**Multilevel ERGM Results on Kinship Support Networks**

This analysis tested three hypotheses concerning the structure of support ties in extended household networks, using multilevel Exponential Random Graph Models (multi-ERGM) across thousands of egocentric kinship graphs.

**H1: Geodesic Distance and Support Likelihood**

* **Model Specification**: edges + mutual + edgecov(dist1) + edgecov(dist2)
* **Number of Households**: 25,279
* **Estimation Time**: 5.3 hours
* **Main Results**:
  + Ties between kin at geodesic distance 1 (directly connected via descent or marriage) had a **strong positive effect** on the likelihood of a support tie (β = 2.79, *p* < .001).
  + Distance 2 ties (β = 0.05, *p* = .164) were not significantly different from the baseline category (distance ≥ 3).
  + **Interpretation**: Proximity in the kinship structure plays a major role—immediate kin are far more likely to be supportive.
* **Variable Construction**:  
  Kinship matrices were merged (descent + marriage + their transposes) into a **kin union matrix**, from which geodesic distances were computed. This generated binary matrices indicating whether any dyad was at distance 1 (dist1), distance 2 (dist2), or 3+ (baseline). These matrices were cleaned (no diagonals, no NAs) and added as edge covariates.

**H2: Blood vs. Affinal (In-law) Ties**

* **Model Specification**: edges + mutual + edgecov(blood) + edgecov(affinal)
* **Number of Households**: 6,524
* **Estimation Time**: 0.56 hours
* **Main Results**:
  + Blood ties had a **strong positive effect** (β = 1.50, *p* < .001).
  + Affinal (in-law) ties also increased the likelihood of support, but more modestly (β = 0.42, *p* < .001).
  + **Interpretation**: Support is strongest among consanguineal kin, though significant affinal solidarity is also present.
* **Variable Construction**:  
  Blood ties were defined as any undirected edge in the descent matrix (including parent-child and siblings via transposed links). Affinal ties were identified by 2-step paths combining one marriage and one descent tie, **excluding direct spouses and blood kin**. These matrices were binarized and cleaned before inclusion.

**H3: Directionality of Support (Down vs. Up)**

* **Model Specification**: edges + mutual + edgecov(down) + edgecov(up)
* **Number of Households**: 40,210
* **Estimation Time**: 24.5 hours
* **Main Results**:
  + Support flowing **downward** (parent → child) was highly likely (β = 2.33, *p* < .001).
  + Support **upward** (child → parent) was significantly less likely (β = –1.33, *p* < .001).
  + **Interpretation**: The dependency network is structured around **asymmetric generational flows**, prioritizing support from older to younger kin.
* **Variable Construction**:  
  Directional edges were extracted directly from the descent matrix: down corresponds to parent-to-child edges; up to child-to-parent edges (transpose of descent). Each was transformed into binary matrices, cleaned, and passed as edge covariates.