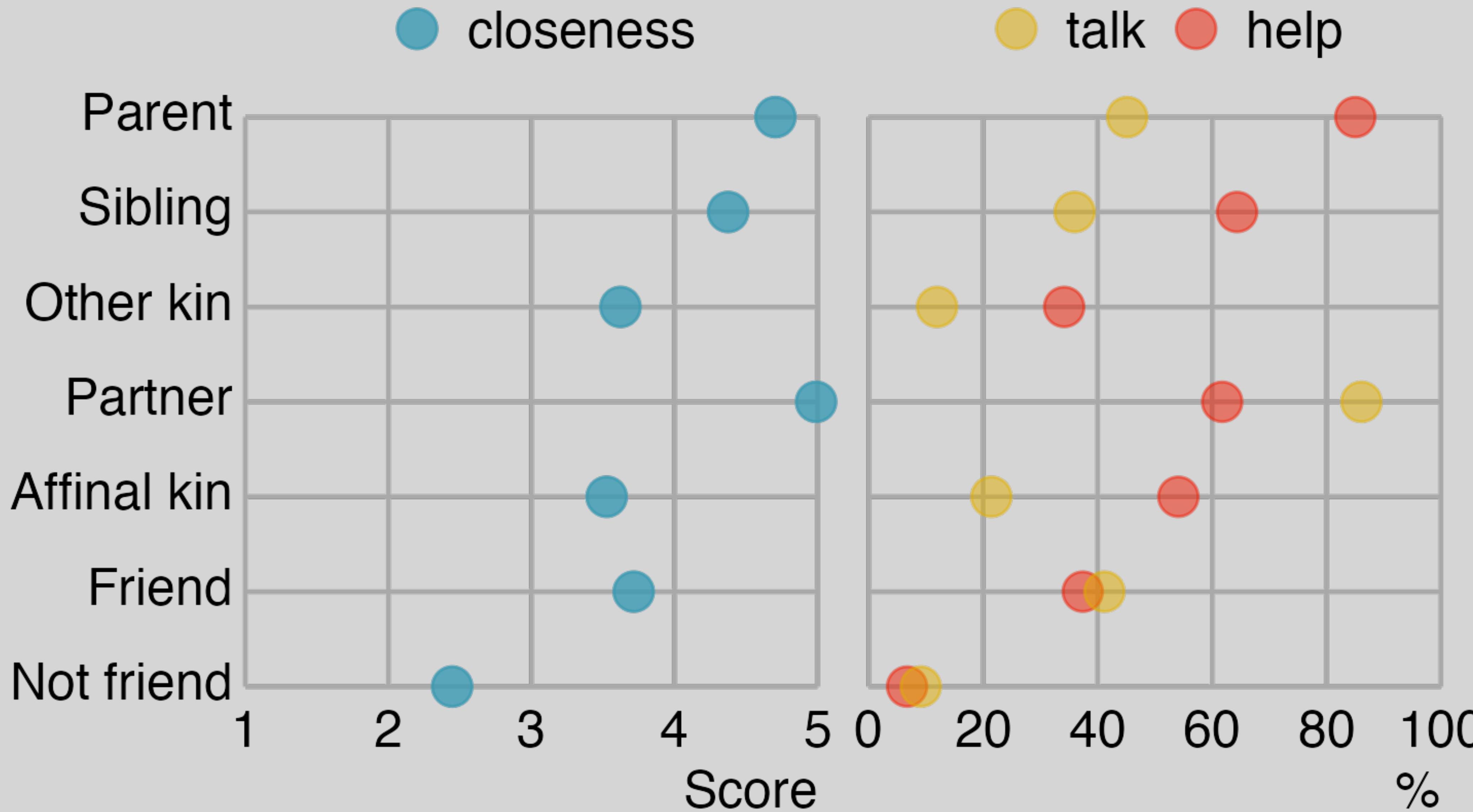




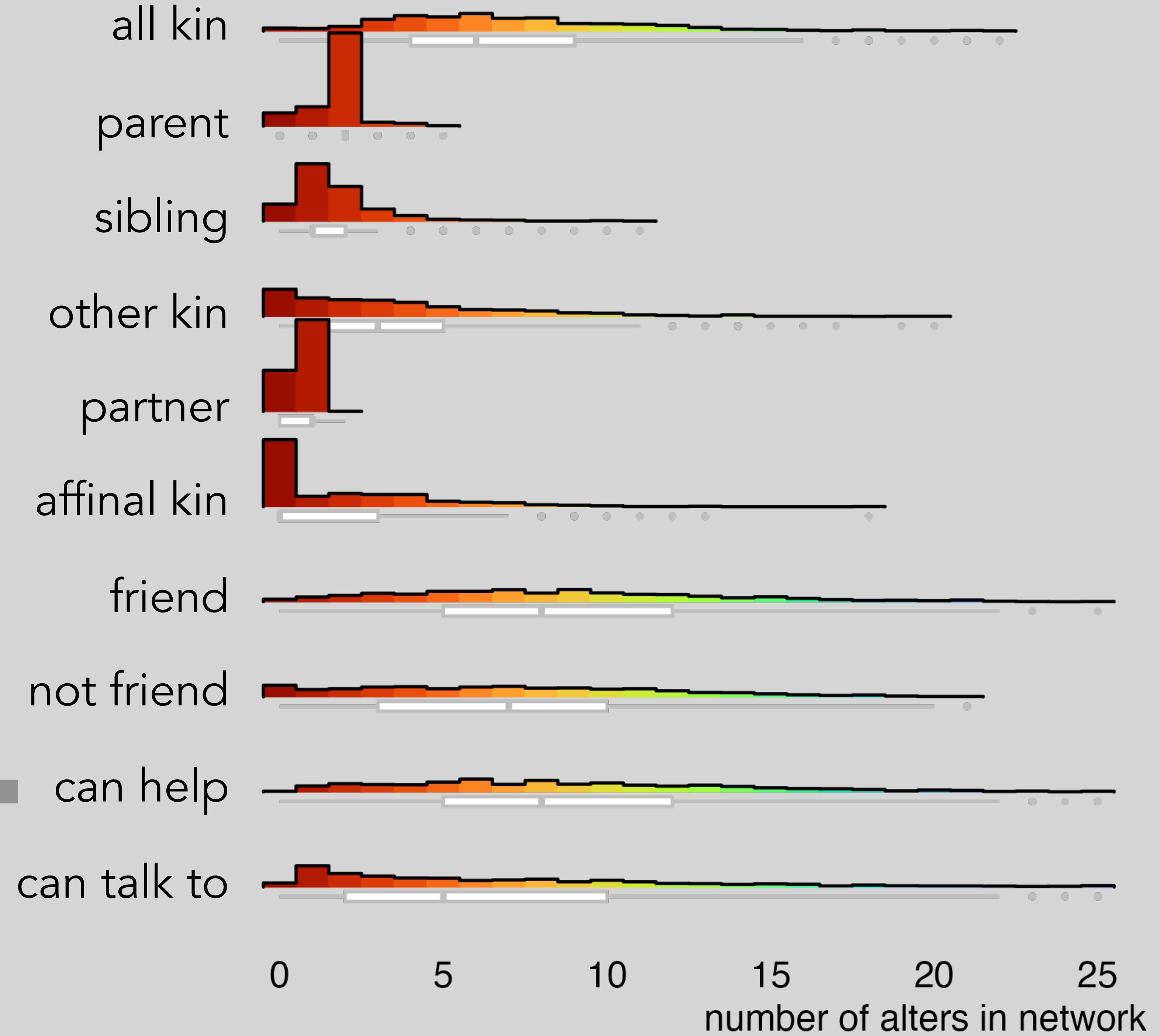
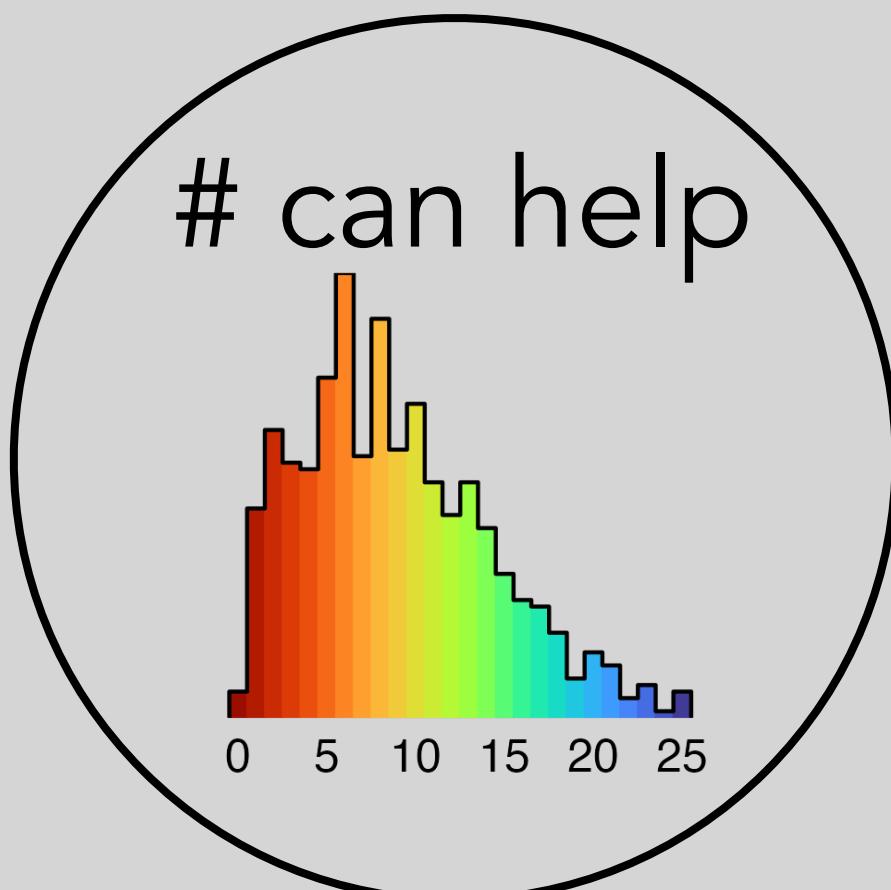
close kin close,
distant kin as close as affinal kin and friends



help with childcare family matter,
talking about having children also likely with friends

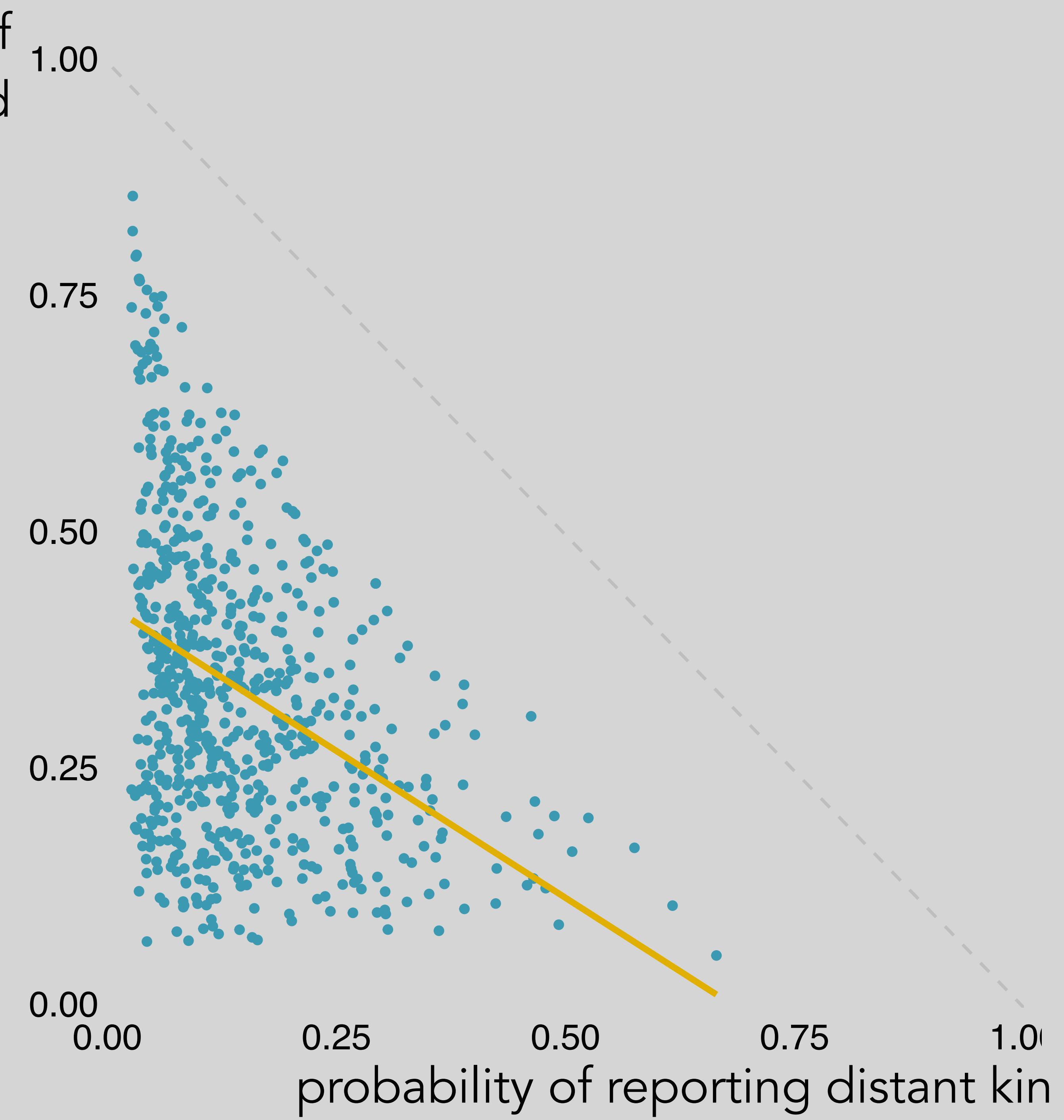


substantial variation
[in resources]



trade-offs in reporting kin versus non-kin

probability of
reporting friend



trade-offs in reporting kin versus non-kin

correlations between probabilities
of reporting relationship types

parent

sibling

other kin

partner

affinal kin

friend

not friend

0.74

0.36 0.16

0.72 0.86 0.21

0.59 0.59 0.32 0.82

-0.04 -0.09 0.36 -0.29 -0.28

-0.34 -0.2 -0.26 -0.13 -0.3 -0.59

parent sibling other partner affinal friend not
kin kin friend not friend

trade-offs in tie-strength kin versus non-kin

average (residual)
closeness towards
friends

3

2

1

0

-1

-2

-3

average (residual) closeness towards distant kin

-3

-2

-1

0

1

2

3



closeness interdependencies

trade-offs in tie-strength
kin versus non-kin

parent

sibling

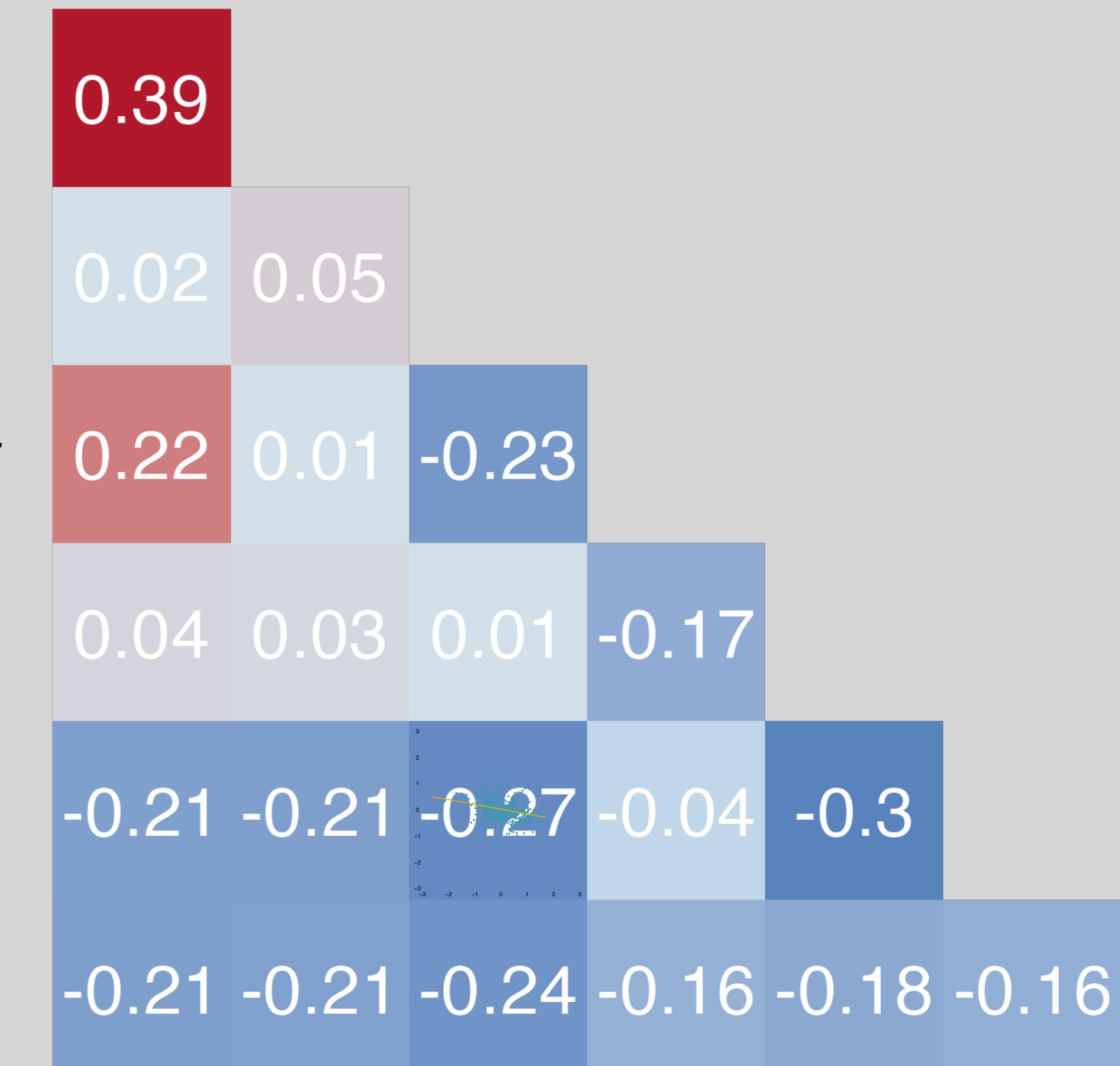
other kin

partner

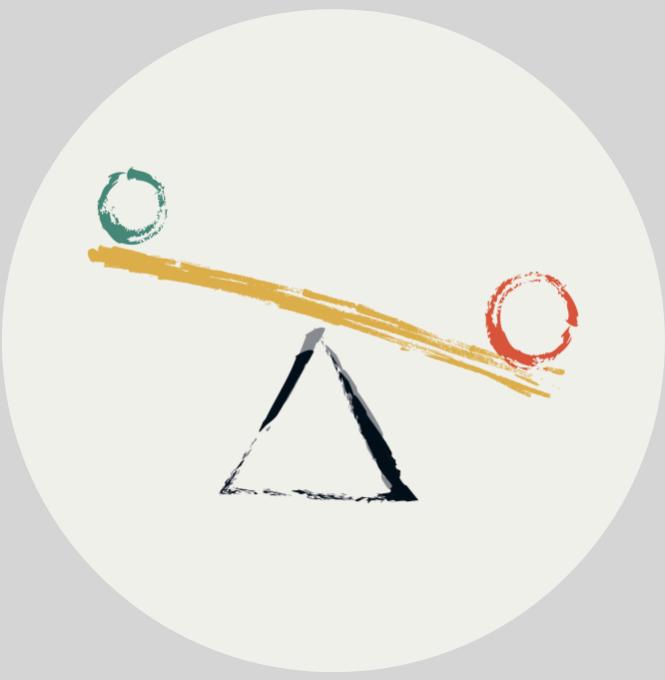
affinal kin

friend

not friend



parent sibling other partner affinal friend not
kin kin friend not friend

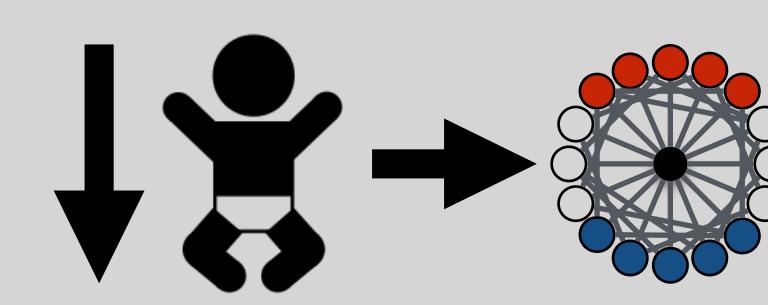


Why?

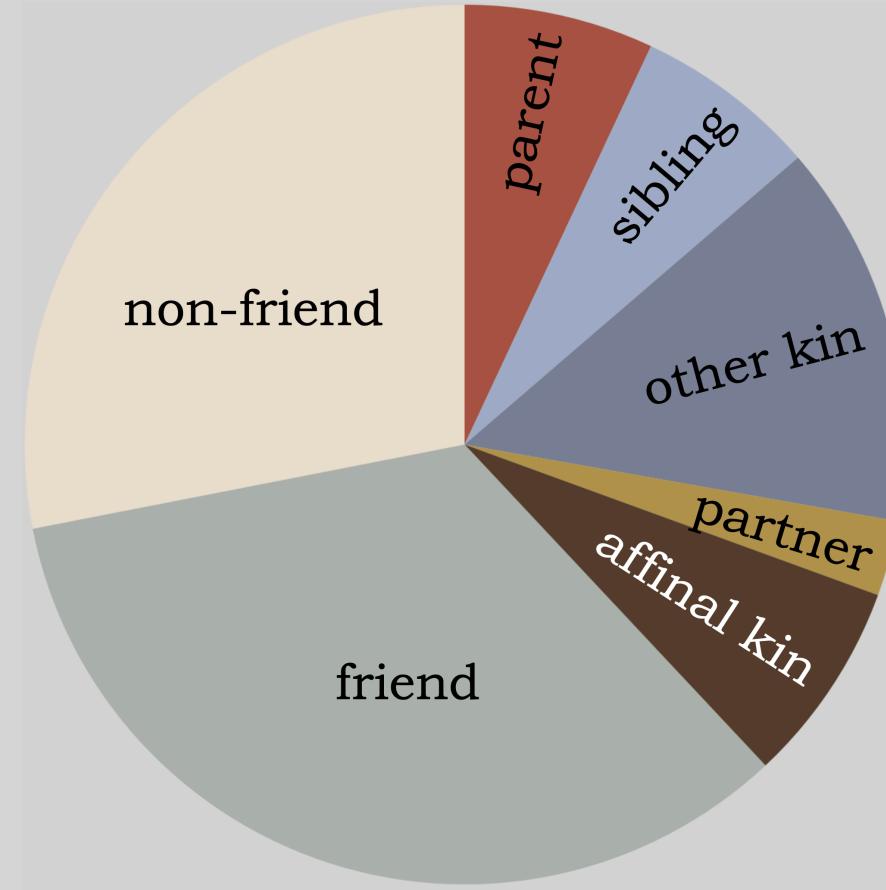
meeting opportunities (“exposure”)
cognitive/time constraints
family mindedness (“bias”)

Implications?

can’t have it all (?)
constraints on support



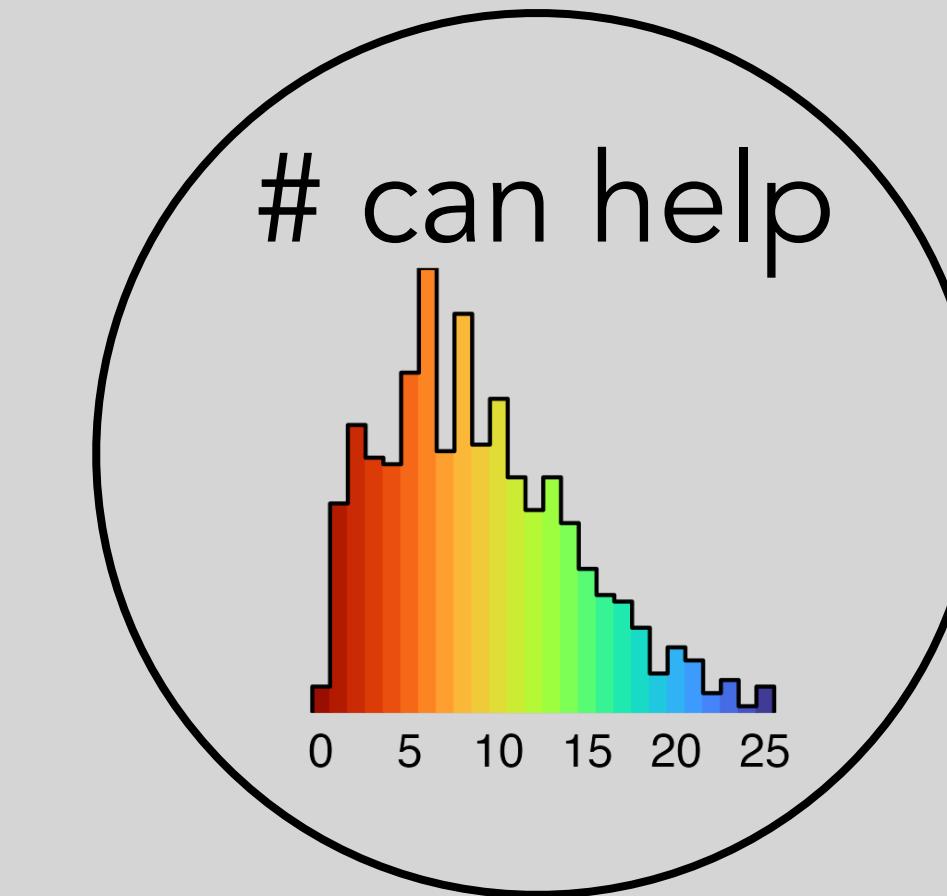
Take-Home Messages



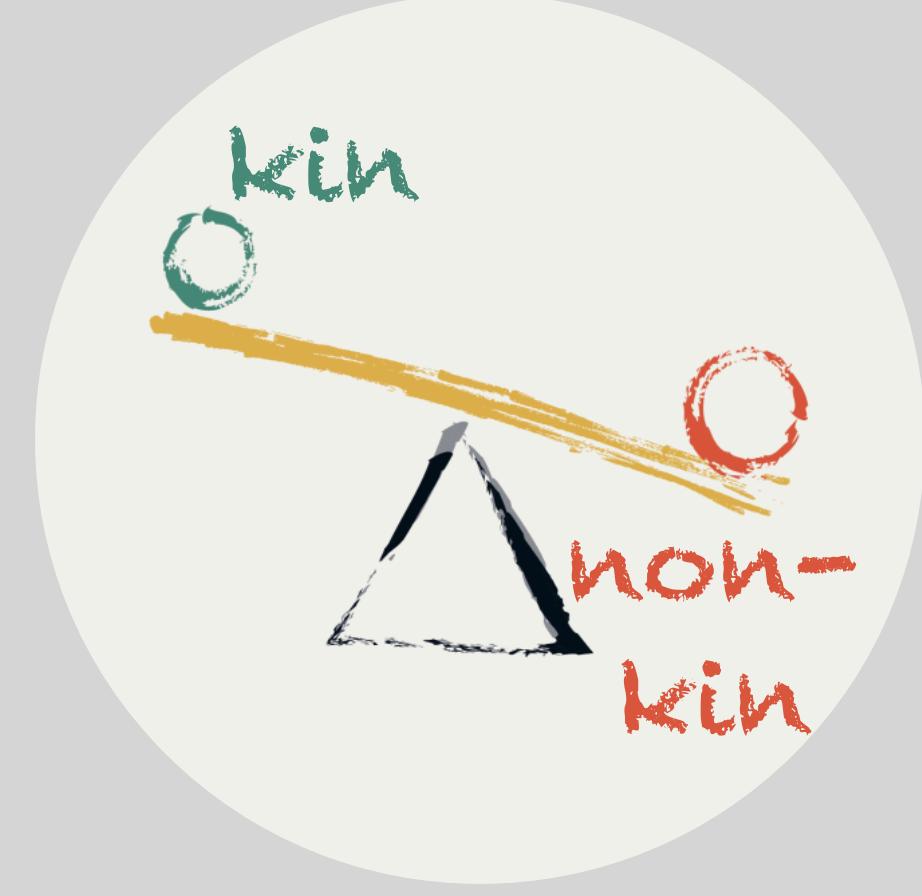
Substantial numbers
of kin



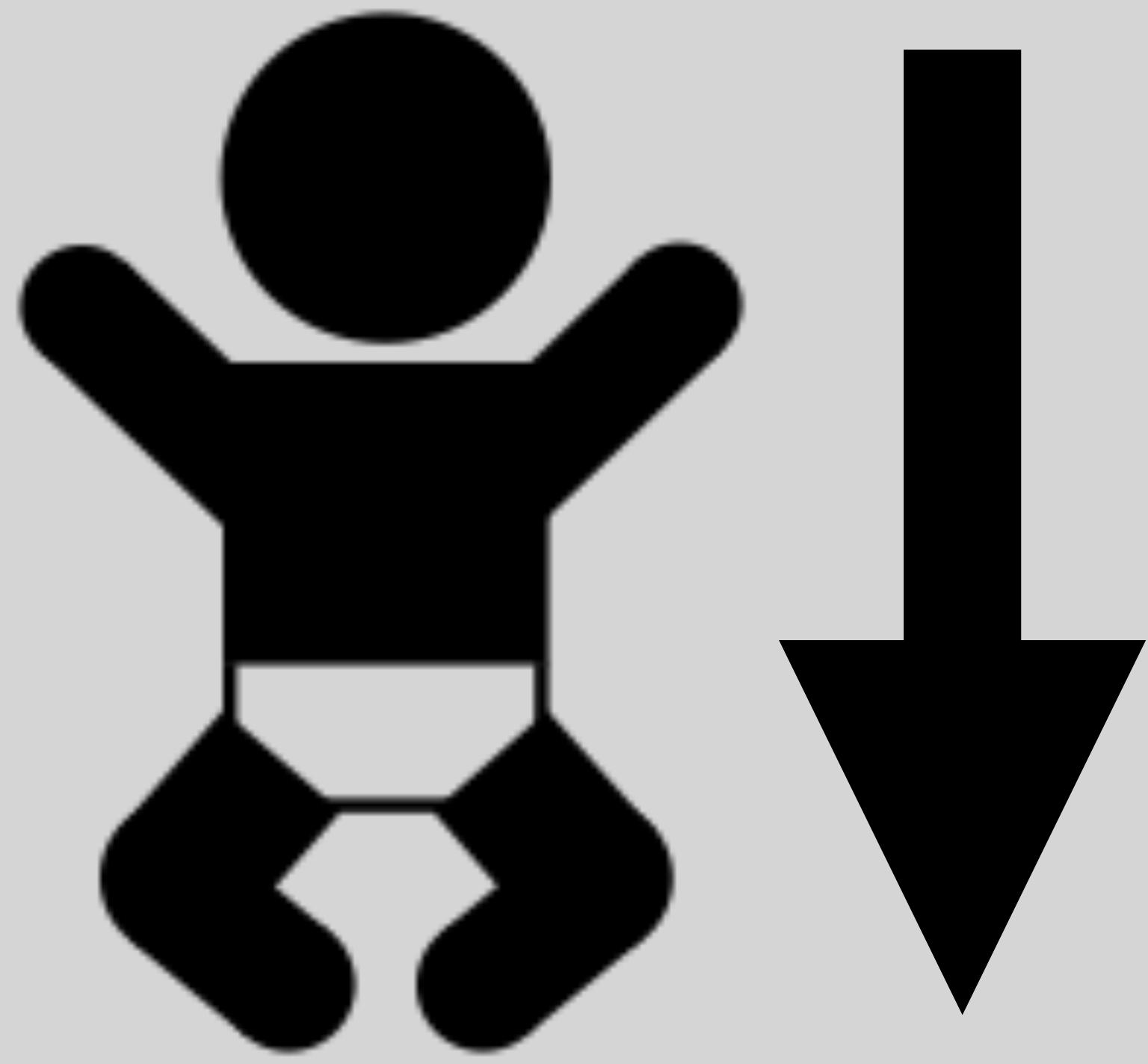
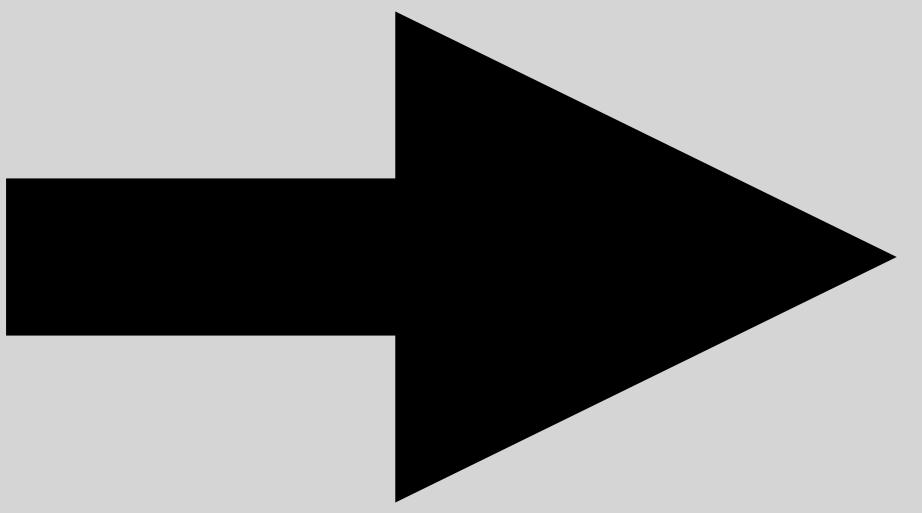
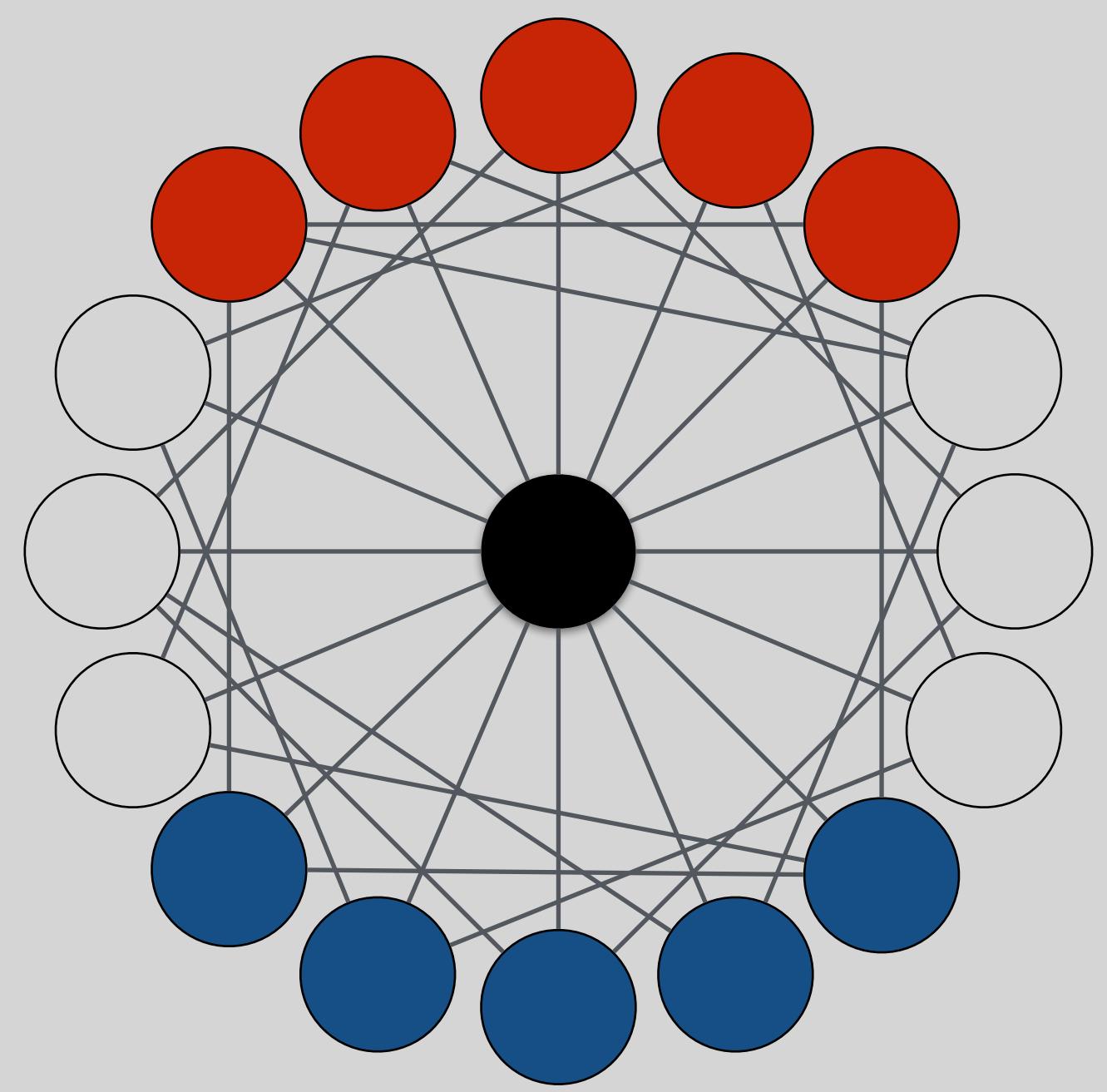
Importance
nuclear family



Variation in
resources



Networks are
constrained



Methodology



Longitudinal Internet
Studies for the
Social sciences

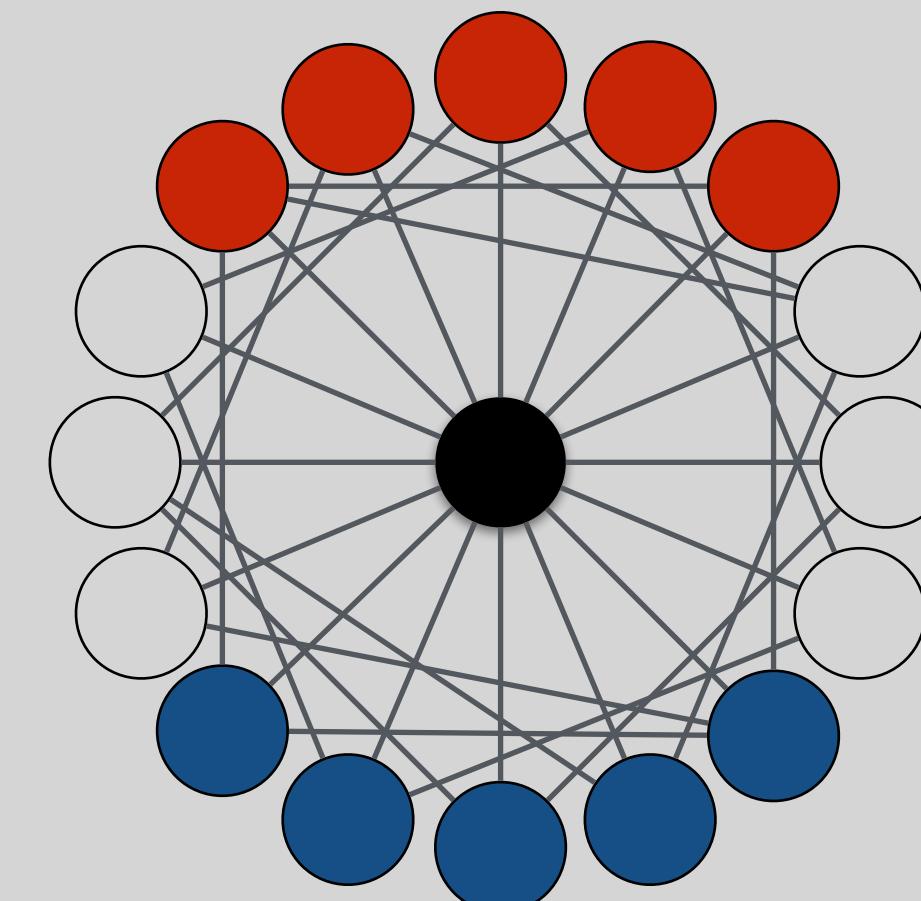


~750 women
age: 18 - 40

Ego



Alters (25)



Age
Education
Income
Partnership status
Children
Detailed fertility preferences

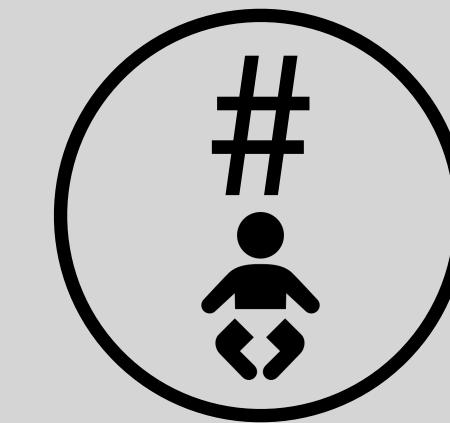
OUTCOMES



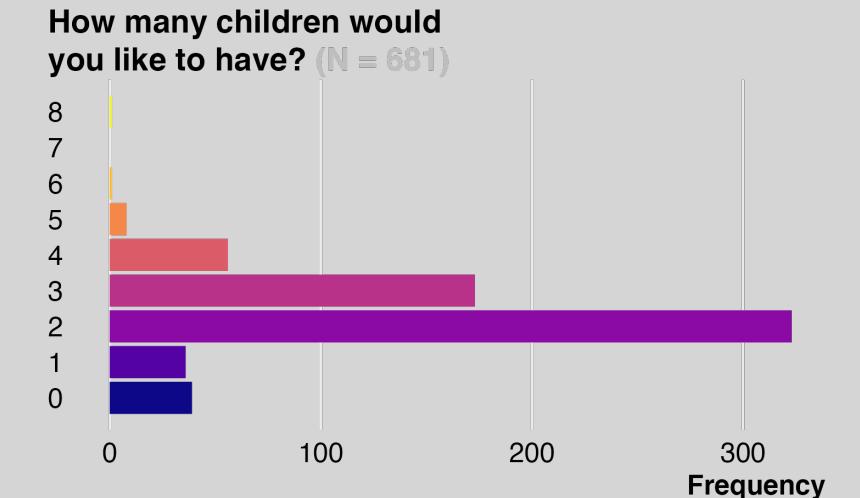
Sex
Age
Education
Relationship type
Closeness
Frequency of contact F2F
Frequency of other contact

Number and age of children
Friend
Wants children
Does not want children
Help with children
Talk about children
Relationship with other alters

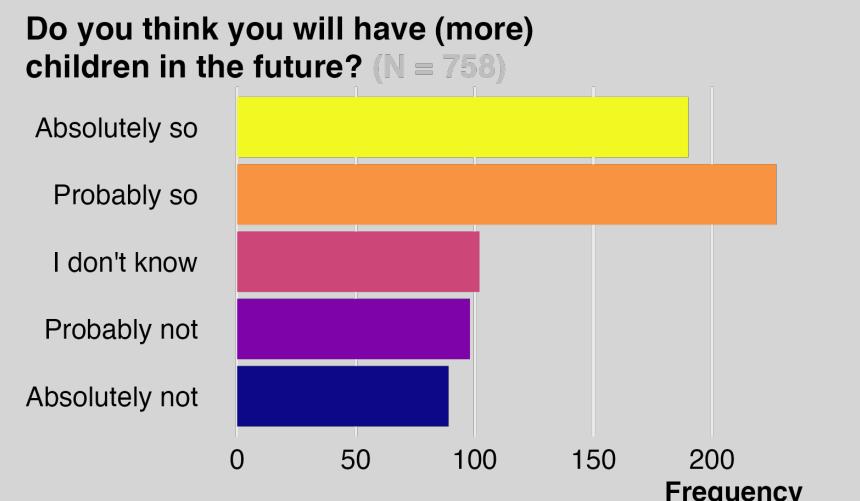
Outcomes



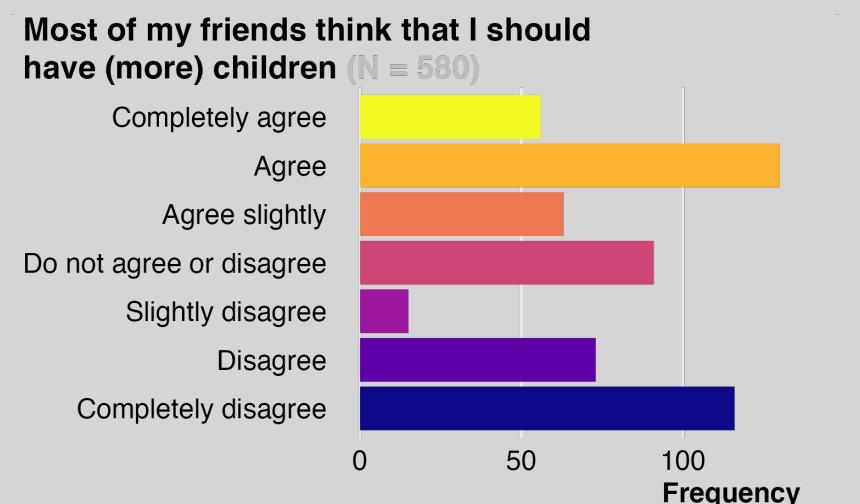
How many children would you like to have?



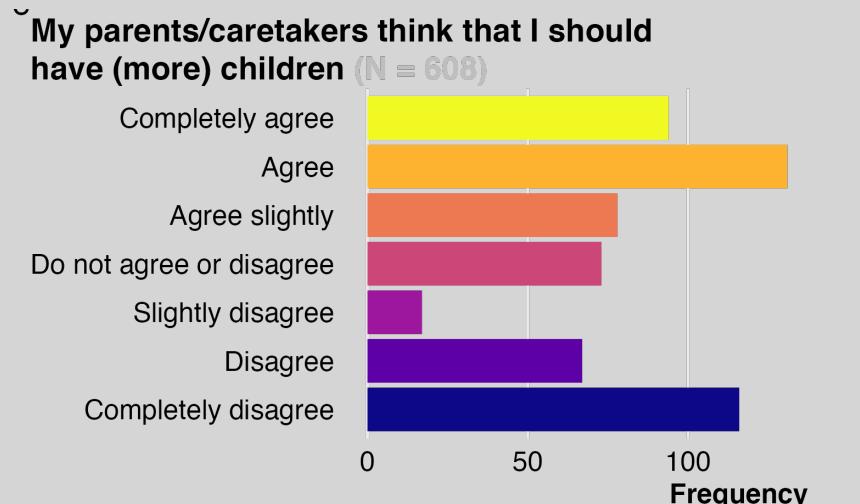
Do you think you will have (more) children in the future?



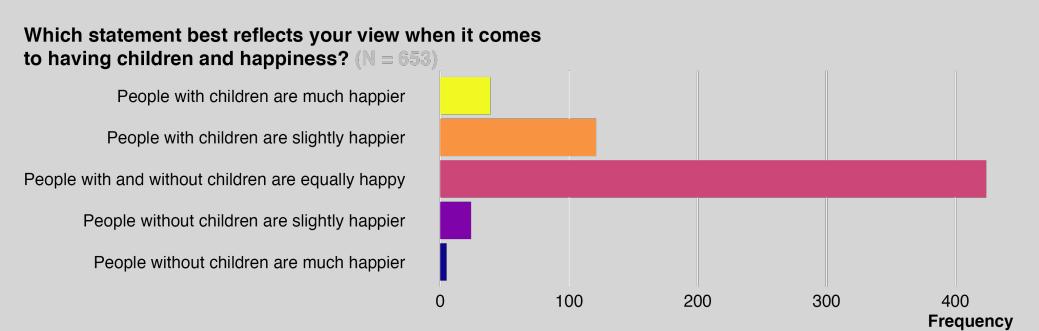
Perceived pressure to have children from friends



Perceived pressure to have children from parents/caretakers



Do you think people with or without children are happier?



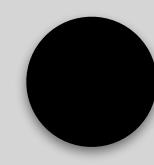
Methodology



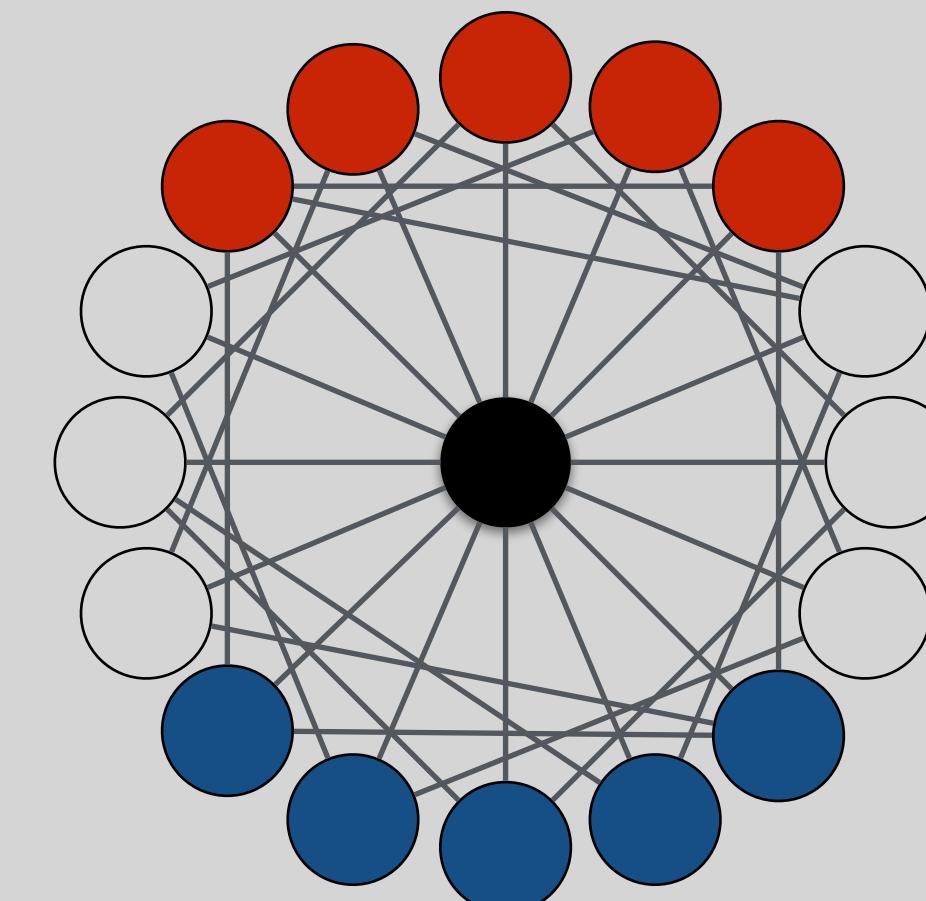
Longitudinal Internet
Studies for the
Social sciences

~750 women
age: 18 - 40

Ego



Alters (25)



EGO VARIABLES

Age
Education
Income
Partnership status
Children

NETWORK VARIABLES

Sex	Number and age of children
Age	Friend
Education	Wants children
Relationship type	Does not want children
Closeness	Help with children
Frequency of contact F2F	Talk about children
Frequency of other contact	Relationship with other alters

Personal Networks



tie (strength)

average closeness
average f2f contact
average other contact

average closeness **family**
average closeness **friends**
average closeness **childfree**

...

24 variables

composition

% **family**
% **friends**
% **childfree**
% with children
% who want children
% childfree
% highly educated
% women
% can provide childcare
% can talk to about children

...

13 variables

structure

density
cliques
isolates and duos
communities
modularity
degree centralisation
betweenness centralisation

...

density among **family**
density among **friends**
density among **childfree**

...

20 variables

Personal Networks



tie (strength)

average closeness

average f2f contact

average other contact

average closeness family

average closeness friends

average closeness childfree

...

composition

% family

% friends

HOW TO CHOOSE
WHICH VARIABLES
TO FOCUS ON?

% can talk to about children

...

24 variables

13 variables

structure

density

cliques

and duos
nities

key
centralisation
less centralisation

density among family
density among friends
density among childfree

...

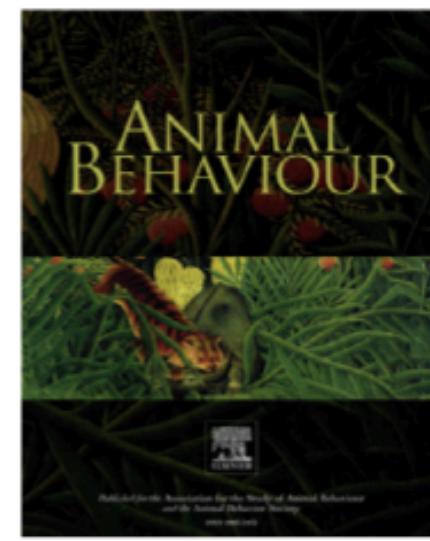
20 variables



Contents lists available at [ScienceDirect](#)

Animal Behaviour

journal homepage: www.elsevier.com/locate/anbehav



Commentary

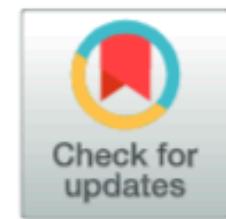
Is less more? A commentary on the practice of ‘metric hacking’ in animal social network analysis

Quinn M. R. Webber ^{a,*}, David C. Schneider ^{a, b, c}, Eric Vander Wal ^{a, c}

^a Cognitive and Behavioural Ecology Interdisciplinary Program, Memorial University of Newfoundland, St John's, NL, Canada

^b Department of Ocean Sciences, Ocean Sciences Centre, Memorial University of Newfoundland, St John's, NL, Canada

^c Department of Biology, Memorial University of Newfoundland, St John's, NL, Canada

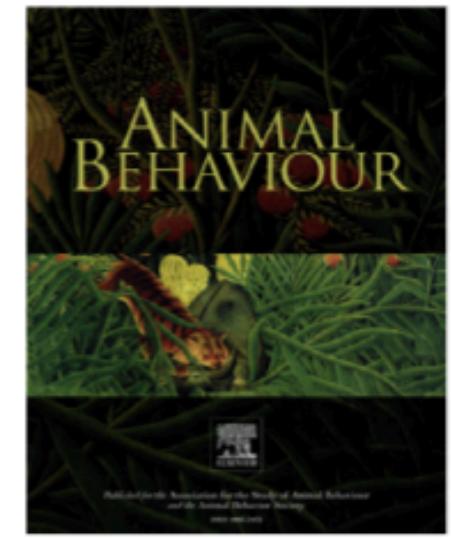




Contents lists available at [ScienceDirect](#)

Animal Behaviour

journal homepage: www.elsevier.com/locate/anbehav



Commentary

Is less more? A commentary on the practice of ‘metric hacking’ in animal social network analysis

Quinn M. R. Webber ^{a,*}, David C.

^a Cognitive and Behavioural Ecology Interdisciplinary Program

^b Department of Ocean Sciences, Ocean Sciences Centre, University of British Columbia, Vancouver, BC V6T 1Z3, Canada

^c Department of Biology, Memorial University of Newfoundland, St. John's, NF A1C 5S7, Canada



[Check for updates](#)

[General Article](#)

False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant

Joseph P. Simmons¹, Leif D. Nelson², and Uri Simonsohn¹

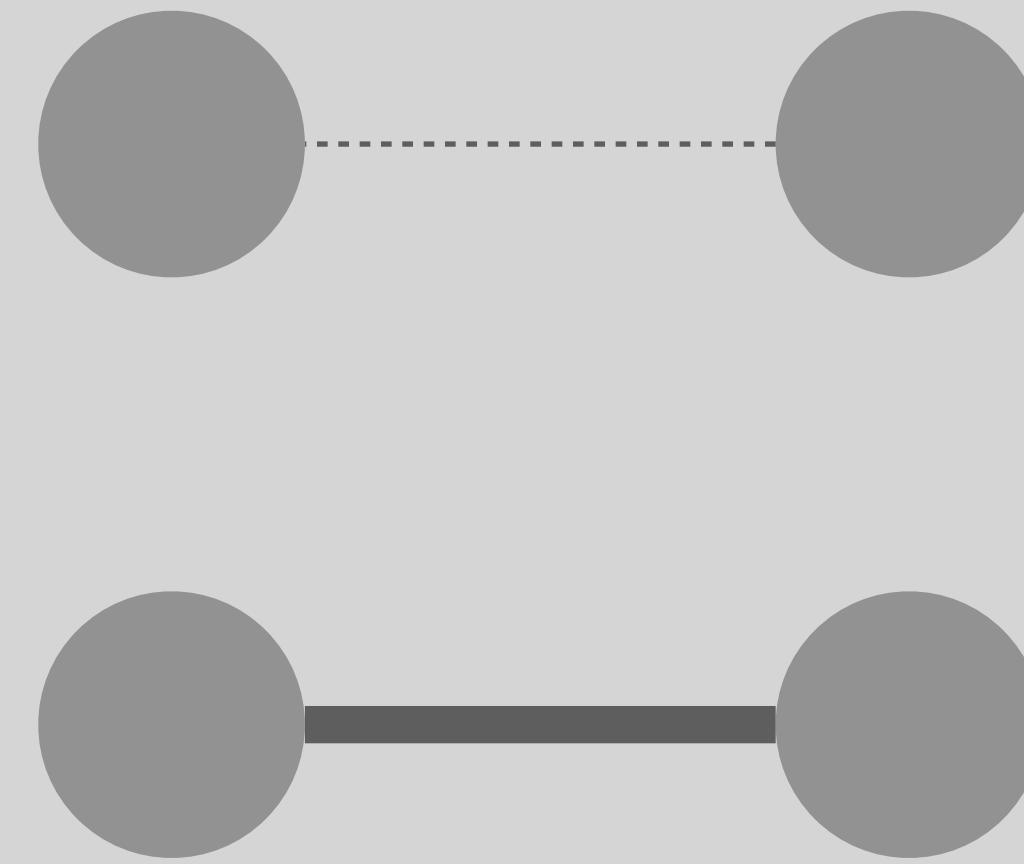
¹The Wharton School, University of Pennsylvania, and ²Haas School of Business, University of California, Berkeley



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DOI: 10.1177/0956797611417632
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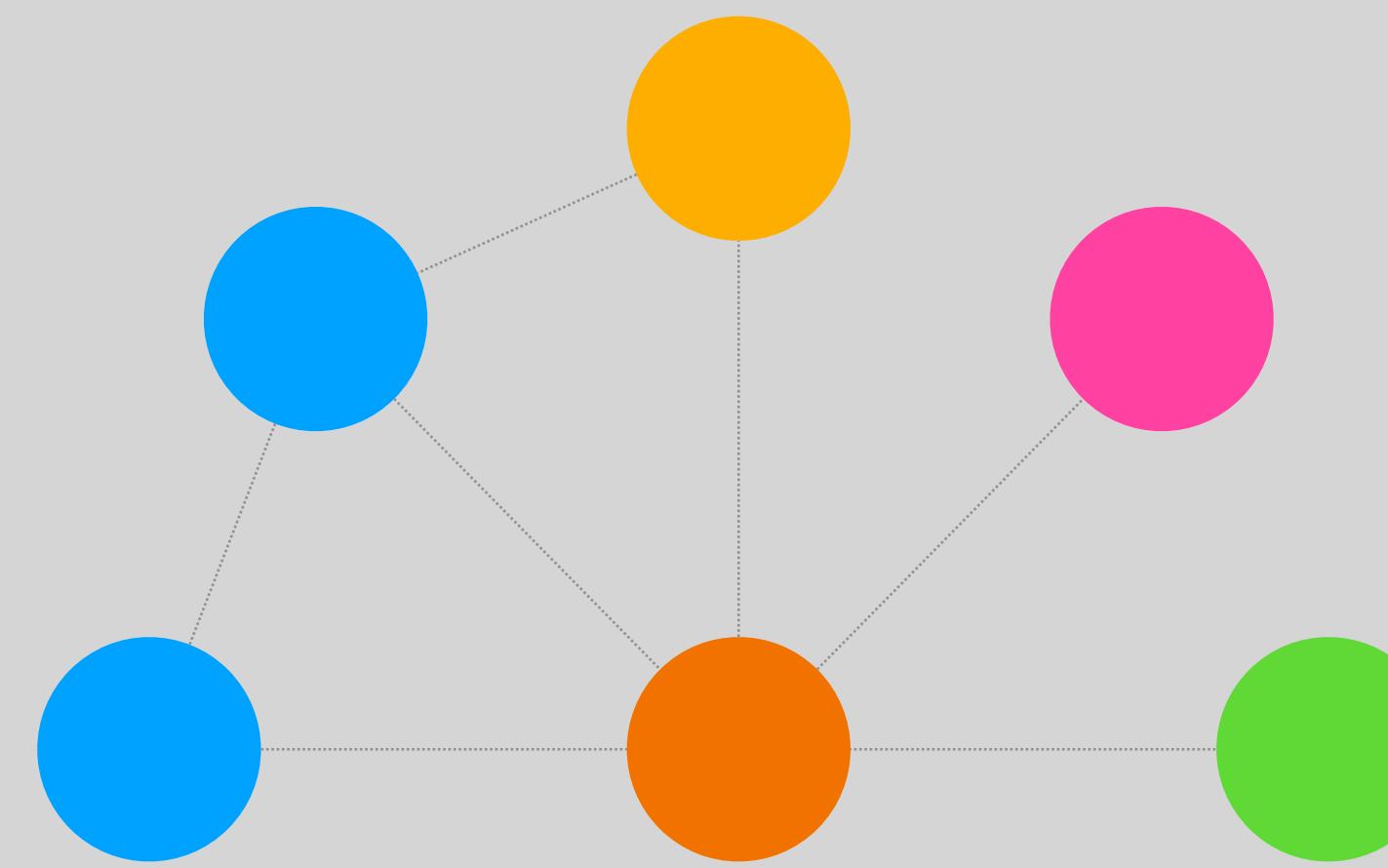
Personal Networks

tie (strength)



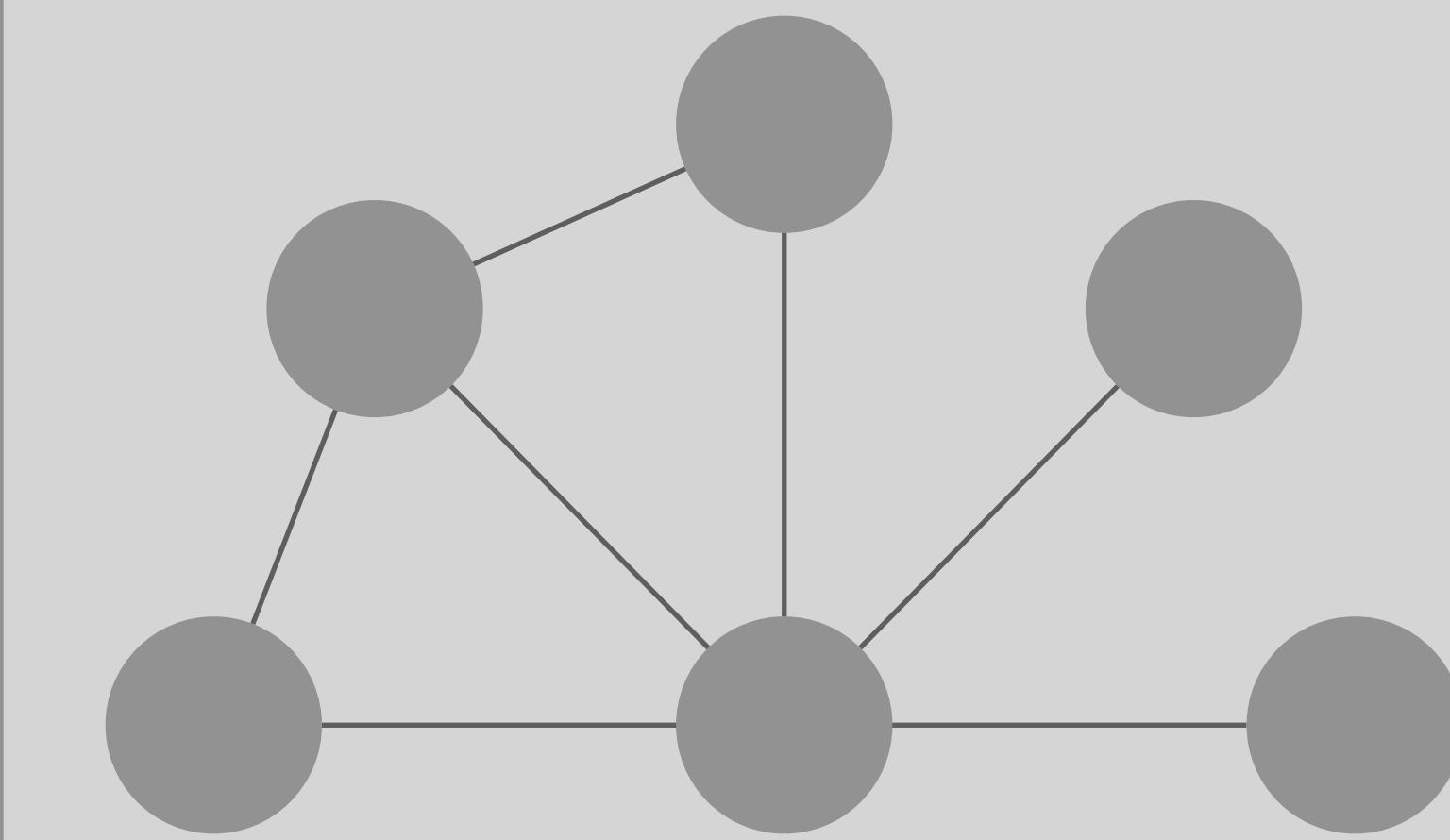
strong tie, more support/pressure
e.g., quality of relation with parent

composition



support network, diversity in ideas
e.g., # kin, # friends, # can help

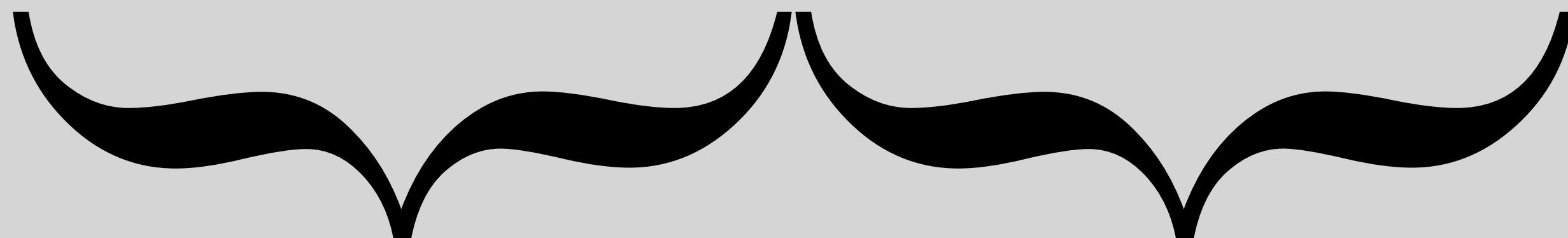
structure



reinforcing norms, flow information
e.g., density, # cliques



Lasso Regression

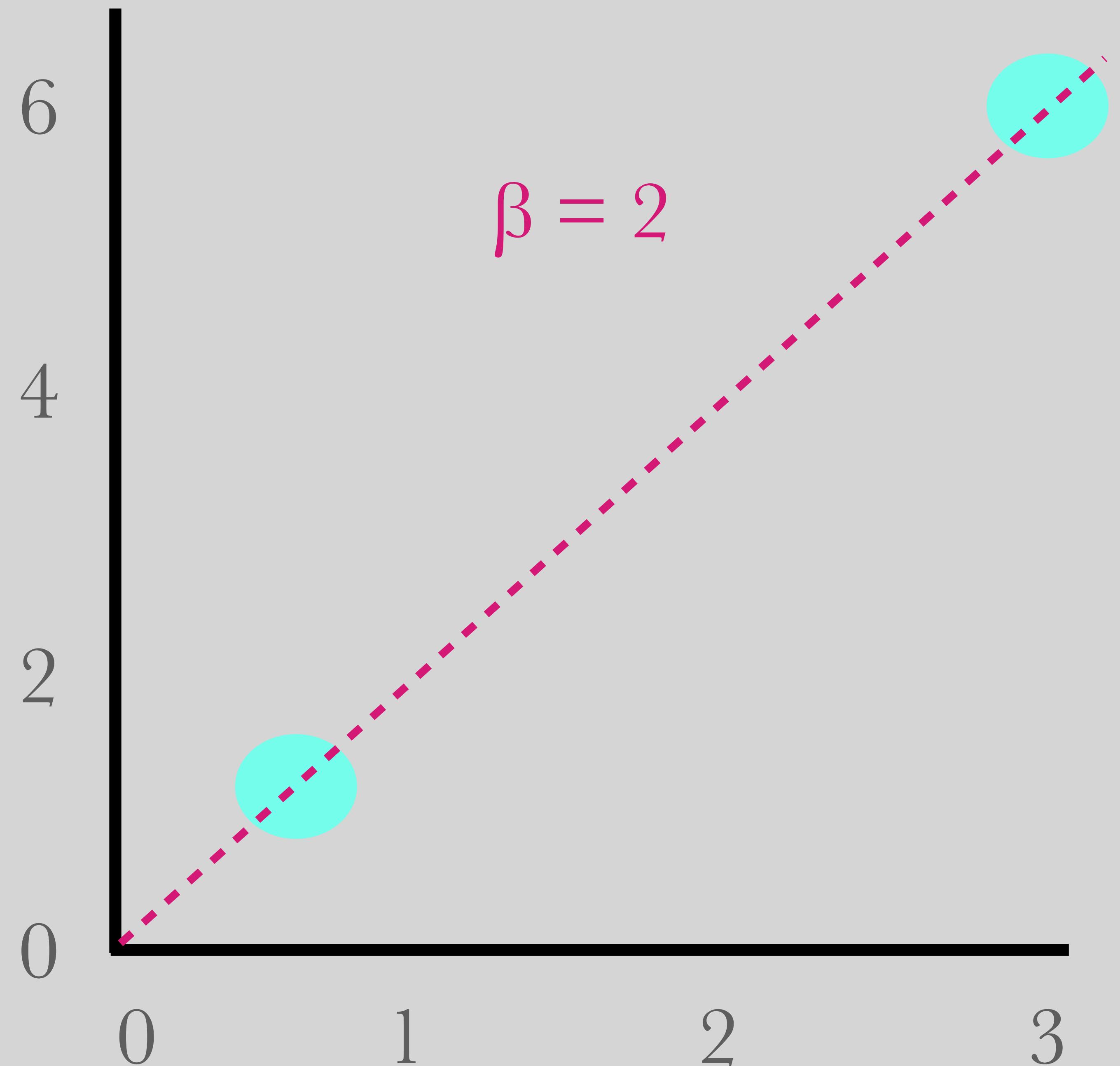
$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{i=1}^p |\beta_j|$$


linear regression penalty term

- ✓ can handle many, correlated variables
- ✓ leads to sparse, predictive, interpretable models
- ✗ reduced variance through increased bias

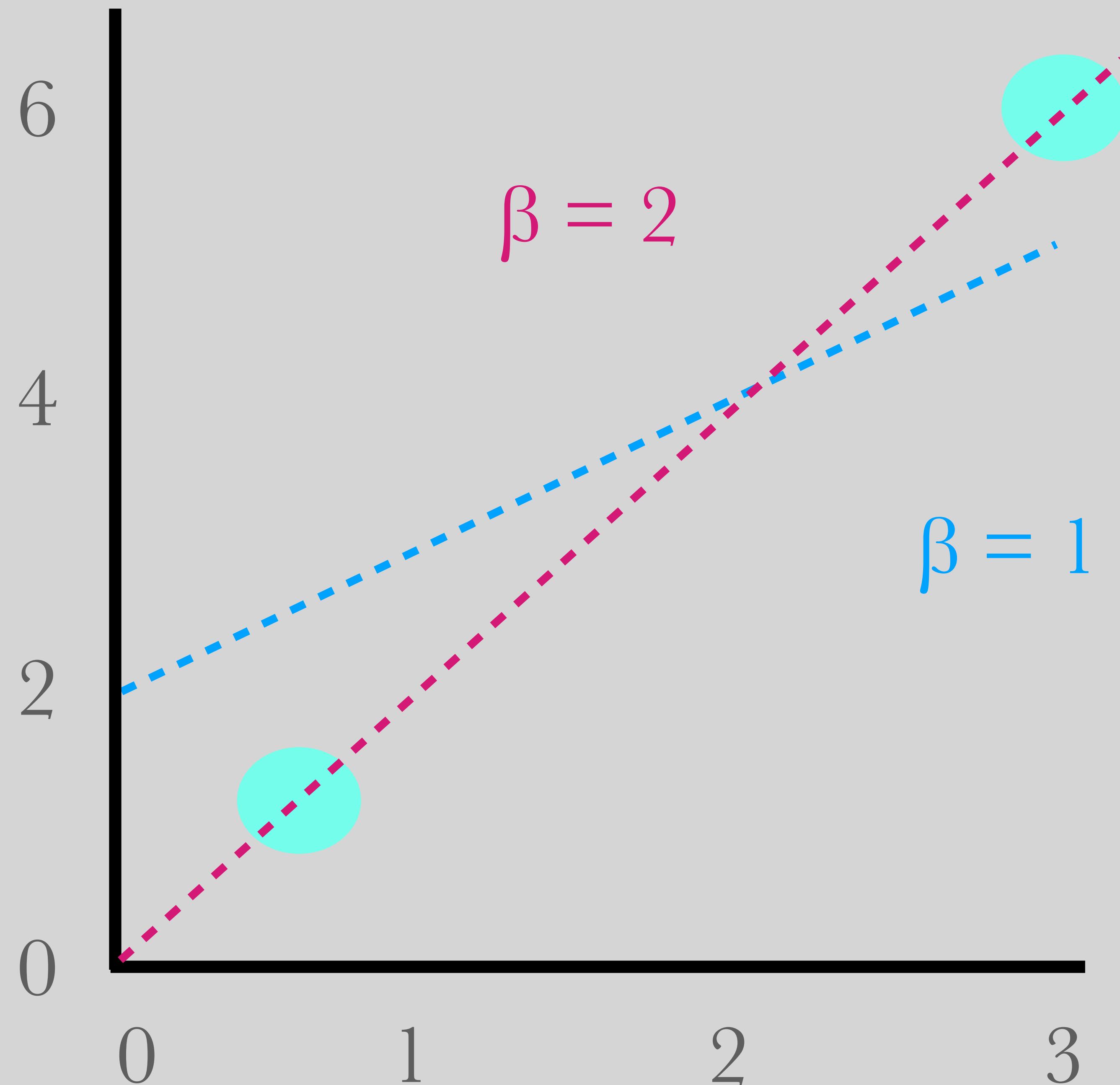
Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$



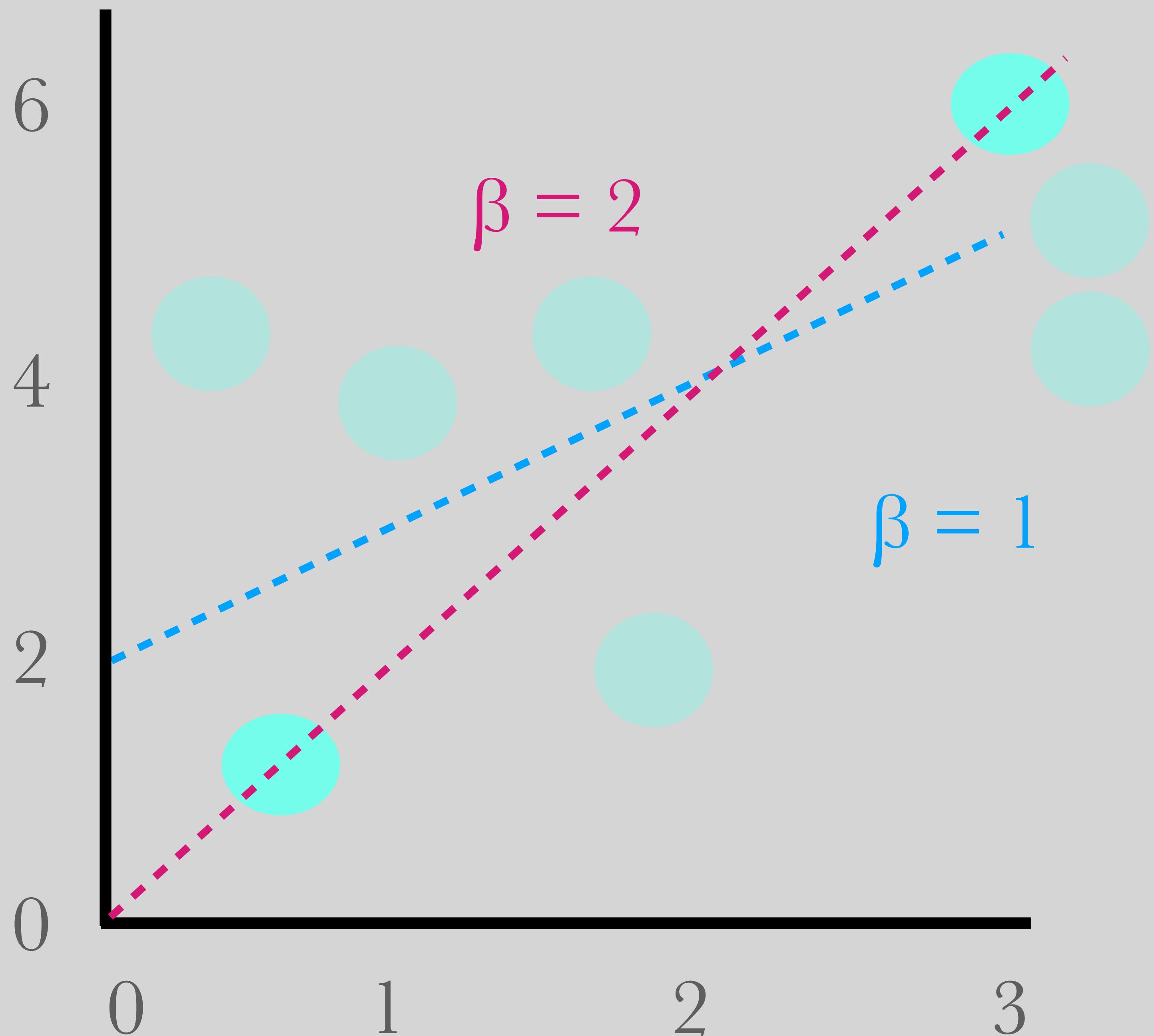
Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$



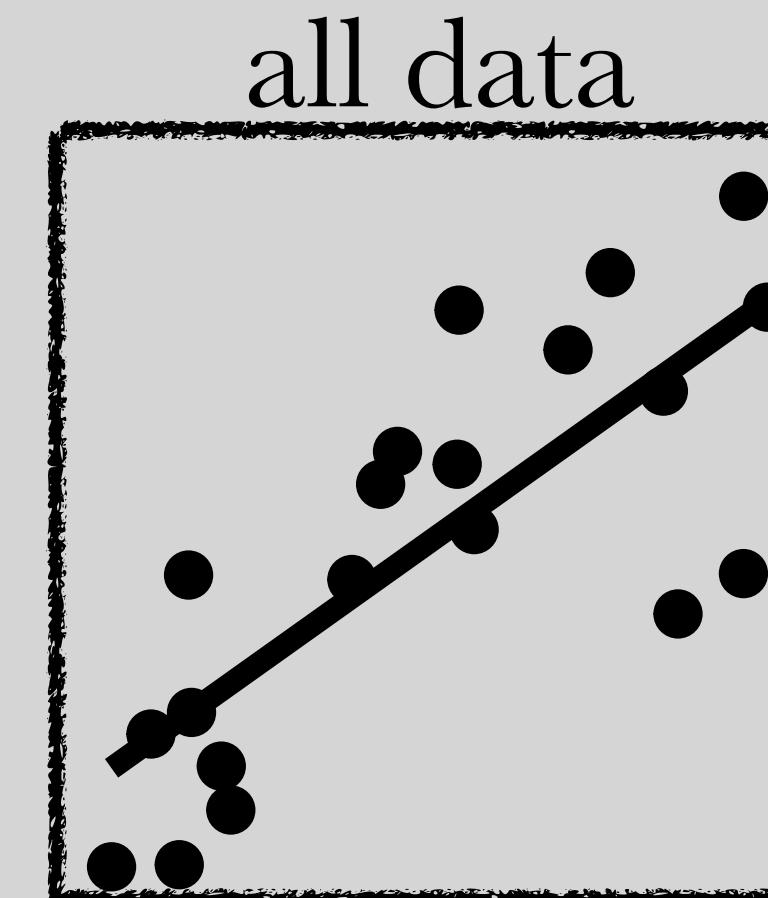
Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$

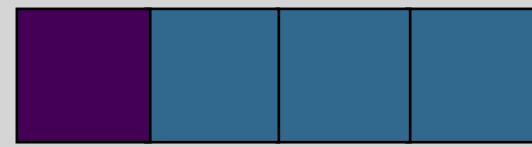


Cross-Validation

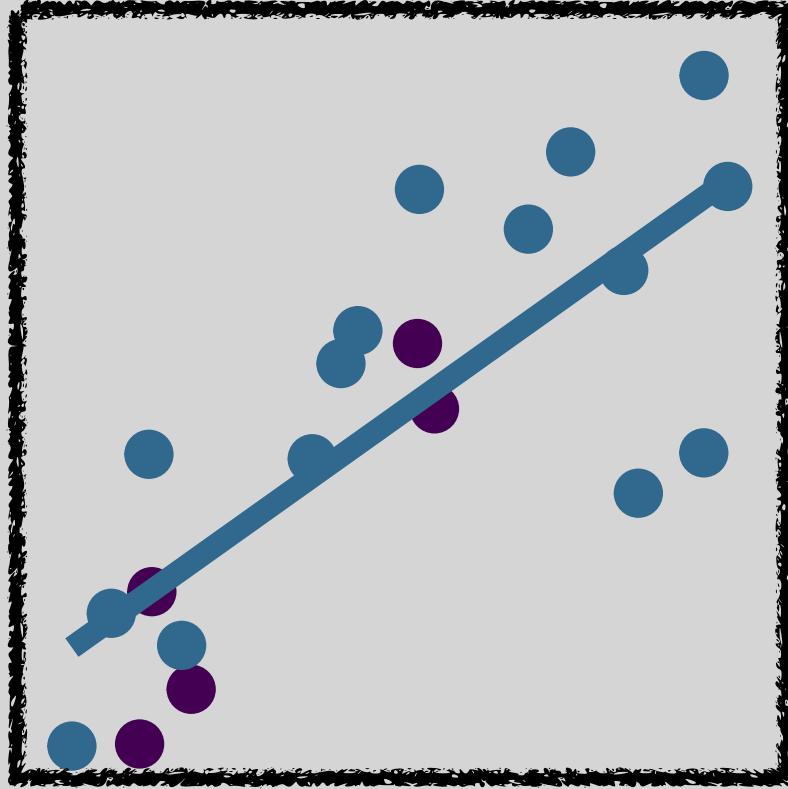
λ is determined through cross-validation and **out-of-sample predictive ability**



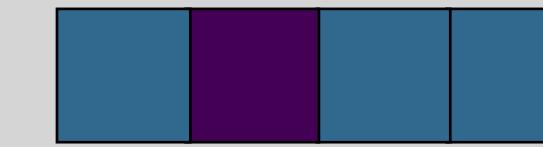
RMSE: 0.41



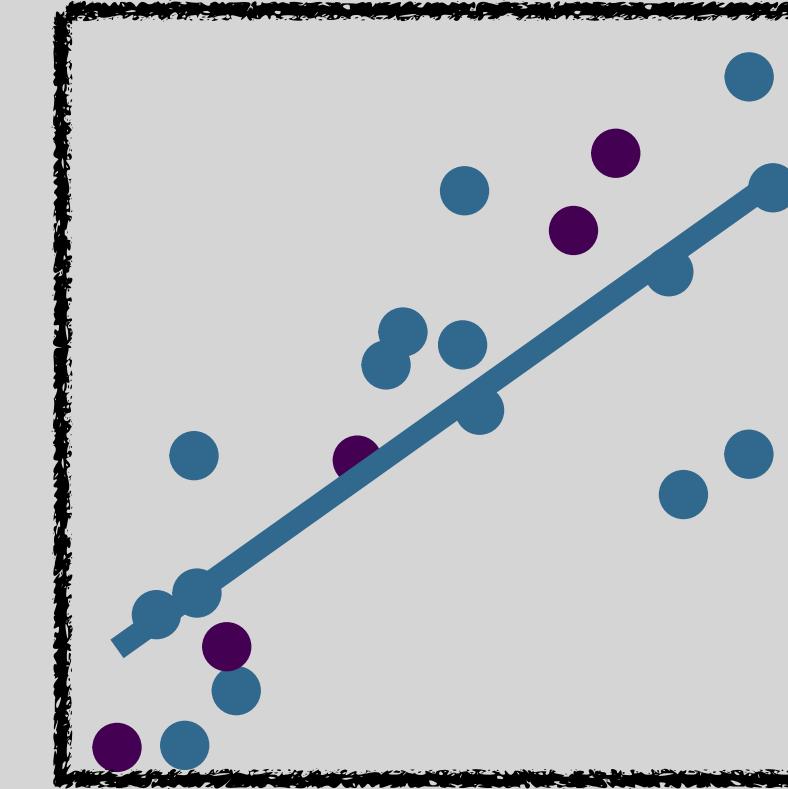
fold 1



RMSE: 0.38



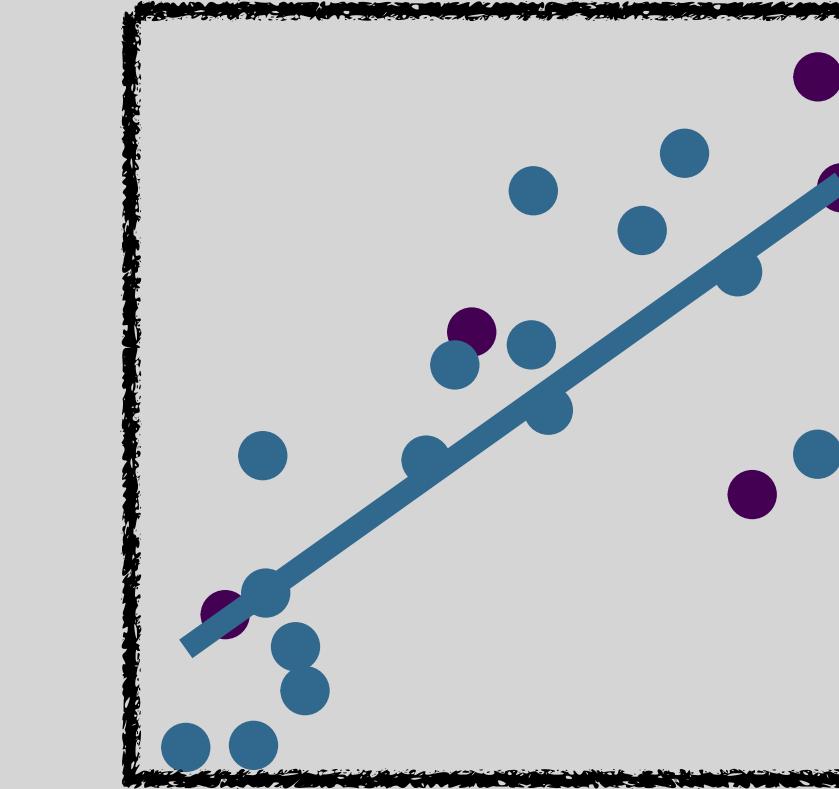
fold 2



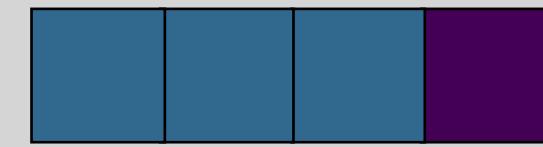
RMSE: 0.38



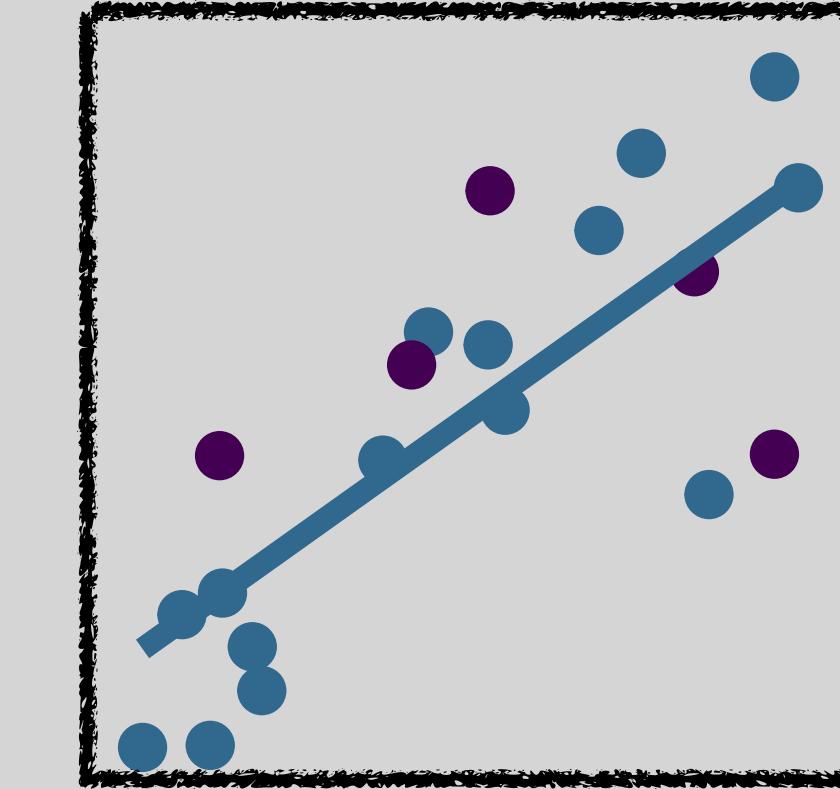
fold 3



RMSE: 0.45



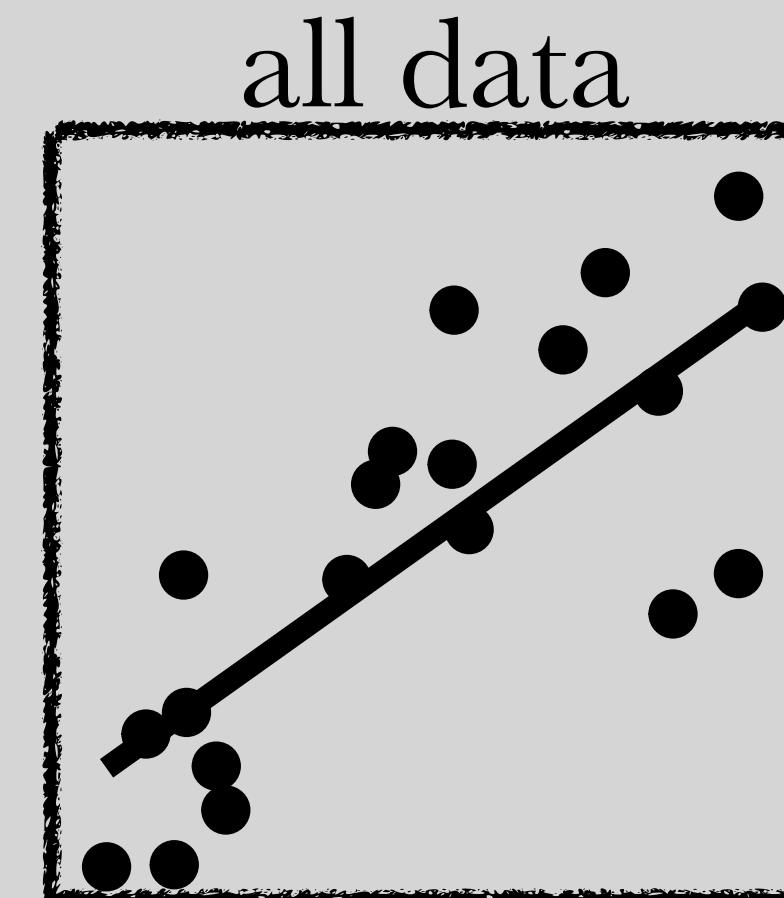
fold 4



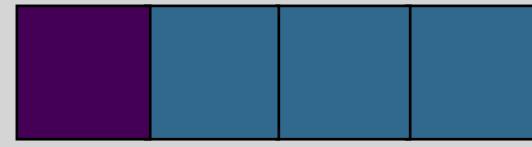
RMSE: 0.62

Cross-Validation

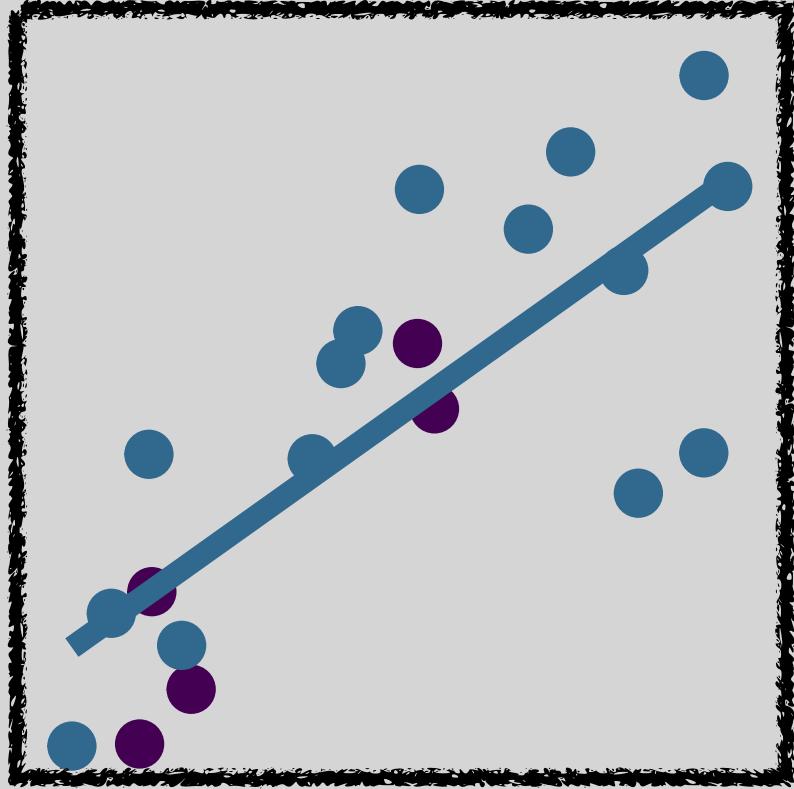
strength of model determined
through cross-validation and
**quantified by out-of-
sample predictive ability**



RMSE: 0.41



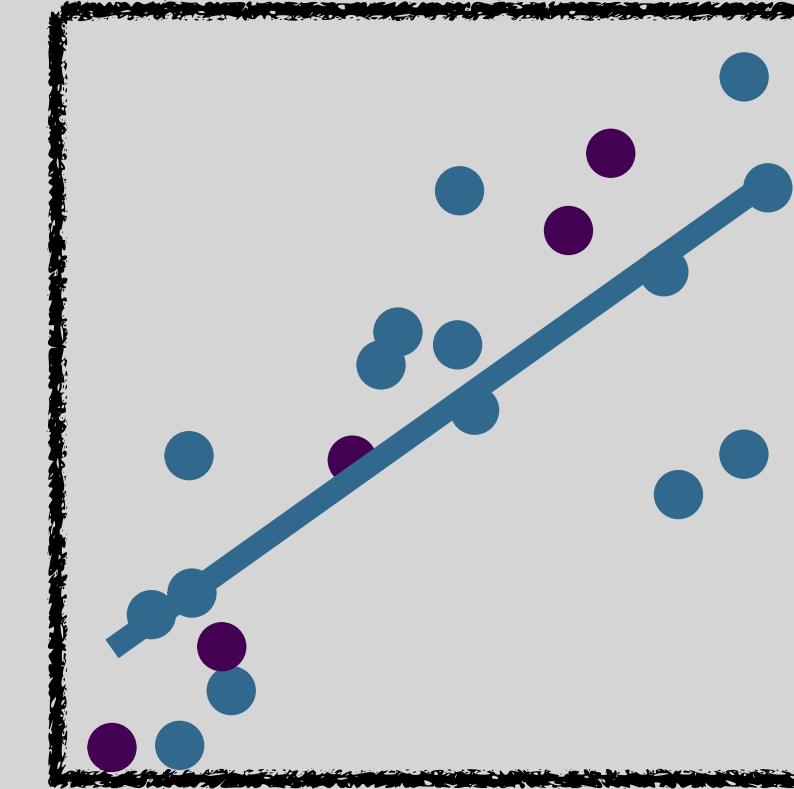
fold 1



RMSE: 0.38



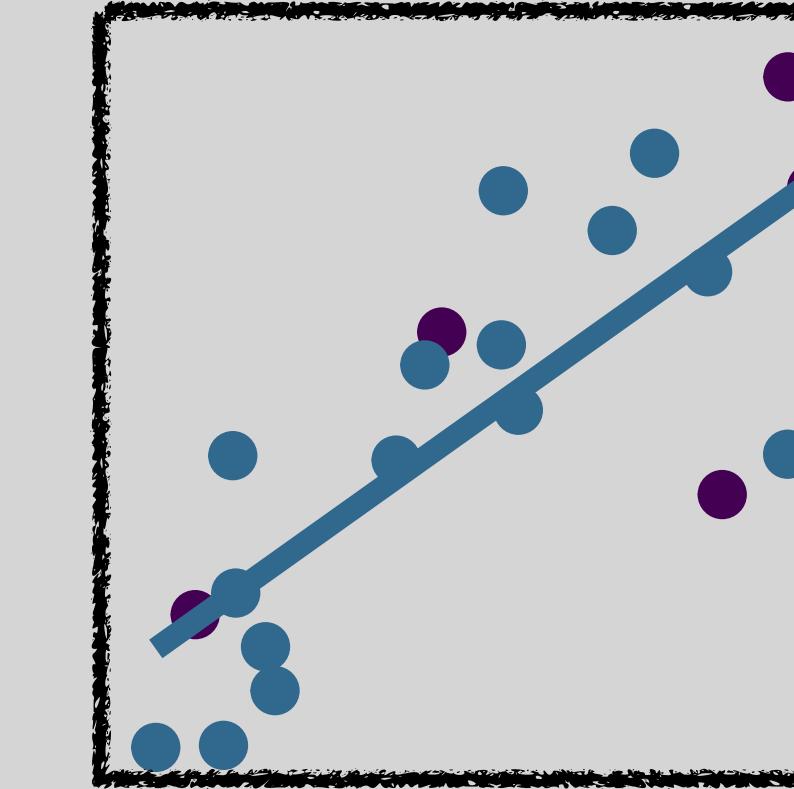
fold 2



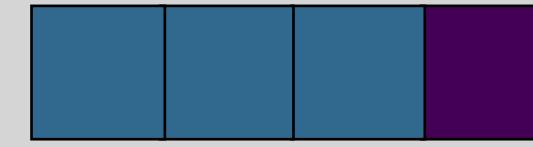
RMSE: 0.38



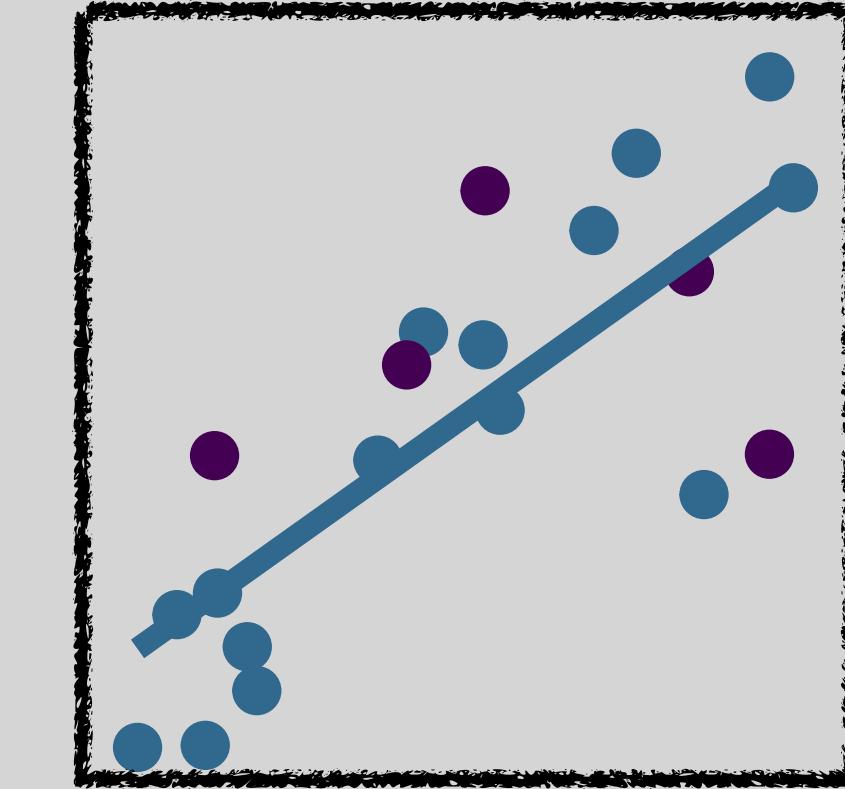
fold 3



RMSE: 0.45

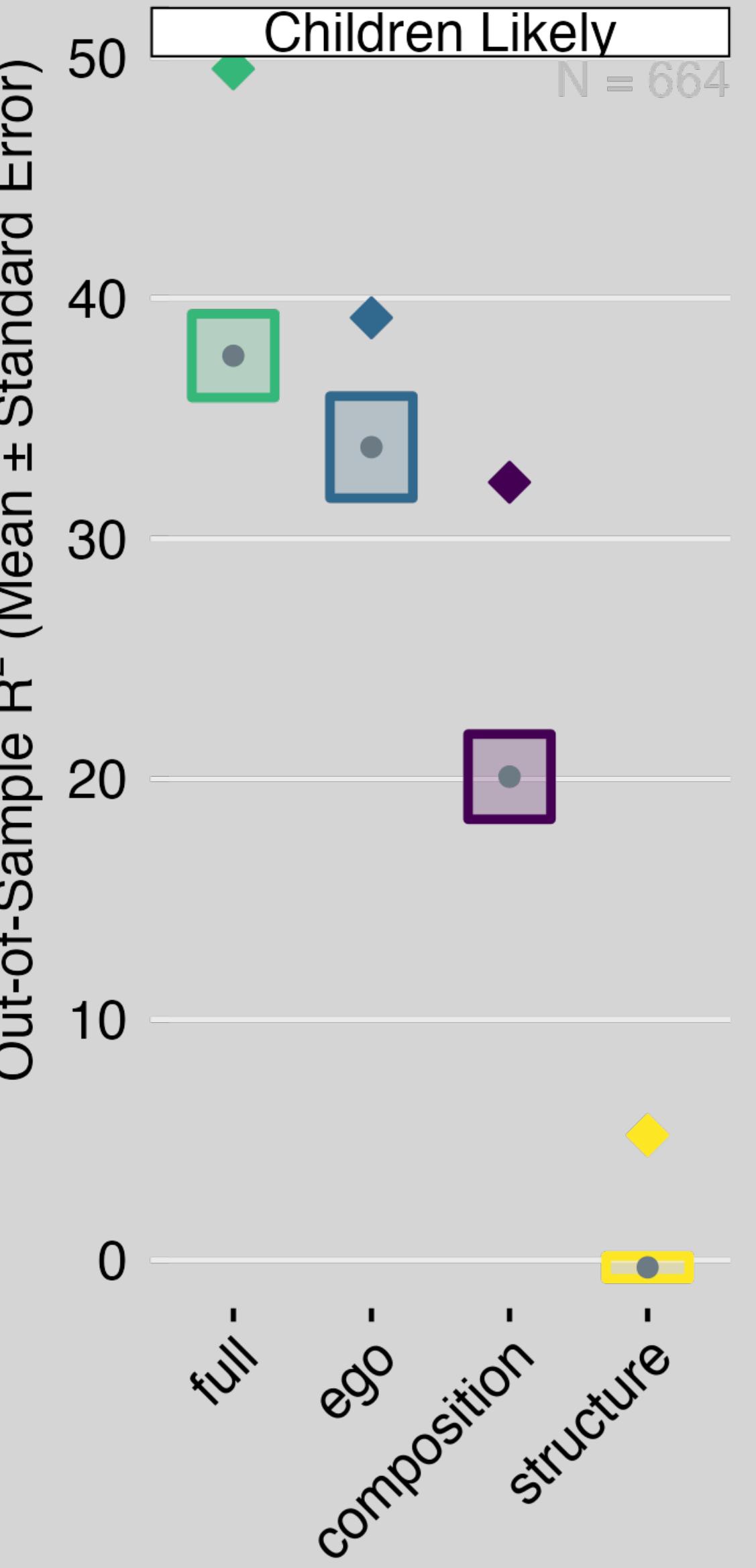


fold 4

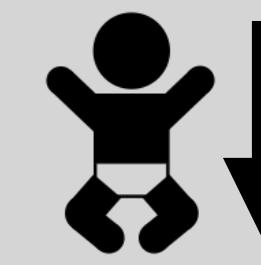
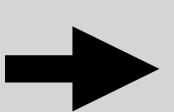
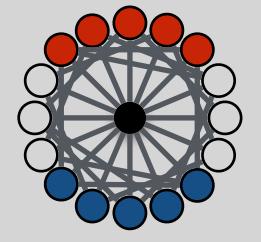


RMSE: 0.62

Results



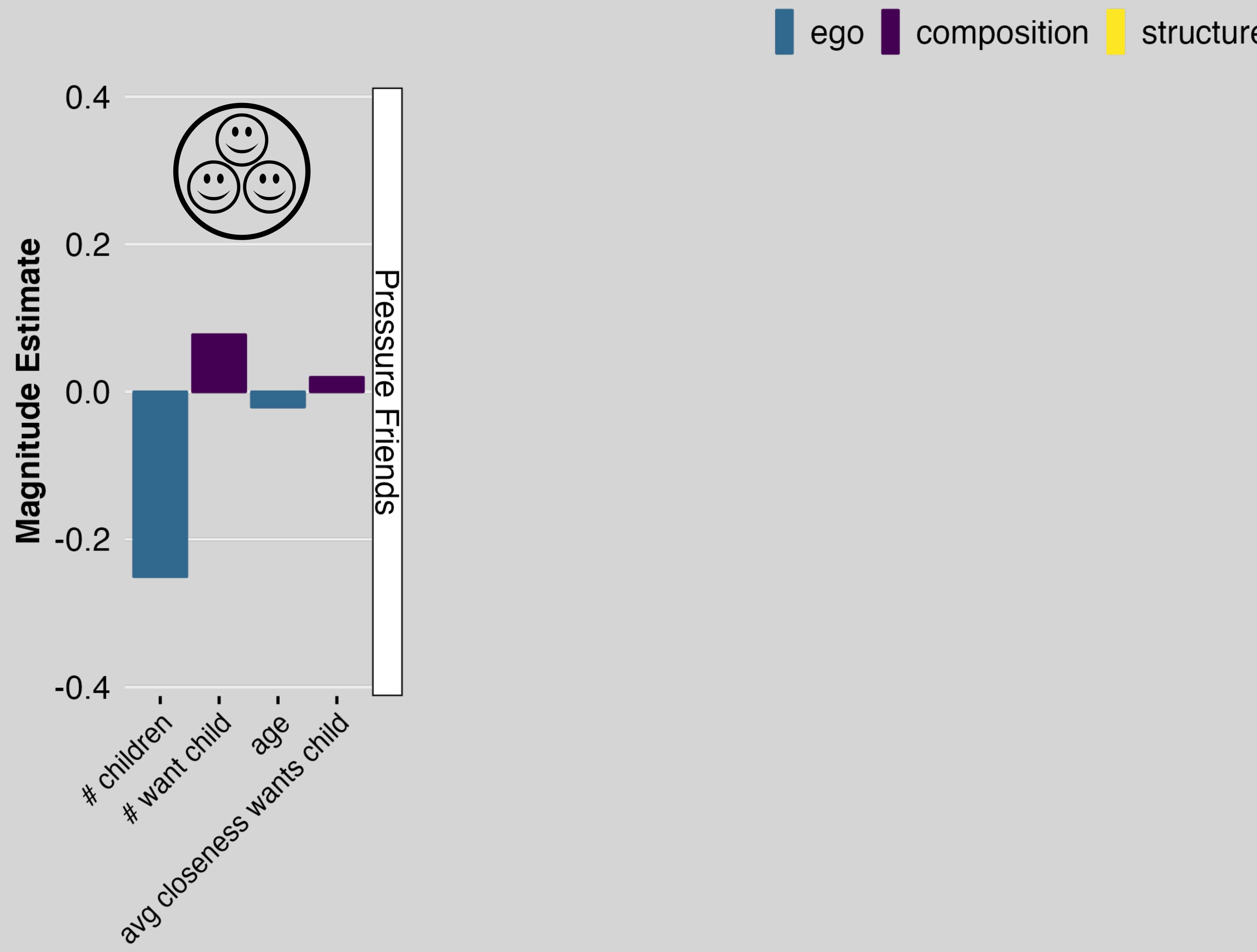


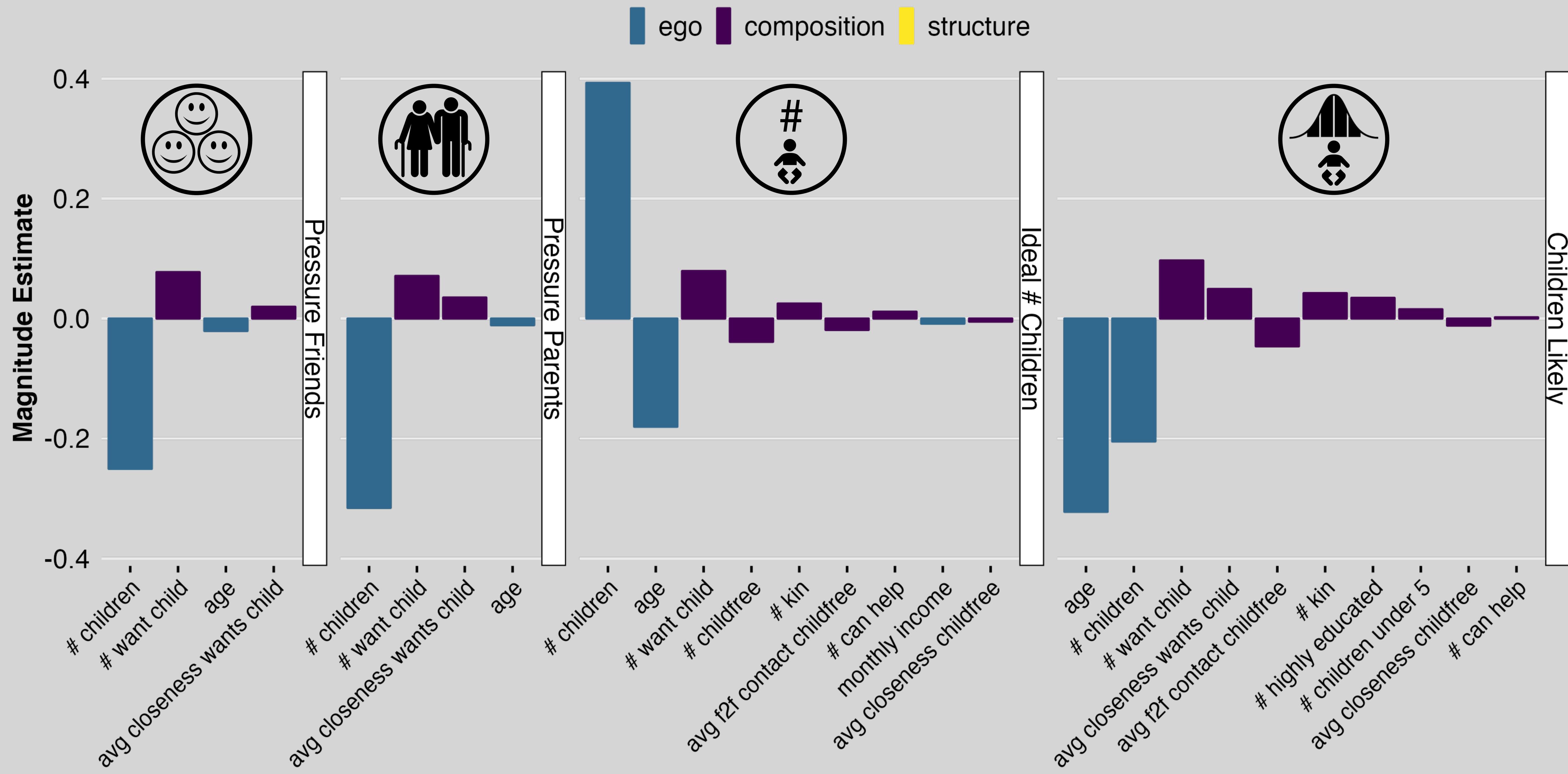


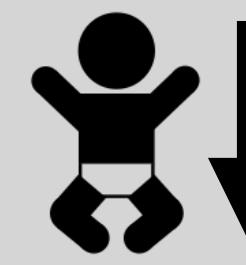
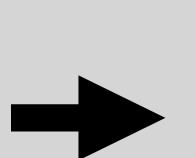
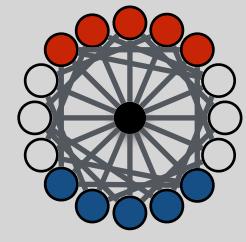
Take-Home Messages

✓ predicting pretty well!

(✗) massive overfitting (~15 %-points)





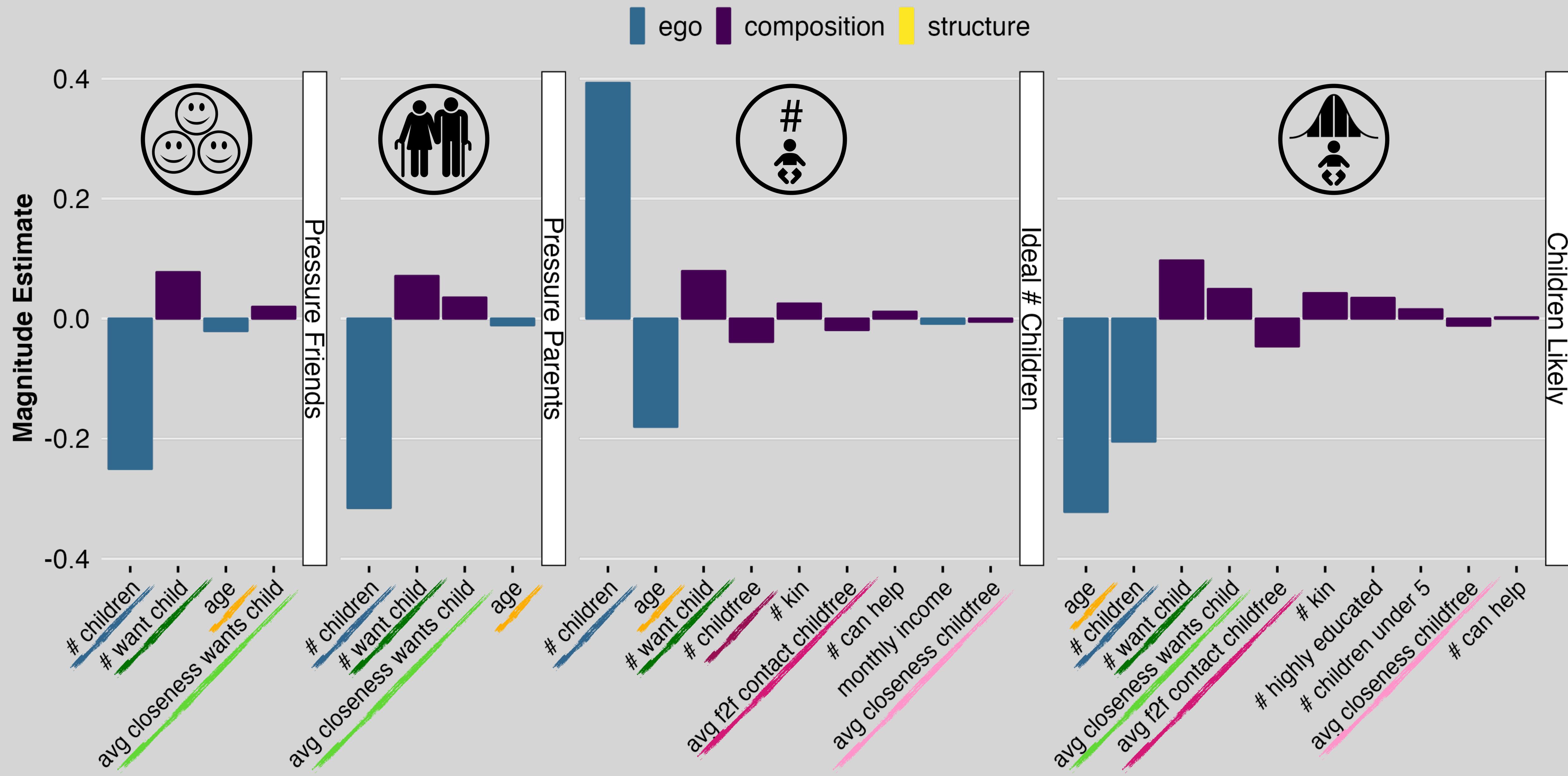


Take-Home Messages

✓ predicting pretty well!

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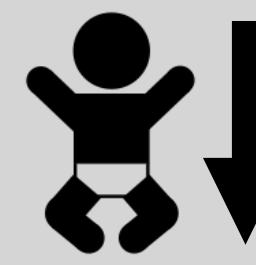
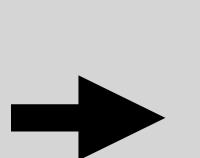
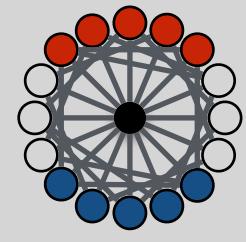
✓ personal variables important, composition so-so, structure not



Important Variables



- age
- # children
- # alters who **do** want children
- # alters who **do not** want children
- strength of relationship to these people



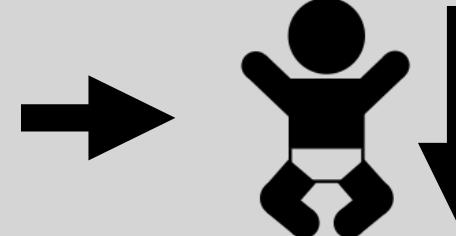
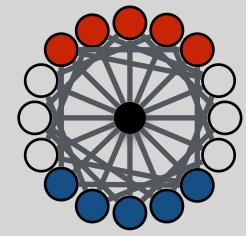
Take-Home Messages

✓ predicting pretty well!

✗ massive overfitting (~15 %-points)

✓ personal variables important, composition so-so, structure not

✓ people who want children and who do not important



Take-Home Messages

✓ predicting pretty well!

difficult to assess how well

✗ massive overfitting (~15 %-points)

potentially misleading conclusions

✓ personal variables important, composition so-so, structure not networks may not be unimportant, few ego variables

✓ people who want children and who do not important understudied

social learning

- ✓ # people with childwish,
ties to them
- ✓ # childfree people,
ties to them

social contagion

- ✓ # children under 5

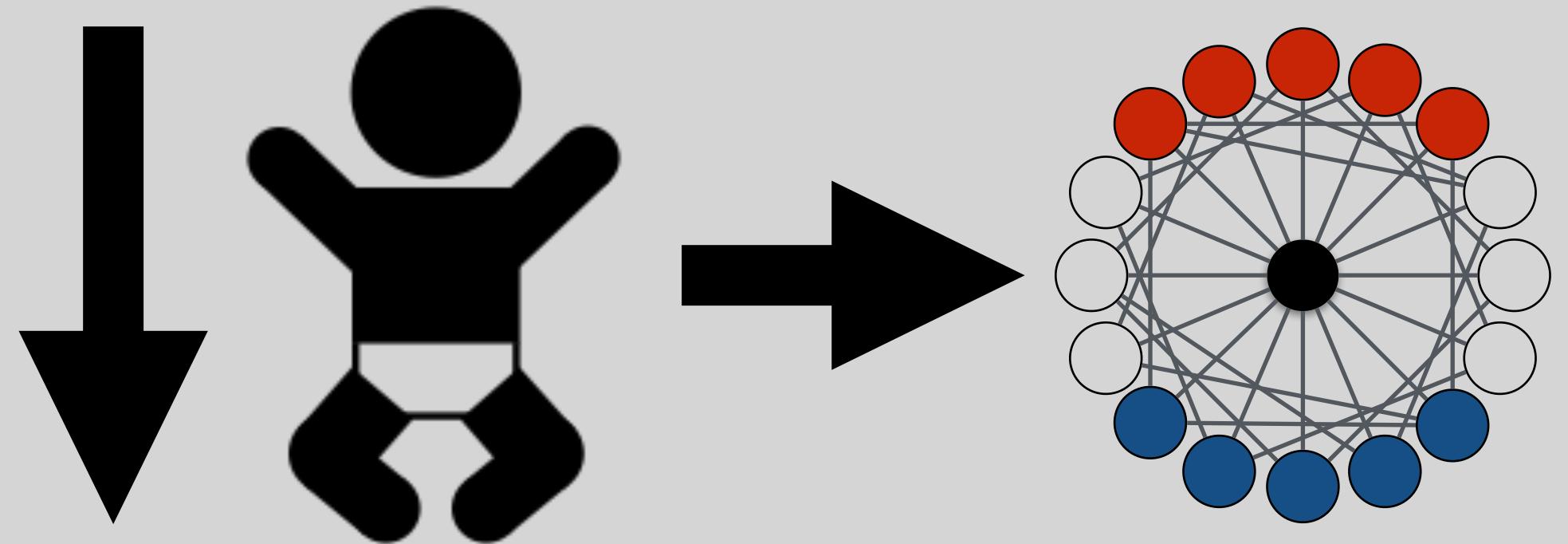
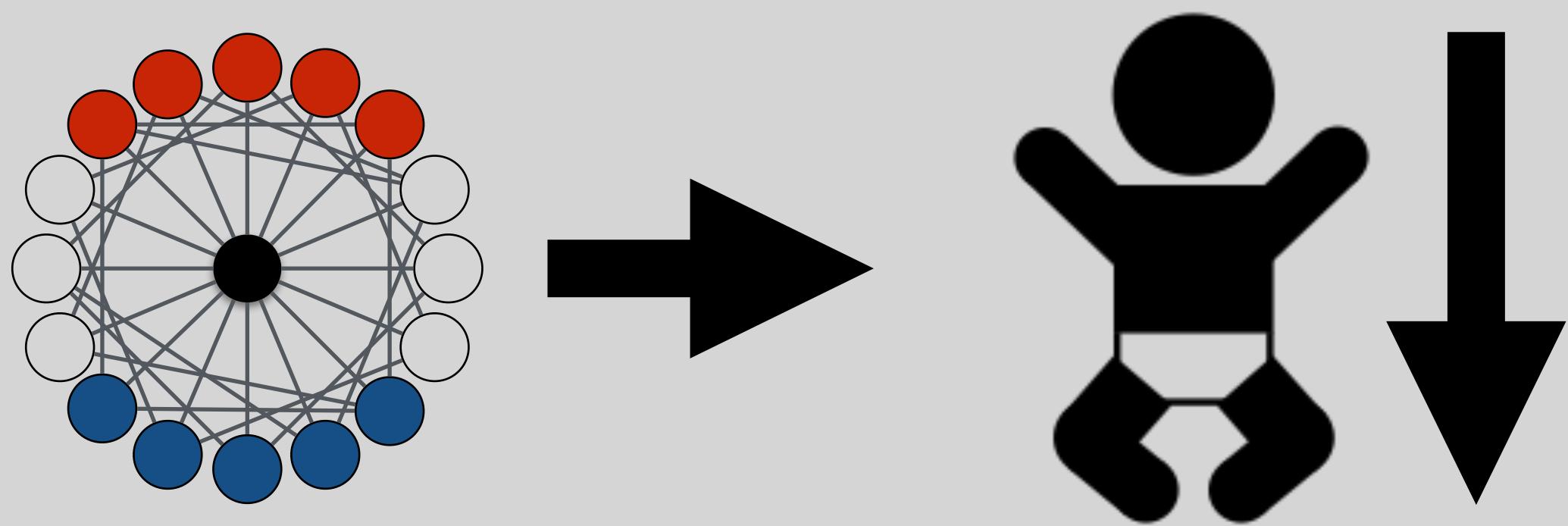
- ✓ # kin
- ✓ # people that can help

social support

- ✓ people felt pressure
- ✓ # people with childwish

social pressure

CAUSALITY



et
voilà
la
réalité

R package FertNet

FertNet: Process Data from the Social Networks and Fertility Survey

Processes data from The Social Networks and Fertility Survey, downloaded from <<https://dataarchive.lissdata.nl>>, including correcting respondent errors and transforming network data into network objects to facilitate analyses and visualisation.

Version: 0.1.1
Imports: [haven](#) (≥ 2.5.1)
Suggests: [testthat](#) (≥ 3.0.0), [tidygraph](#) (≥ 1.2.2)
Published: 2023-03-16
Author: Stulp Gert  [aut, cre]
Maintainer: Stulp Gert <g.stulp at rug.nl>
License: [CC BY 4.0](#)
NeedsCompilation: no
Materials: [README](#) [NEWS](#)
CRAN checks: [FertNet results](#)

Documentation:

Reference manual: [FertNet.pdf](#)

Downloads:

Package source: [FertNet 0.1.1.tar.gz](#)

Windows binaries: r-devel: [FertNet 0.1.1.zip](#), r-release: [FertNet 0.1.1.zip](#), r-oldrel: [FertNet 0.1.1.zip](#)

macOS binaries: r-release (arm64): [FertNet 0.1.1.tgz](#), r-oldrel (arm64): [FertNet 0.1.1.tgz](#), r-release (x86_64): [FertNet 0.1.1.tgz](#), r-oldrel (x86_64): [FertNet 0.1.1.tgz](#)

Linking:

Please use the canonical form <https://CRAN.R-project.org/package=FertNet> to link to this page.



DEMOGRAPHIC RESEARCH

A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

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DOI: 10.4054/DemRes.2023.49.19

Data Description

Describing the Dutch Social Networks and Fertility Study and how to process it

Gert Stulp

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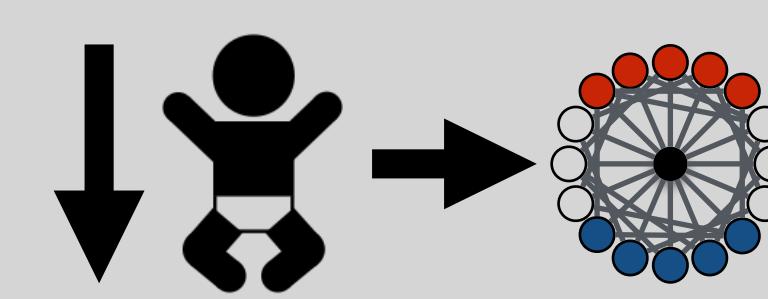
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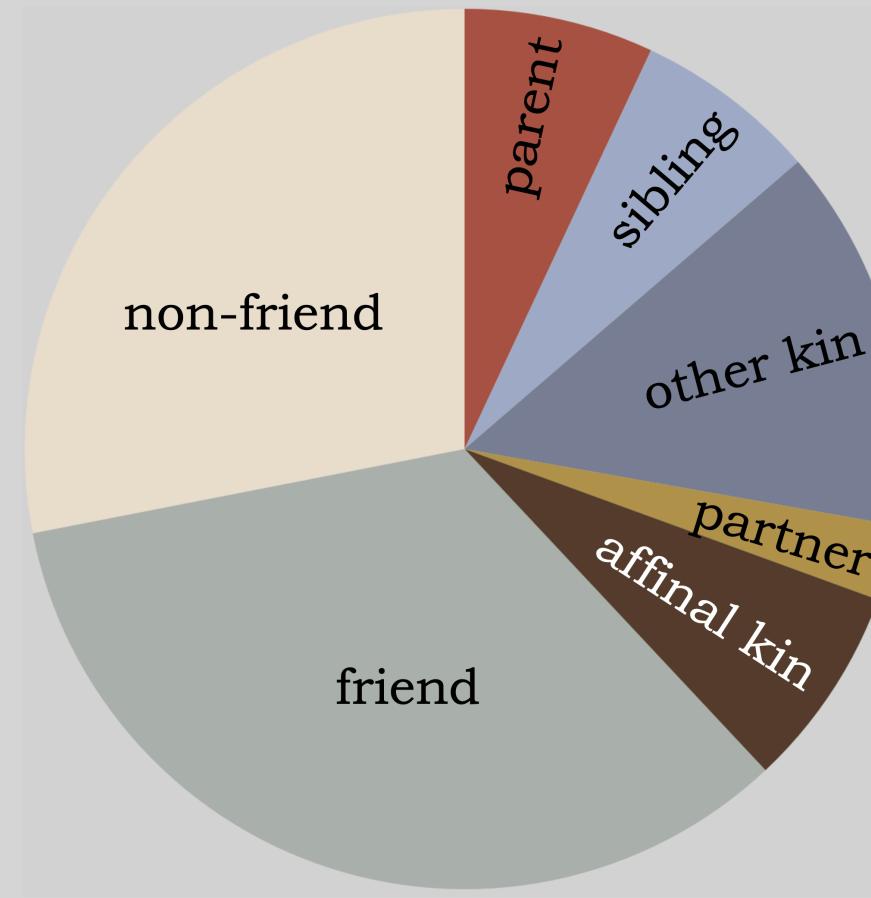
Predicting Fertility data challenge

preferdatachallenge.nl

- ✓ Be a part of a unique data challenge
- ✓ Contribute to fertility research & computational social sciences
- ✓ Write a paper for special issue
- ✓ Work with amazing data



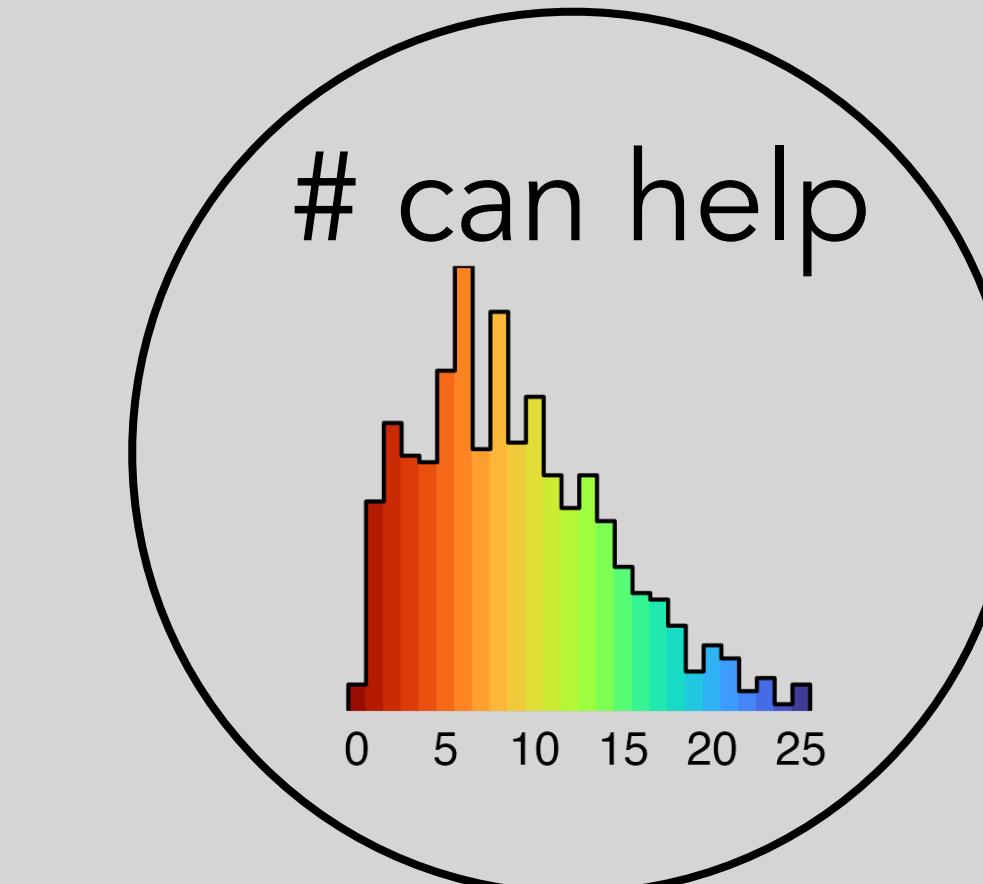
Take-Home Messages



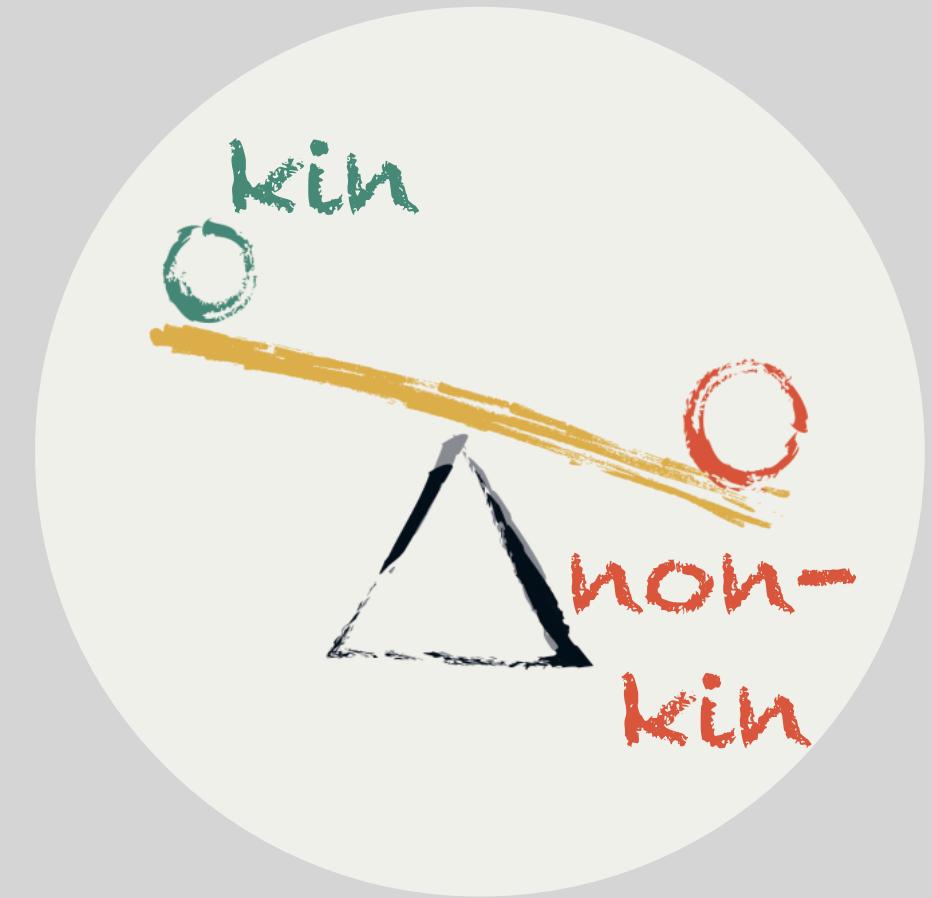
Substantial numbers
of kin



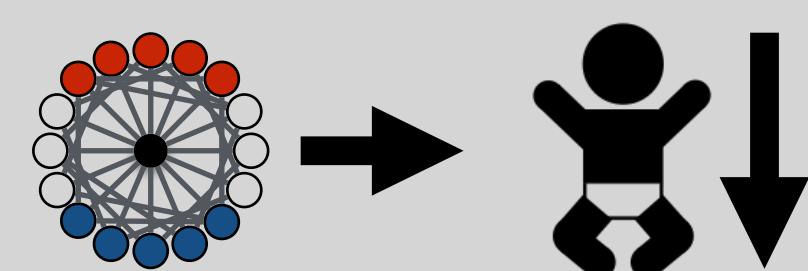
Importance
nuclear family



Variation in
resources



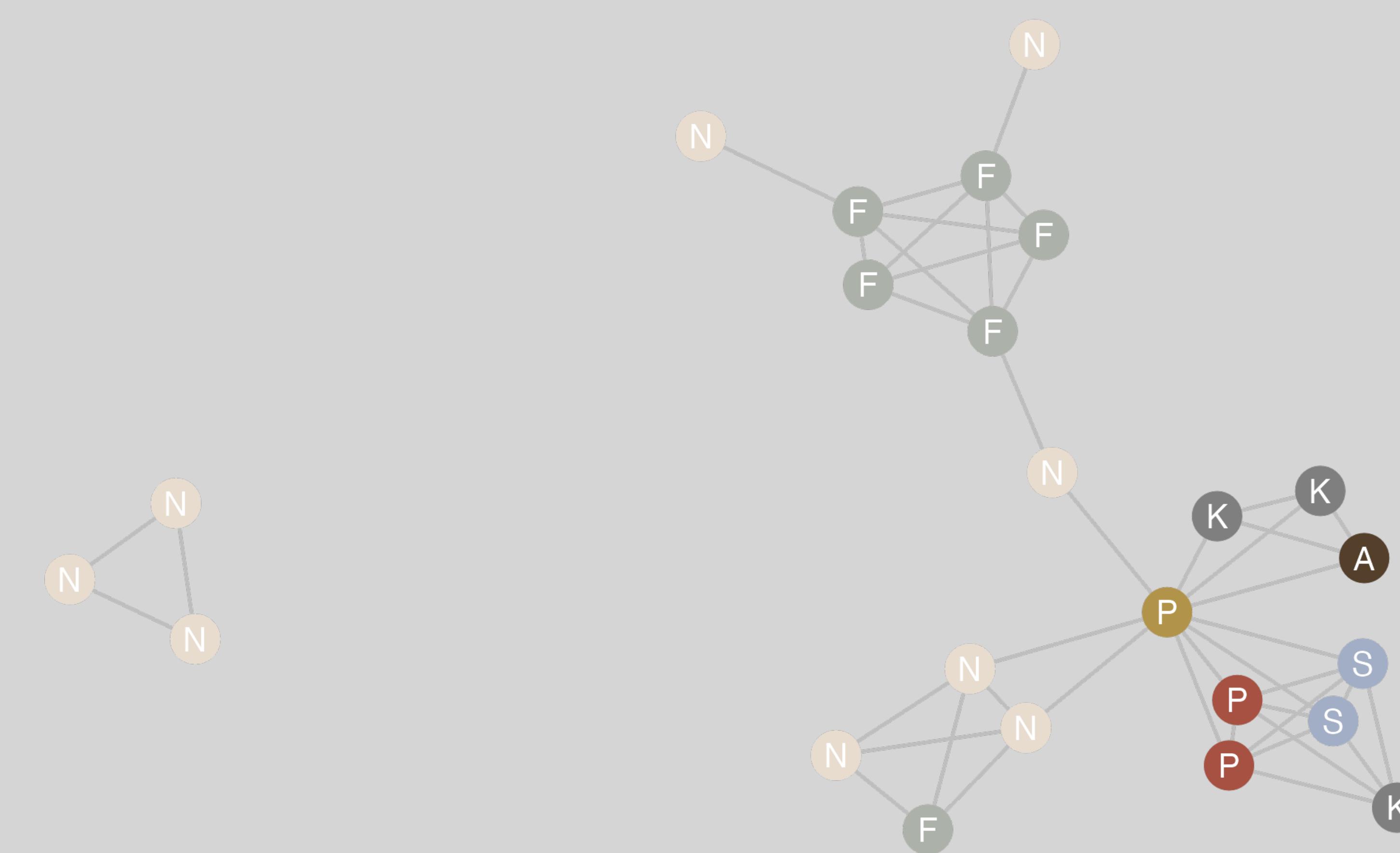
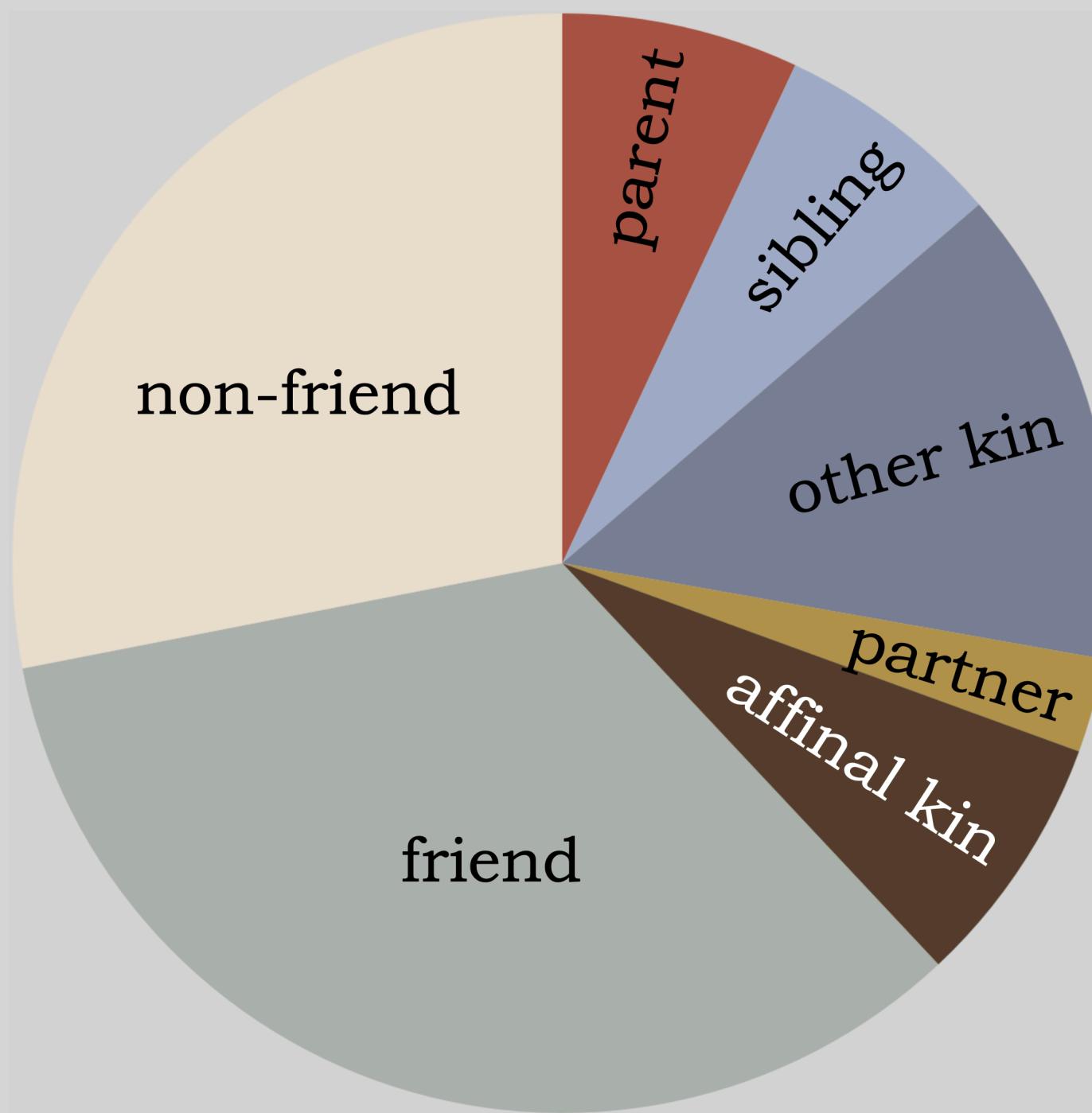
Networks are
constrained



- ✓ personal variables important, composition so-so, structure not
- ✓ people who want children and who do not important
- (✗) CAUSALITY



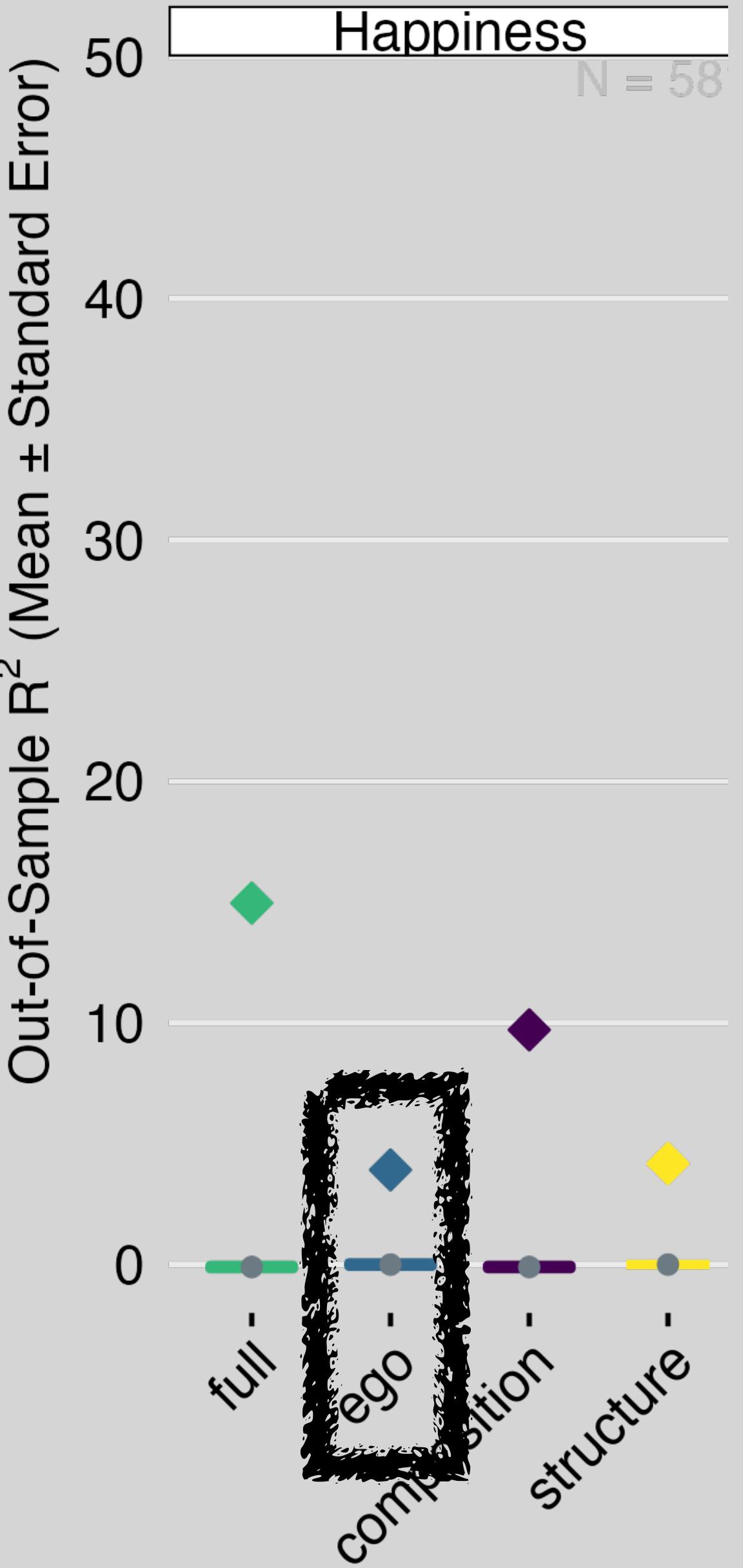
Social mechanisms underlying whether people have children



“A complicated data-mining exercise,
with much oversold results”



()**massive overfitting (~15 %-points)**
potentially misleading conclusions



“A complicated data-mining exercise, with much oversold results”

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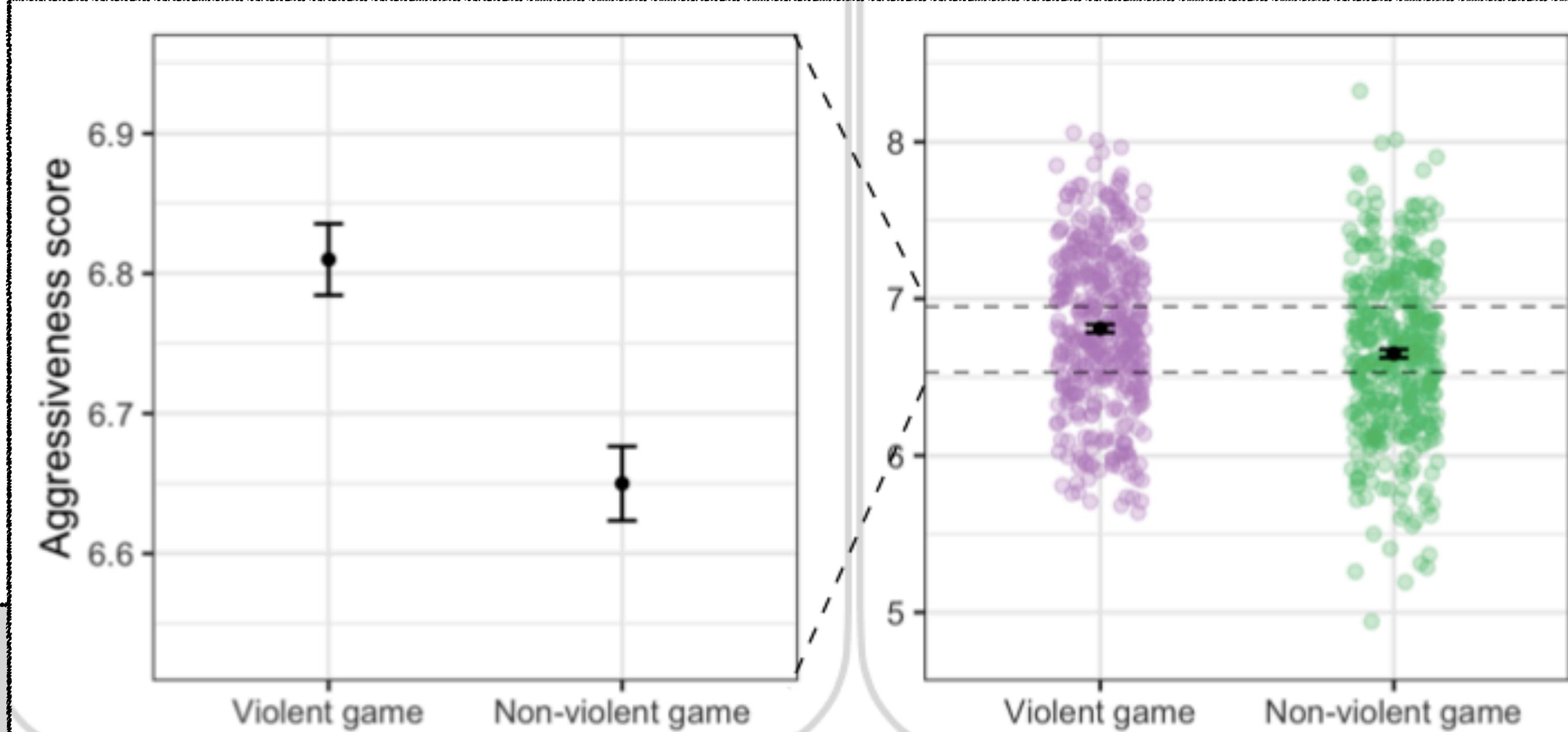
An illusion of predictability in scientific results: Even experts confuse inferential uncertainty and outcome variability

Sam Zhang^{a,1} , Patrick R. Heck^b , Michelle N. Meyer^c , Christopher F. Chabris^c , Daniel G. Goldstein^d , and Jake M. Hofman^{d,1} 

Edited by Elke Weber, Princeton University, Princeton, NJ; received February 22, 2023; accepted June 26, 2023

Traditionally, scientists have placed more emphasis on communicating inferential uncertainty (i.e., the precision of statistical estimates) compared to outcome variability (i.e., the predictability of individual outcomes). Here, we show that this can lead to sizable misperceptions about the implications of scientific results. Specifically, we present three preregistered, randomized experiments where participants saw the same scientific findings visualized as showing only inferential uncertainty, only outcome variability, or both and answered questions about the size and importance of findings they were shown. Our results, composed of responses from medical professionals, professional data scientists, and tenure-track faculty, show that the prevalent form of visualizing only inferential uncertainty can lead to significant overestimates of treatment effects, even among highly trained experts. In contrast, we find that depicting both inferential uncertainty and outcome variability leads to more accurate perceptions of results while appearing to leave other subjective impressions of the results unchanged, on average.

statistics | uncertainty | science communication | visualization | experiments

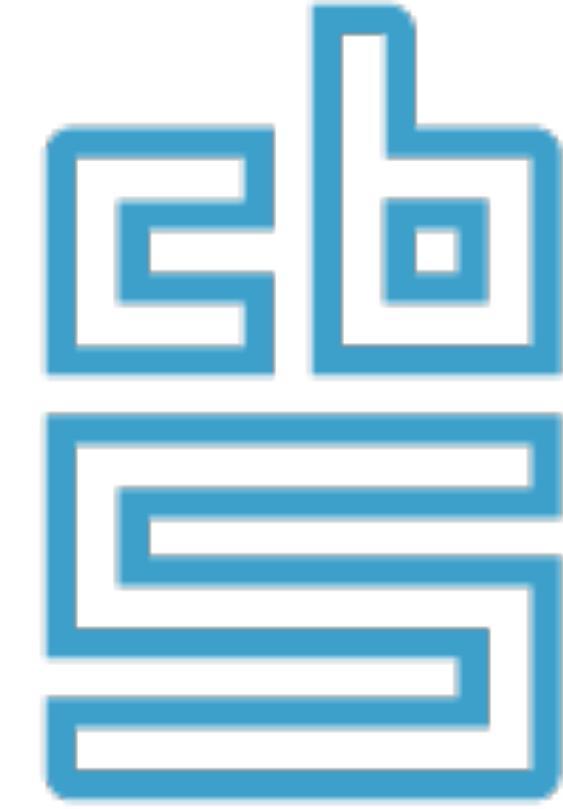


The figure consists of two side-by-side scatter plots. Both plots have 'Aggressiveness score' on the y-axis. The left plot has 'Violent game' and 'Non-violent game' on the x-axis. It shows two data points with error bars: a black dot at approximately 6.82 for the violent game and a black dot at approximately 6.65 for the non-violent game. The right plot also has 'Violent game' and 'Non-violent game' on the x-axis. It shows two clusters of data points: a purple cluster for the violent game ranging from ~5.8 to ~8.2 and a green cluster for the non-violent game ranging from ~5.0 to ~8.0. Both plots have dashed horizontal grid lines at 6.5, 7.0, 7.5, and 8.0.

variables
explain
little

Fewer births through education and flexwork?

“total effect on fertility ...
rather small



incomparable
results

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PHILOSOPHICAL TRANSACTIONS B
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Review
Gert Stulp¹ and Louise Barrett²
¹Department of Population Health, London School of Hygiene and Tropical Medicine, Keppel Street, London, United Kingdom
²Department of Psychology, University of Lethbridge, Lethbridge, Alberta, Canada T1K 3M4

Cite this article: Stulp G, Barrett L. 2016 Wealth, fertility and adaptive behaviour in industrial populations. *J. R. Soc. Interface*, **13**, 20150353. <http://dx.doi.org/10.1098/rsif.2015.0353>
Accepted: 28 December 2015
On the evolution of life in a human population. Understanding variation in human fertility, what we know from evolutionary demography.
Subject Areas:
behaviour, evolution, ecology
Keywords:
human fitness, human behavioural ecology, industrial society, research
Author for correspondence:
Gert Stulp
e-mail: gert.stulp@lshtm.ac.uk

The lack of association between wealth and fertility in contemporary industrialized populations has often been used to question the value of an evolutionary perspective on human behaviour. Here, we first present the evidence that the relationship between wealth and fertility in modern industrial societies and the number of children) are decoupled in modern industrial settings. We suggest that the pattern of the relationship between wealth and fertility in modern industrial populations is consistent with the predictions of wealth and human evolution: cross-sectional studies are inconclusive with respect to how material wealth and fertility are linked. A literature review of longitudinal studies on wealth and fertility shows that the majority of these studies support the idea that wealth is associated with fertility, but fall below those that would maximize fitness. We emphasize that reproductive decision-making reflects a complex interplay between individual and social factors. In particular, we highlight the role of education and the role of economic inequality in fertility decisions. We conclude by discussing whether the wealth-fertility relationship can inform us about the adaptiveness of modern fertility behaviour, and argue against simplistic claims regarding 'adaptability' behaviour in humans.

Supplementary material is available at <http://rsb.royalsocietypublishing.org> or via <http://dx.doi.org/10.1098/rsif.2015.0353.supp>.

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Wealth, fertility and adaptive behaviour in industrial populations
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¹Department of Population Health, London School of Hygiene and Tropical Medicine, Keppel Street, London, United Kingdom
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Wealth, fertility and adaptive behaviour in industrial populations, Part I
Gert Stulp¹ and Louise Barrett²
¹Department of Population Health, London School of Hygiene and Tropical Medicine, Keppel Street, London, United Kingdom
²Department of Psychology, University of Lethbridge, Lethbridge, Alberta, Canada T1K 3M4

Cite this article: Stulp G, Barrett L. 2016 Wealth, fertility and adaptive behaviour in industrial populations, Part I. *J. R. Soc. Interface*, **13**, 20150353. <http://dx.doi.org/10.1098/rsif.2015.0353>
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Wealth, fertility and adaptive behaviour in industrial populations, Part II
Gert Stulp¹ and Louise Barrett²
¹Department of Population Health, London School of Hygiene and Tropical Medicine, Keppel Street, London, United Kingdom
²Department of Psychology, University of Lethbridge, Lethbridge, Alberta, Canada T1K 3M4

Cite this article: Stulp G, Barrett L. 2016 Wealth, fertility and adaptive behaviour in industrial populations, Part II. *J. R. Soc. Interface*, **13**, 20150353. <http://dx.doi.org/10.1098/rsif.2015.0353>
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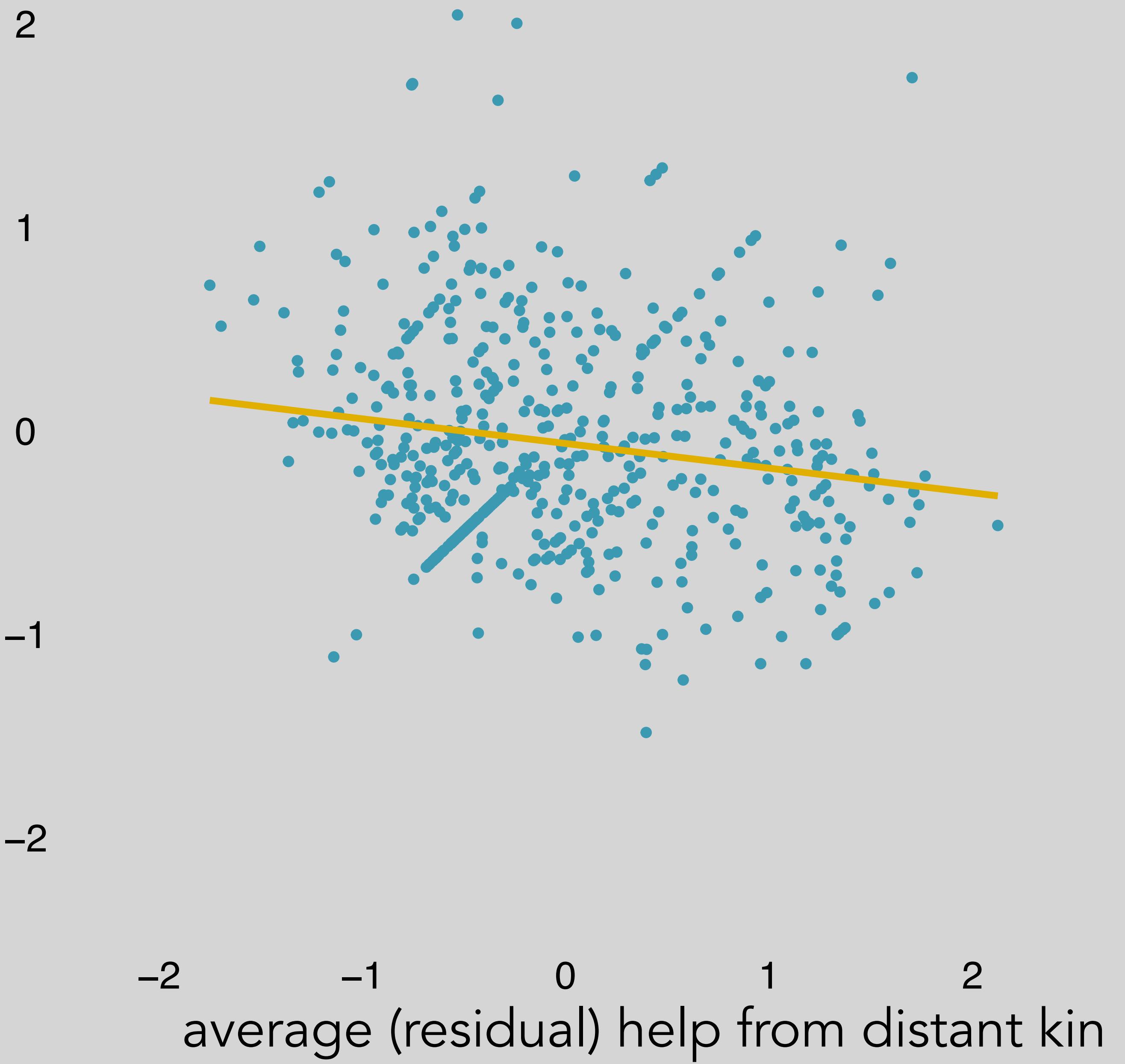


surprising
patterns

non-replicable
results

trade-offs in
fertility matters
kin versus non-kin

average (residual)
help from friends



interdependecies in help
with child care

trade-offs in
fertility matters
kin versus non-kin

parent

sibling

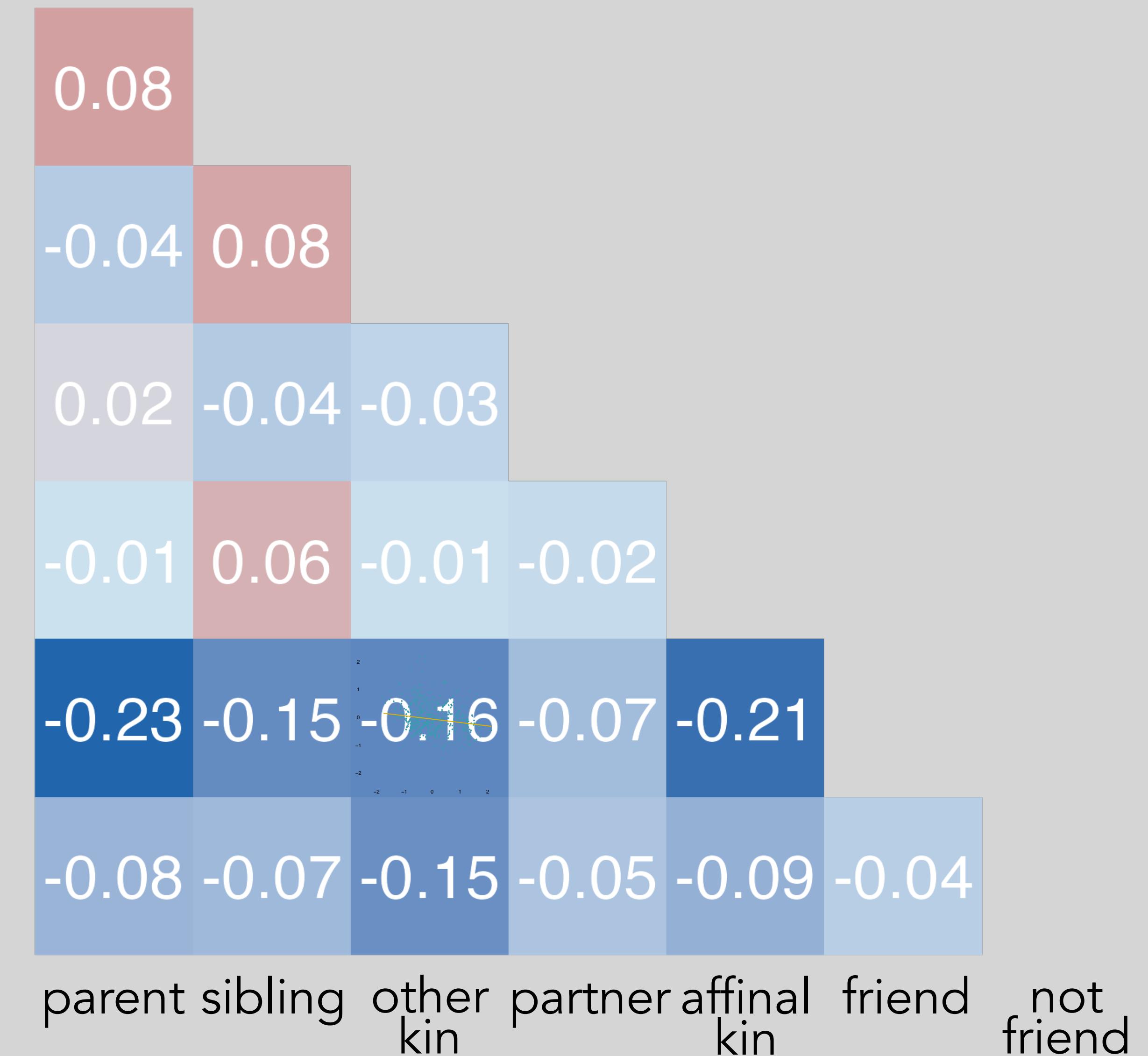
other kin

partner

affinal kin

friend

not friend







cohort '60-'64

% childlessness

50

25%

7%

17%

24%

38%

I

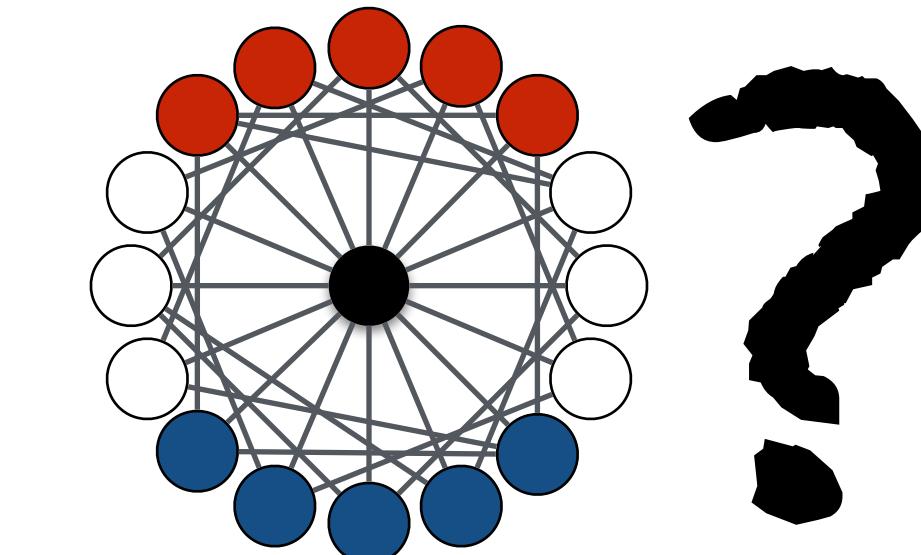
II

III

IV

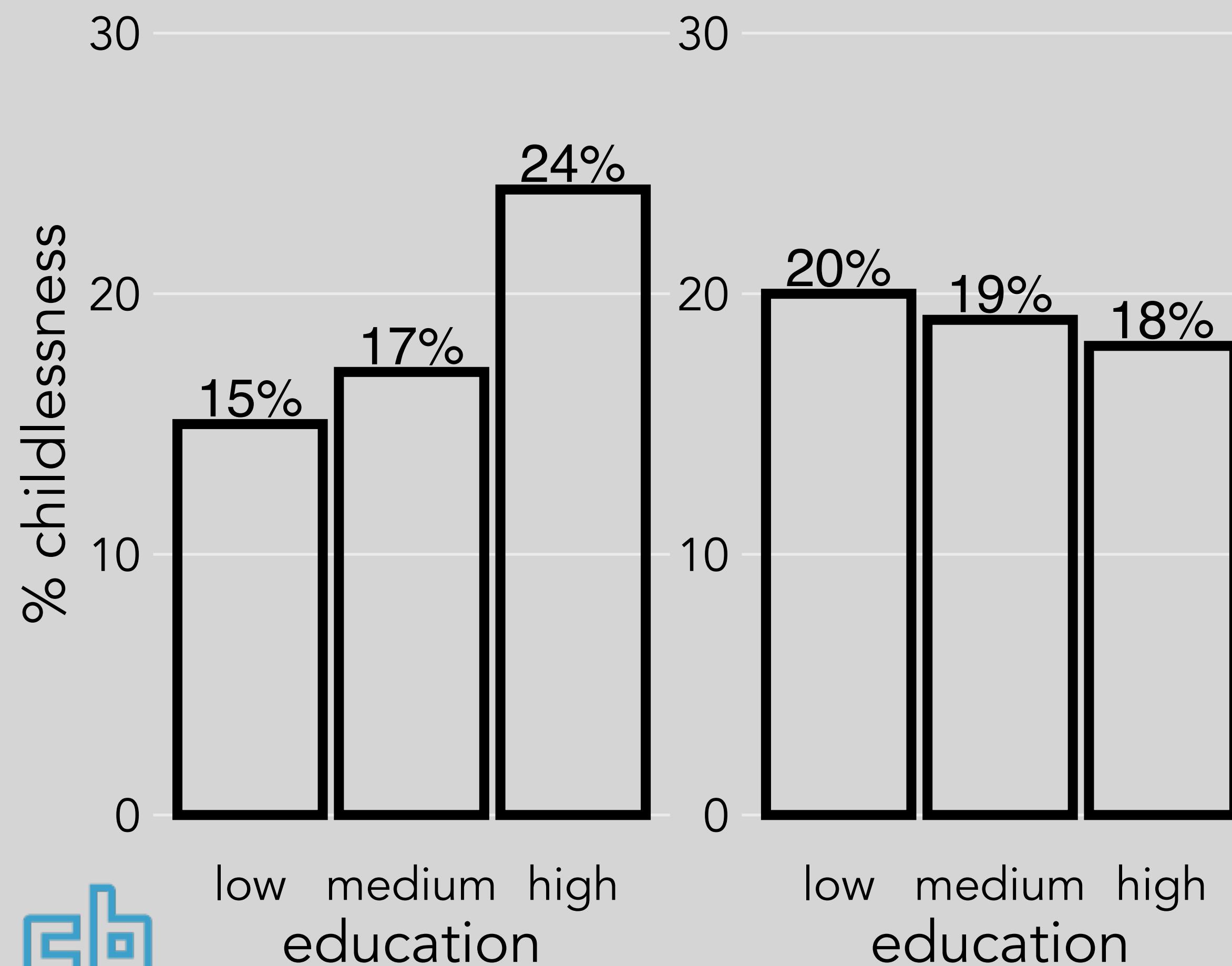
V

level of education

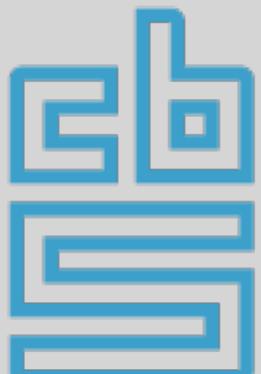
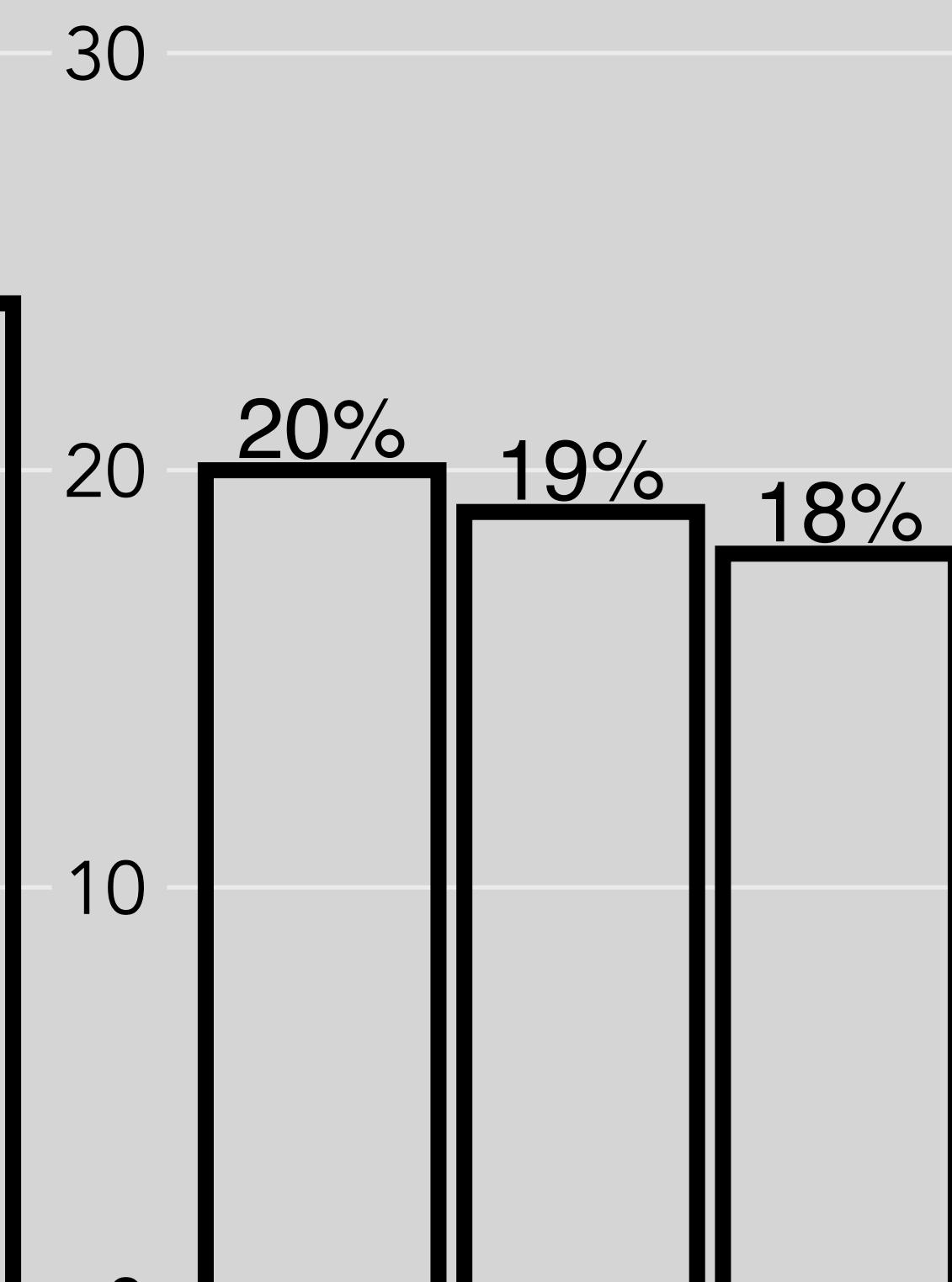


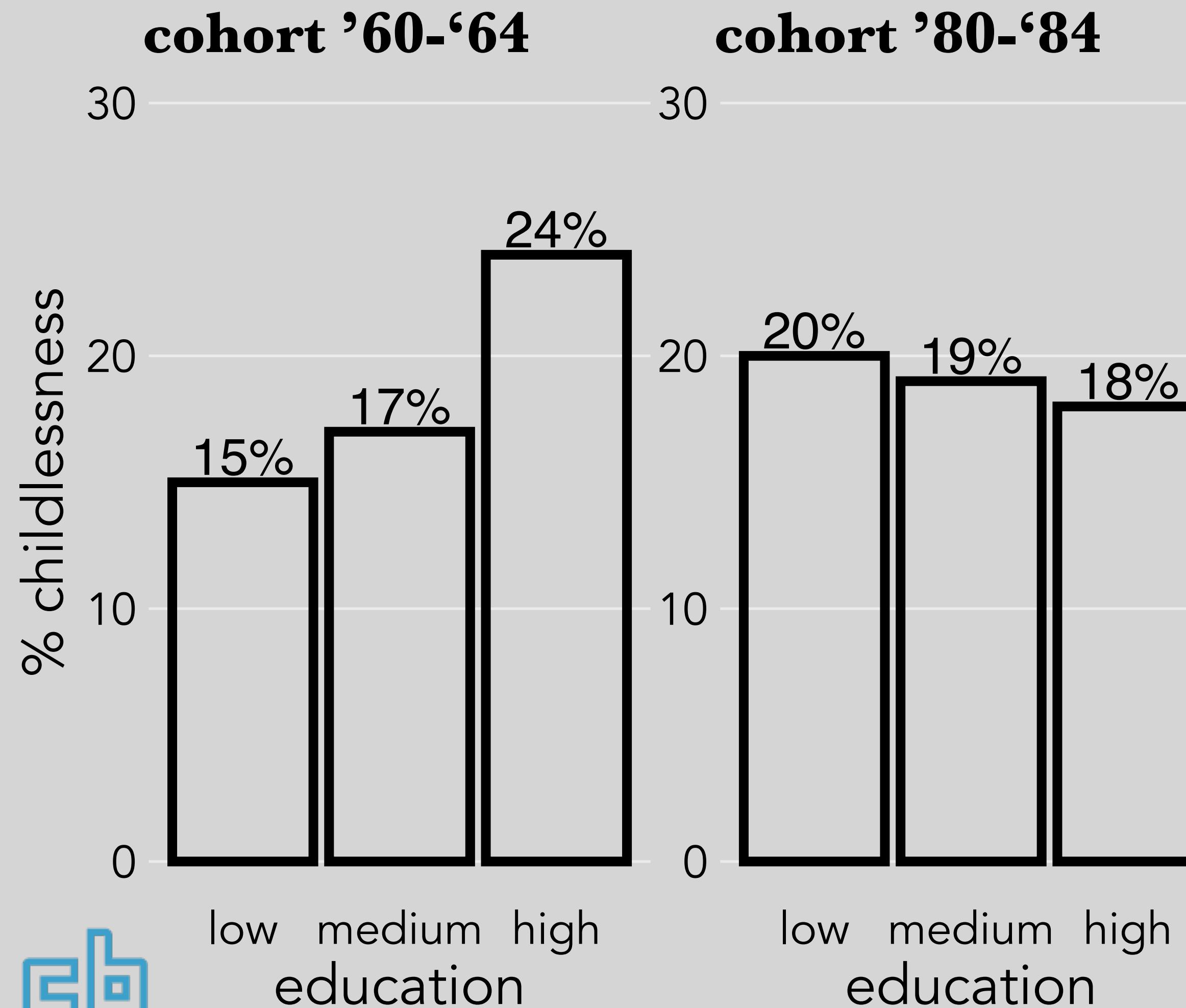


cohort '60-'64



cohort '80-'84

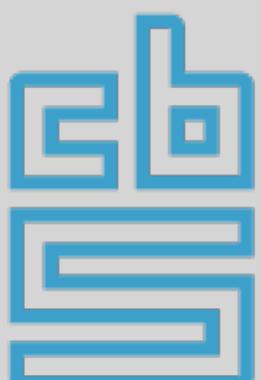




“

[this] development ... may well indicate that social inequality in childbearing is intensifying in that lowered educated persons are increasingly left behind in family formation

JALOVAARA et al



% childlessness

50

25%

7%

17%

24%

38%

0

I

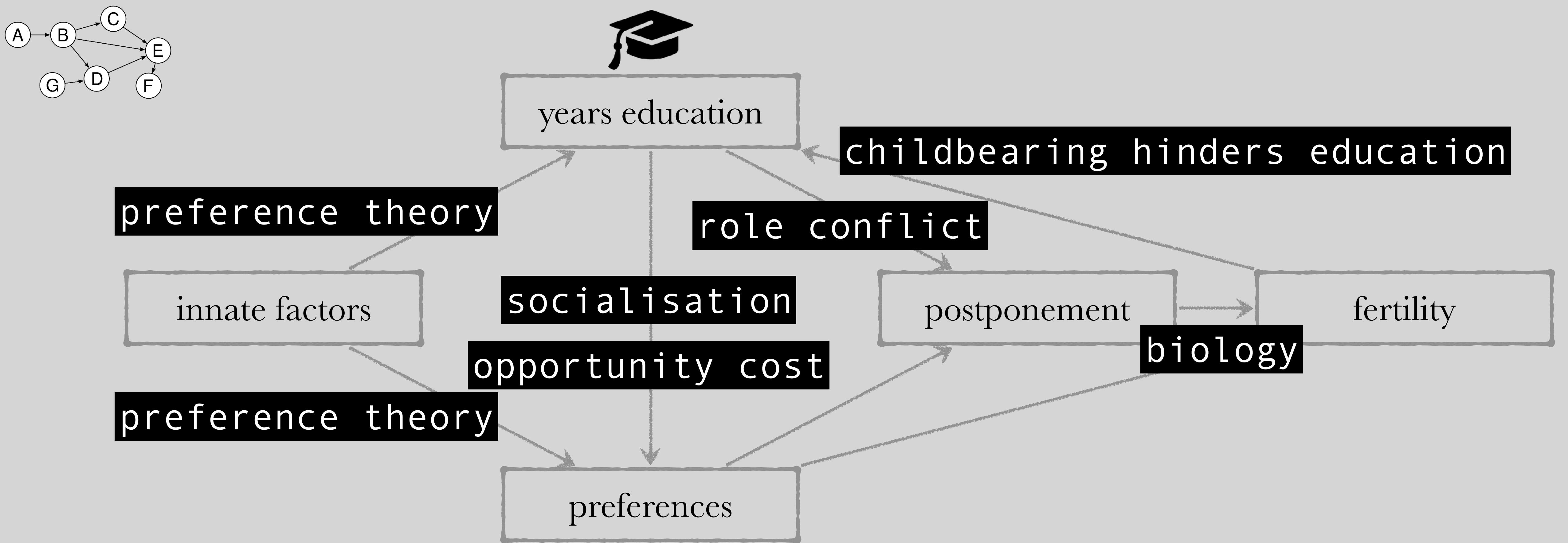
II

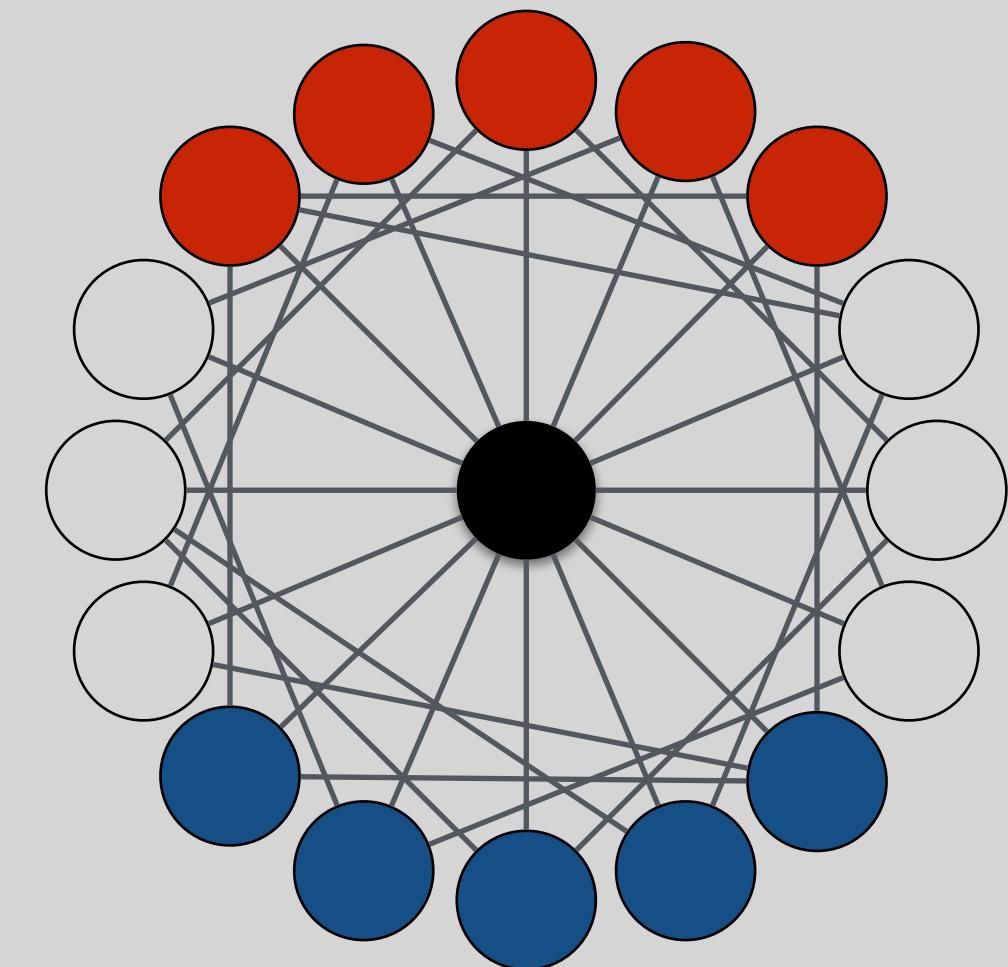
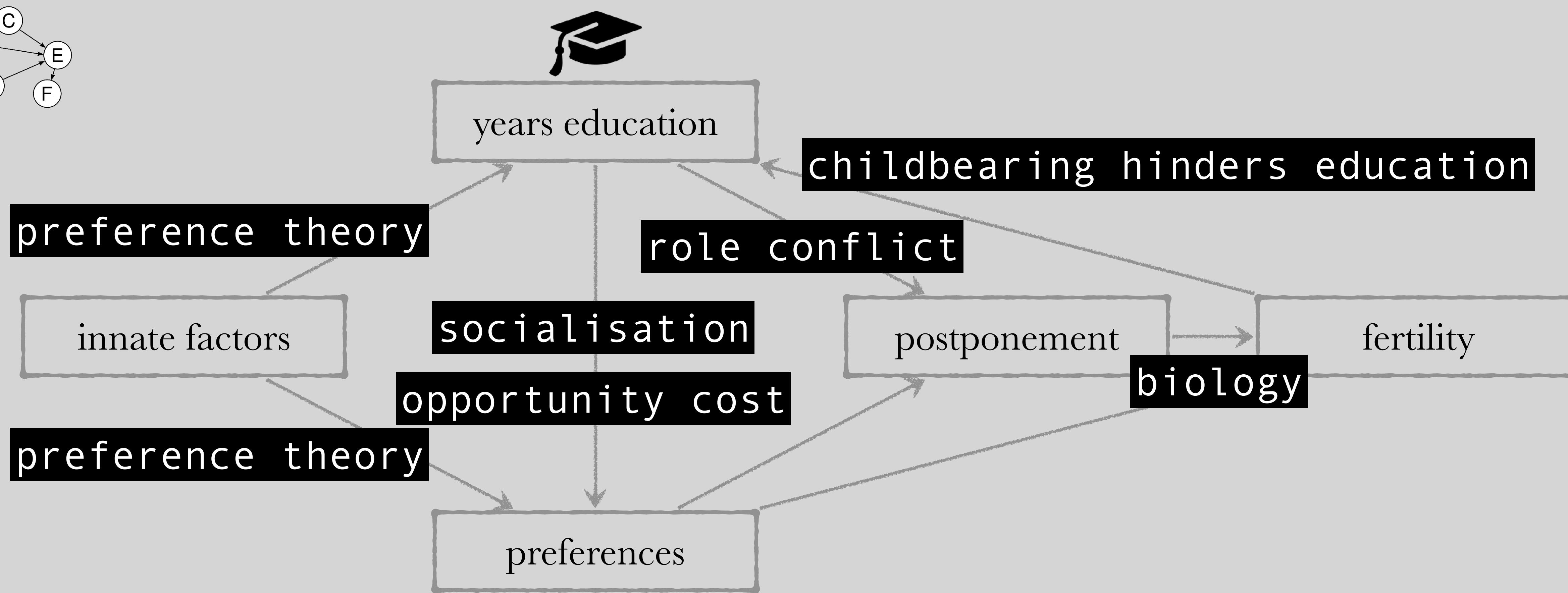
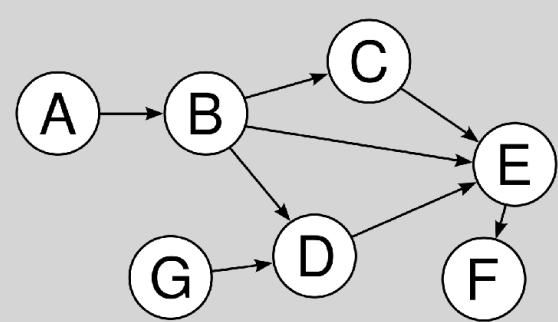
III

IV

V

level of education





Education, Kin, Networks



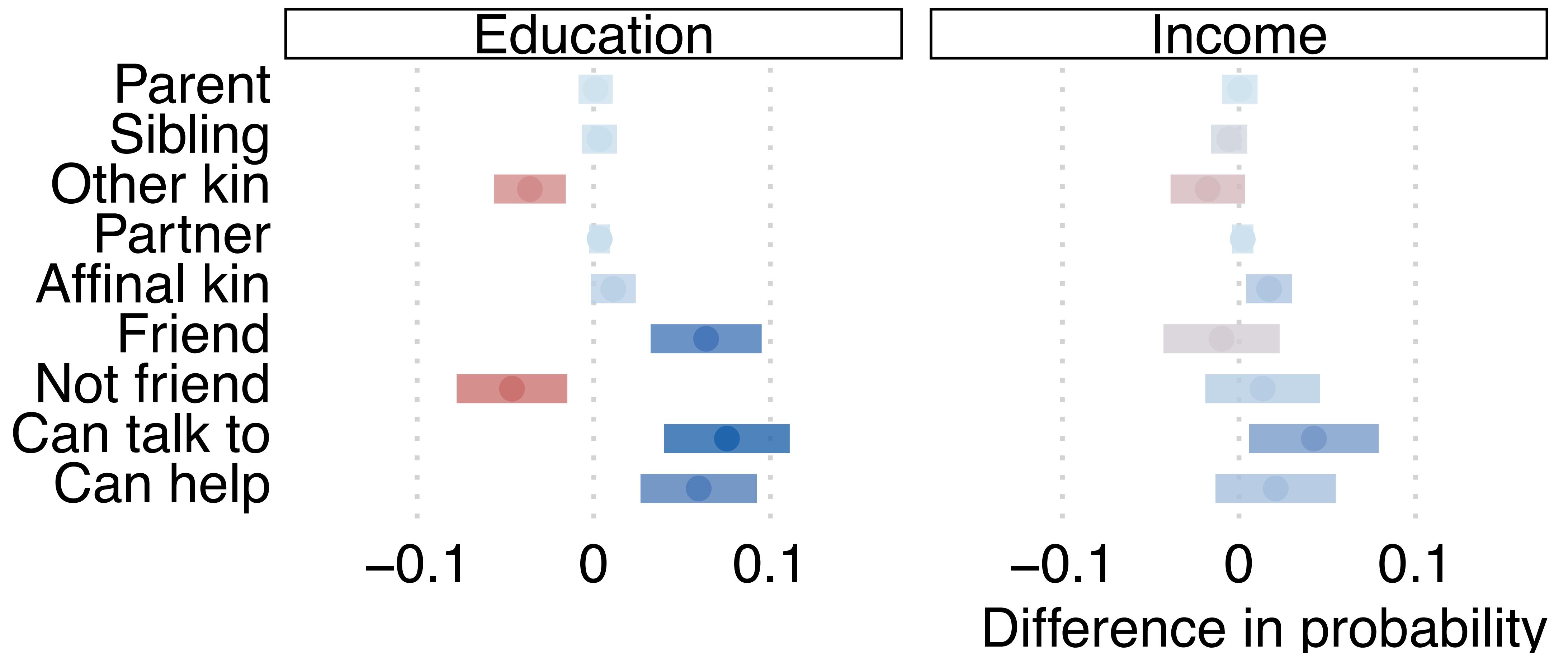
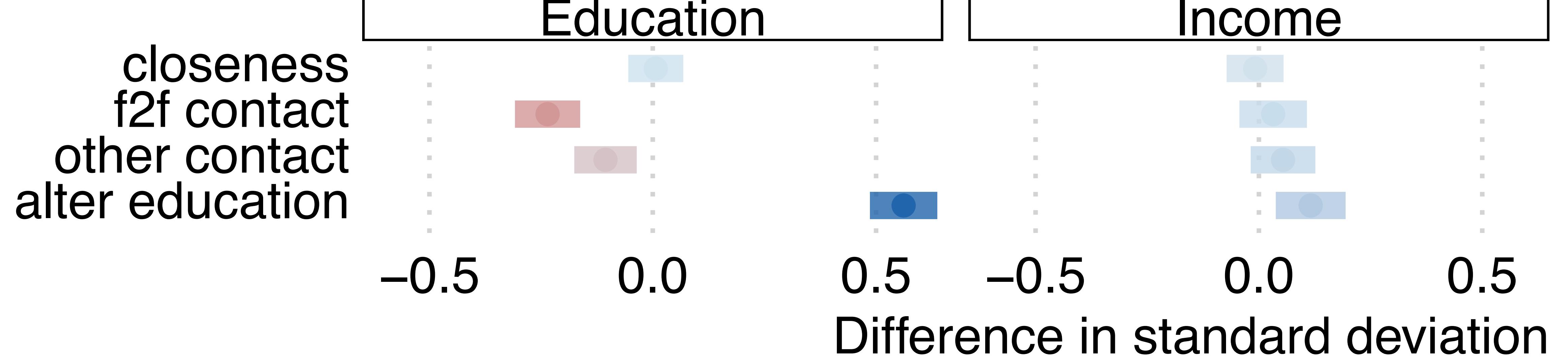
'Advantages'

- *Less disruption*
- *Stronger family obligations*
- *Stronger cohesion*

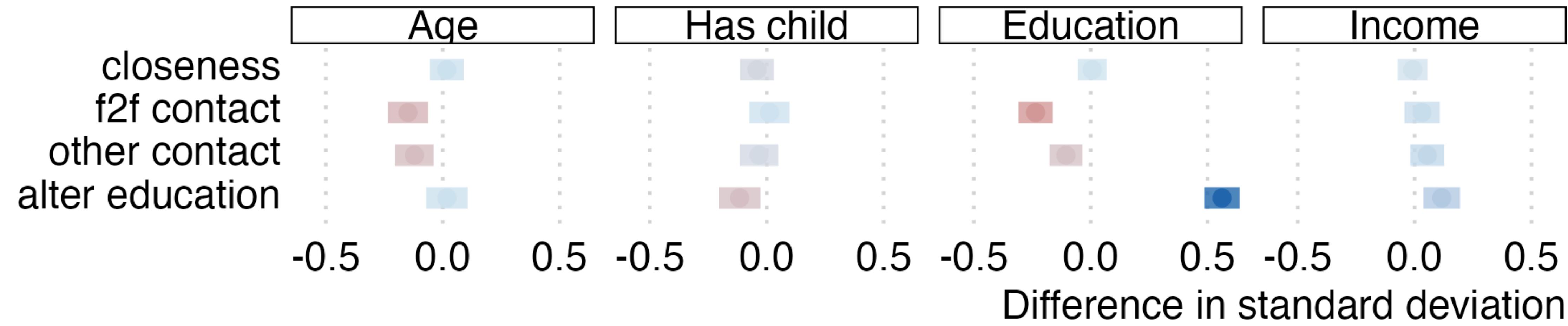


'Disadvantages'

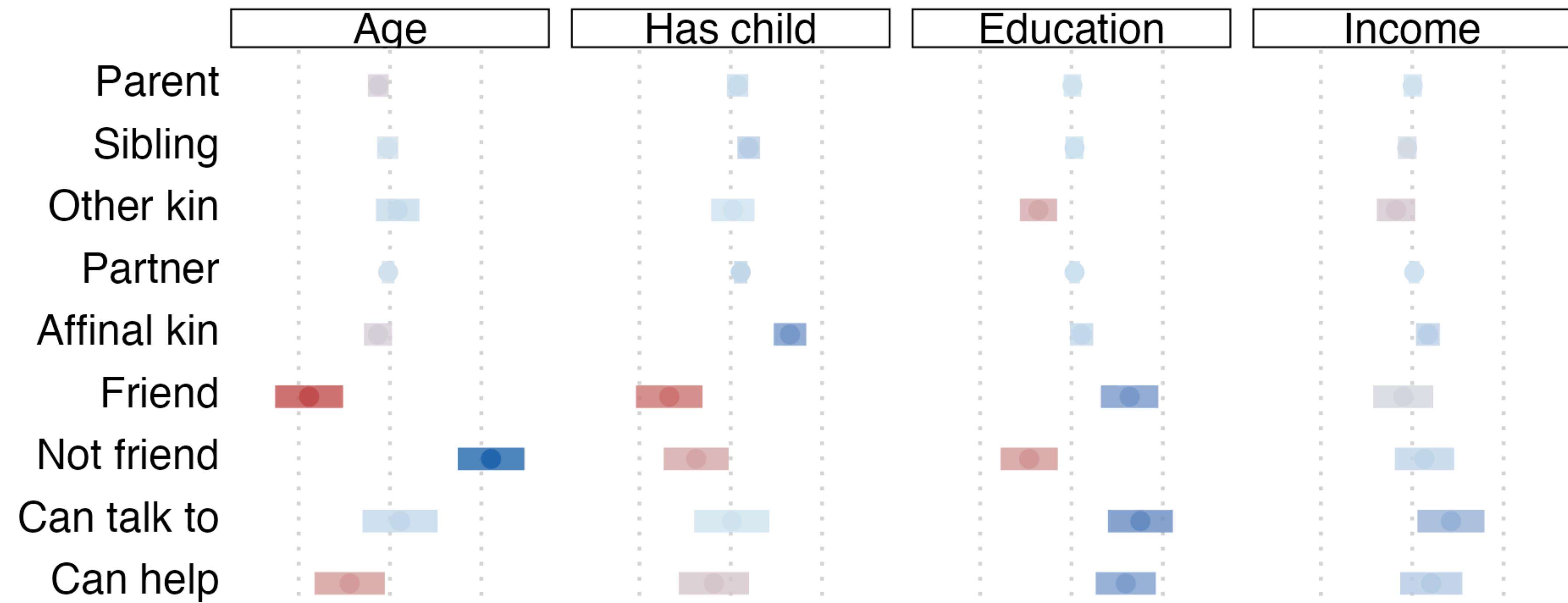
- *Longer distances from kin*
- *Less contact*
- *Fewer kin*
- *Diverser networks*



A



B

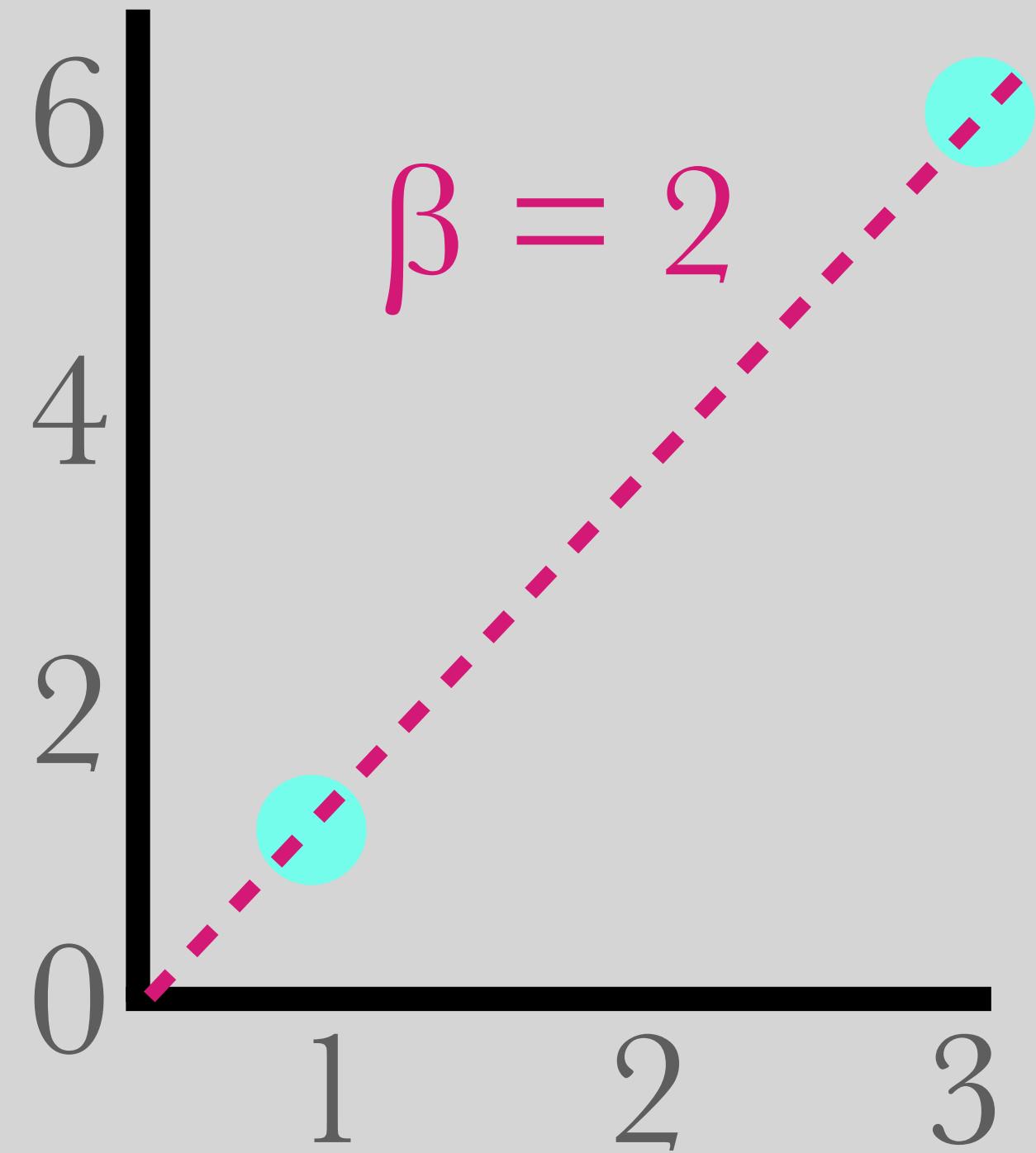


Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$

Linear regression

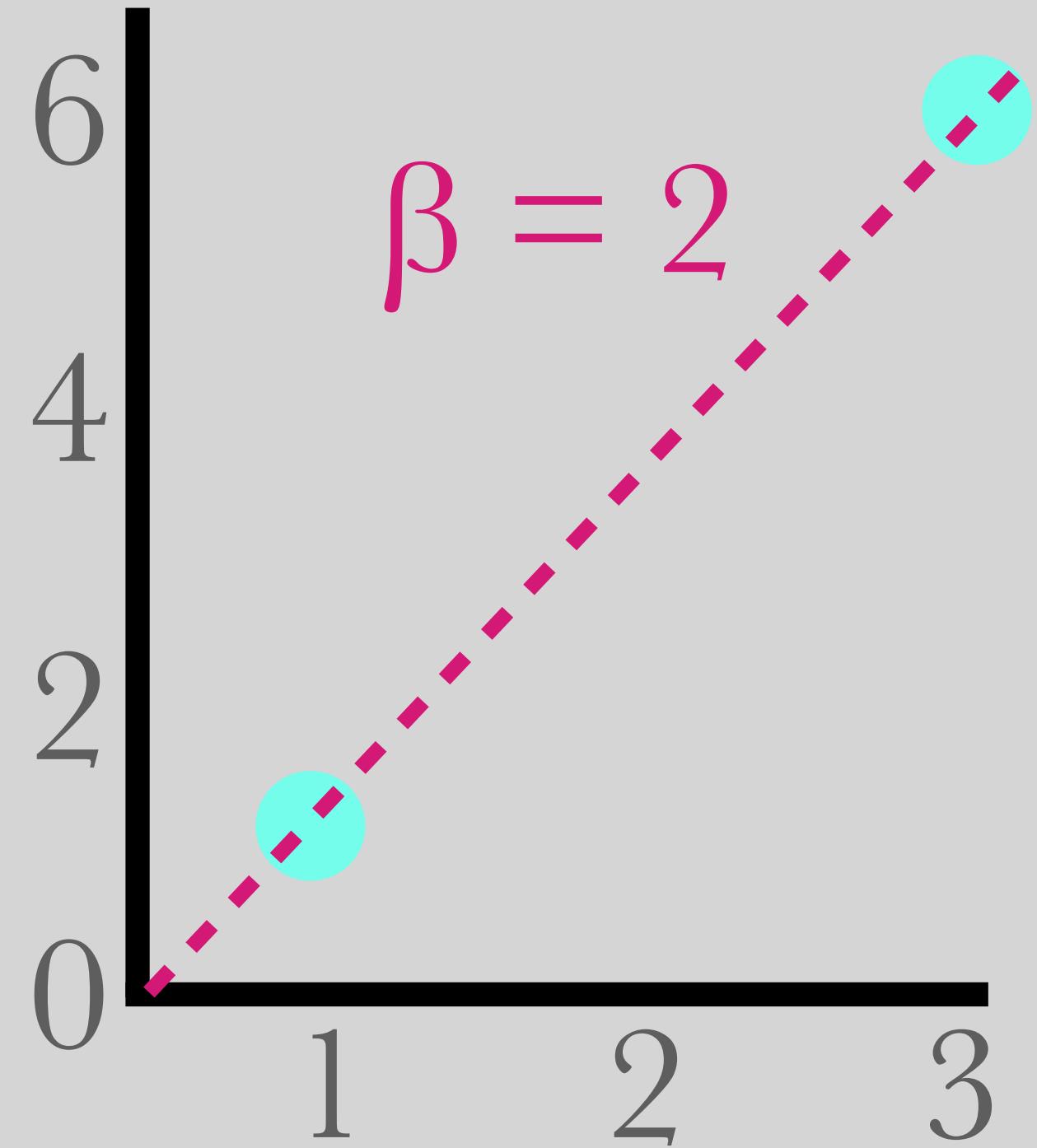
$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 = (1 - 1)^2 + (3 - 3)^2 = 0$$



Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$

assume $\lambda = 6$



Linear regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 = (1 - 1)^2 + (3 - 3)^2 = 0$$

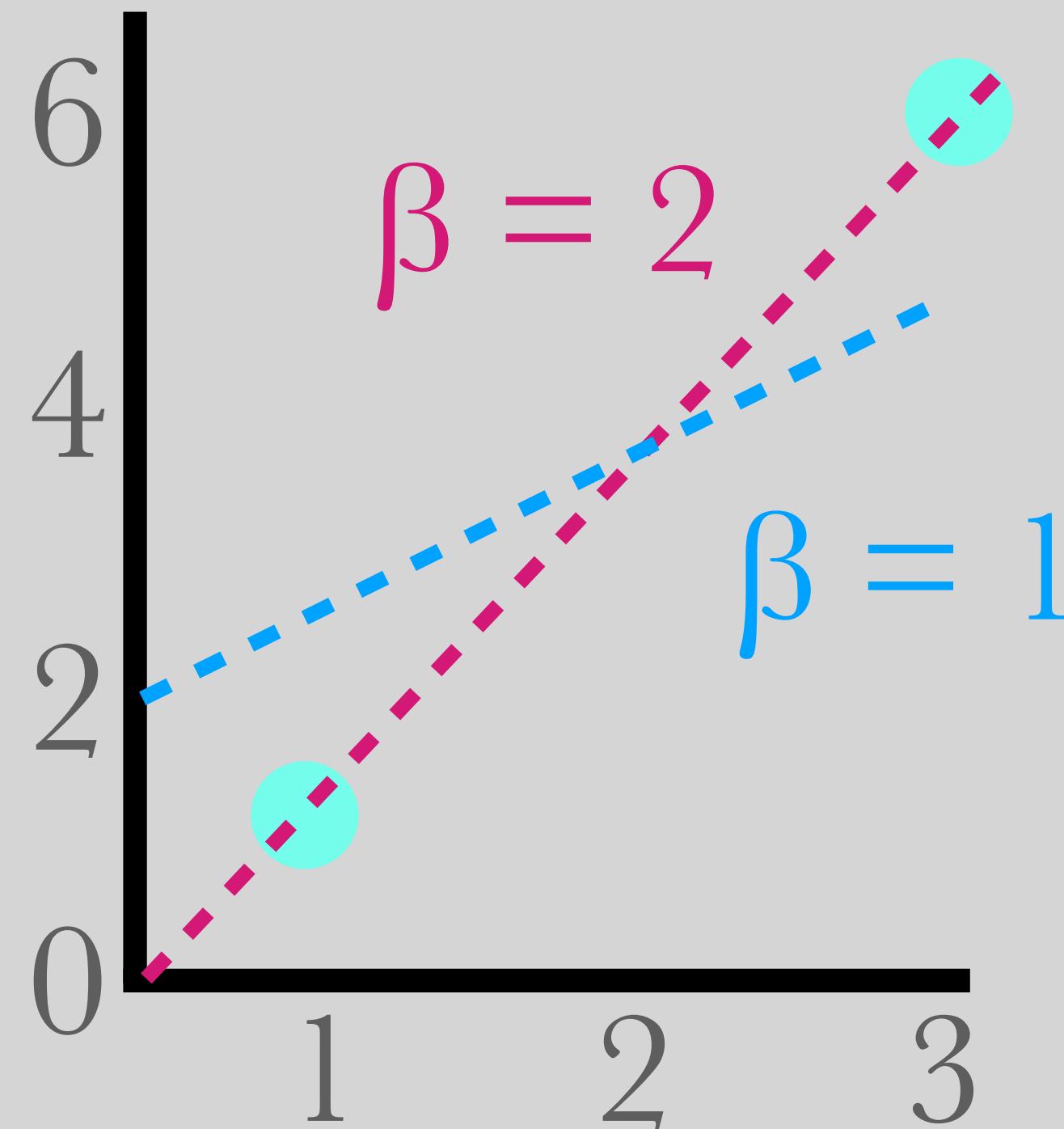
LASSO regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 + 6 \sum_{j=1}^1 |2| = 0 + 12 = 12$$

Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$

assume $\lambda = 6$



Linear regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 = (1 - 1)^2 + (3 - 3)^2 = 0$$

LASSO regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 + 6 \sum_{j=1}^1 |2| = 0 + 12 = 12$$

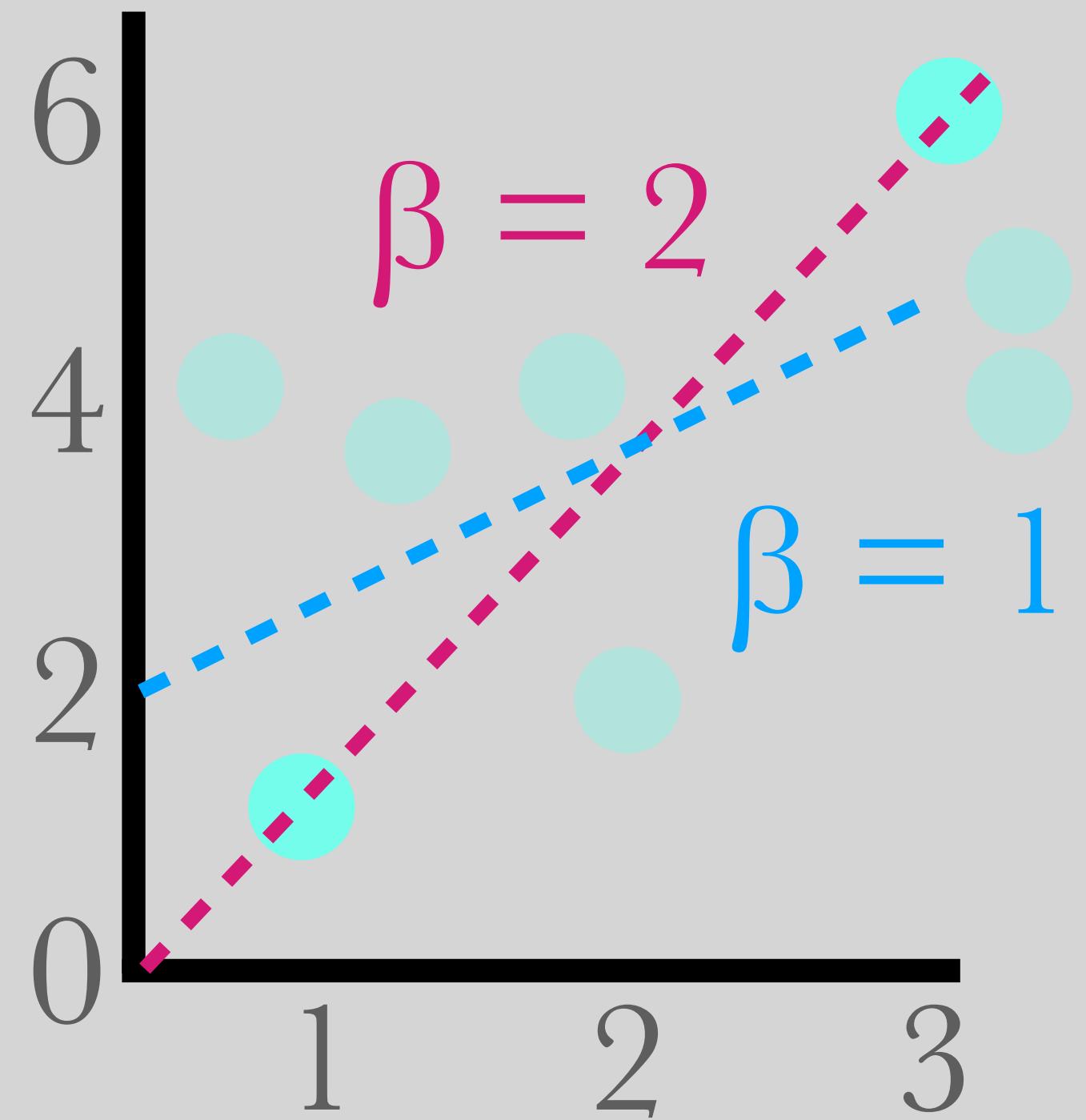
LASSO regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 + 6 \sum_{j=1}^1 |1| = 2^2 + 1^2 + 6 = 11$$

Lasso Regression

$$\sum_{i=0}^n (y_i - \hat{y}_i)^2 + \lambda \sum_{j=1}^p |\beta_j|$$

assume $\lambda = 6$



Linear regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 = (1 - 1)^2 + (3 - 3)^2 = 0$$

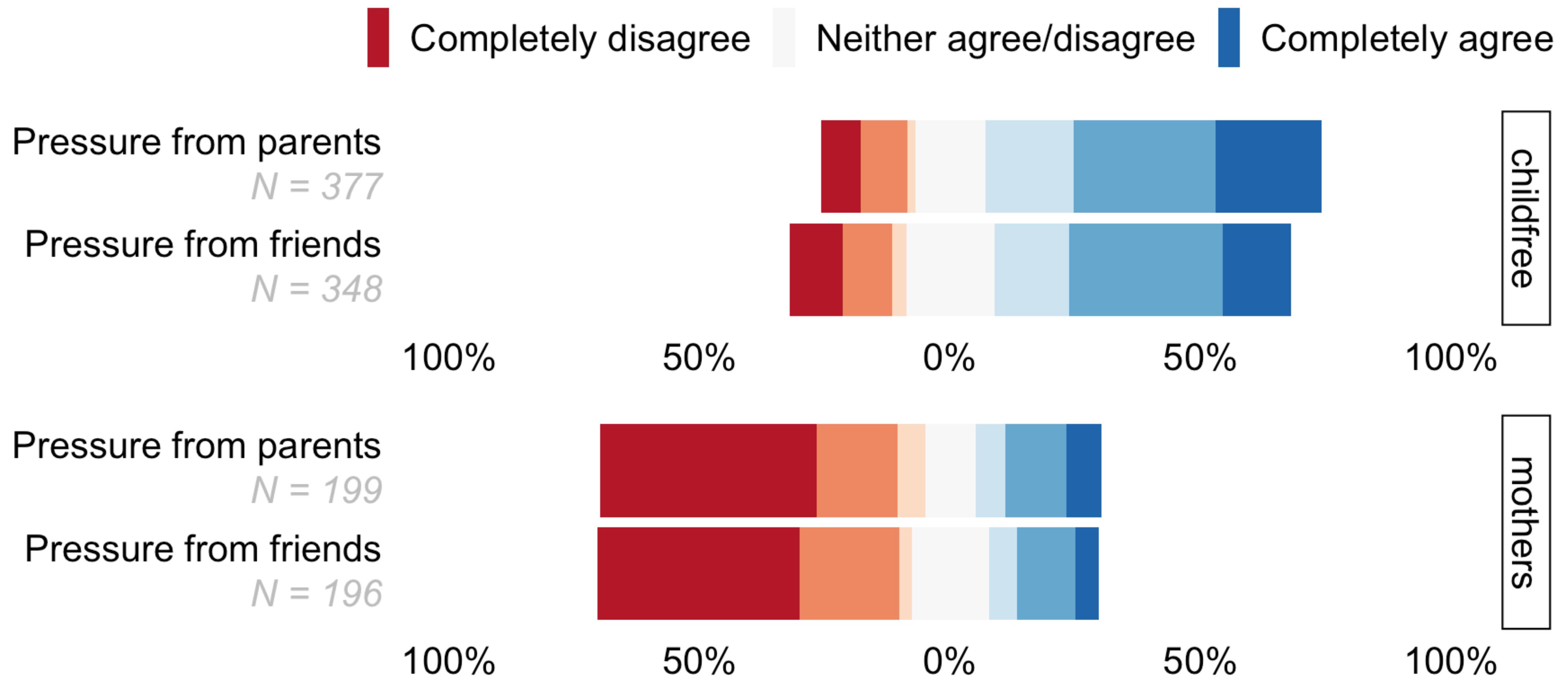
LASSO regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 + 6 \sum_{j=1}^1 |2| = 0 + 12 = 12$$

LASSO regression

$$\sum_{i=0}^2 (y_i - \hat{y}_i)^2 + 6 \sum_{j=1}^1 |1| = 2^2 + 1^2 + 6 = 11$$

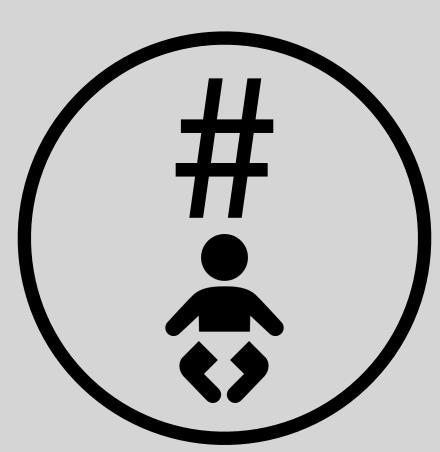
Childfree women perceived more pressure than mothers, pressure from parents similar yet slightly higher than from friends



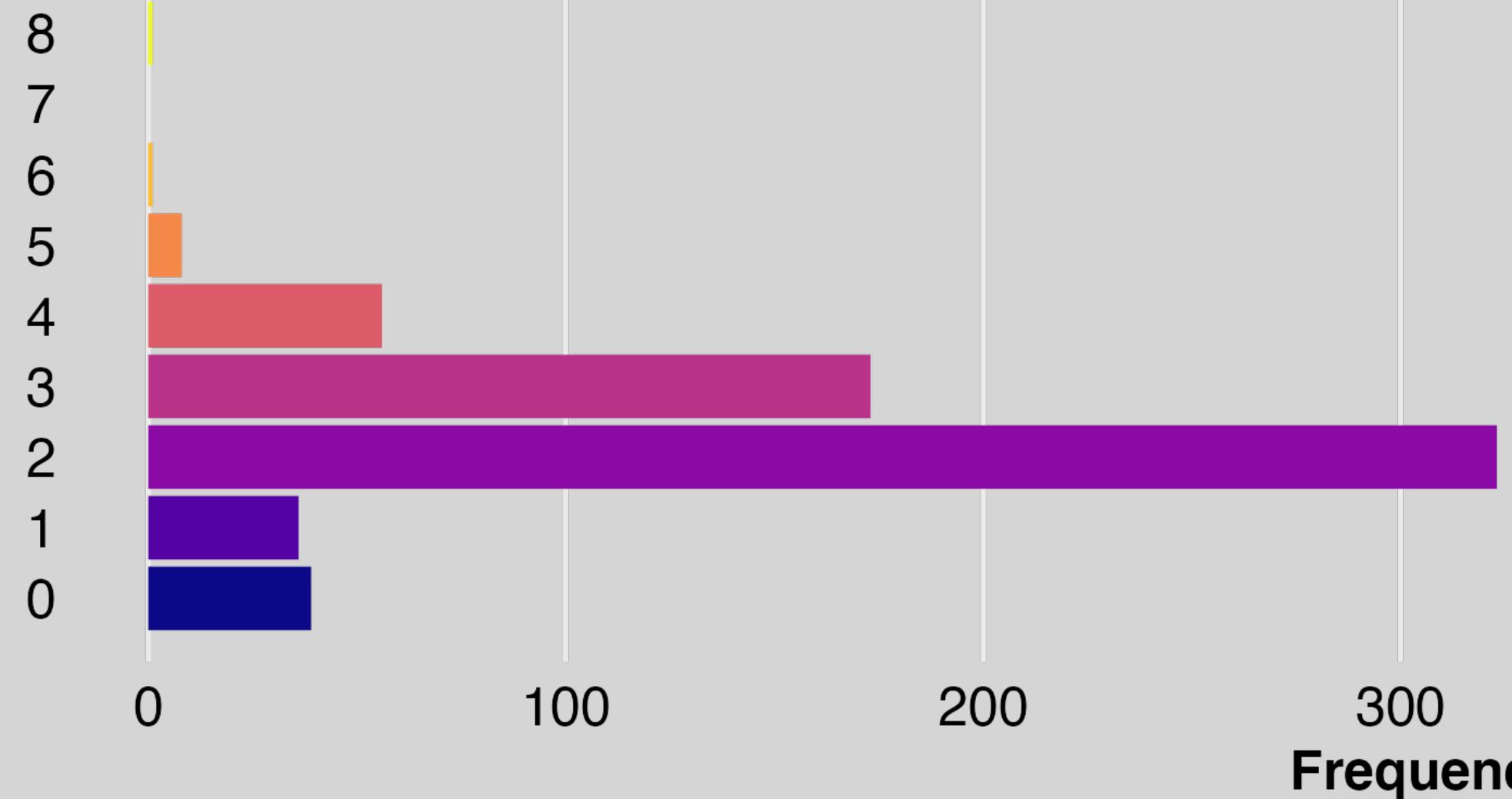
the Future

 **assessing non-linearities and interactions**
more advanced machine learning techniques

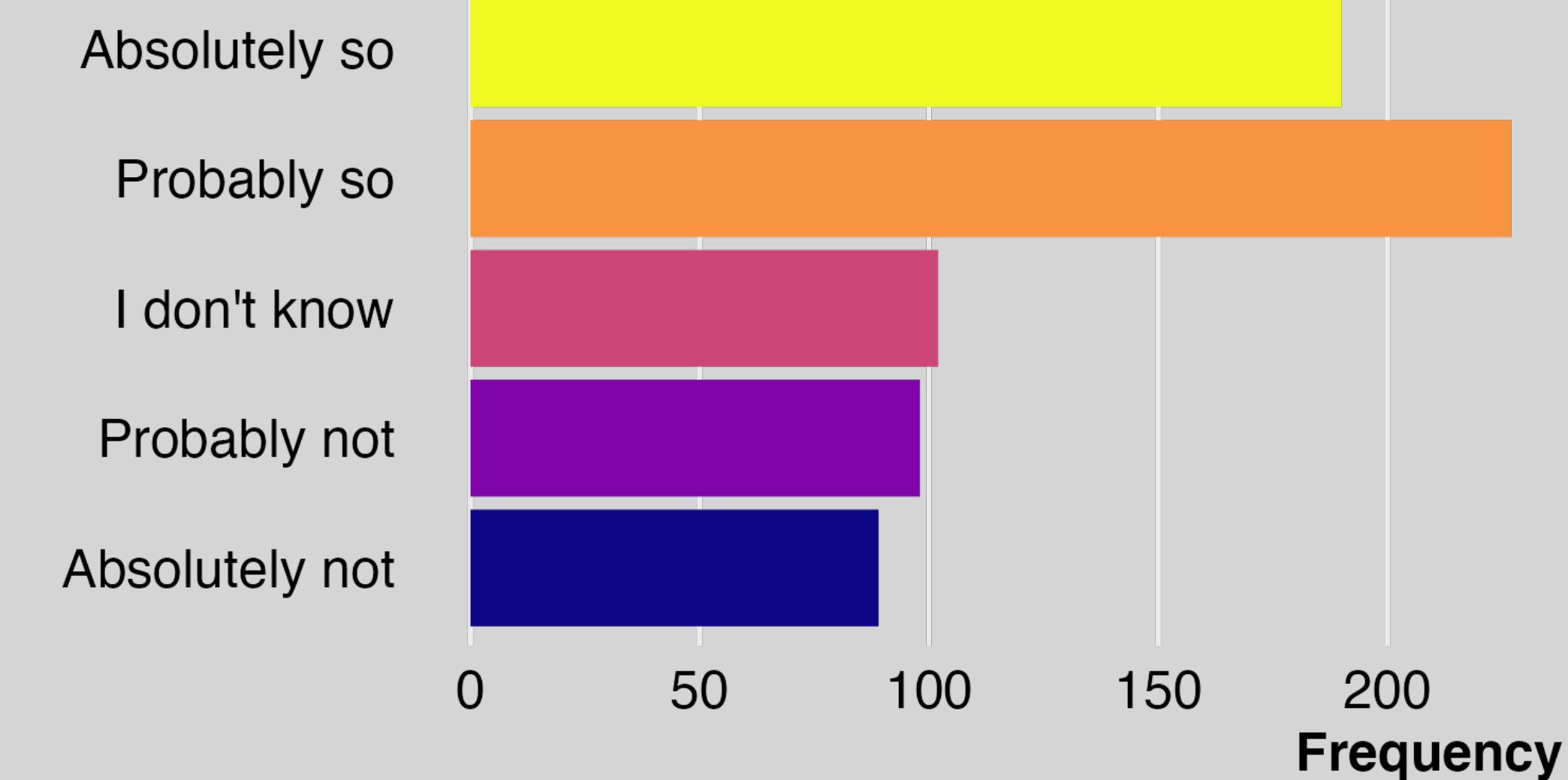
 **second wave of data collection**
causality, although ...



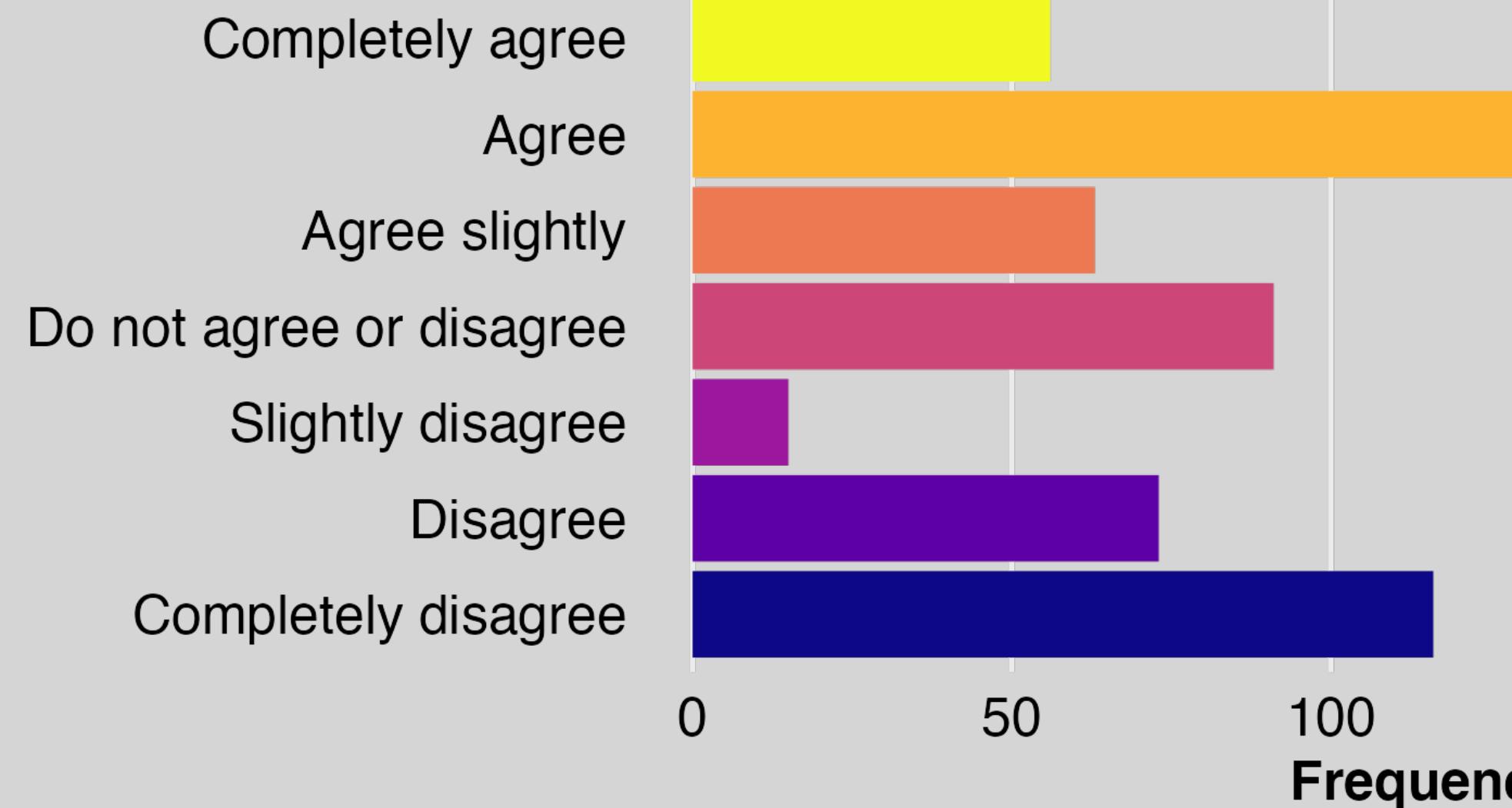
How many children would you like to have? (N = 681)



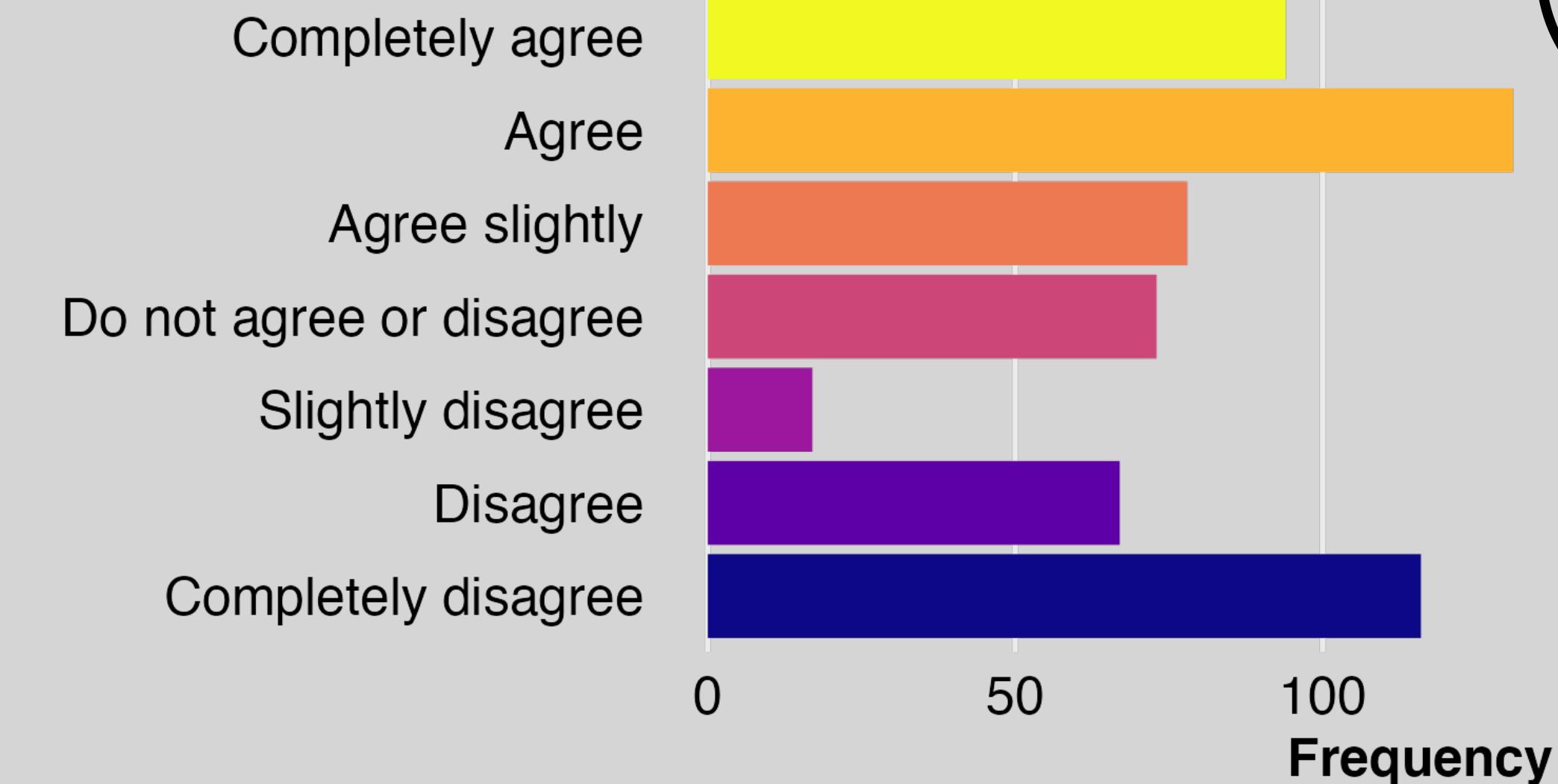
Do you think you will have (more) children in the future? (N = 758)



Most of my friends think that I should have (more) children (N = 580)



My parents/caretakers think that I should have (more) children (N = 608)





Which statement best reflects your view when it comes to having children and happiness? (N = 653)

- People with children are much happier
- People with children are slightly happier
- People with and without children are equally happy
- People without children are slightly happier
- People without children are much happier

