

NETWORK TOPOLOGY AS A BUFFER AGAINST SECULARIZATION: STRUCTURAL MECHANISM IN AGENT-BASED MODEL

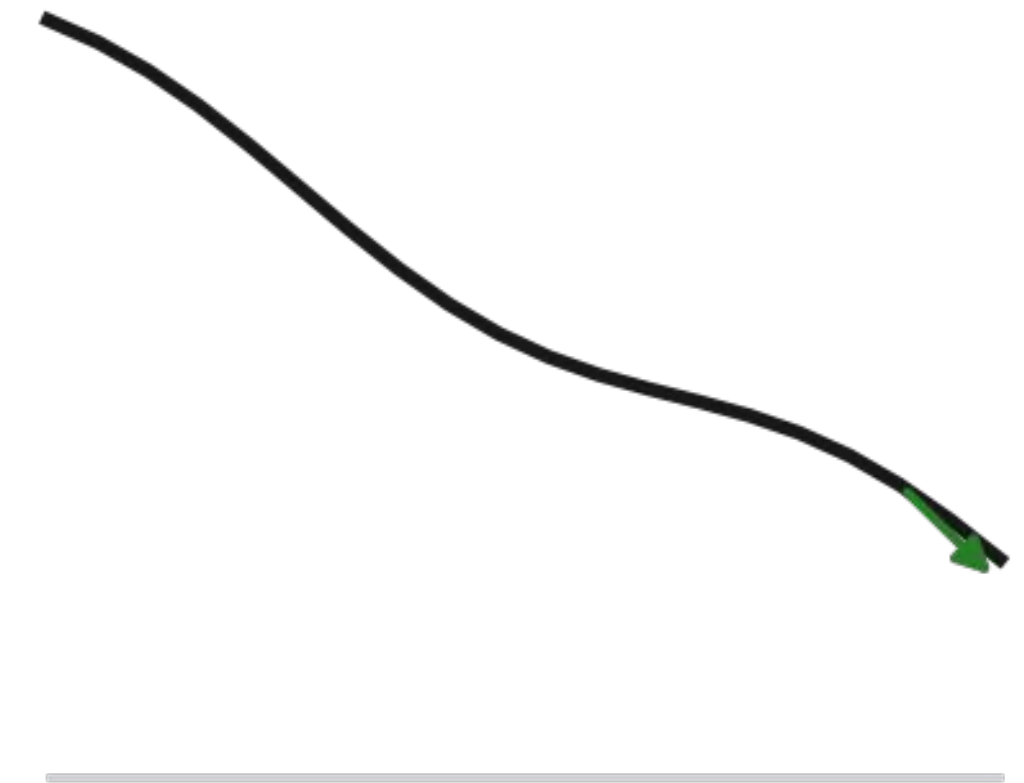
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MODERNIZATION → SECULARIZATION (?)

- Rising security lowers the need for religion (ESH by P. Norris, R. Inglehart and colleagues)
- Decline runs through generations



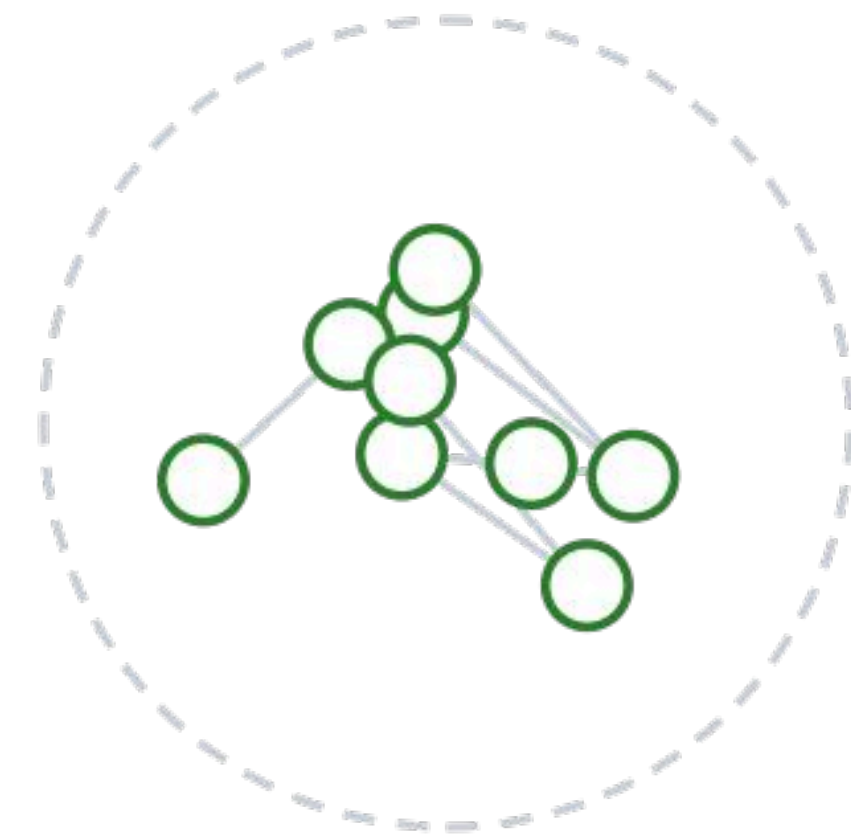
Cross-national and historical research has reported this pattern across many countries and over several decades.

At the same time, the interpretation remains debated.

SOME COMMUNITIES RESIST

Highly religious communities can maintain strong religious commitment even when the surrounding society becomes increasingly secular: the Amish in Pennsylvania, US; Old Believers in Russia; Lakewood township in New Jersey, US; etc.

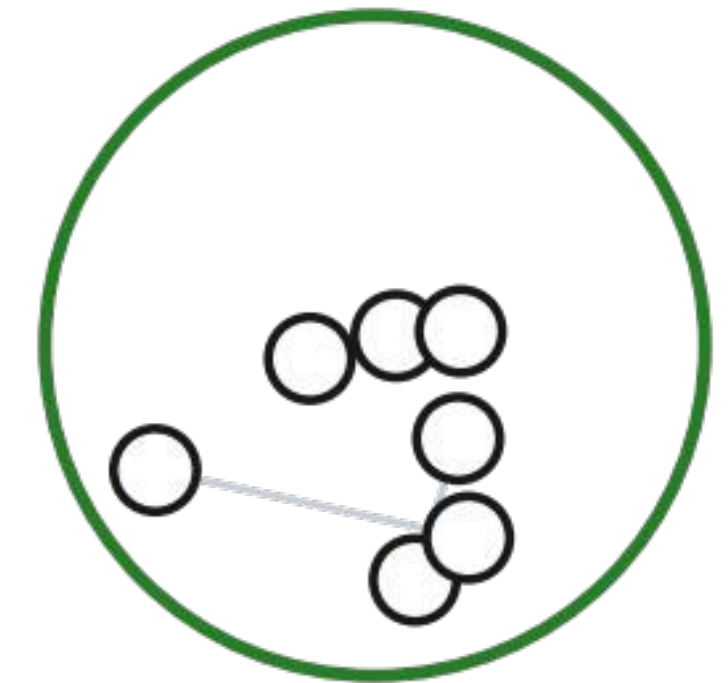
The existence of such groups suggests that **secularization does not affect every group in the same way.**



QUESTION

WHY DO SOME COMMUNITIES KEEP RELIGIOSITY?

- Exceptions can help reveal the mechanism and show how and why religious commitment stays.
- The aim is to develop a middle-range testable explanation that connects broad social conditions with observable behavior.



HYPOTHESIS

The mechanism may be **structural**.

Religious commitment can depend on a number of factors: who people interact with, how often they interact, how closely these relationships connect to religious institutions.

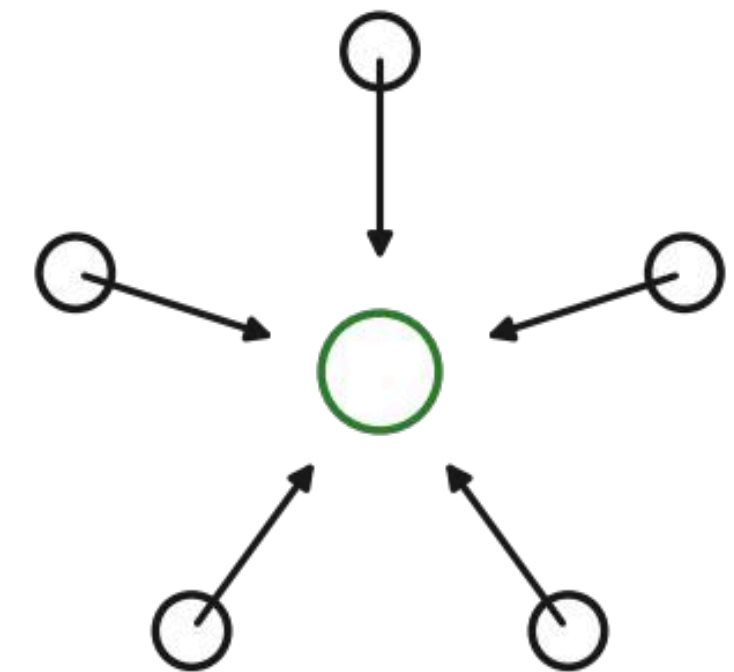
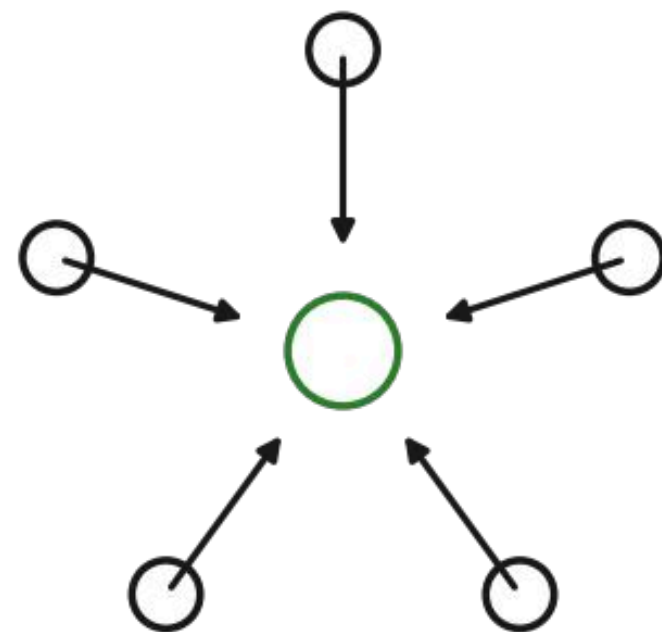
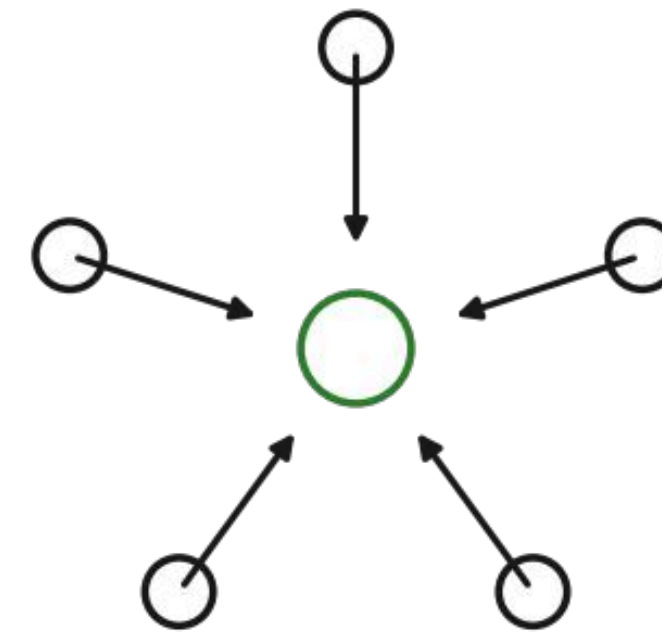
Social network can be a possible explanation.

RELIGIOSITY IS REINFORCED BY CO-BELIEVERS

Religiosity is:

- spread through credible displays (CRED)
- reinforced by the share of co-believers

This process can be understood as a **continuous cousin of complex contagion.**



NETWORK PROBLEM: HOW TO SOLVE IT

Social network structure
determines who reinforces
whom

Segregation concentrates
co-believers within the same
part of the network

Integration creates a
different pattern: exposes
the minority

An **agent-based model** is used **to test if the network mechanisms can produce these differences** in religiosity.

ABM can be VERY instrumental in exploring religious dynamics*

*Gore, R. et al., 2018. Forecasting changes in religiosity and existential security with an agent-based model.

MODEL

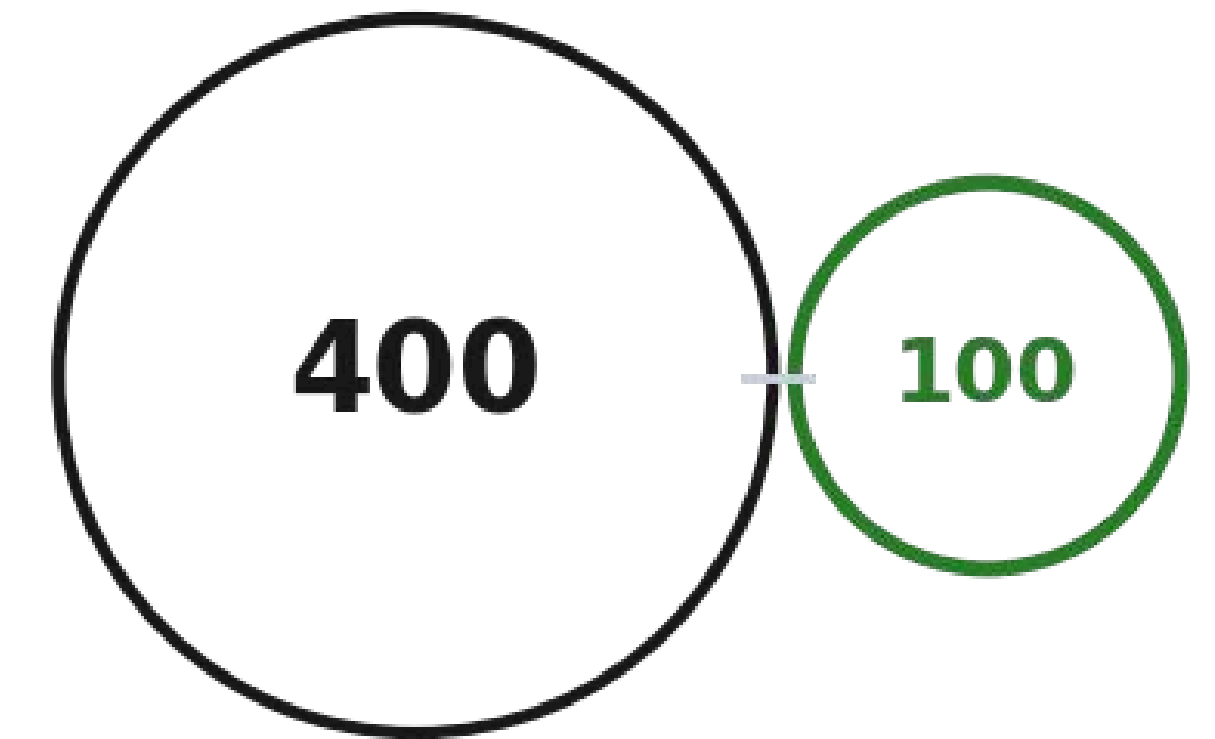
500 agents, each with religiosity R in $[0,1]$

400 secular, 100 religious: **a 20% minority**

Scale set for stable averages and many runs

300 steps, **10** replications, burn-in - **100** steps

Python 3.10 + NetworkX + NumPy + Pandas



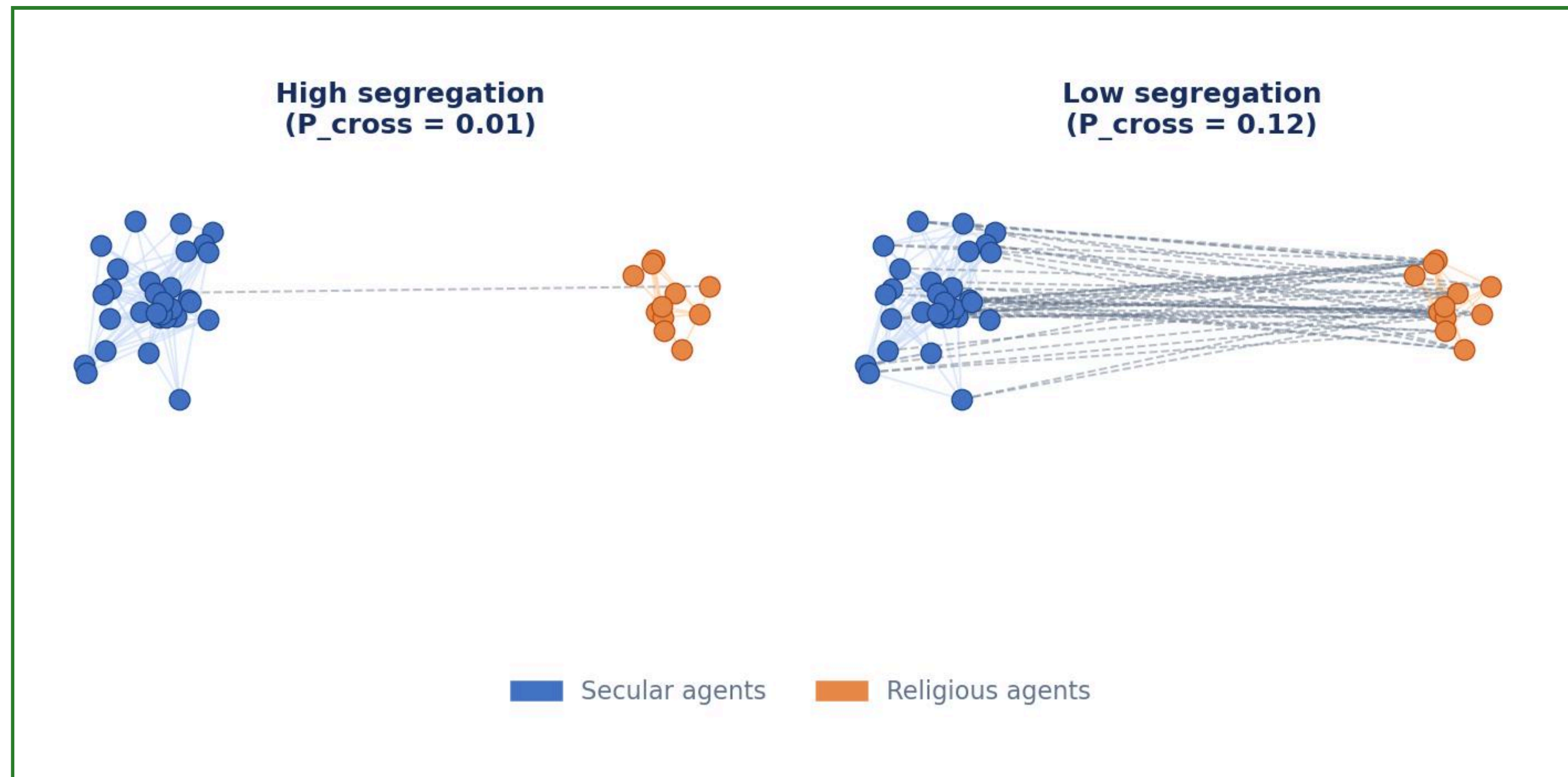
METHOD: P_IN AND P_CROSS

Ties from a stochastic block model (Holland 1983)

- p_{in} : within-group probability, fixed at 0.15
- p_{cross} : between-group probability, the only variable
- Equal density: any difference comes from p_{cross}

	Sec	Rel
Sec	p_{in}	p_{cross}
Rel	p_{cross}	p_{in}

ONE KNOB: P_CROSS



p_{cross} tunes segregation to integration

Low: a segregated enclave
High: minority mixed in

Everything else held constant

METHOD

NETWORK DYNAMICS

SECULARIZING PRESSURE:

a downward push

COMPENSATORY CONTROL:

softens it, always on

SUPPORT BUFFER:

co-believers slow decay (network)

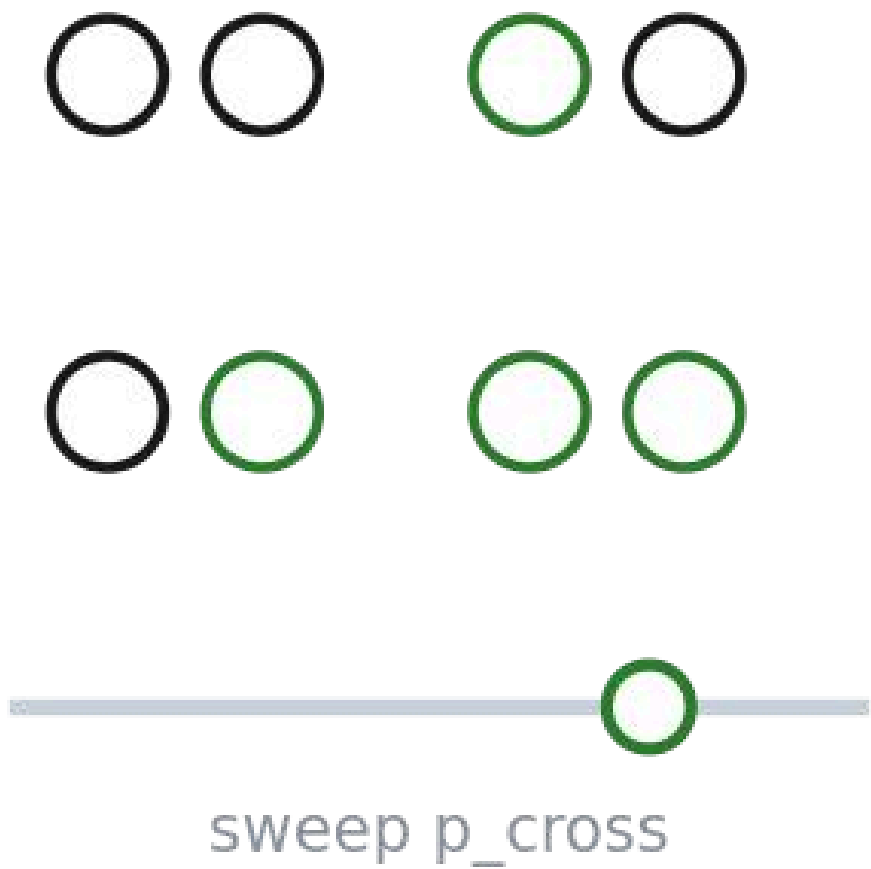
ASSIMILATION:

a downward push

EXPERIMENT

- Switching the two network forces on and off
- Keeping pressure and compensatory control on
- Sweep p_{cross} across its range

10 replications per setting



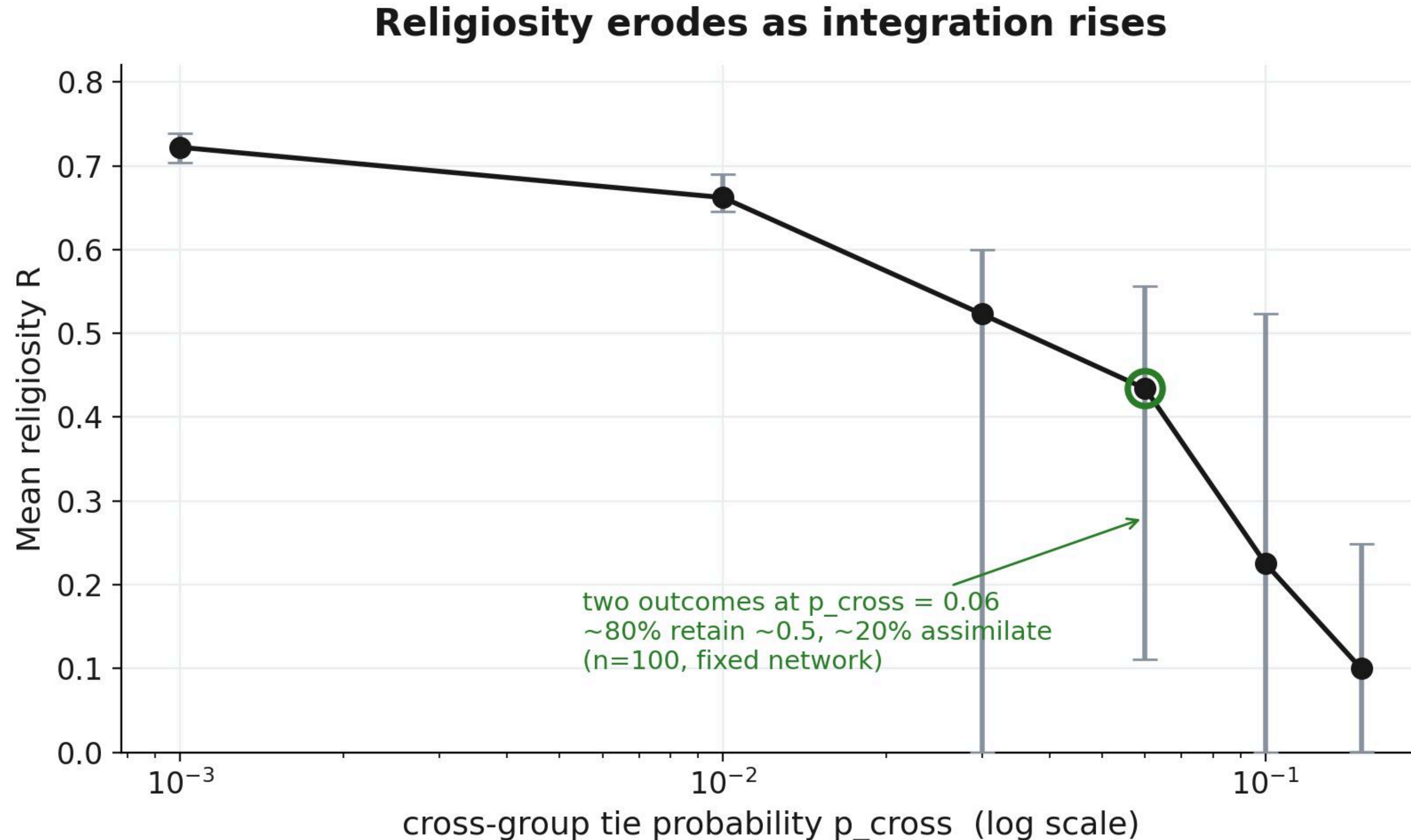
SUPPORT BUFFER: THE MAIN MECHANISM

BUFFER LIFTS RELIGIOSITY FROM 0.40 TO 0.72

- Assimilation alone barely moves it: 0.35
- Full $\approx$ buffer: no synergy under segregation
- Half of 0.40 is compensatory control

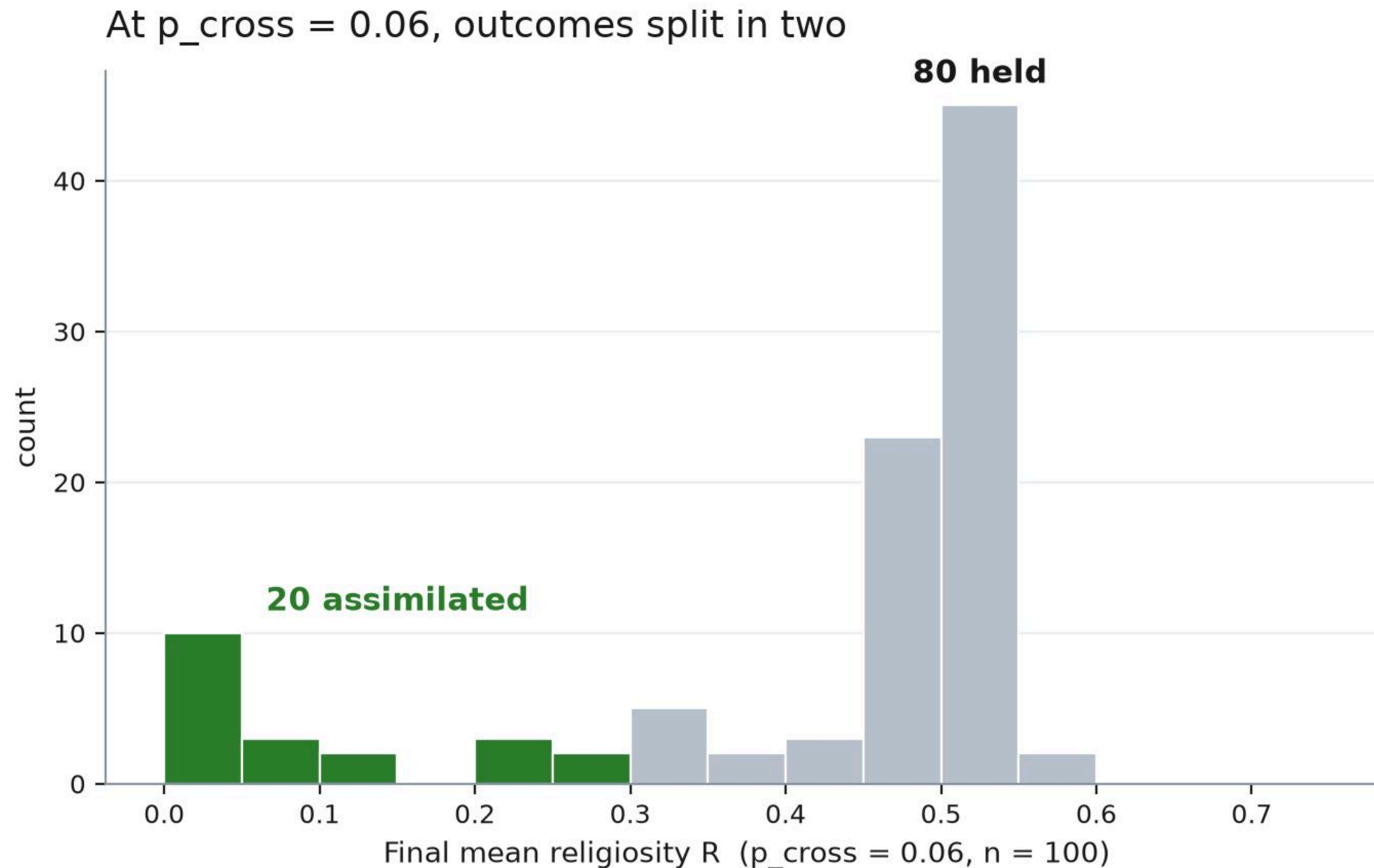


TWO OUTCOMES AT P_CROSS OF 0.06



- Religiosity falls from 0.72 to 0.10 with integration
- At p_{cross} 0.06 the outcome splits in two
- ~80% retain ~0.5, ~20% assimilate
- Confirmed at $n=100$ on a fixed network

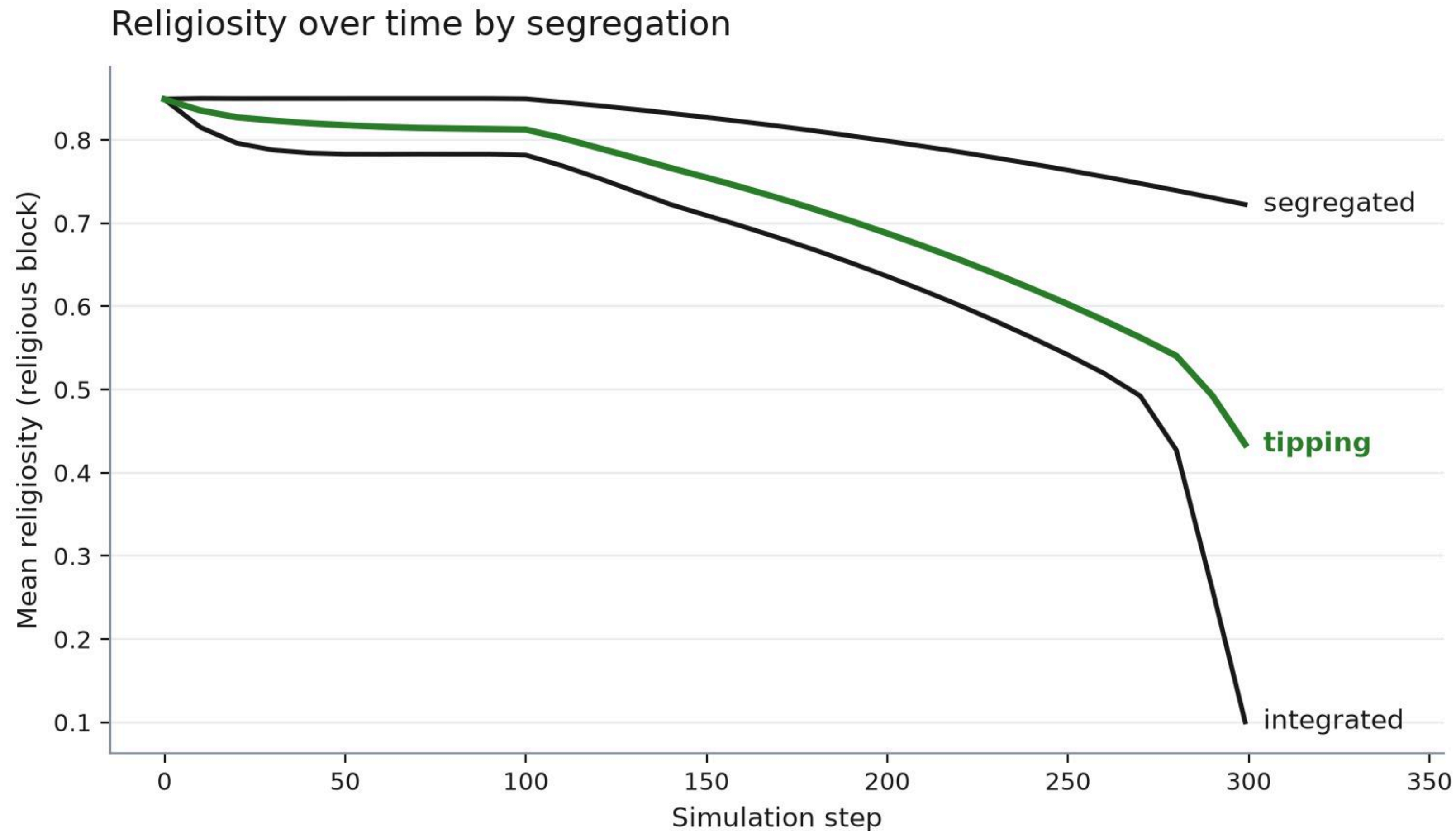
BRIDGES DILUTE THE BUFFER



- Cross-ties bring outsiders into the neighbourhood
- They dilute co-believer support
- The buffer runs out of fuel
- Weak ties reverse for reinforcement (Granovetter)

RESULTS

SEGREGATION PROTECTS RELIGIOSITY WHILE INTEGRATION ERODES (?)



- Religiosity falls from 0.72 to 0.10 with full integration
- Protection is individual plus network
- Near p_{cross} 0.06 communities can diverge
- A proof-of-concept micro-mechanism

RESEARCH LIMITATIONS

Single social network,
not a multiplex one

Compensatory control
always on

Static network:
ties are exogenous, new agents do not enter the network

Unweighted and binary thin bridges

Lack of validation:
qualitative and quantitative data is hard to collect

**EXTENSIVE
NEXT STEPS**

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