Korean Family Planning (KFP): Replication and Redefinition of "Modern" Methods

Table A. Comparison with Valente (2010) and Two Replication Variants

	Valente (2010)[a] *KFP odds ratio*	m_tbl102_vil (8)[b] *OR*	tbl102_vil_mod6 (6)[c] *OR*
Time (trend / FE)	4.34	*FE only*[d]	*FE only*[d]
Cumulative adoption (village)	0.32	1.05^{**}	$1.01^{\bullet}$
Number sent (deg_out)	1.02	1.02	1.00
Number received (deg_in)	1.05^{**}	1.06^{**}	1.08^{**}
Cohesion exposure	2.08^{**}	1.90^{**}	4.78^{**}
Structural equivalence exposure	1.34	1.10	1.91^{**}
Number of children	1.23^{**}	1.00	0.98
Media exposure	1.03^{*}	1.04	1.03
AIC	–	3814.34	7219.60
BIC	–	3929.41	7335.46

Notes. Entries are adjusted odds ratios (OR). A single harmonized significance scheme is used across columns: ** $p < .01$, * $p < .05$, $^{\bullet}$ $p < .10$, blank otherwise. ORs for the two replication models are obtained by exponentiating the logit coefficients you reported.

[a] Valente, T. (2010), *Social Networks and Health*, Table 10–2 (Korean Family Planning column).

[b] Replication using what seems to be the *original* modern-set definition (8 methods) with village-level cumulative adoption and period fixed effects:
`glm(Adopt ~ exposure + exposure_se + deg_in + deg_out + media_exposure + children + factor(per) + cum_num_vil, family=binomial)`.
Redefined modern methods:
`"Loop", "Condom", "Oral Pill", "Vasectomy", "TL", "Injection", "Rhythm", "Withdrawal"`.

[c] Replication with the *redefined* modern-set (6 methods) and otherwise identical specification replacing `cum_num_vil` by `cum_num_vil6`.
`glm(Adopt ~ exposure + exposure_se + deg_in + deg_out + media_exposure + children + factor(per) + cum_num_vil6, family=binomial)`.
Original modern methods:
`"Loop", "Condom", "Oral Pill", "Vasectomy", "TL", "Injection"`.

[d] The regression reported in Valente (2010) reported a single "Time" coefficient. These replications use period fixed effects `factor(per)` (baseline period omitted), so there is no single OR for time. The model thus controls non-parametrically for time.

Brief Methodological Notes

Where to find Valente's numbers. The comparison uses the Korean Family Planning column in Valente (2010) Table 10–2, which reports adjusted odds ratios for adoption as a function of network and individual covariates.

How the first (original) model was constructed. From the KFP survey we built a `diffnet` object and computed (i) cohesion exposure as the proportion of direct neighbors who adopted in $t-1$, (ii) structural-equivalence exposure using `alt.graph="se"`, (iii) in- and out-degree per period from the observed contact matrices, (iv) media exposure and number of children as individual covariates replicated across periods, (v) village-level cumulative adoption by period (`cum_num_vil`), and (vi) period fixed effects `factor(per)`. The core logit model is:

$$\Pr(\text{Adopt}_{i,t} = 1) = \text{logit}^{-1}\big(\beta_0 + \beta_1 \text{exposure} + \beta_2 \text{exposure\_se} + \beta_3 \text{deg\_in} + \beta_4 \text{deg\_out} + \beta_5 \text{media} + \beta_6 \text{children} + \gamma_t + \delta\ \text{cum\_num\_vil}\big),$$

where:

- **Cohesion exposure**: fraction of an ego's direct neighbors who had adopted by $t-1$ (social influence via direct ties).
- **Structural-equivalence exposure**: influence from alters occupying similar network positions, computed using structural equivalence graphs in `netdiffuseR`.
- **Number received (deg_in)**: in-degree in the contact network (information arriving).
- **Number sent (deg_out)**: out-degree (information sent).
- **Cumulative adoption (village)**: count of adopters in ego's village at each t; varies across villages within period, so it is identifiable alongside period FEs.
- **Media exposure**: index computed as FP-campaign items over media ownership; replicated across periods:

  ```
  own_cols <- intersect(paste0("media", 1:5), names(kfamily))
  exp_cols <- intersect(paste0("media", 6:19), names(kfamily))
  ```

- **Number of children**: sons+daughters, replicated across periods.
- **Time**: Valente reports a single trend coefficient; I model non-parametric period effects via `factor(per)`.

Redefining "modern methods". I rebuilt adoption timing using a stricter "modern" set: {*Loop, Oral Pill, Condom, Vasectomy, TL, Injection*}. Then `toa`, exposures, and village-level cumulative adoption (`cum_num_vil6`) were recomputed, and refit the same specification. This redefinition tightens the construct to methods typically considered technological/clinical, excluding rhythm and withdrawal.

Key takeaways from the comparison.

- **Direction of effects** matches Valente: cohesion exposure and in-degree are positively associated with adoption; media and children are weak in our replications (Valente reports small but significant effects for KFP).
- **Magnitudes**: the original model (modern=8) yields ORs close to Valente's KFP column (e.g., deg_in $\approx 1.06^{**}$; cohesion exposure $\approx 1.90^{**}$).
- **Redefined modern=6**: cohesion and SE exposures become much larger (OR $\approx 4.78^{**}$ and 1.91^{**}), while village cumulative adoption is only marginal ($p<.10$). Overall fit (AIC/BIC) worsens versus the original, indicating the 8-method definition aligns better with Valente's design and observed outcomes in this dataset.