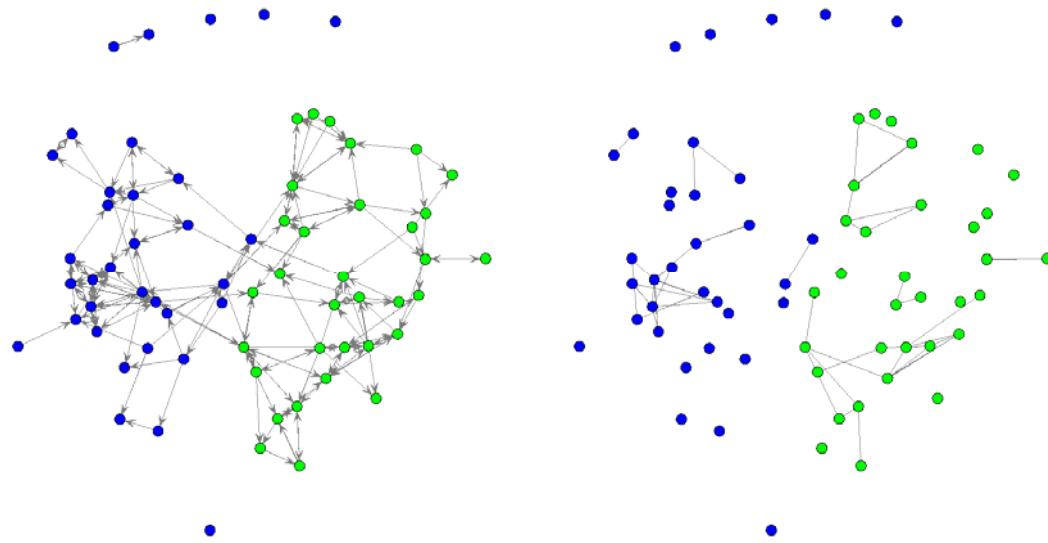
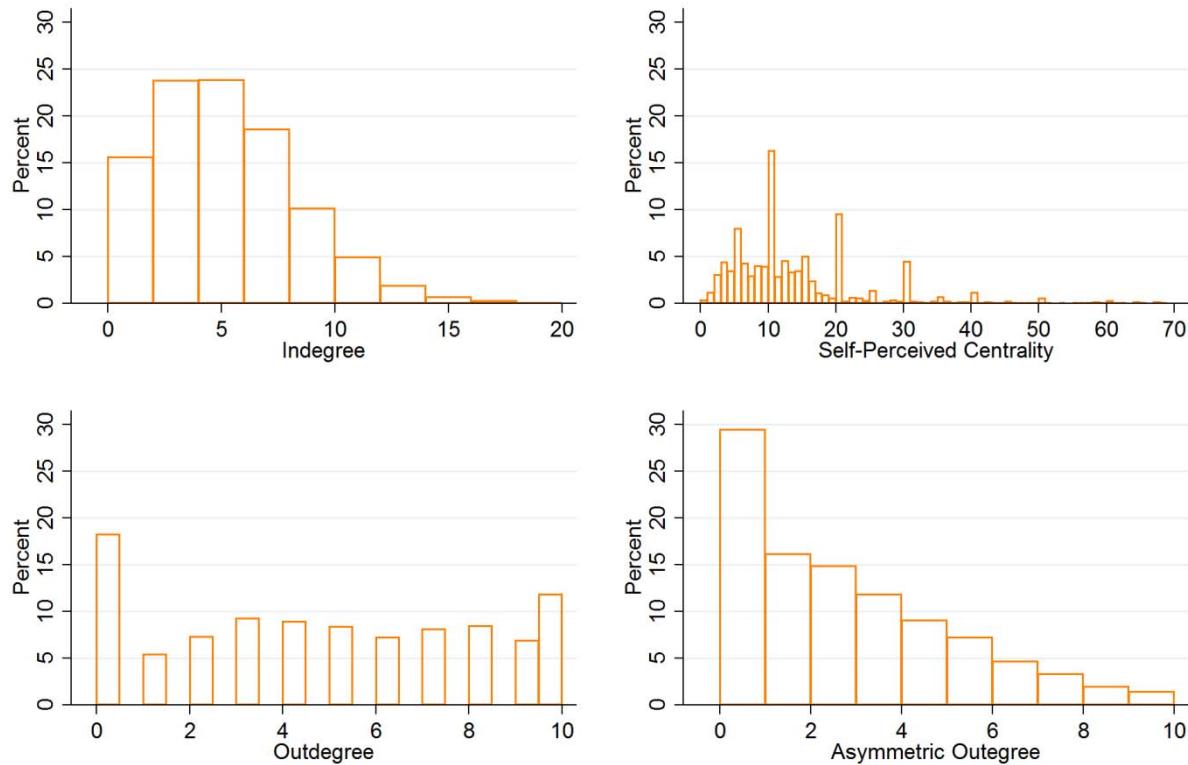


Figure A1. An Exemplary Network with Asymmetric Ties Retained and Removed



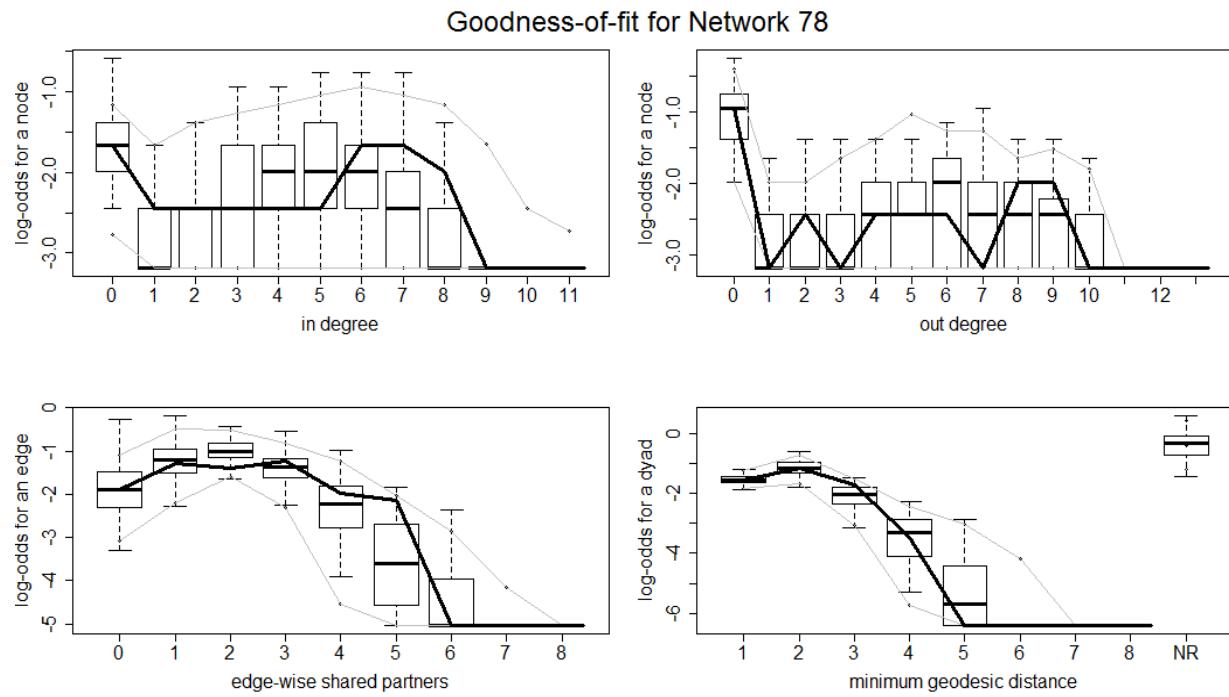
Note: Graph for the friendship network in one class with asymmetric ties retained (left) and removed (right). Nodes are colored by gender with boys in blue while girls in green.

Figure A2. Distribution of Friendship Ties and Self-perceived Centrality



Note: Indegree and outdegree are the number of friend nominations a student receives from and sends to classmates, respectively. Asymmetric outdegree is the number of friend nominations that are not reciprocated. Self-perceived centrality (counts) is the number of friend nominations a student expects to receive from classmates.

Figure A3. Diagnostics of Goodness-of-fit for Another Network



Note: solid black line is distribution of statistics in observed network. Box plots are distributions of statistics in 100 simulated networks, with 95% confidence intervals. Y-axis presented as log-odds.

Appendix B. Proof of the Estimation Method

We are interested in examining whether actors with high self-perceived centrality are more likely than those with low self-perceived centrality to send out asymmetric ties. The statistics of interest can be defined as:

$$\begin{aligned} d &= a_1 - a_0 \\ &= \sum_{ij} y_i x_{ij} (1 - x_{ji}) - \sum_{ij} (1 - y_i) x_{ij} (1 - x_{ji}) \\ &= \sum_{ij} (2y_i - 1) x_{ij} (1 - x_{ji}), \end{aligned}$$

where a_1 and a_0 denote the number of symmetric ties sent out by actors with high self-perceived centrality and actors with low self-perceived centrality, respectively. $y_i = 1$ for actors with high self-perceived centrality, $y_i = 0$ for actors with low self-perceived centrality, $x_{ij} = 1$ if there is a tie from i to j , and $x_{ij} = 0$ otherwise.

In model I of Table 3, we can estimate the effects for the following statistics.

$$\begin{aligned} b &: \sum_{ij} (2y_i - 1) x_{ij}, \\ m_0 &: \sum_{ij} (1 - y_i) x_{ij} x_{ji}, \\ m_1 &: \sum_{ij} y_i x_{ij} x_{ji}. \end{aligned}$$

where b represents the statistics for the sender effect of actors with high self-perceived centrality relative to those with low self-perceived centrality, m_0 the statistics for the interaction effect between mutuality and low self-perceived centrality, and m_1 the statistics for the interaction effect between mutuality and high self-perceived centrality. We can show that

$$\begin{aligned} b + m_0 - m_1 &= \sum_{ij} (2y_i - 1) x_{ij} + \sum_{ij} (1 - y_i) x_{ij} x_{ji} - \sum_{ij} y_i x_{ij} x_{ji} \\ &= \sum_{ij} (2y_i - 1) x_{ij} + \sum_{ij} (1 - 2y_i) x_{ij} x_{ji} \\ &= \sum_{ij} (2y_i - 1)(x_{ij} - x_{ij} x_{ji}) \\ &= \sum_{ij} (2y_i - 1)x_{ij}(1 - x_{ji}) \\ &= d. \end{aligned}$$

Since the coefficients in the ERGM reflect the effects of these statistics, they will have corresponding relationships. Accordingly, we can estimate the variance of d as

$$\begin{aligned} \text{Var}(d) &= \text{Var}(b + m_0 - m_1) \\ &= \text{Var}(b) + \text{Var}(m_0) + \text{Var}(m_1) + \\ &\quad 2\text{Cov}(b, m_0) - 2\text{Cov}(b, m_1) - 2\text{Cov}(m_0, m_1). \end{aligned}$$