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Sibling Similarity in Spatial Pathways: Distance-From-Origin Trajectories Across Adulthood

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LIFE LONG MOVE
erc European Research Council
UAB Universitat Autònoma de Barcelona
CED Centre d'Estudis Demogràfics

Two theoretical lenses

1. Family-of-origin (effects)[1]

Socialization processes
Norms, expectations, resources, and barriers to mobility

Location of family in mobility decisions
Proximity to family facilitates support and contact

2. Mobility as a life-course process[2]

Trajectories rather than an event/status
Timing, sequencing, duration and direction (away, onward, return, etc.)

Place of origin as anchor
Defines opportunity structures and location-specific capital (including family)

[1]Mulder 2007; Vidal and Huinink 2019

[2]Vidal and Lersch 2021

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Research gap

Evidence on family-of-origin influences has mainly focused on:
- Mobility during the transition to adulthood (leaving home)[3]
- Proximity to kin as either a deterrent to moving away or a catalyst for moving closer[4]

We ask whether family-of-origin contexts are visible in long-term distance-from-origin trajectories?

Empirical strategy: compare sibling dyads to unrelated dyads using trajectory similarity across adulthood

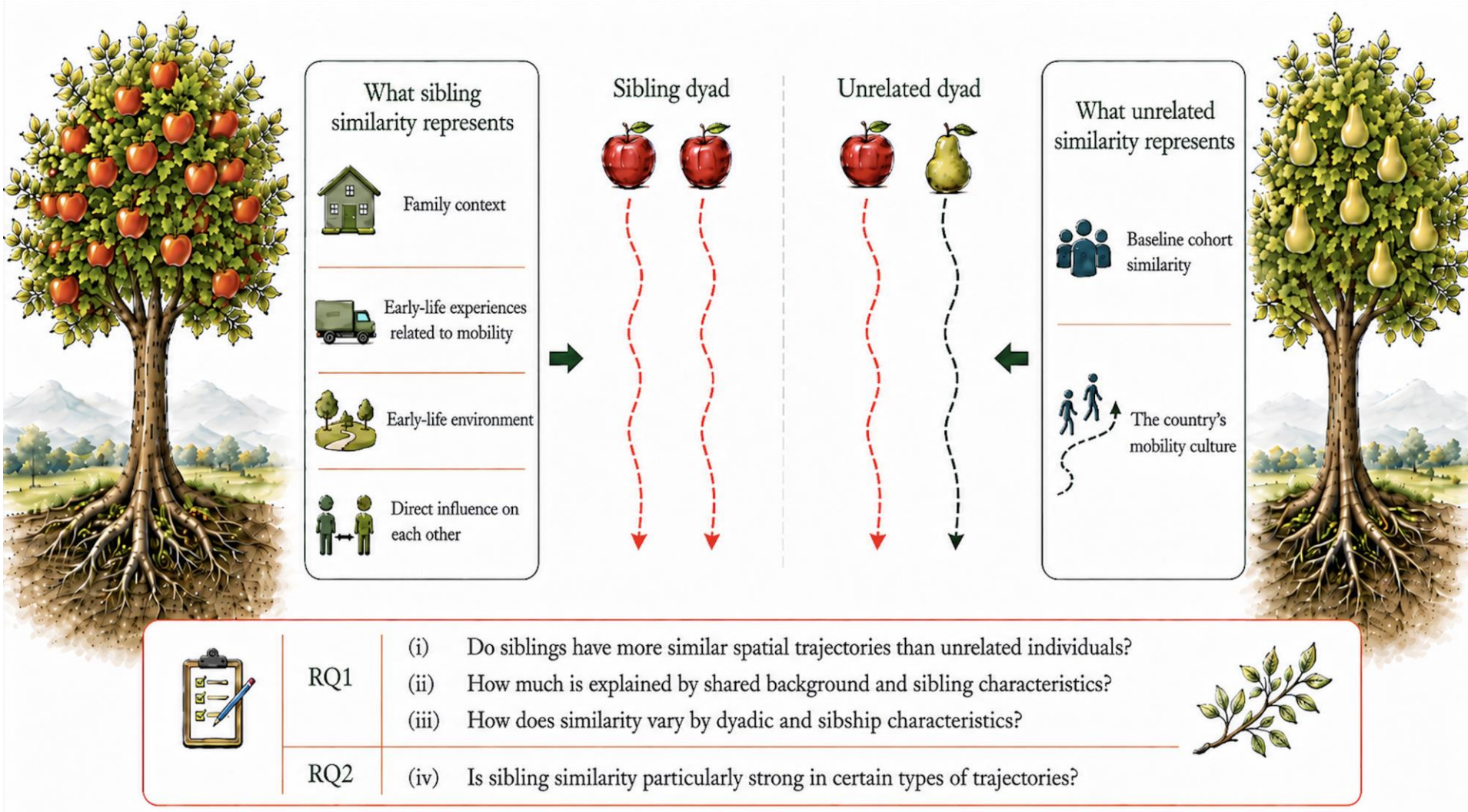
[1]Mulder 2007; Vidal and Huinink 2019

[2]Vidal and Lersch 2021

[3]Leopold et al. 2012; Her et al. 2022

[4] Li and Huang 2025; Michielin et al. 2008; Mulder et al. 2020a, 2020b; Pertzikovitz et al. 2026; Pettersson and Malmberg 2009; Smits 2010 ; Thomassen 2021

Strategy and research questions



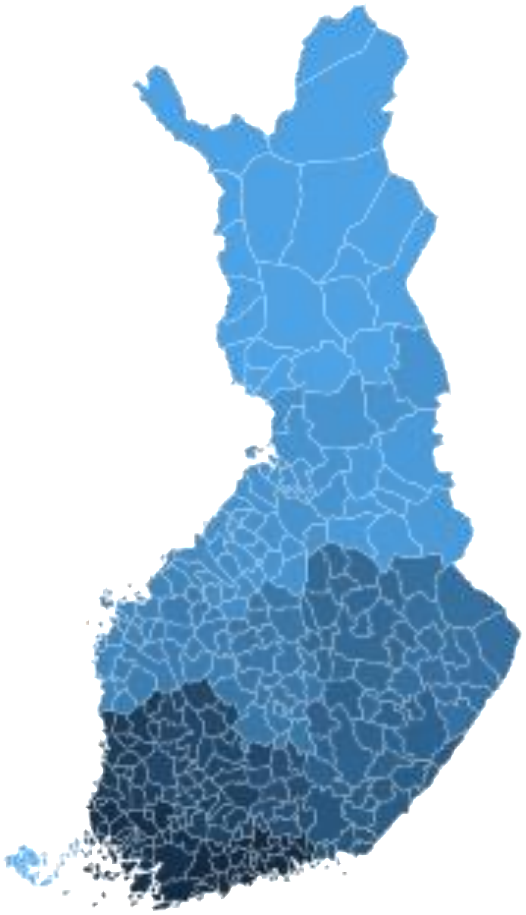
RQ1	(i)	Do siblings have more similar spatial trajectories than unrelated individuals?
	(ii)	How much is explained by shared background and sibling characteristics?
	(iii)	How does similarity vary by dyadic and sibship characteristics?
RQ2	(iv)	Is sibling similarity particularly strong in certain types of trajectories?

Finnish population register data

- Birth cohorts: 1970-1980
- Annual information on municipality of residence
- Years: 1987-2023
- Parent-child linkage (to identify full siblings)

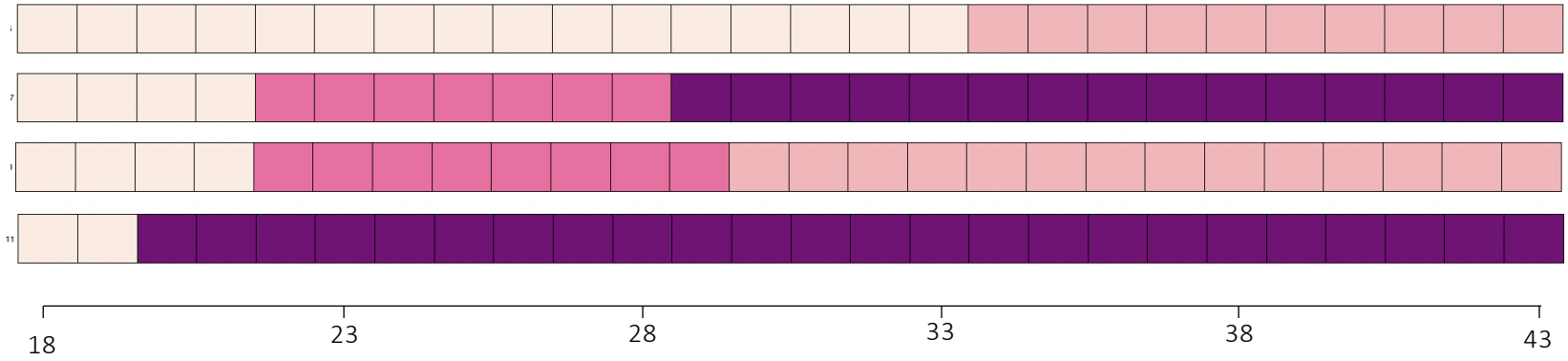
Full analytical sample
Individuals with full residential histories over ages 18–43 who moved at least once to a different municipality

N = 447,233

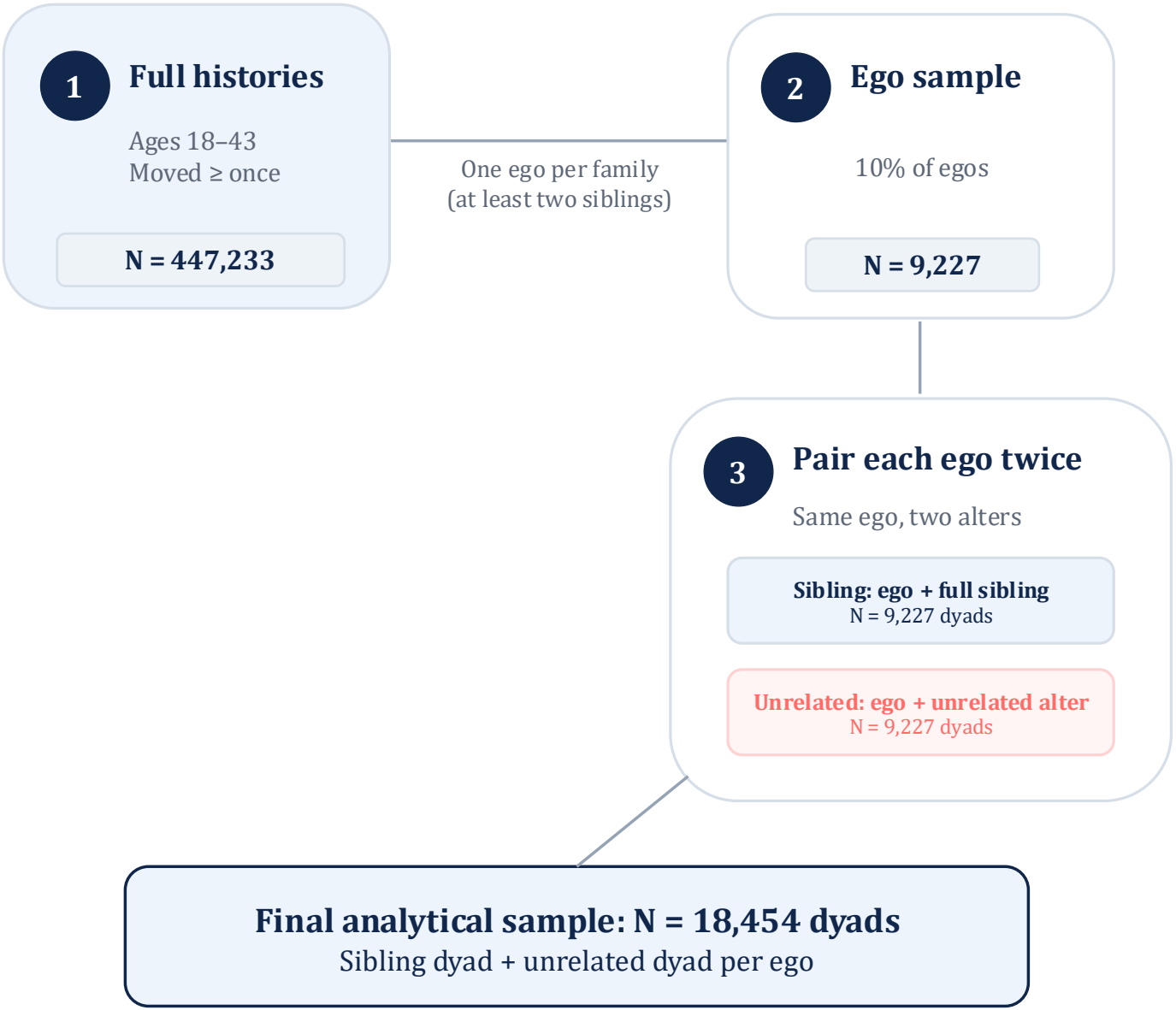


Trajectories of distance origins (age 17)

4 trajectory examples



Dyad construction



Analytic strategy

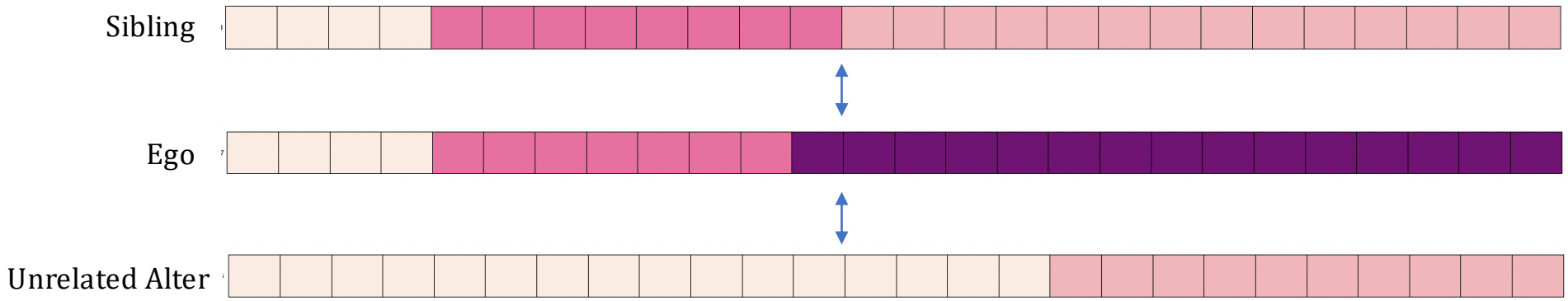
Sequence analysis in two complementary ways:

Analytic strategy

Sequence analysis in two complementary ways:

RQ1: Dyadic similarity

- Optimal Matching



*Each dyad gets a **similarity score** between 0-1 (1 = identical trajectories)*

Analytic strategy

Sequence analysis in two complementary ways:

RQ1: Dyadic similarity

- Optimal Matching

- Linear regression models:
  y=similarity score , x=dyad type (sib vs unrelated)

Model 1. Unadjusted (raw similarity)

Model 2. Adjusted

urban–rural origin
childhood mobility
parental separation
parental education
age difference
gender composition

Model 3. Fully interacted (when similarity is strongest?)

Analytic strategy

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RQ2: Trajectory types

- Cluster analysis (using CLARA)
  - 18-cluster solution grouped into 5 meta-clusters of broader pathway families
  - Conditional probability of cluster belonging

RESULTS

RQ1

Sibling similarity

Sibling similarity

Average dyadic similarity (0 = different, 1 = identical)

	Model 1: Unadjusted	
	Predicted similarity	SE
Sibling dyad	0.522	0.003
Unrelated dyad	0.376	0.003
Difference (sibling − unrelated)	0.146	—
% of difference explained	—	—

Model 1 reports unadjusted differences in average similarity between sibling and unrelated dyads.

Sibling similarity

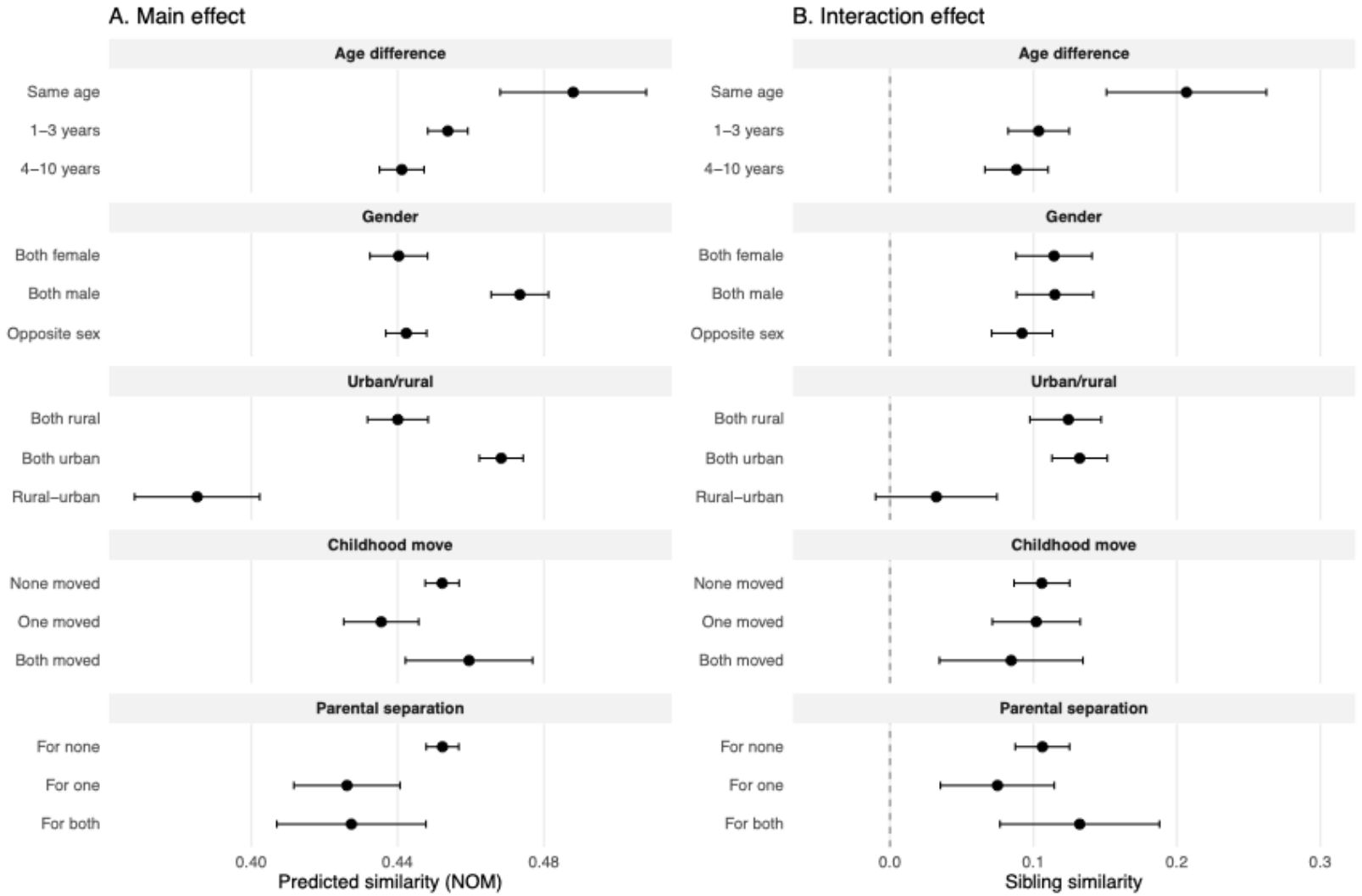
Average dyadic similarity (0 = different, 1 = identical)

	Model 1: Unadjusted		Model 2: Adjusted	
	Predicted similarity	SE	Predicted similarity	SE
Sibling dyad	0.522	0.003	0.509	0.004
Unrelated dyad	0.376	0.003	0.389	0.004
Difference (sibling − unrelated)	0.146	—	0.120	—
% of difference explained	—	—	17.8	—

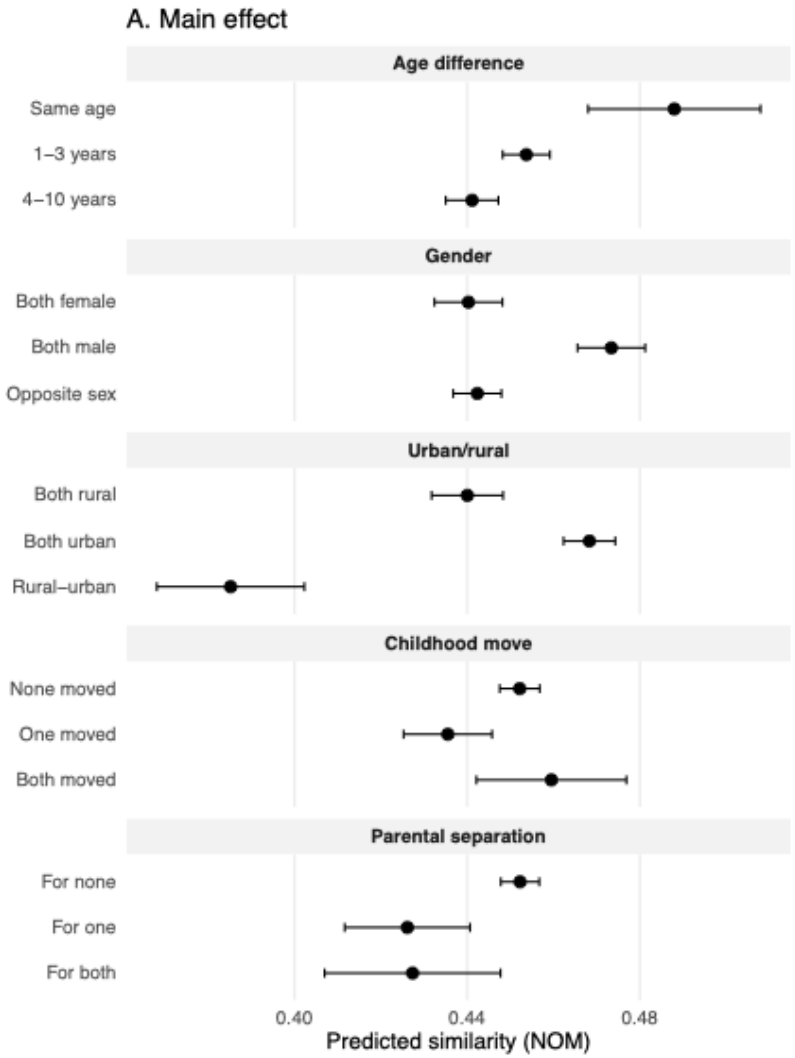
Model 1 reports unadjusted differences in average similarity between sibling and unrelated dyads.
Model 2 reports adjusted differences, controlling for:

- shared childhood context (urban–rural origin)
- childhood mobility
- parental geographic separation
- parental education
- age difference
- gender composition

Model 3 – fully interactive



When **dyads** are more similar?



→ Closer in age

→ Two males

↘

→ Similar background

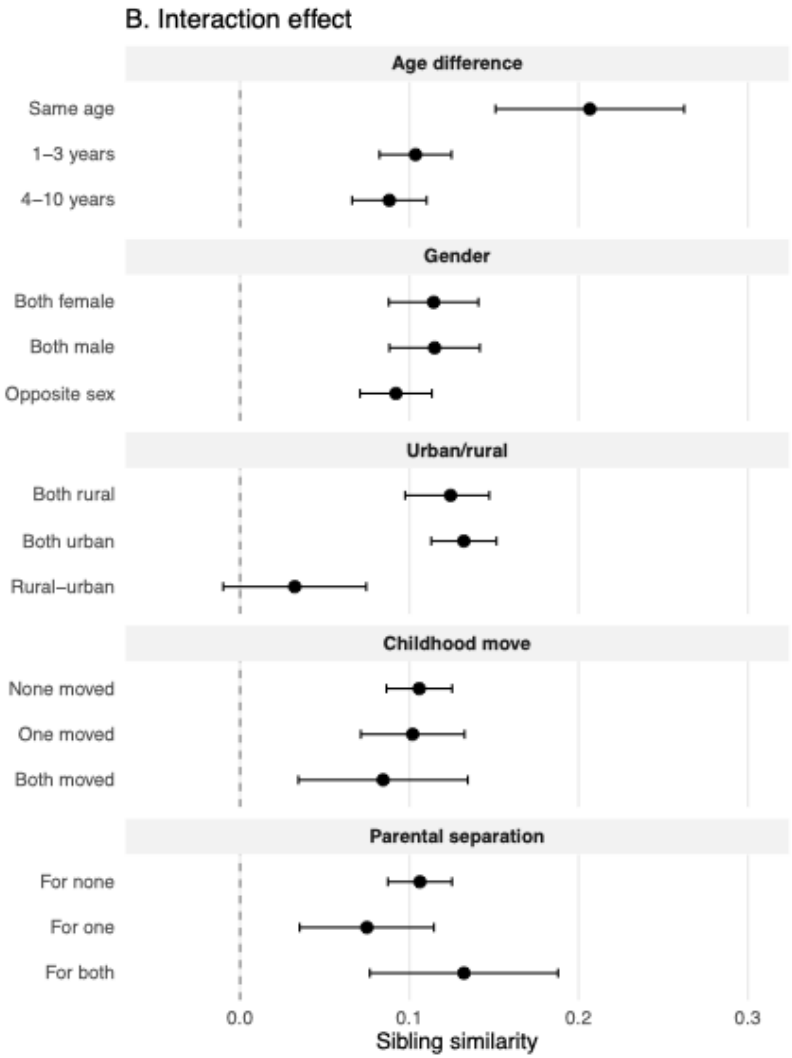
↗

When are **siblings** more similar above the overall similarity pattern?

Twins

Same sex
(sister-sister/brother-brother)

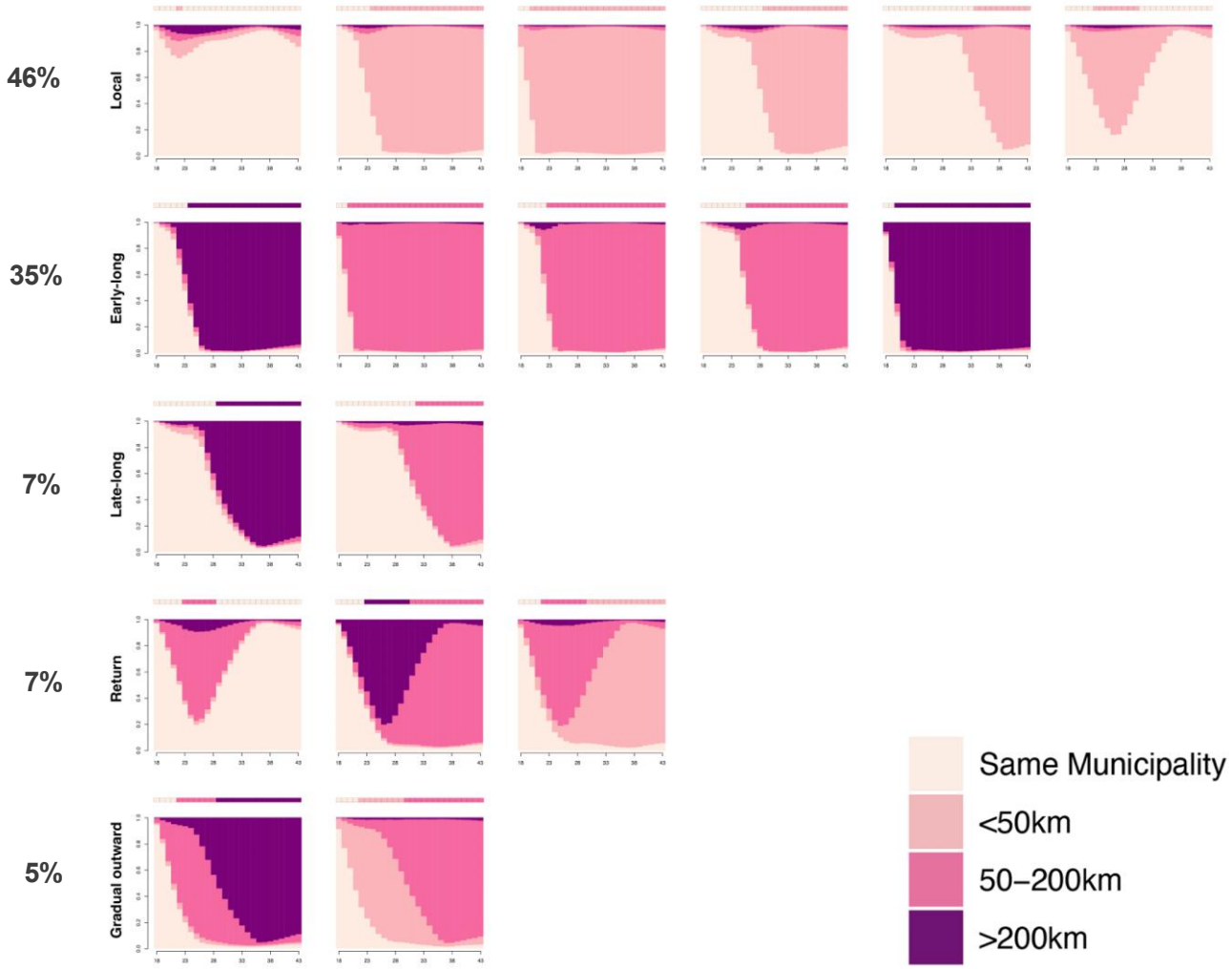
Shared family experiences



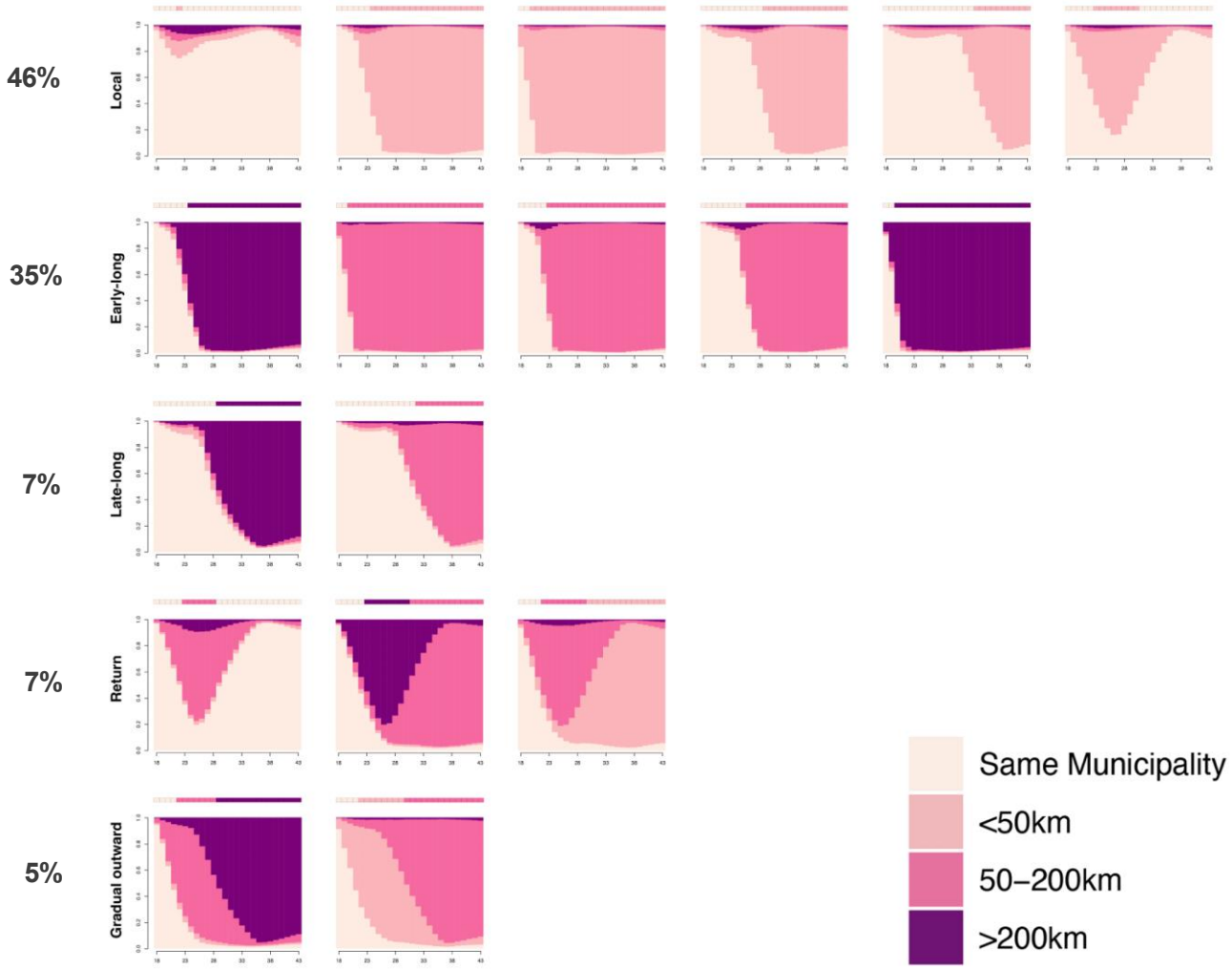
RQ2

Similarity in *types* of spatial pathway

Cluster analysis: 5 spatial pathways families



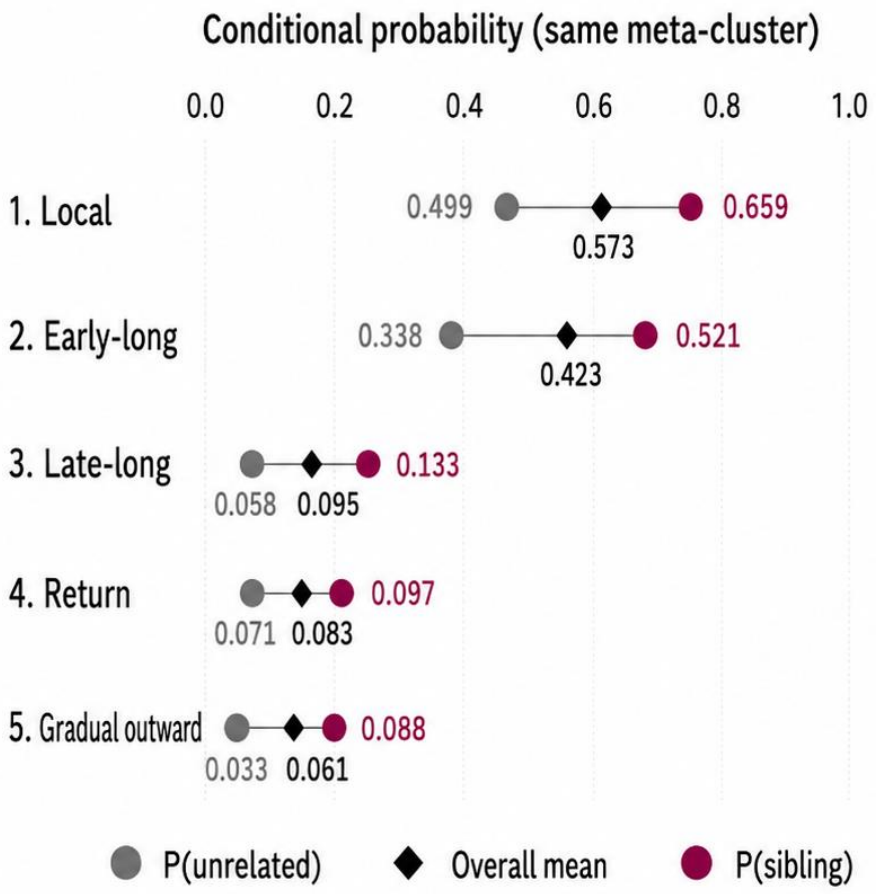
Cluster analysis: 5 spatial pathways families



In which spatial pathway the family-of-origin has a stronger imprint?

What is the probability for **Ego** to share a cluster with each **Alter**?

Shared cluster membership



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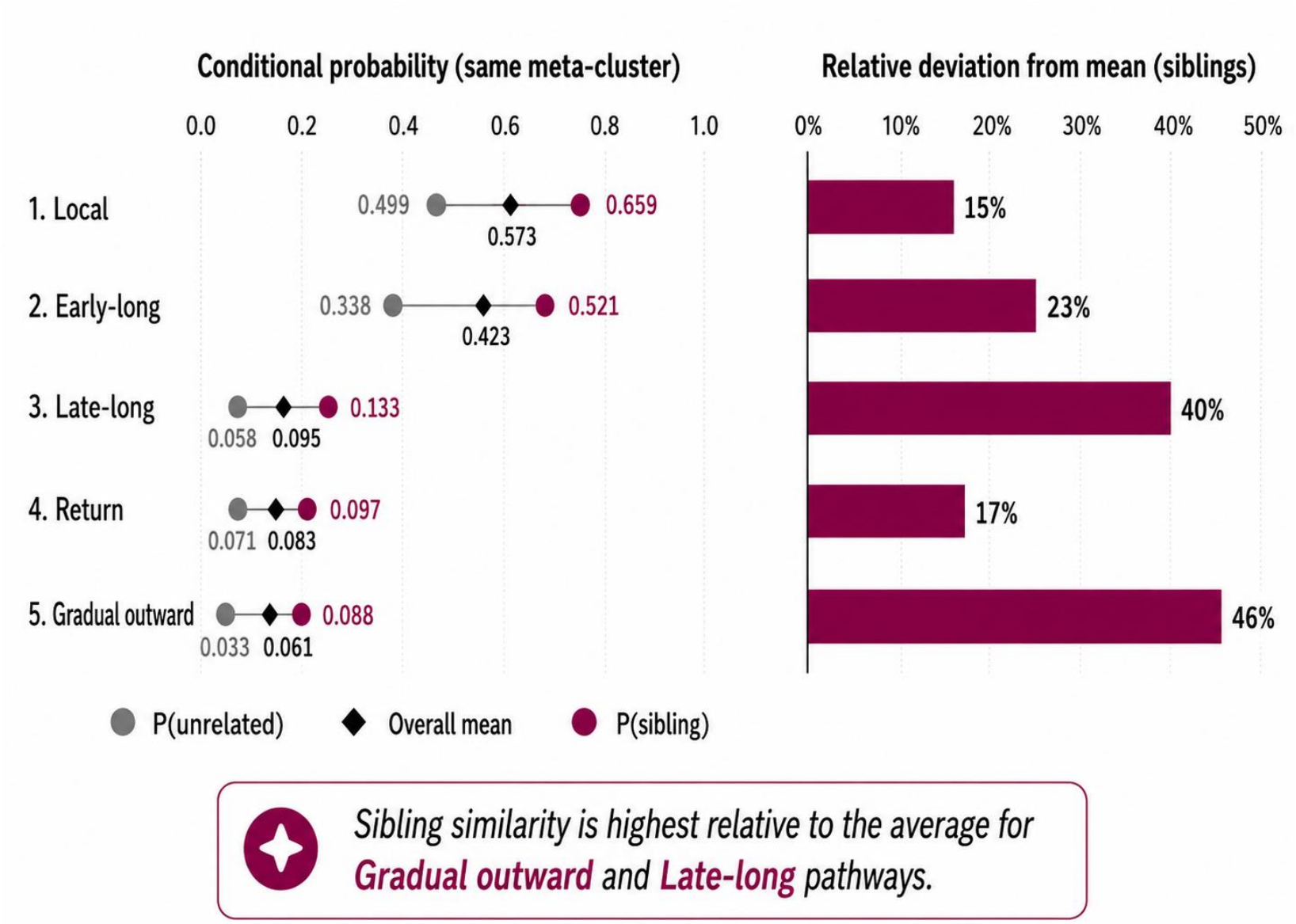

Take home messages

- Siblings structure geographic proximity regarding timing, duration, and distance from origin in more similar ways than the unrelated.
- Therefore, the family of origin matters for adult geographic trajectories long after children leave the parental home.
- This gap is partly explained by background characteristics.
  (mutual influence and unobserved family processes)
- Sibling similarity is higher among same-sex (gendered socialization), closer in age (synchronized transitions), and those who shared childhood experiences.
- Family influence is apparent in all pathway types, but is strongest in trajectories involving geographic distancing.
- Spatial mobility should be considered a key mechanism through which social and spatial inequalities are reproduced (or mitigated) across generations.

Thank you!

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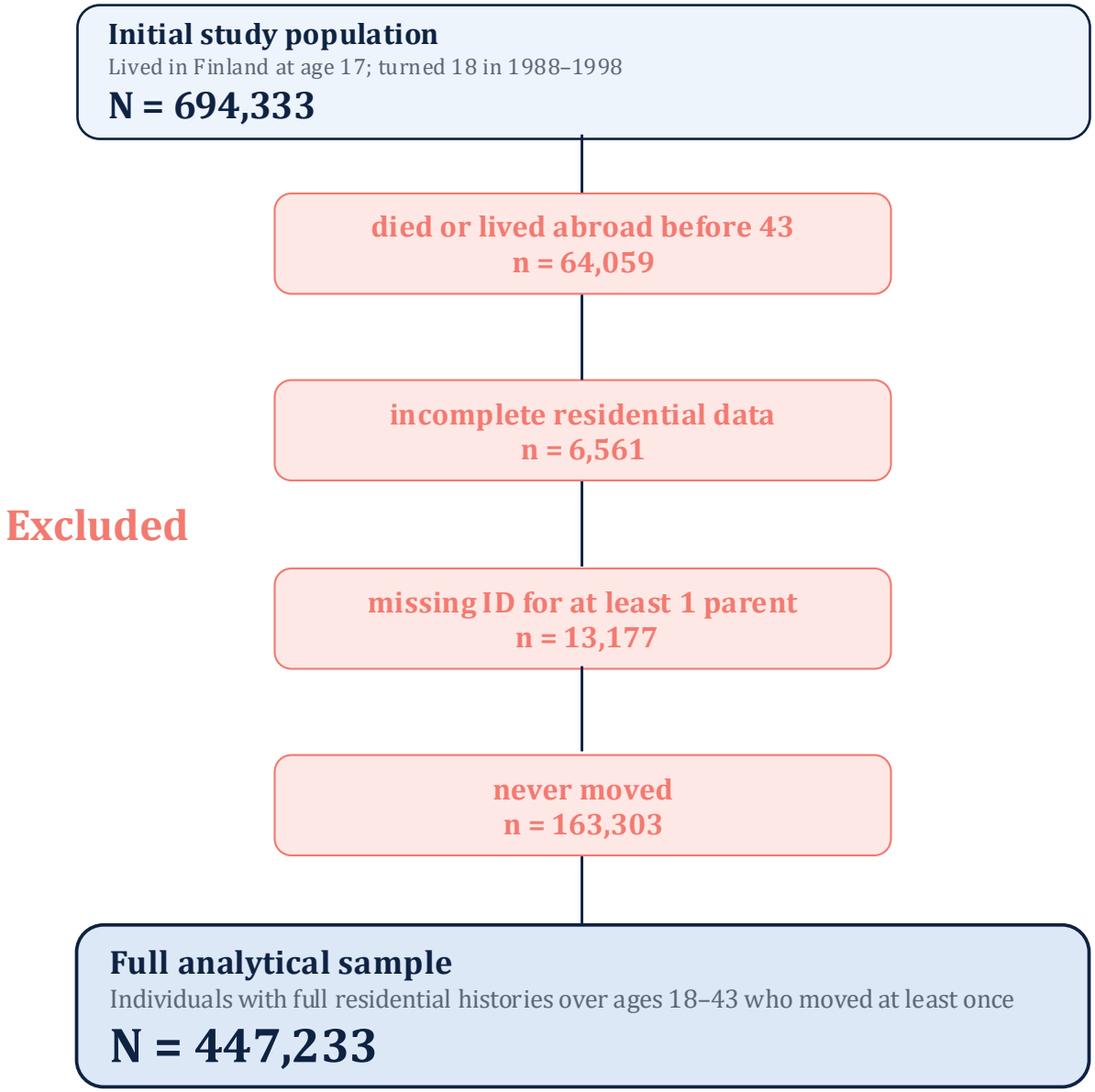
Sample selection



Distribution of dyadic normalized similarity

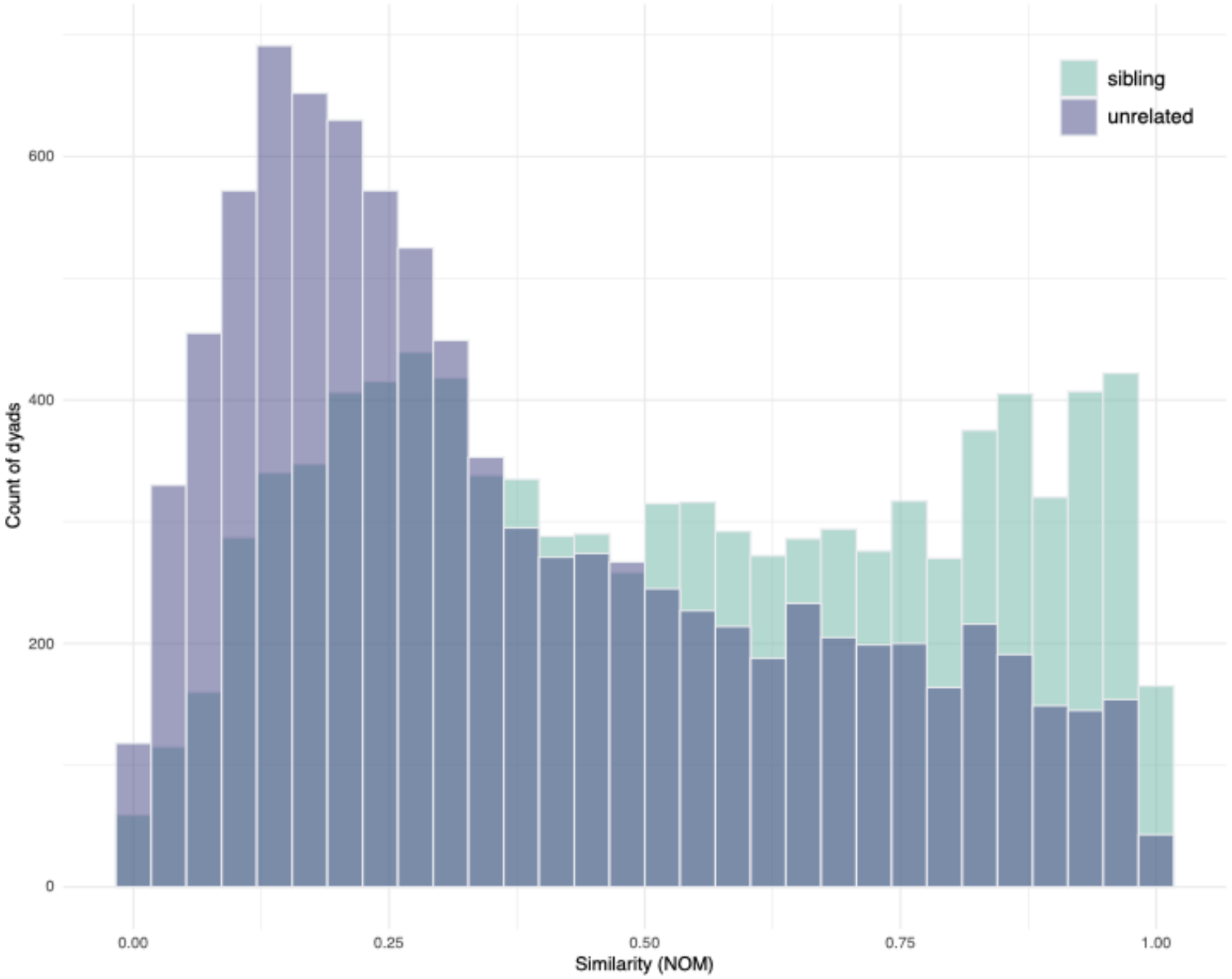


Table 1. Dyadic composition: descriptive statistics

	Sibling *Percentage (%)*	**Unrelated** *Percentage (%)*
Urban–rural origin		
Both urban	54.64	34.22
Both rural	41.95	17.10
Rural–urban	3.40	48.67
Childhood mobility		
None moved	75.46	67.00
Both moved	13.33	3.30
One moved	11.21	29.70
Parental separation		
For none	85.24	73.00
For both	10.39	2.14
For one	4.36	24.86
Parental education		
Low–low	17.57	3.99
Low–medium	-	19.27
Low–high	-	12.66
Both medium	50.47	24.10
Medium–high	-	30.68
Both high	31.96	9.30
Age difference		
Same age	2.72	9.13
1–3 years	57.95	46.68
4–10 years	39.33	44.19
Gender composition		
Both female	26.00	26.96
Both male	23.65	22.91
Opposite	50.35	50.12

Table A2. Descriptive statistics by meta-cluster (percentages)

	(1) Local	(2) Early-long	(3) Late-long	(4) Return	(5) Gradual outward	Overall
Urban origin	0.67	0.45	0.52	0.48	0.51	0.56
Childhood mobility	0.14	0.24	0.21	0.20	0.22	0.19
Parental separation	0.14	0.12	0.11	0.10	0.13	0.13
Parental education (tertiary)	0.29	0.36	0.32	0.33	0.32	0.34
Female	0.50	0.45	0.56	0.46	0.44	0.48
Share of Ego sample	0.46	0.35	0.07	0.07	0.05	100

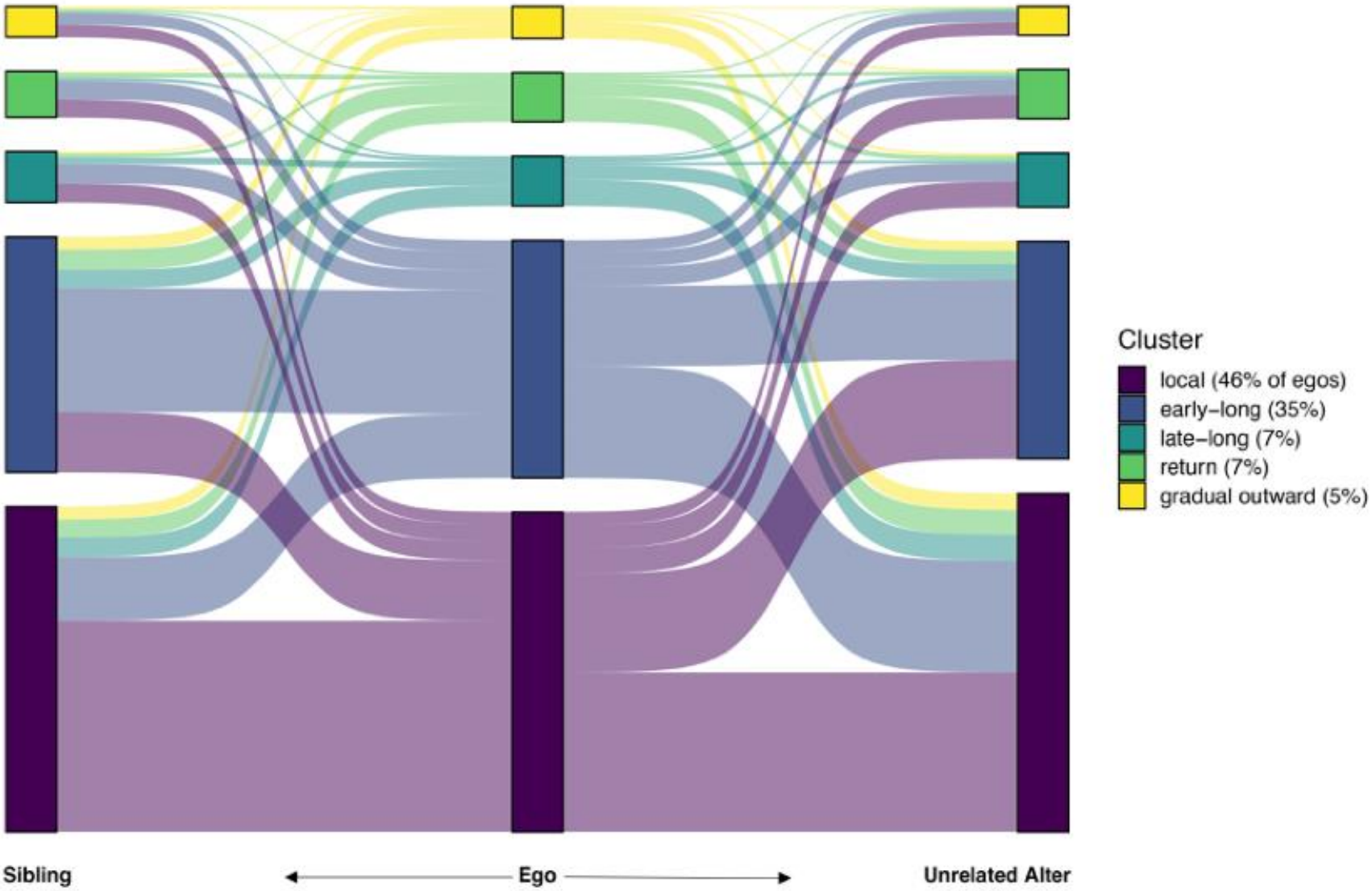
Notes: Distribution of covariates (percentages) in the Ego sample, N=9,227.

Table A1. Linear regression models of dyadic similarity

	Model 1 (baseline)	**Model 2 (+controls)**	**Model 3 (+interactions)**	
			Main effect (unrelated)	Interaction effect
	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
Sibling dyad (ref: unrelated)	0.146*** (0.004)	0.120*** (0.007)	0.117*** (0.011)	
Urban–rural origin (ref: both rural)				
Rural–urban		-0.018* (0.006)	-0.010 (0.008)	-0.090*** (0.019)
Both urban		0.029*** (0.005)	0.023** (0.008)	0.009 (0.010)
Childhood mobility (ref: none moved)				
One moved		-0.019*** (0.006)	-0.015* (0.006)	-0.004 (0.011)
Both moved		0.001 (0.009)	0.018 (0.016)	-0.021 (0.019)
Parental separation (ref: for none)				
For one		-0.018** (0.006)	-0.010 (0.006)	-0.031* (0.016)
For both		-0.018* (0.008)	-0.038* (0.018)	0.026 (0.021)
Parental education (ref: low–low)				
Low–medium		0.001 (0.001)	0.001 (0.001)	
Low–high		-0.022* (0.010)	-0.022* (0.010)	
Both medium		-0.009 (0.007)	-0.009 (0.007)	
Medium–high		-0.008 (0.009)	-0.008 (0.009)	
Both high		0.013 (0.007)	0.013 (0.007)	
Age difference (ref: 1–3 years)				
Same age		0.005 (0.009)	-0.017 (0.011)	0.103*** (0.021)
4–10 years		-0.013* (0.004)	-0.005 (0.006)	-0.015 (0.008)
Gender composition (ref: opposite-sex)				
Both female		-0.001 (0.005)	-0.013* (0.007)	0.022* (0.011)
Both male		0.032*** (0.005)	0.020** (0.007)	0.023* (0.011)
Constant	0.376*** (0.003)	0.389*** (0.009)	0.389*** (0.010)	
Observations	18,454	18,454	18,454	
Egos (dyads)	9,227	9,227	9,227	
R-squared	0.0662	0.0763	0.0807	

Notes: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Standard errors clustered at the Ego level.

Correspondence between Ego's and Alter's cluster



Shared cluster membership