Supplemental Material

CBE—Life Sciences Education

Esparza *et al*.

Supplemental Materials 1. Name Generator Survey

Name: _____

Instructions: Please answer each question honestly and to the best of your ability. If you have any questions, please do not hesitate to ask. Otherwise, please work quietly until all forms have been collected.

1. In the space below, please identify the student who, in your opinion, is the “star researcher” in **this** laboratory course.

_____

2. Why did you select this student as your nomination?

3. Who, in this laboratory, would you say is most outspoken, and why?

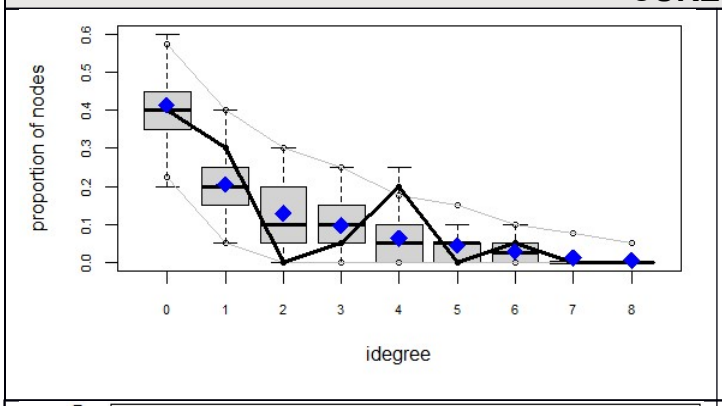
Supplemental Materials 2. Goodness-of-fit for Exponential Random Graph Models

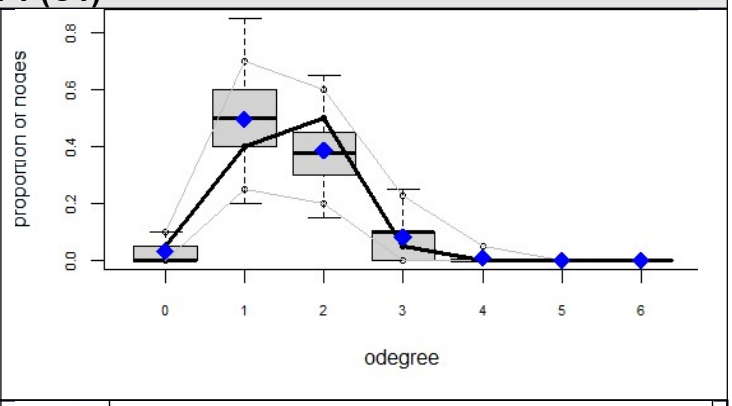
The goodness-of-fit plots pictured on pages 2-4 are included to show that the ERGMs fit the network data well. When testing the goodness-of-fit, networks are simulated using the parameters included in the ERGM (Hunter et al., 2008). Following, structural measures (e.g., number of edgewise-shared partners) of the simulated networks are calculated. These measures can then be compared to the empirical networks under study. In these plots, the thick black line represents the observed distribution for the CURE and traditional laboratory networks, boxplots summarize the statistics for the simulated networks, and the thin black lines represent the range in which 95% of simulated observations fall. Our final models fit the data well, with our observed data (thick black line) largely falling within the 95% support interval.

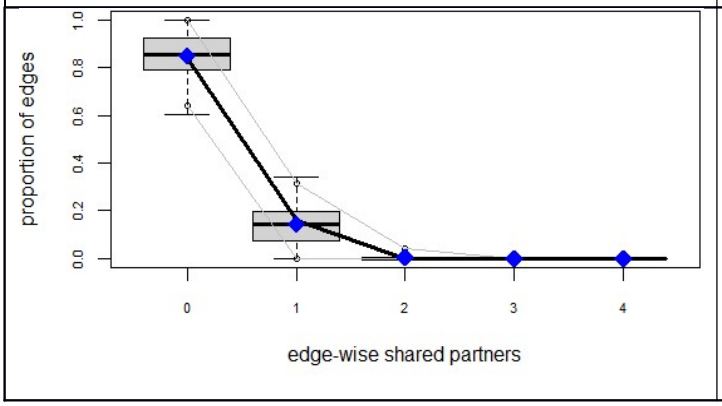
Reference:

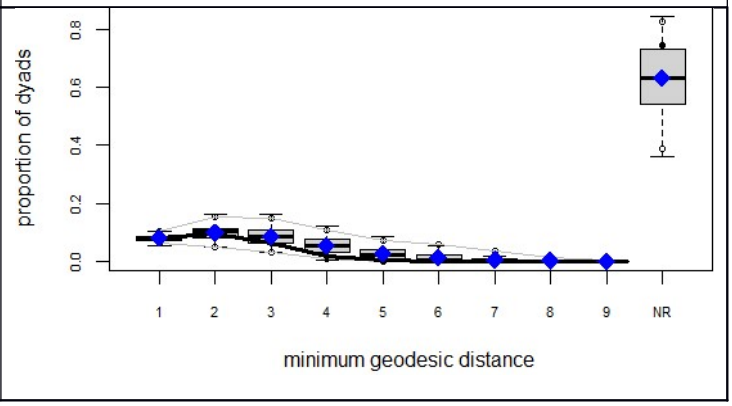
Hunter, D. R., Goodreau, S. M., & Handcock, M. S. (2008). Goodness of fit of social network models. *Journal of the American Statistical Association*, *103*(481), 248-258.

CURE 1 (C1)

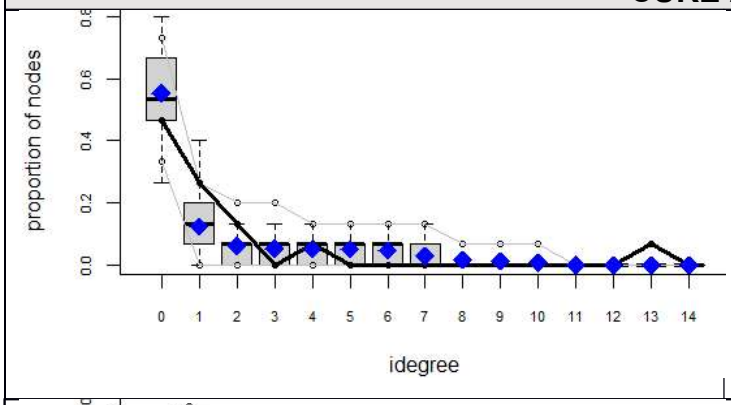


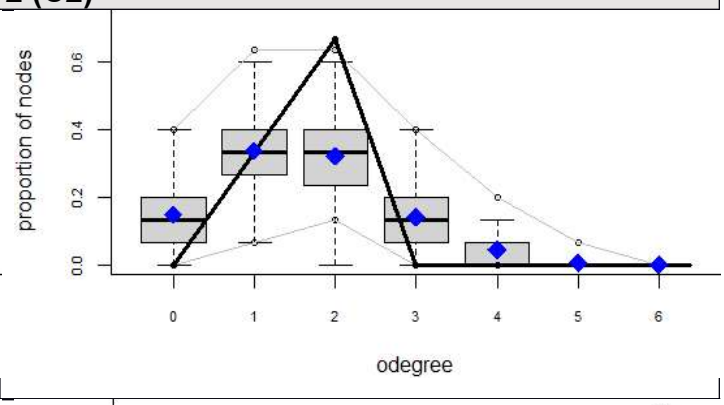


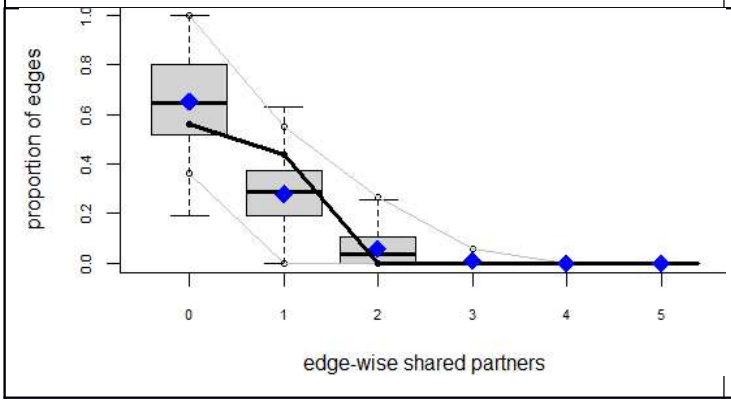


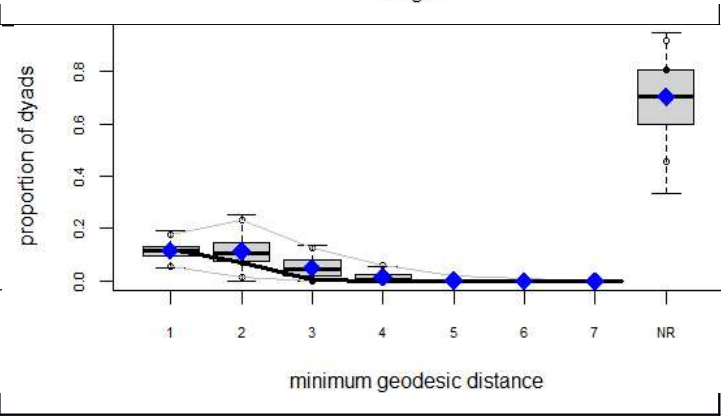


CURE 2 (C2)

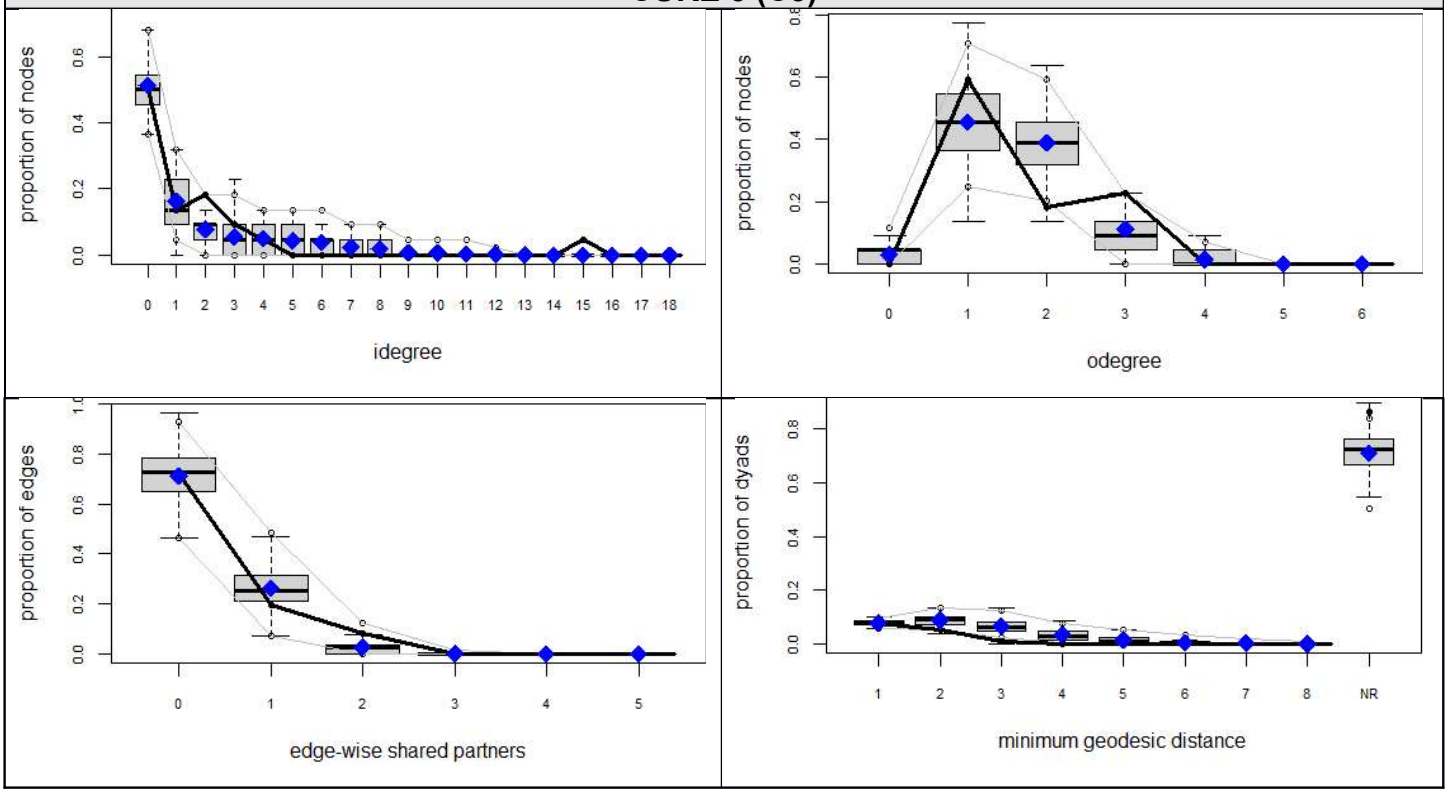




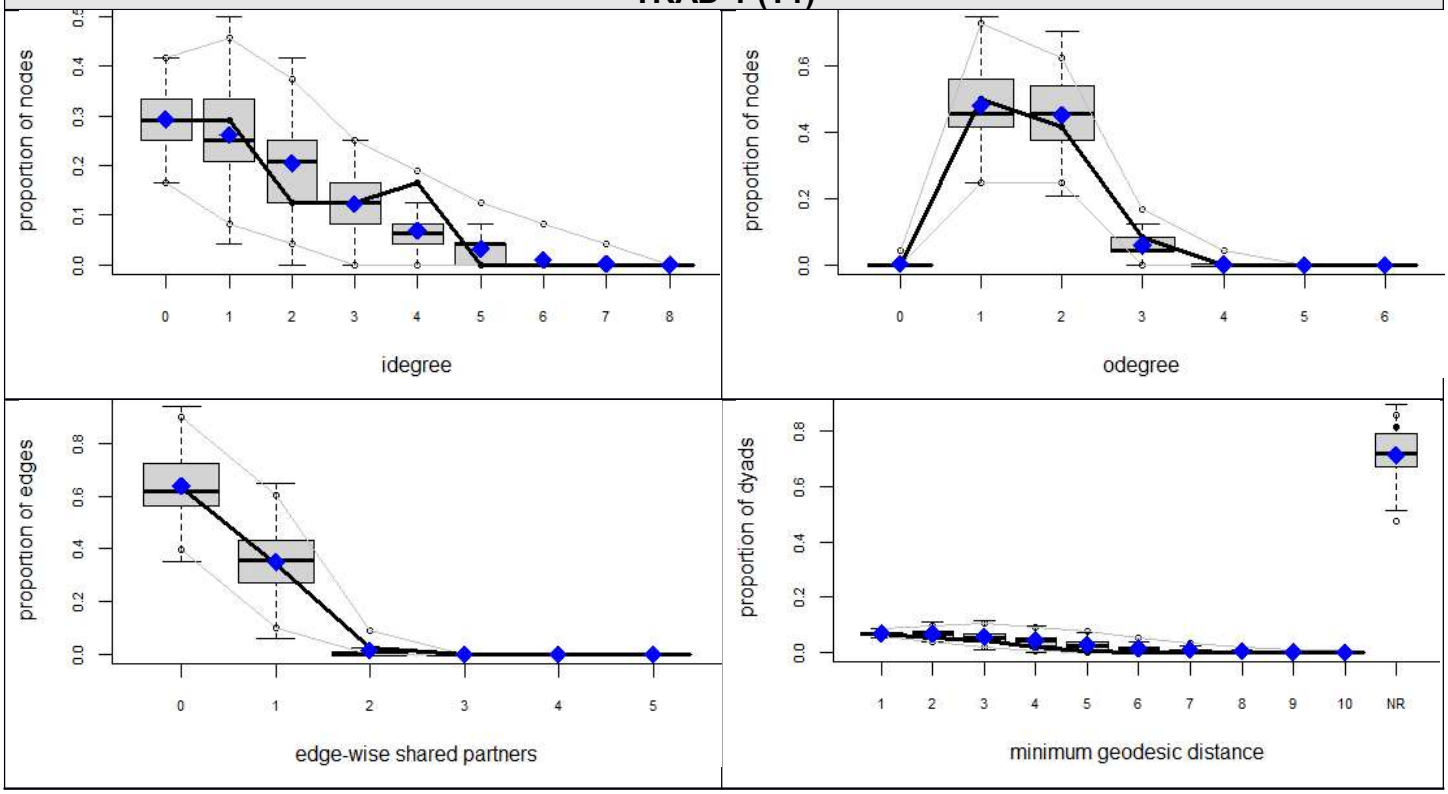




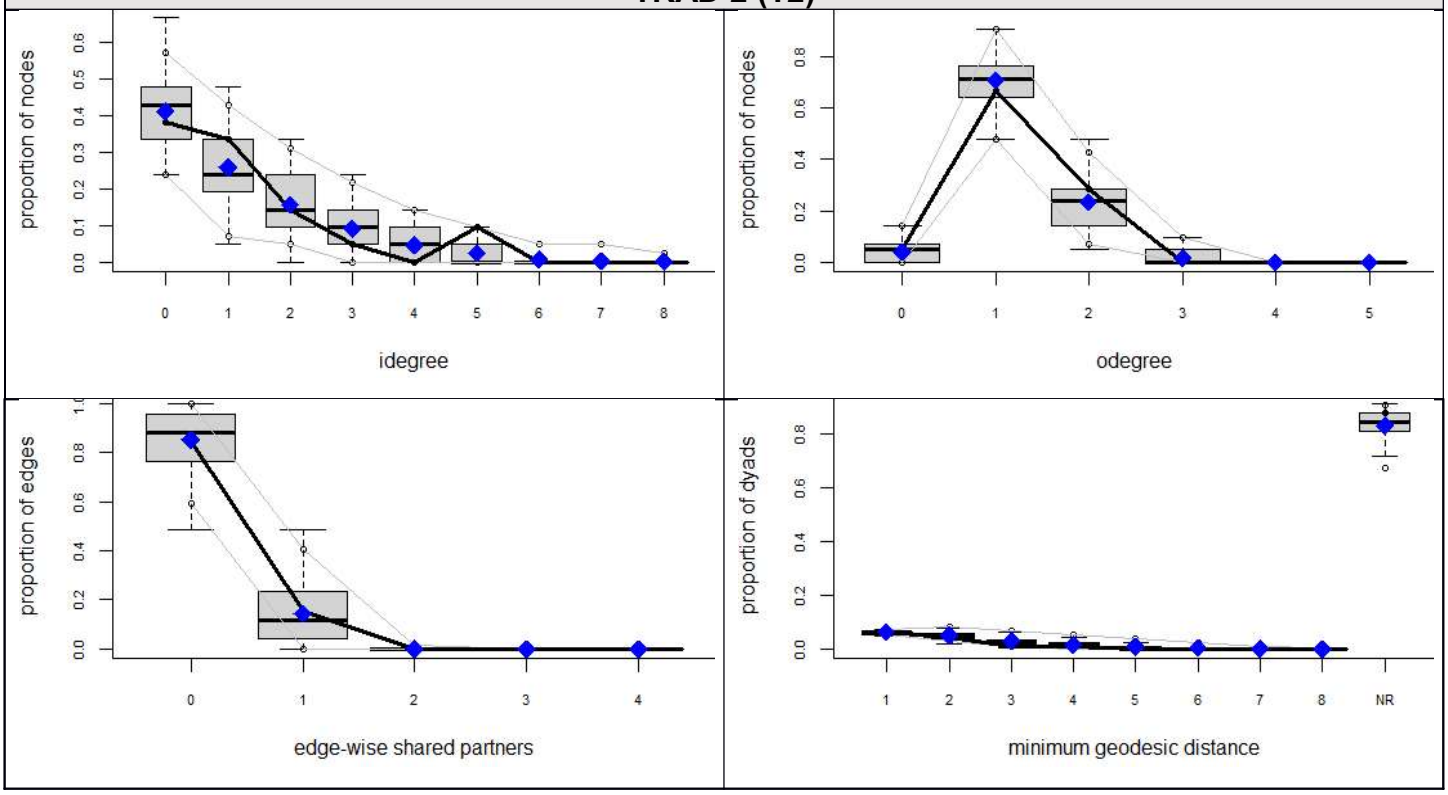
CURE 3 (C3)



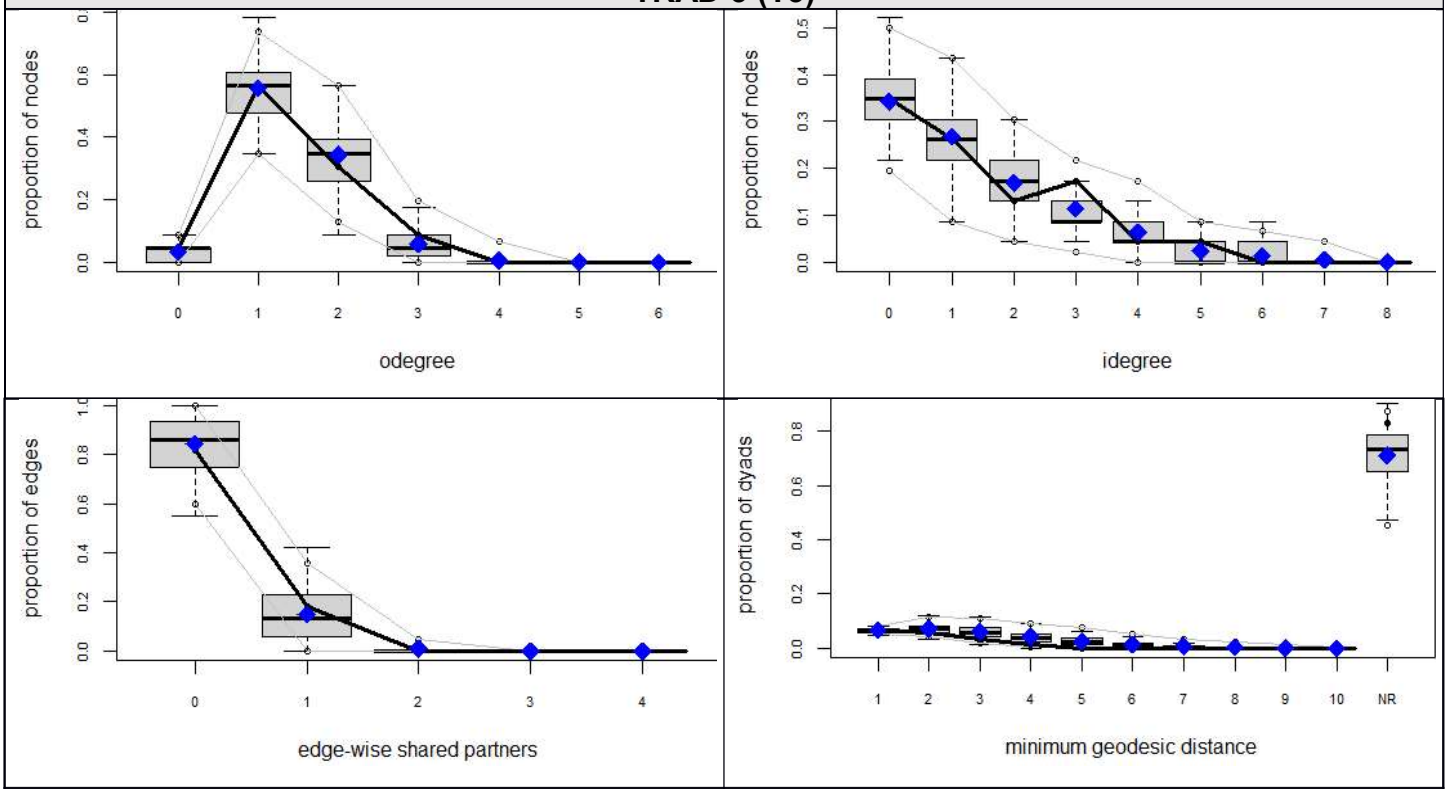
TRAD 1 (T1)



TRAD 2 (T2)



TRAD 3 (T3)



Supplemental Materials 3. Qualitative Code Descriptions and Intercoder Reliability Details

S3.1. Student Nomination Justification Code Descriptions

1. **Asks/Answers a Lot of Questions:** A quote coded as this suggests that the nominee would ask or answer many questions in class. If the nominator specifies that the nominee answers their questions, the response would be co-coded with "Collaborative."

2. **Collaborative:** A quote coded as this suggests that the nominee was helpful to other students, either by assisting them with laboratory tasks, being described as "collaborative," answering other students' questions, "having good communication skills," or generally making themselves available to other students.

3. **Engaged in Labwork:** The nominee is described as being engaged in the lab, either by being "on task," interested in the lab material, willing to learn, and/or expressing enthusiasm in the tasks assigned in the lab. The nominee might also be described as a hard worker or as someone who puts work/effort into the laboratory activities either in preparation for class, during class, or outside of class. This might include when the nominee is described as taking on most of the work (potentially a disproportionate amount of work).

4. **Knowledgeable:** The nominee is described as being smart or knowledgeable in the laboratory material (or being able to accrue knowledge quickly). A quote coded as this suggests that the nominee was recognized by their peers as being knowledgeable about the **content** being taught in the laboratory course. This is different from "Proficient in the Lab Tasks," as it does not focus on practical skills (i.e., doing experiments well) and instead focuses on the nominee's knowledge about biology. This includes mentions of grades on assignments/exams.

5. **Proficient in the Lab Tasks**: A quote coded as this suggests that the nominee was recognized by their peers as being proficient in the laboratory tasks. This includes being described as working quickly, efficiently, being organized, doing experiments well, following instructions, being reliable, or being responsible. This category is focused on **practical skills** rather than content knowledge.

6. **Team Leader:** The nominee is described as being a "leader" explicitly or implicitly. This might include encouraging the team to work, taking "charge," keeping the group on task/on track, making sure the group is informed about all procedures, etc.

7. **Other:** Other reasons could include professionalism, fancy lab coats, "looking smart," being social, being "friendly," because they talk to them the most, or because they are their lab partner.

S3.2. Intercoder Reliability Statistics Disaggregated by Code

Code	Cohen's kappa	*p* – value
Asks/answers a lot of questions	0.737	< 0.001
Collaborative	0.737	< 0.001
Engaged in labwork	0.811	< 0.001
Knowledgeable	0.766	< 0.001
Proficient in the lab tasks	0.766	< 0.001
Team leader	0.854	< 0.001
Other	0.763	< 0.001

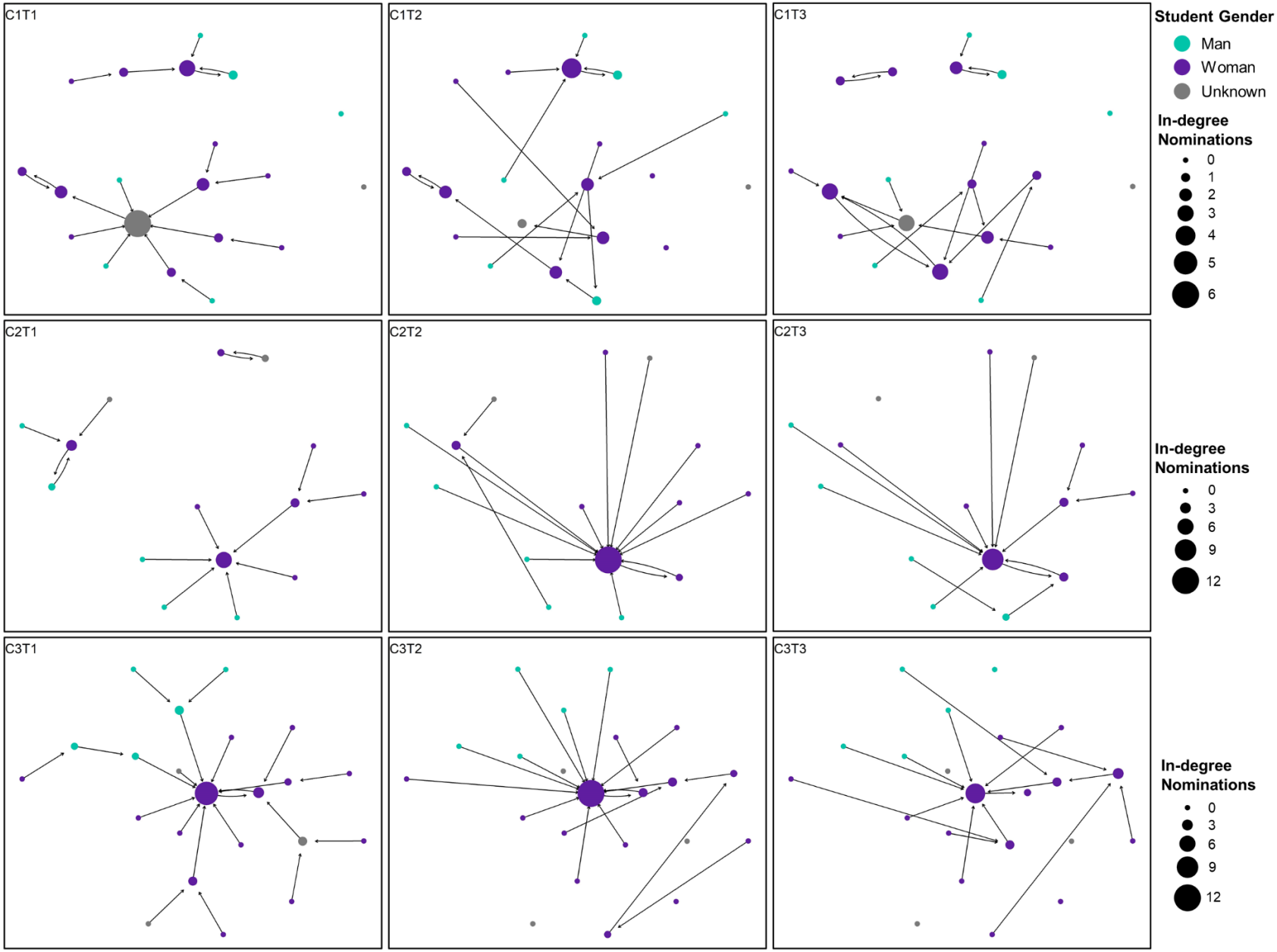
Supplemental Material 4: Additional Tables and Figures

Supplemental Materials 4.1. Demography of CURE and Traditional Students Separated by Section

Category	CUREs			Traditional Courses		
Lab section	**CURE 1** (*n* = 20)	**CURE 2** (*n* = 15)	**CURE 3** (*n* = 22)	**TRAD 1** (*n* = 24)	**TRAD 2** (*n* = 21)	**TRAD 3** (*n* = 23)
Gender Identity						
Man	6	5	5	3	13	4
Woman	12	8	14	18	7	15
Unknown[a]	2	2	3	3	1	4
Race/Ethnicity						
White	3	2	0	2	2	0
Latiné	13	10	17	17	13	17
Black	0	0	0	2	0	1
Asian	0	1	0	0	0	1
Multiracial/Multiethnic	2	0	2	0	1	0
Unknown	2	2	3	3	5	4
Generational Status						
First-generation	6	1	4	11	5	7
Continuing generation	12	12	15	10	11	11
Unknown	2	1	3	3	5	5
College Major						
Biological Sciences	10	12	14	4	4	4
Other STEM Discipline	7	1	5	11	9	11
Non-STEM	1	0	0	6	3	4
Unknown	2	2	3	3	5	4
Prior Research Experience						
No prior research experience	15	10	11	15	14	15
Prior research experience	3	3	8	6	2	4
Unknown	2	2	3	3	5	4

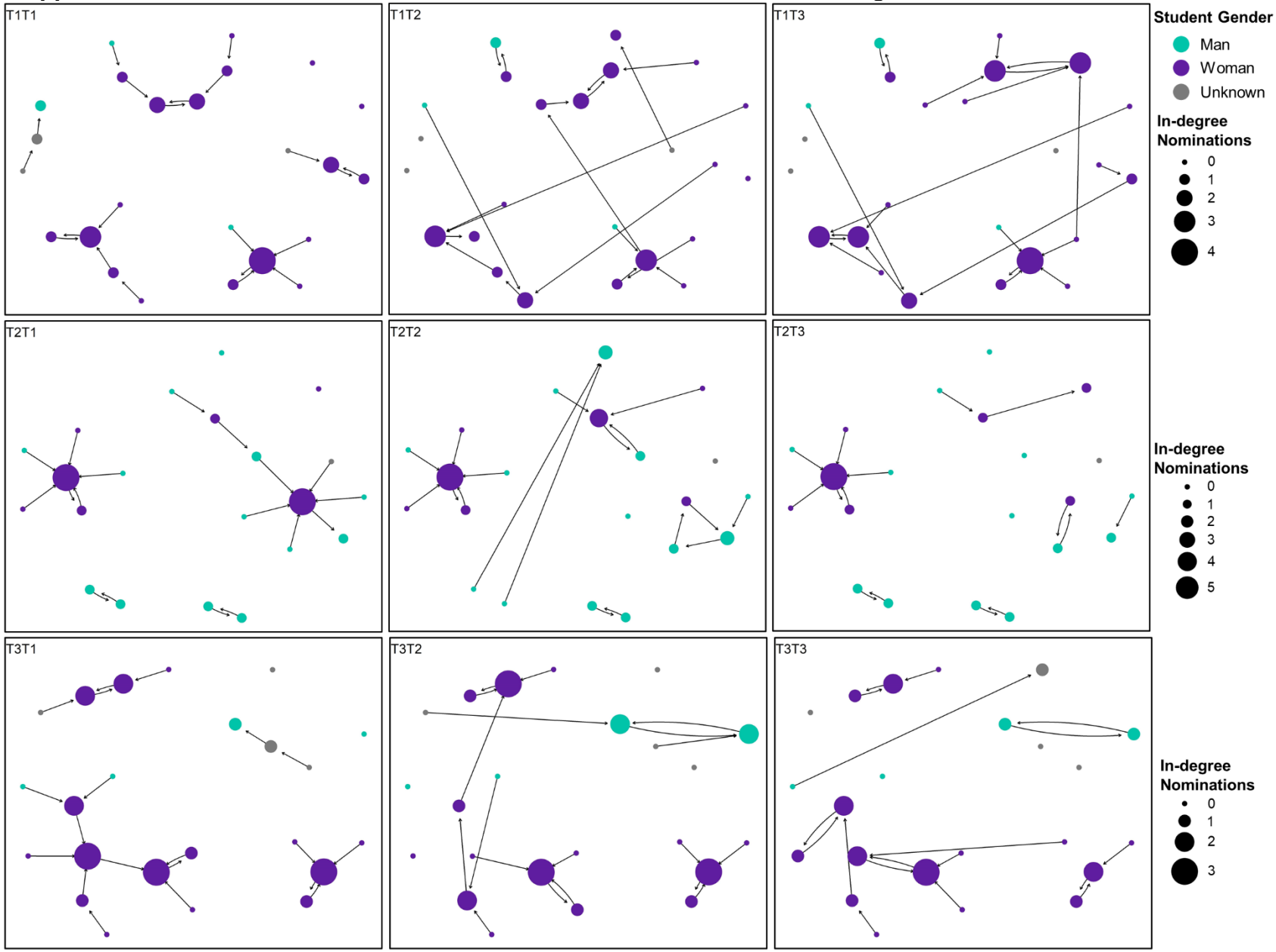
[a]The unknown category for each demographic feature is comprised of students who did not respond to the demographic survey.

Supplemental Materials 4.2. CURE Course Nomination Networks throughout the Semester



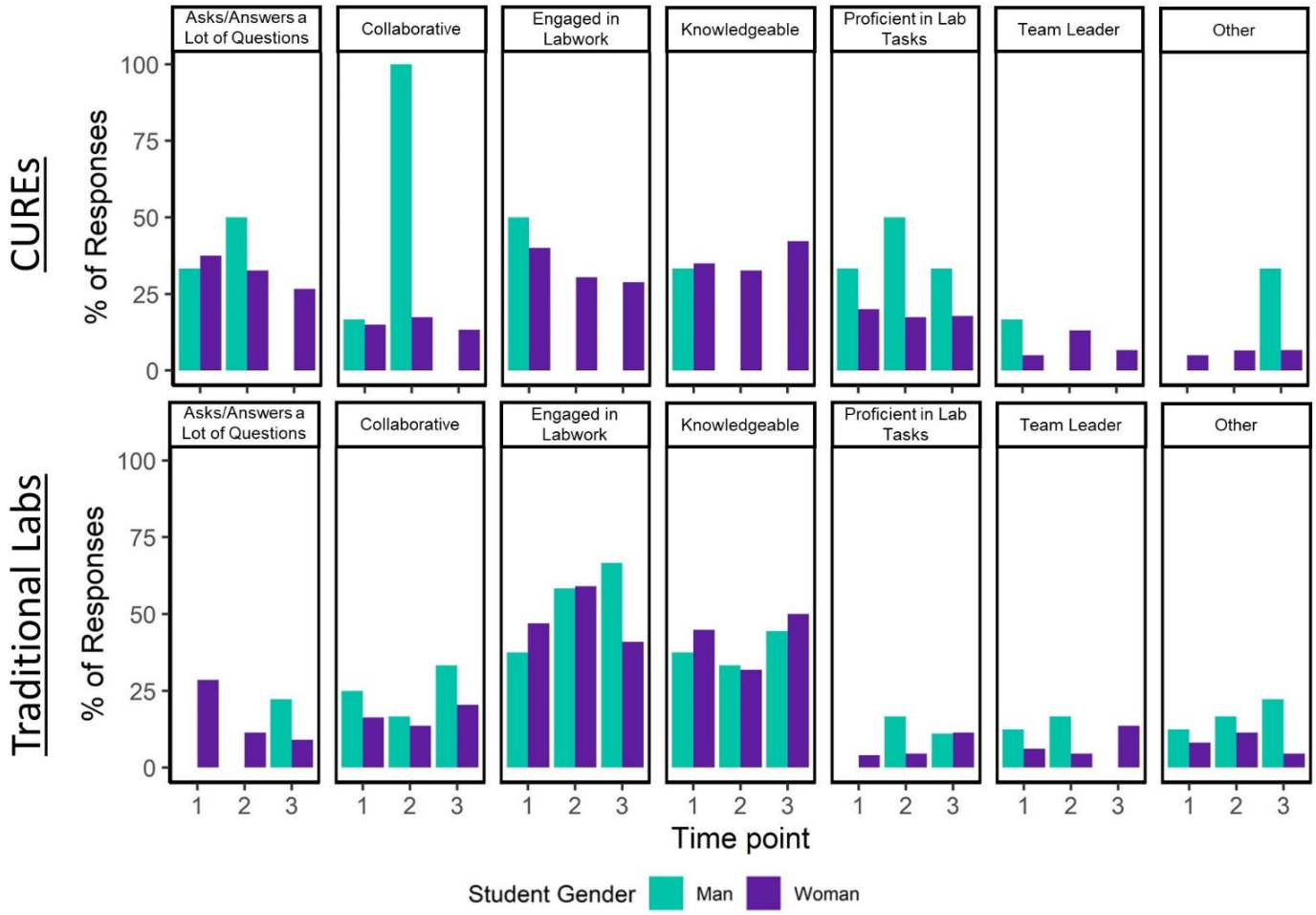
S4.2. CURE nomination networks throughout the semester. The course [i.e., CURE 1 (C1), CURE 2 (C2), and CURE 3 (C3)] and time point [i.e., week 4 (T1), week 8 (T2), week 12 (T3)] are denoted in the upper left corner of each sociogram. Nodes (circles that symbolize students in the course) are sized by the number of nominations (in-degree) that students obtained throughout the course of the semester. Edges (arrows) are directional and have an arrow that signifies the flow of nominations (i.e., who sent the nomination to who).

Supplemental Materials 4.3. Traditional Course Nomination Networks throughout the Semester



S4.3. Traditional nomination networks throughout the semester. The course [i.e., TRAD1 (T1), TRAD 2 (T2), and TRAD 3 (T3)] and time point [i.e., week 4 (T1), week 8 (T2), week 12 (T3)] are denoted in the upper left corner of each sociogram. Nodes (circles that symbolize students in the course) are sized by the number of nominations (in-degree) that students obtained throughout the course of the semester. Edges (arrows) are directional and have an arrow that signifies the flow of nominations (i.e., who sent the nomination to who).

Supplemental Materials 4.4. Distribution of Nomination Justification Codes throughout the Semester



Supplemental materials 4.4. Distribution of nomination justification codes throughout the semester. Percentages are normalized based on the course type, nomination justification (code), and time point. The course type (CUREs/Traditional Labs) is pictured on the left of S4.4, with the figure faceted by the code (e.g., “Asks/ Answers a Lot of Questions). Further, the timepoint can be found on the x-axis [i.e., week 4 (time point 1), week 8 (time point 2), week 12 (time point 3)] and the normalized percentage of responses is represented on the y-axis.