Influence of Kin on Fertility in the Developing World

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Introduction

Most non-human primates wean an offspring before engaging in another bout of reproduction.

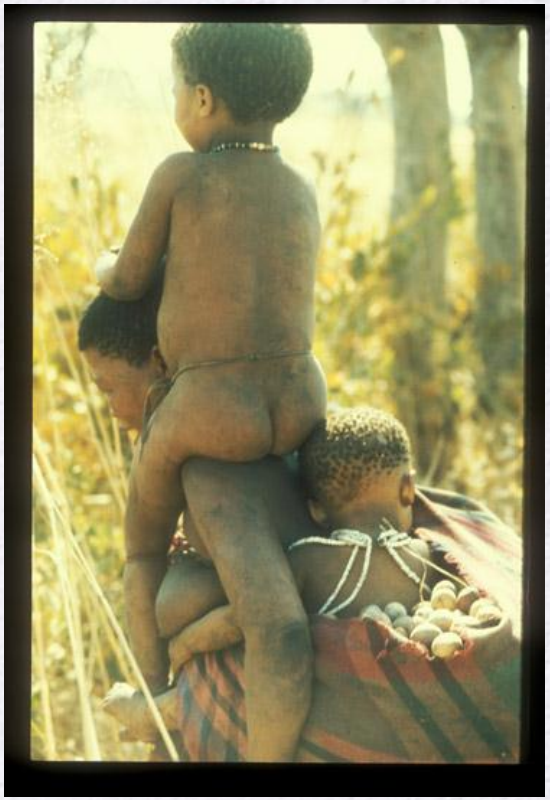
At this point, the offspring is typically an independent food producer.

Introduction

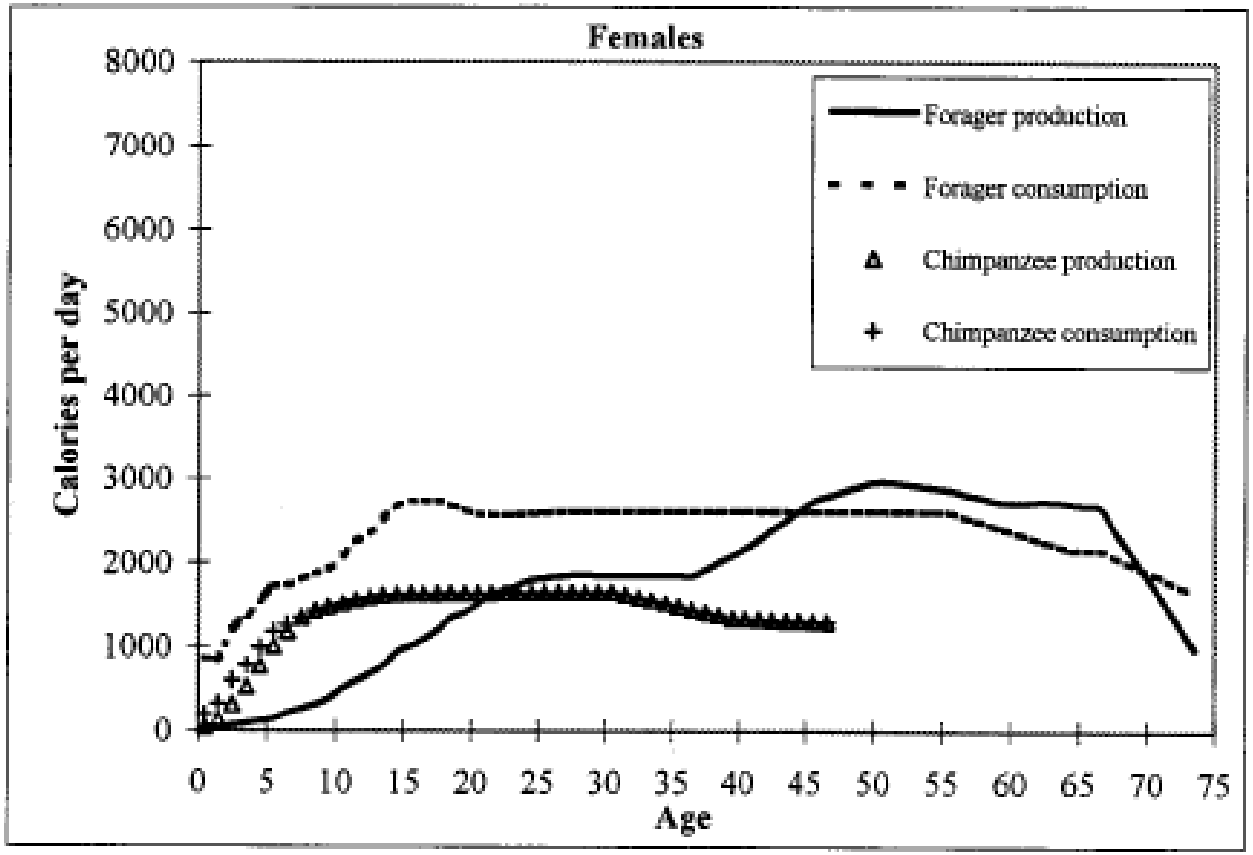
In contrast, when human mothers wean their offspring and begin another bout of reproduction, the child is typically still dependent on others to supplement food.

Allomothers?

Given the human reproductive strategy of having multiple dependent offspring of differing ages, other individuals may help mothers successfully rear these offspring.

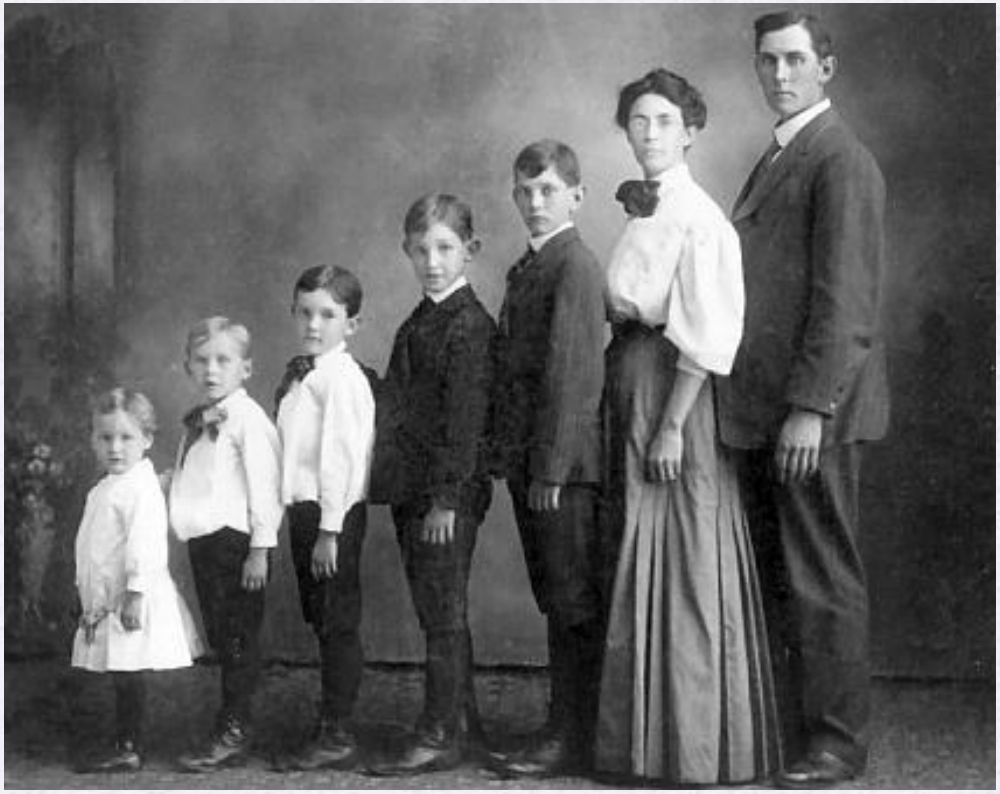


Production / Consumption Curve



Kaplan et al. (2000)

Cooperative Breeding



Women need help rearing multiple dependent children

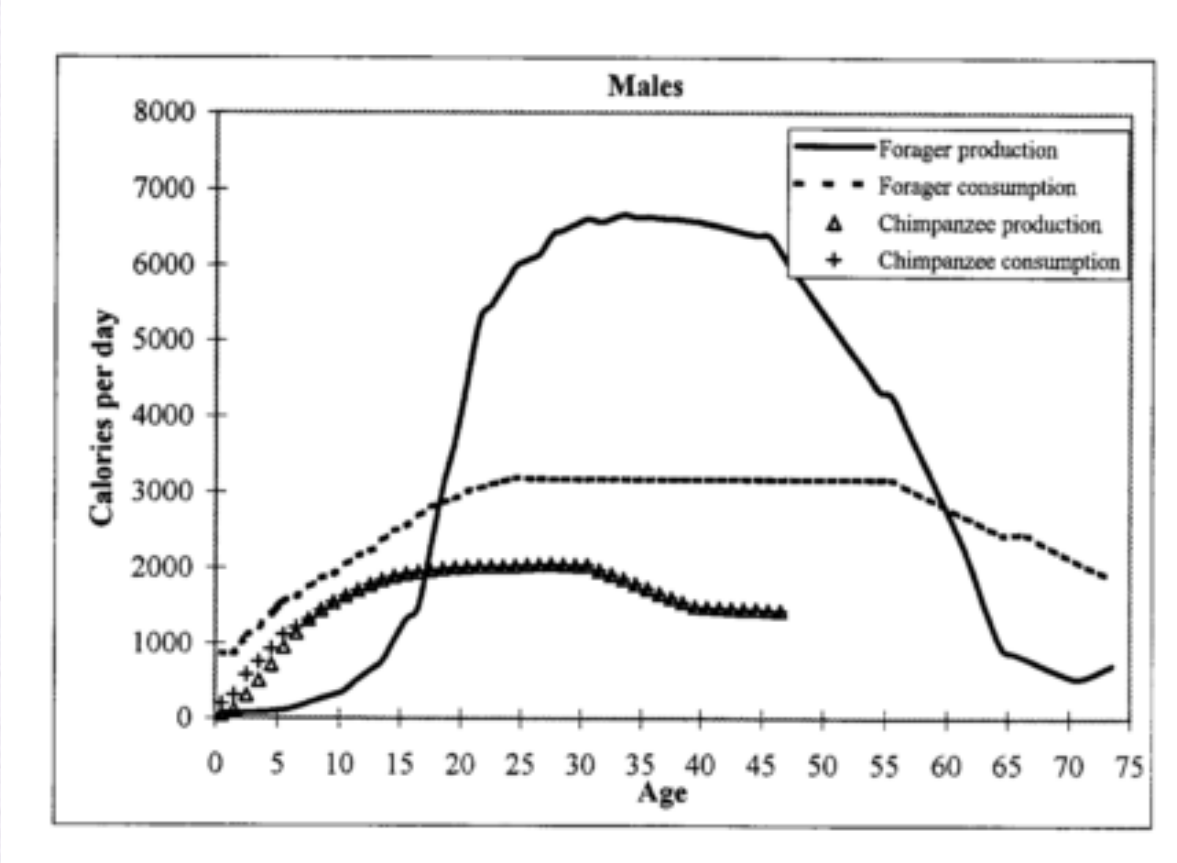
=> cooperative breeding

Hrdy (1999)

Cooperative Breeding

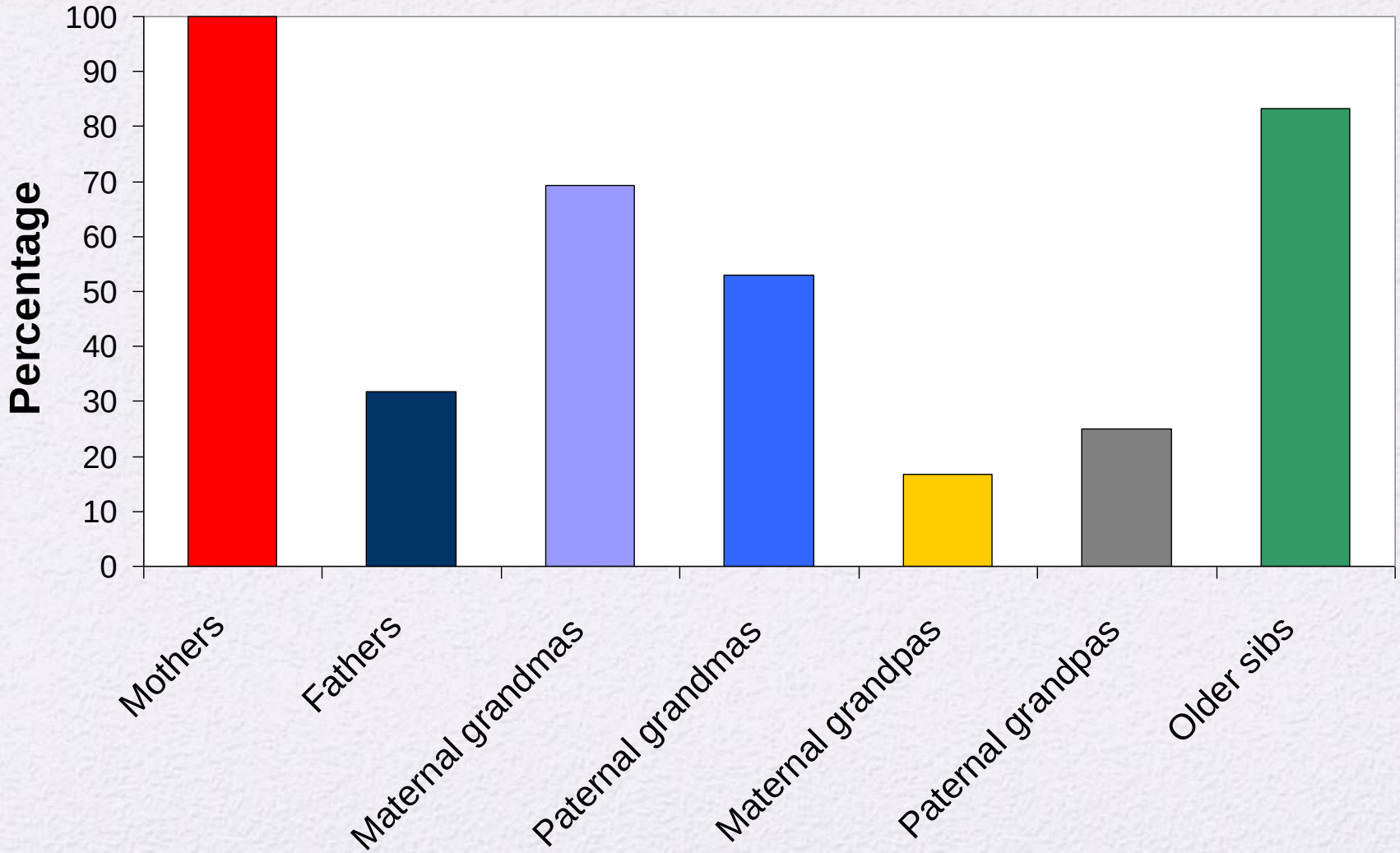
- System in which mothers receive help from other individuals to raise offspring

Surely the solution =

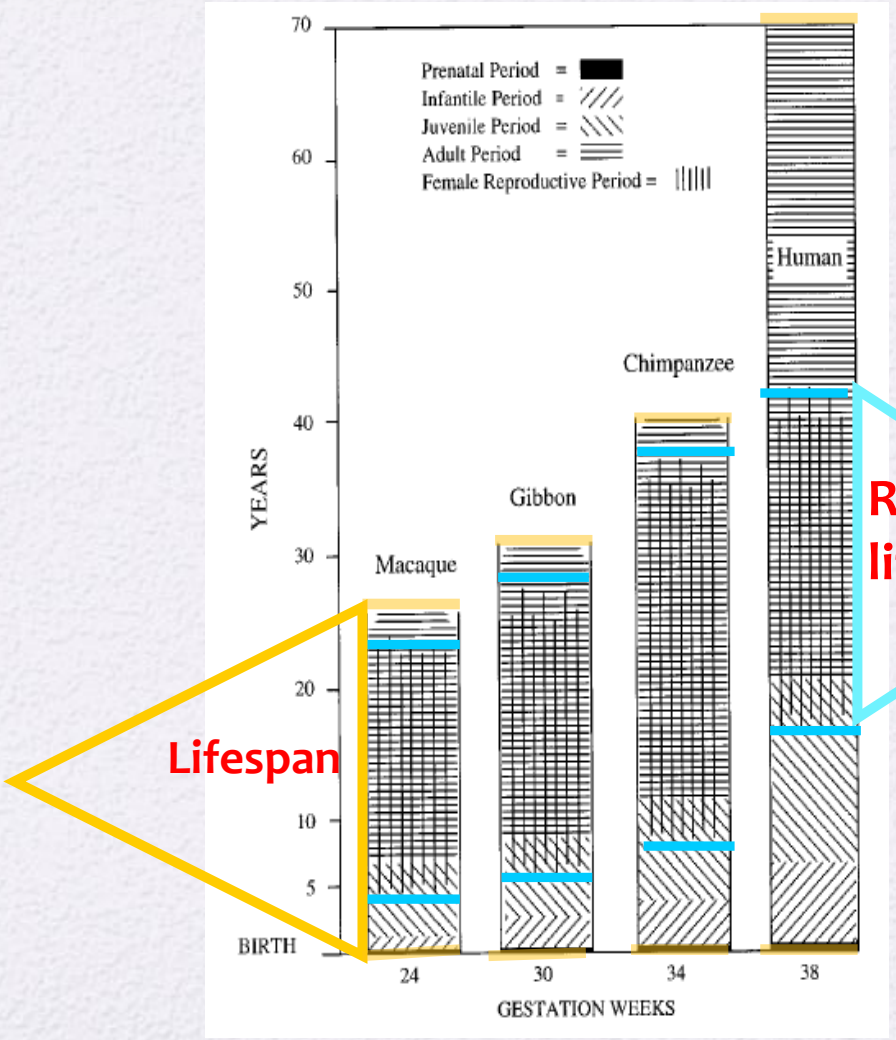


Kaplan et al. (2000)

Literature review: Percent of studies in which each relative improved child survival

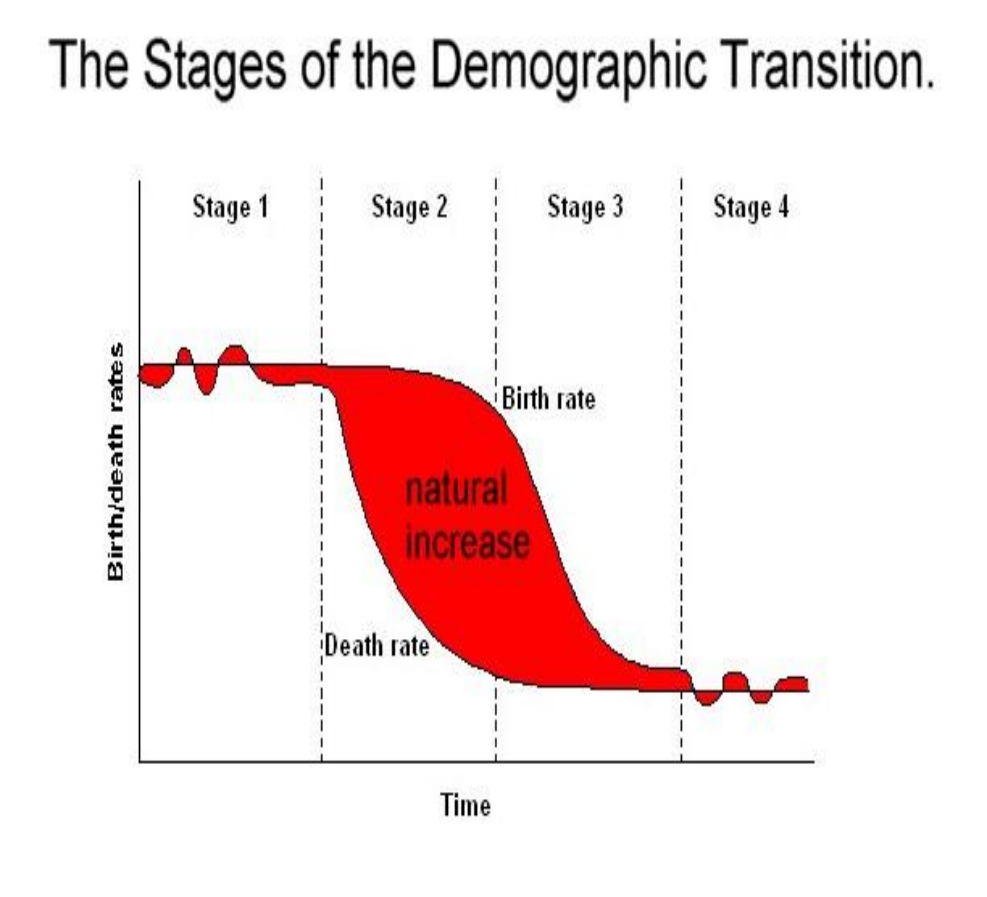


Comparing Life Histories of Female Primates



Schultz (1960)

Demographic Transition



- Theories of fertility and fertility decline abound
- Explanation undoubtedly multi-factorial
- Are kin part of the answer?

Kin Conflict

- Kin may have different desired reproductive outputs for a given woman than the woman does for herself (Leonetti et al., 2007)
  - Men may want more children than their wives do (Ratcliffe et al., 2000; Bankole & Singh, 1996)

In-Law Conflict?

- Kin may try to support the reproductive desires of the individual they are genetically related to.

Resource Competition

- Given that kin often share the same resource base, competition may occur between relatives when resources are scarce.

Aims of Project

1. Do kin influence reproductive outcomes?

2. Do these influences vary between populations?

3. What are the mechanisms?

Systematic literature review of effects of kin on fertility

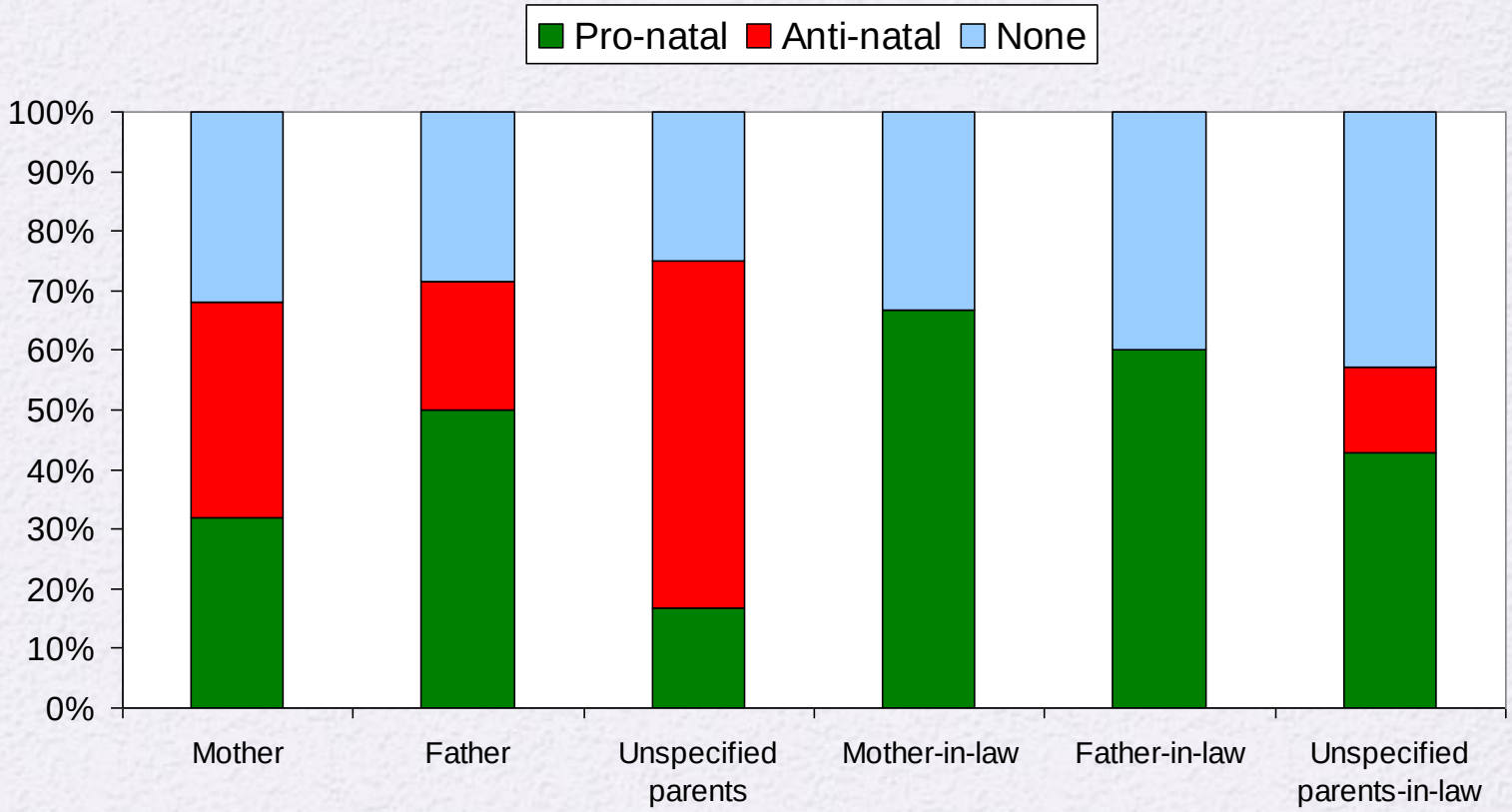
Studies which have **statistically** correlated the availability of **specific** kin with female fertility outcomes

N = 39 populations

- Fertility outcomes
  - Age at first birth/teenage pregnancy
  - Length of birth intervals
  - Total number of births

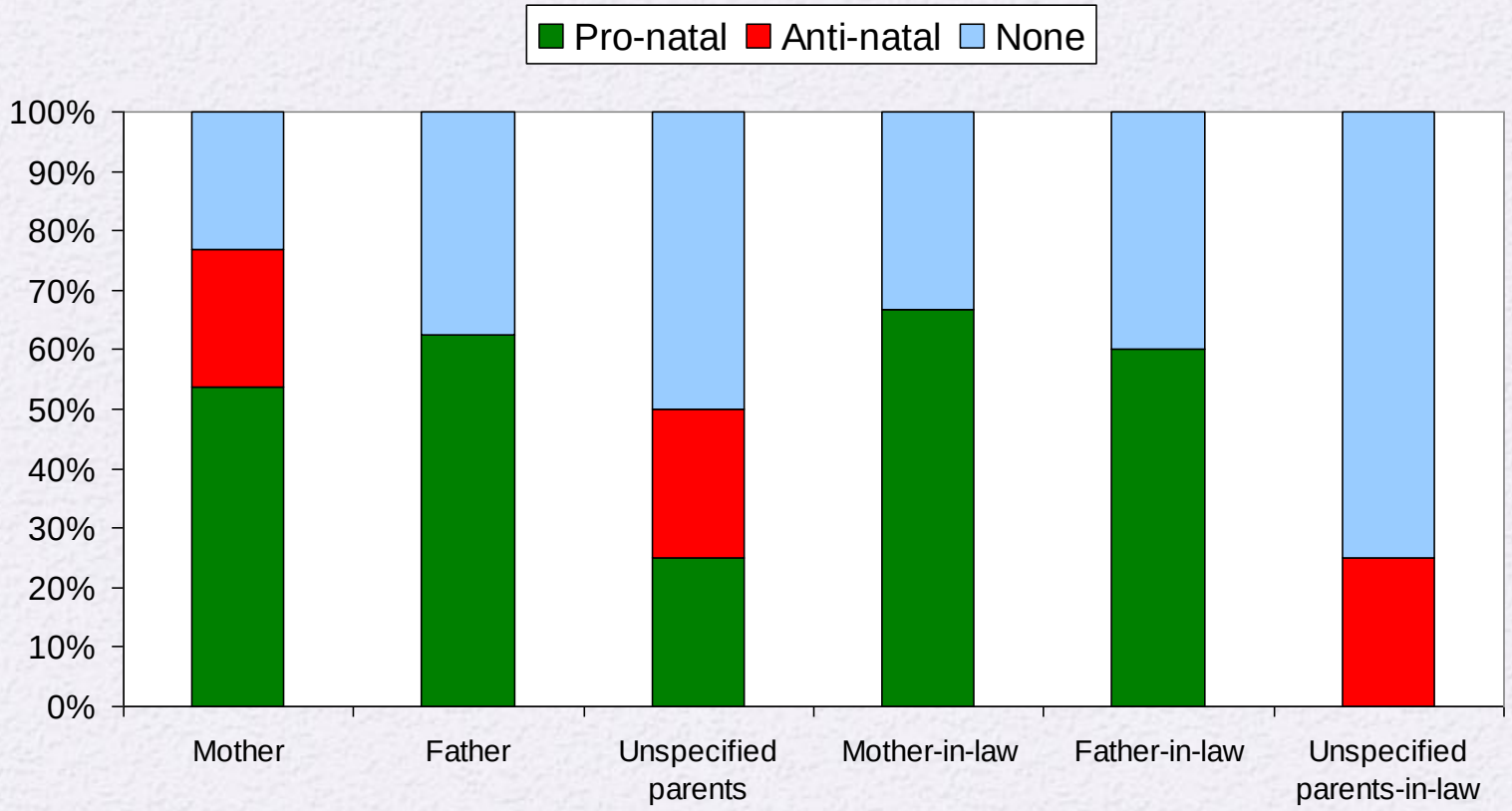
Review of 39 published studies on the effects of kin on fertility

Percentage of studies in which presence of each relative had pro-, anti- or no effect on female fertility



Sear & Coall (2011)

High fertility societies only (TFR≥3; n = 18)



Sear & Coall (2011)

Kin Influences on Fertility in Thailand: Effects and Mechanisms

Aims:

1. Does postmarital residence influence fertility outcomes?
2. By which mechanism(s) does postnuptial residence influence fertility?

Snopkowski & Sear (In Press) Evolution and Human Behavior.

Hypotheses

Hypothesis 1:
Kin reduce the cost of reproduction

a) Kin affect a woman's time allocation
b) Kin influence maternal and child outcomes.

Hypothesis 2:
Kin influence contraceptive uptake

- Main route of controlling fertility.
- Evidence is mixed on the role of kin in contraceptive uptake.

Hypotheses

Hypothesis 3:
Kin influence breastfeeding duration

- Direct – influence of kin on nutrition of young children allowing for earlier breastfeeding cessation
- Indirect – if help allows women the time to continue breastfeeding a child they might have had to wean without help.

Hypothesis 4:
Living with kin postnuptially allows couples to marry at younger ages.

Hypothesis 5:
Individuals with high desired fertility live with kin

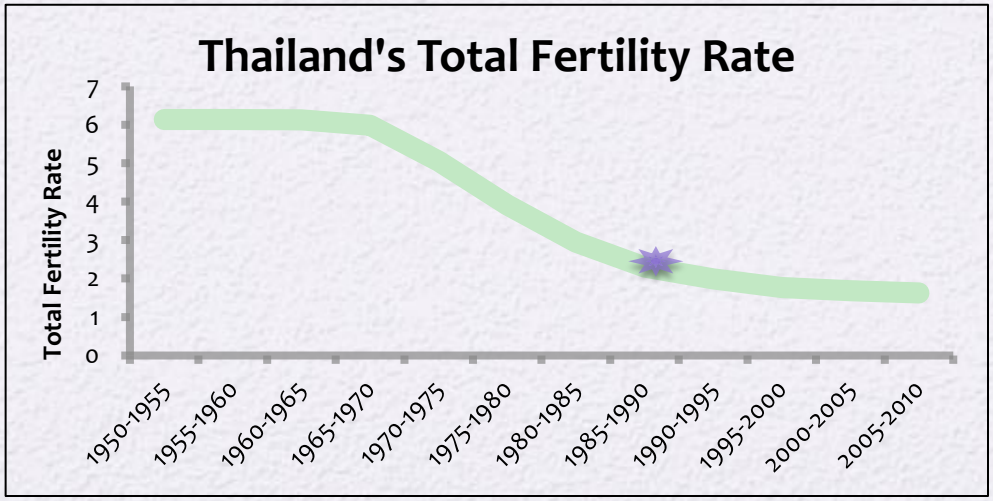
Methods

- Thailand Demographic and Health Survey (collected in 1987)
- Surveyed 6,775 ever-married women between 15 and 49 years old.
- Analyses examine postnuptial residence.

  Virilocal – postnuptial residence with the husband's kin

  Uxorilocal – postnuptial residence with the wife's kin

  Neolocal – postnuptial residence without either set of parents.



Data from United Nations Population Division Department of Economic and Social Affairs https://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

Descriptive Statistics

Descriptive Statistics of Postnuptial Residence

Duration of residence	Living uxorilocally	Living virilocally	Living neolocally
Up to 5 yrs	1945 (28.7%)	1273 (18.8%)	
5-9 yrs	378 (5.6%)	237 (3.5%)	
10-14 yrs	196 (2.9%)	78 (1.2%)	
15-19 yrs	109 (1.6%)	75 (1.1%)	
20+ yrs	85 (1.3%)	45 (0.7%)	
Total	2713 (40.1%)	1708 (25.2%)	2338 (34.6%)

Data are expressed as *n* (%)

Descriptive Statistics by Cohort

	Age Cohort		
	20-29	**30-39**	**40-49**
Uxorilocally (n)	39.1% (913)	41.4% (1023)	41.6% (683)
Virilocally (n)	27.1% (634)	24.4% (604)	23.8% (390)
Neolocally (n)	33.8% (789)	34.2% (846)	34.7% (569)

Control Variables

- Control variables included: language spoken in the home, urban or rural residence, age cohort (categorized in five-year age groups), wealth indicator (at time of interview) and highest educational level achieved.

Do kin influence fertility?

Event History Analysis of Progression to Each Birth by Residence in Previous Year

Sample Size (%)	6017 (89%)	4513 (67%)	2891 (43%)	1743 (26%)	1030 (15%)
Progression to:	First Birth	Second Birth	Third Birth	Fourth Birth	Fifth (or more) birth

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Progression to:	First Birth	Second Birth	Third Birth	Fourth Birth	Fifth (or more) birth
Uxorilocal	**0.272(0.045)*** **	0.025(0.047)	-0.052 (0.063)	0.032 (0.088)	-0.106 (0.092)

Controls for: Cohort of birth, age, education, language category, urban/rural residence, wealth indicator, time, and for 2nd or higher births: gender of previous offspring and their survivor status.

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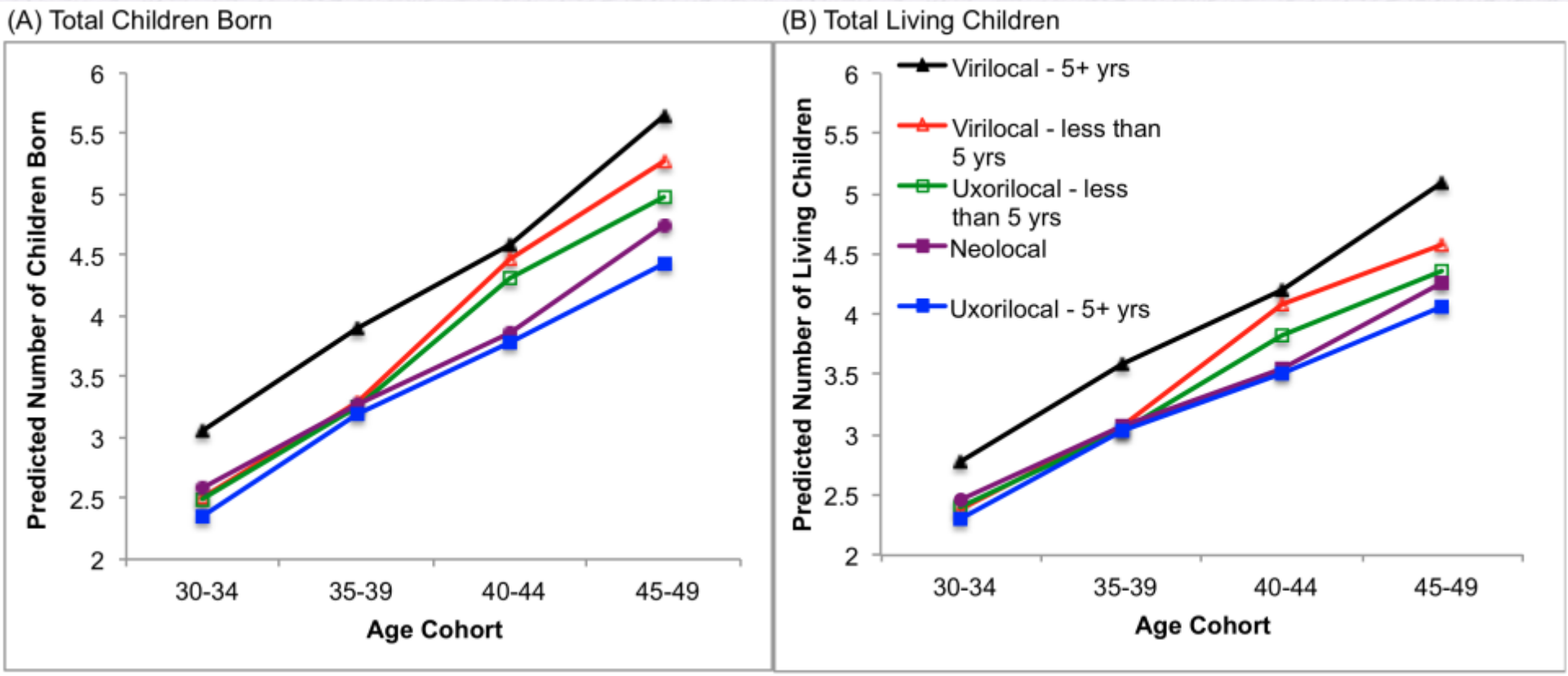
Virilocal	**0.331(0.052)*** **	**0.356 (0.058)*** **	**0.264 (0.075)*** **	**0.246 (0.015)***	**0.185 (0.087)***

* p< 0.05, ** p<0.01, *** p< 0.001

Controls for: Cohort of birth, age, education, language category, urban/rural residence, wealth indicator, time, and for 2nd or higher births: gender of previous offspring and their survivor status.

Do kin influence fertility?



Predicted (A) number of children born and (B) number of living children based on multiple regression analyses which control for: age at marriage, language, urban/rural, wealth factor, education level.

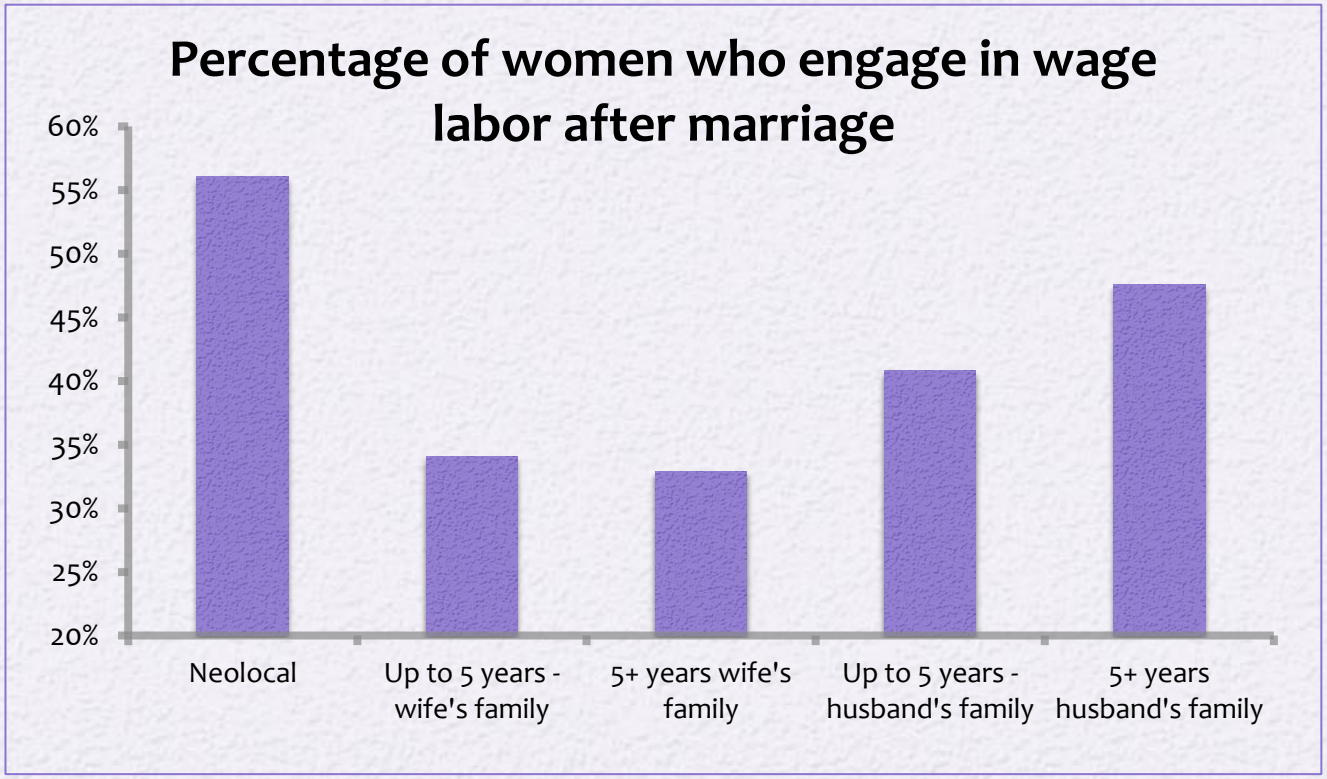
Do kin influence fertility?

- Virilocal residence is associated with higher fertility, while uxorilocal residence appears to have no significant effect other than progression to first birth.

How do kin influence fertility?

Hypothesis 1: Kin reduce the cost of reproduction

A) Kin affect a woman's time allocation



How do kin influence fertility?

Hypothesis 1: Kin reduce the cost of reproduction

A) Kin affect a woman's time allocation

	Whether a woman works after marriage		
Variable	Estimate	S.E.	Odds Ratio
Postmarital Residence (reference is neolocal)	***		
Uxorilocal	-0.37***	0.069	0.691
Virilocal	-0.236**	0.074	0.79

^ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

How do kin influence fertility?

Hypothesis 1: Kin reduce the cost of reproduction

B) Kin influence maternal and child outcomes

Child Outcomes

	Virilocal	Uxorilocal
Mortality	NS	Reduced (marginally significant)
Weight	NS	NS
Height	NS	NS

Maternal Outcomes

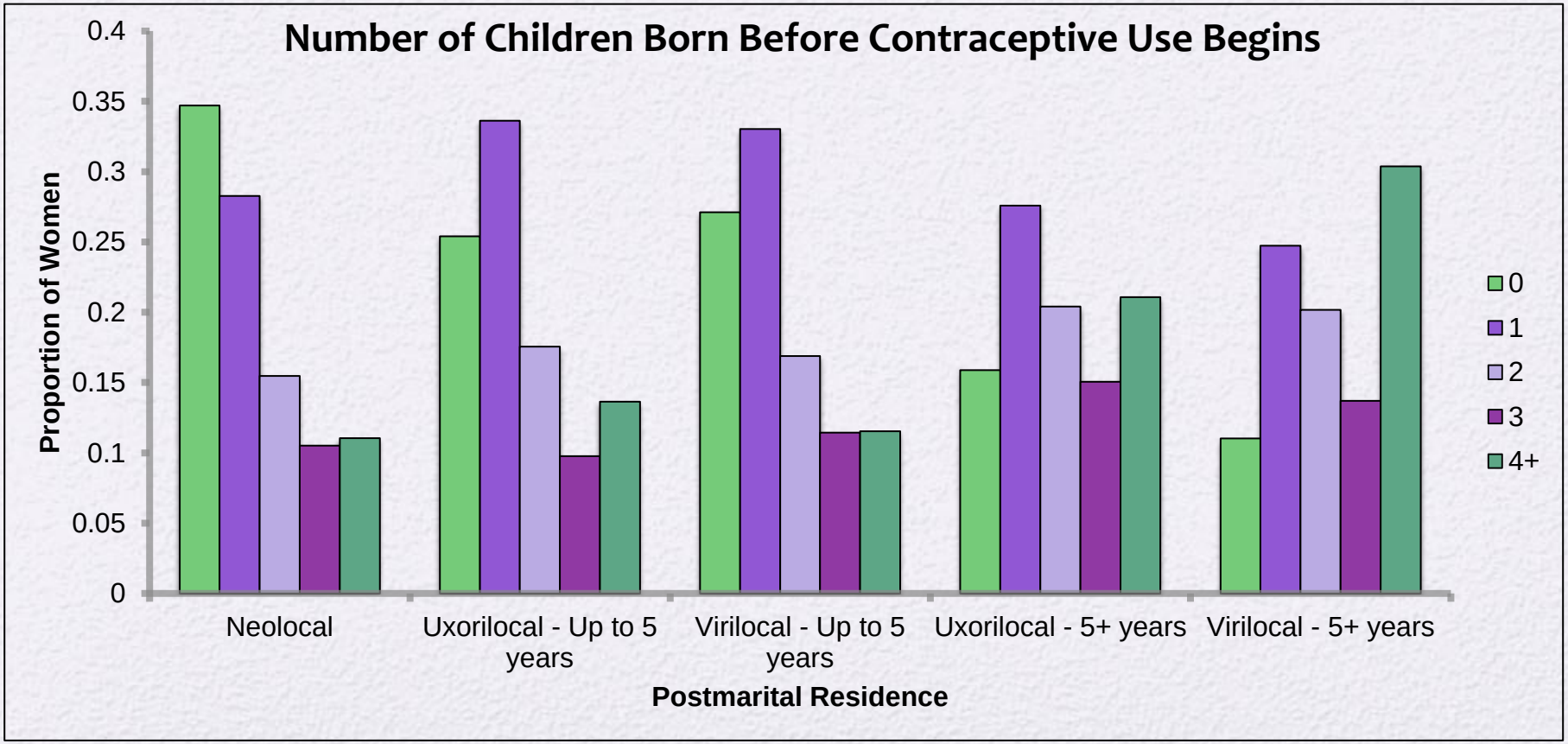
	Virilocal	Uxorilocal
Underweight	NS	NS

Hypothesis 1: Kin reduce the costs of reproduction

- Living with kin is associated with lower rates of wage labour for women. Living uxorilocally is correlated with marginally improved child survivorship.

How do kin influence fertility?

Hypothesis 2: Kin influence contraceptive uptake



How do kin influence fertility?

Hypothesis 2: Kin influence contraceptive uptake

Discrete-time event history analysis predicting start of contraceptive use

Variable	Log Odds	SE	Odds Ratio
Virilocal Residence	-0.293***	0.053	0.746
Uxorilocal Residence	-0.188***	0.046	0.829
Neolocal Residence	0		

* p< 0.05, ** p < 0.01, *** p < 0.001

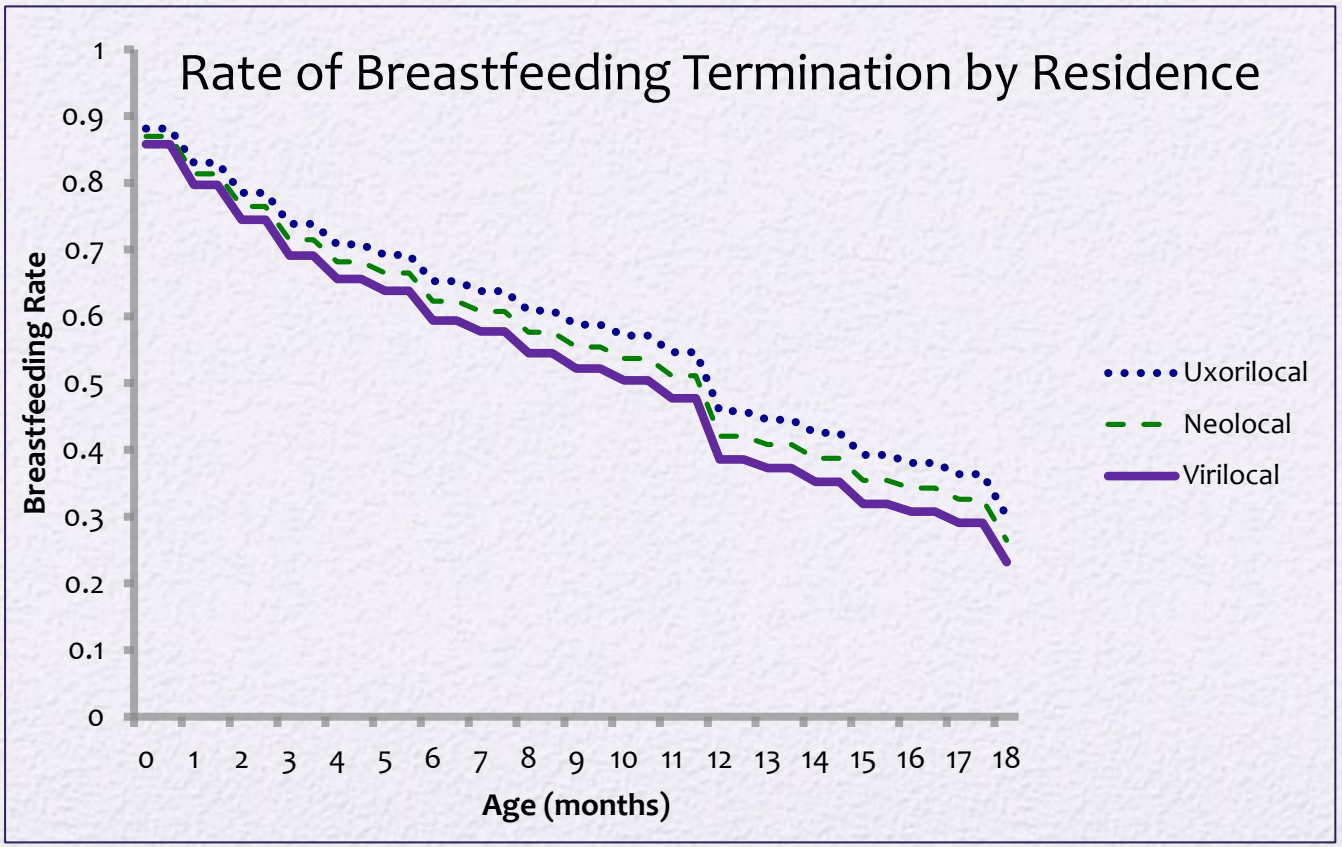
Controls for: years since marriage, age at marriage, language category, birth cohort, total children born, total children born squared, education level, urban/rural residence, wealth indicator, years since marriage squared.

Hypothesis 2: Kin influence contraceptive uptake

- Living with kin is associated with a delay in contraceptive uptake.

How do kin influence fertility?

Hypothesis 3: Kin influence breastfeeding duration



How do kin influence fertility?

Hypothesis 3: Kin influence breastfeeding duration

Discrete-time event-history analysis of termination of breastfeeding

Variable	Estimate	SE	Odds Ratio
Residence after birth (Virilocal is reference group)			
Neolocal Residence	-0.101	0.093	0.904
Uxorilocal Residence	-.208^	0.113	0.812

^ $p < 0.10$

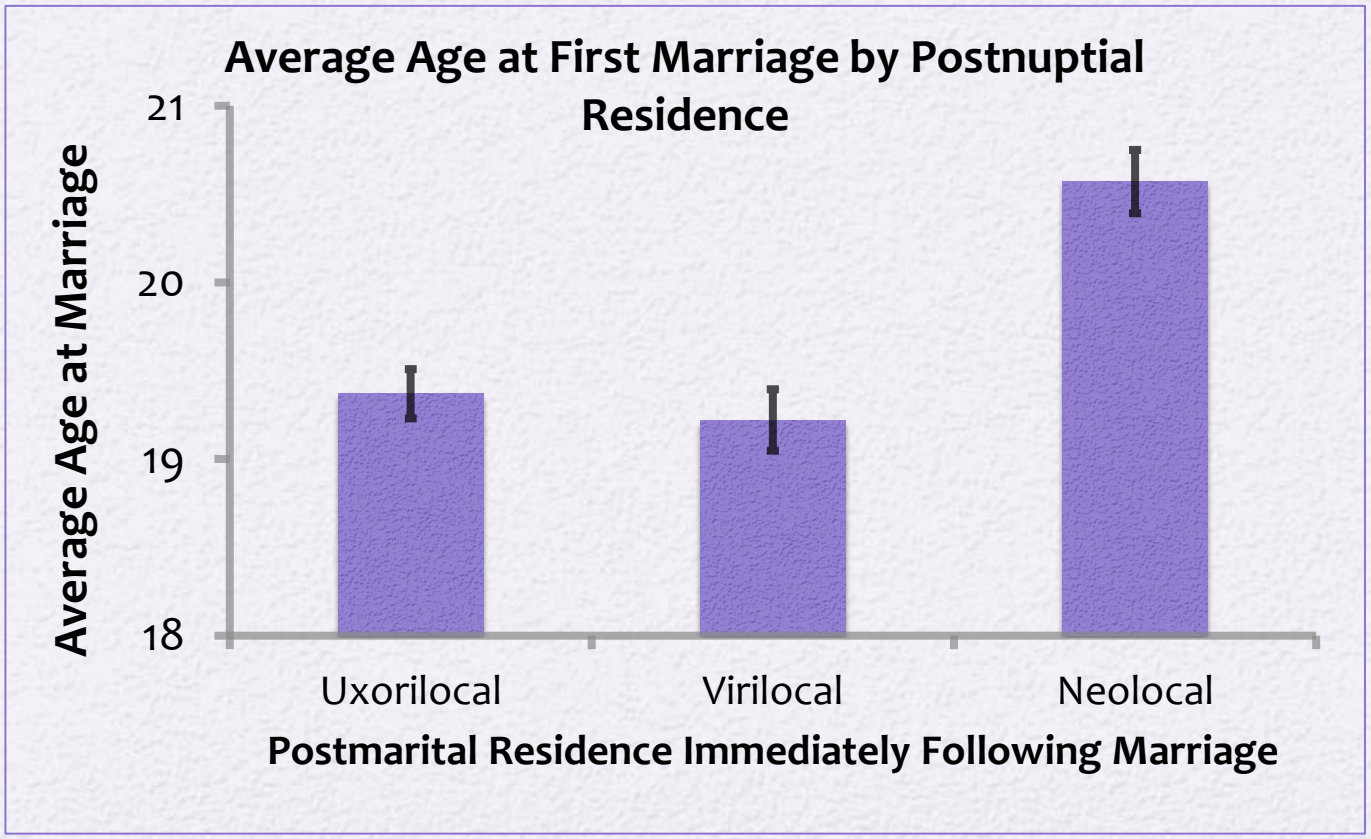
Controls for: Age (in months) of the child, urban/rural, working status of mother after marriage, wealth indicator, age of mother at child's birth, language, and education level.

Hypothesis 3: Kin influence breastfeeding duration

- Breastfeeding duration is marginally shorter for virilocal compared with uxorilocal residence.

How do kin influence fertility?

Hypothesis 4: Living with kin allows couples to marry at younger ages.



Error bars represent 95% confidence intervals

How do kin influence fertility?

Hypothesis 4: Living with kin allows couples to marry at younger ages.

Multivariate linear regression model showing the association between postnuptial residence patterns and covariates with age at first marriage.

Variable	Estimate	S.E.
Uxorilocal	-0.645***	0.108
Virilocal	-0.844***	0.116
Neolocal	0	

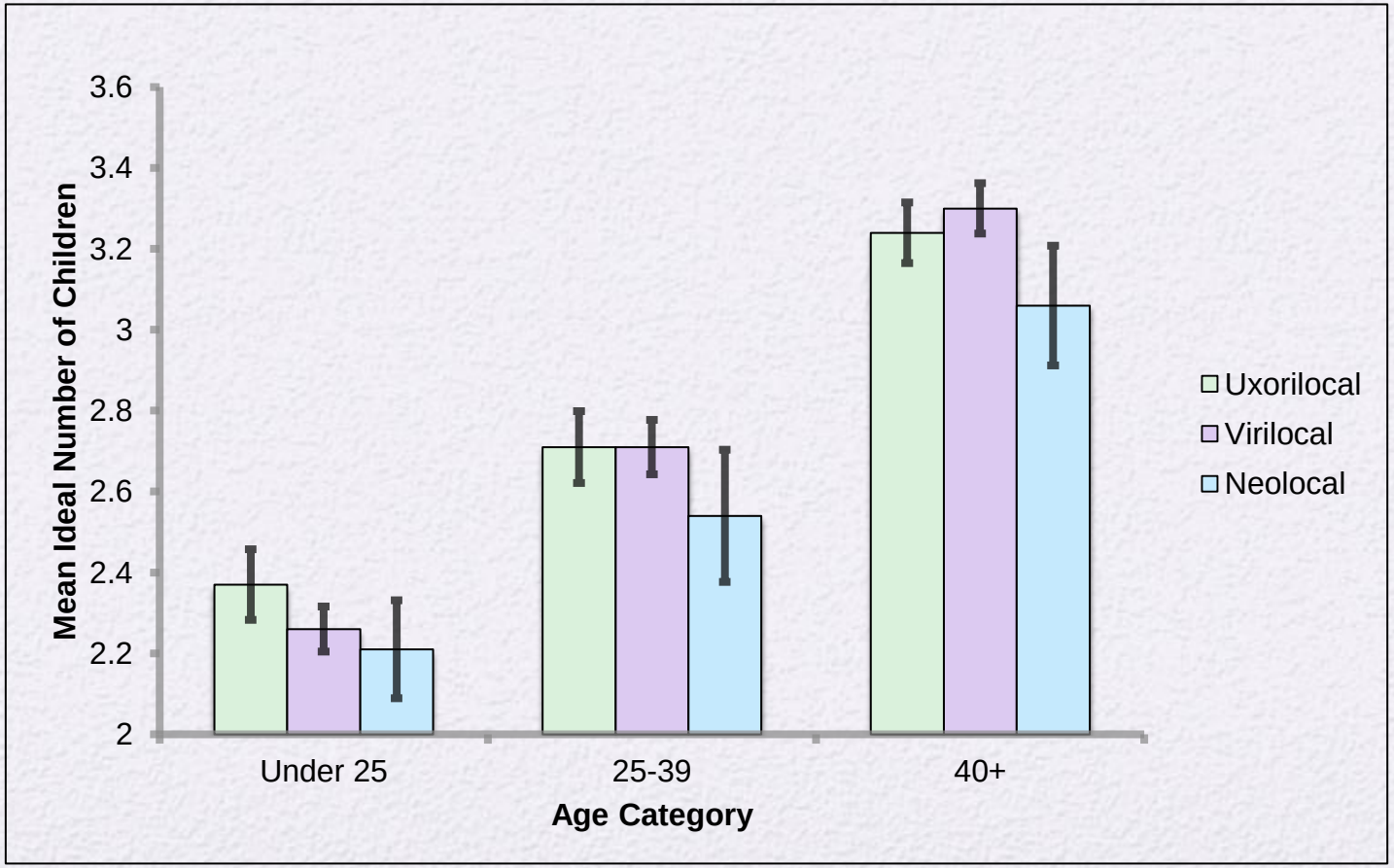
* p< 0.05, **p < 0.01, ***p < 0.001

Hypothesis 4:

- Living with kin postnuptially is associated with an earlier age at marriage.

How do kin influence fertility?

Hypothesis 5: Individuals with high desired fertility live with kin



Hypothesis 5: Individuals with high desired fertility live with kin

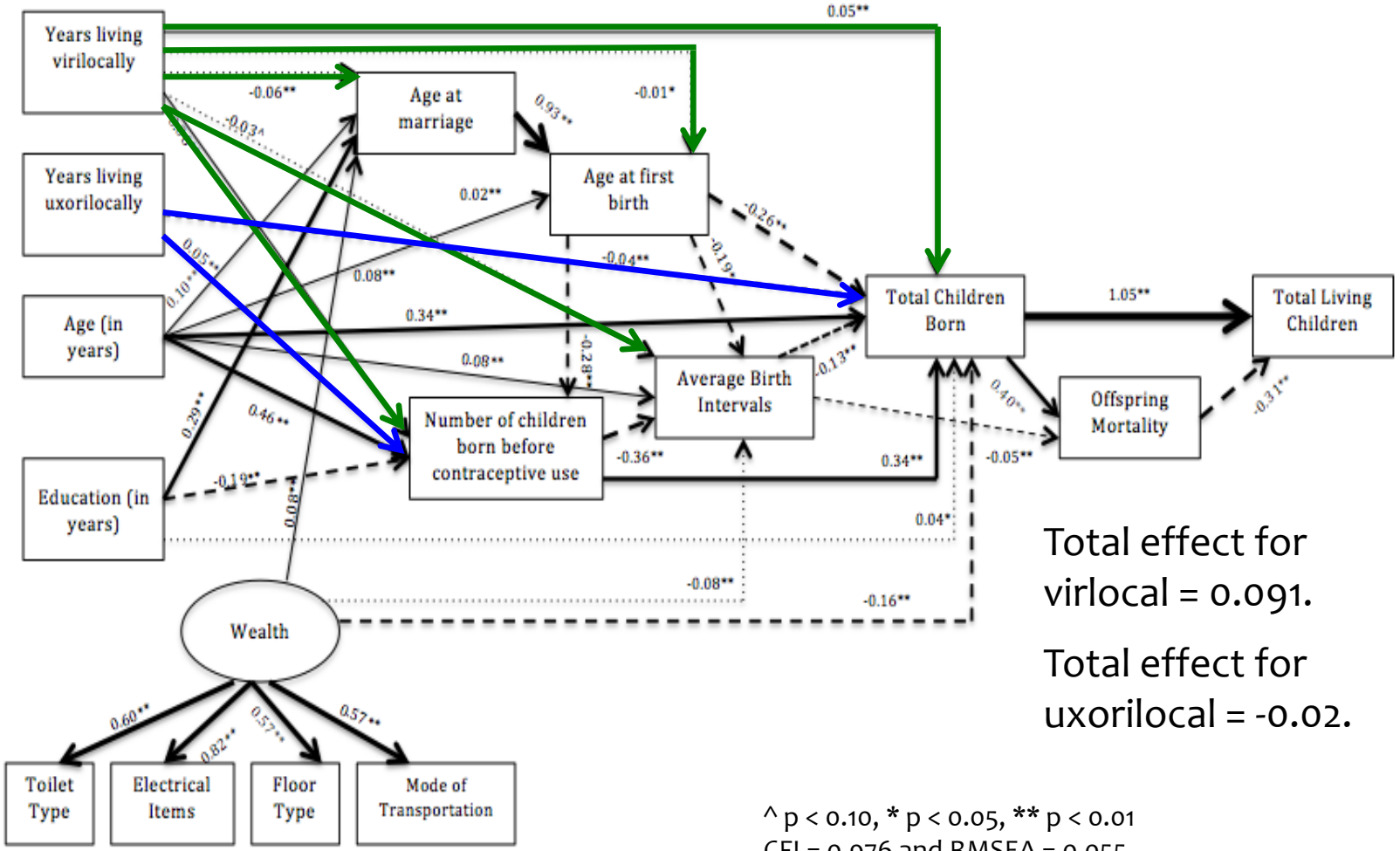
- Higher desired fertility is associated with postnuptial residence with kin.

Results

Hypothesis	Does residence with kin correlate with…	Virilocal	Uxorilocal
	fertility outcomes	↑	↑ (for first birth only)
1a	reduced likelihood of work	↑	↑
1b	Child (and maternal) outcomes	ns	↑ (Child survivorship)
2	Delayed contraceptive uptake	↑	↑
3	Time until breastfeeding termination	↑	↓
4	Earlier age at marriage	↑	↑
5	Higher desired fertility	↑	↑

↑ represent pro-natal effects. ↓ represent anti-natal effects. ns is not significant. The size of the arrow indicates the strength of the relationship compared with the other postnuptial residence pattern.

Structural Equation Modeling



Total effect for virlocal = 0.091.

Total effect for uxorilocal = -0.02.

^ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
CFI = 0.976 and RMSEA = 0.055

Cooperative Breeding? In-law conflict? Resource competition?

The evidence suggests that kin are acting as cooperative breeders.

- Parents allow couples to marry younger, progress to first birth more rapidly, marginally improve grand-offspring survivorship, and mothers are less likely to work in wage labour.

- In-laws allow couples to marry younger and progress more rapidly to each parity, resulting in higher overall fertility. Could this be in-law conflict?

There is no evidence of resource competition.

Limitations

- No data on childcare
- People choose to live with kin postnuptially – they are not randomly assigned.
- Effects of each grandparent cannot be separated out.
- Cannot identify the routes by which kin influence contraceptive uptake or breastfeeding duration. Is it advice from kin?

Thank You

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