



**McGill**

**Desautels**  
Faculty of Management

## **ORGB 672**

### **ORGANIZATIONAL NETWORK ANALYSIS**

Presented to Professor Roman Galperin

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From reviewing the demographic characteristics of examiners across the three groups—161, 162, and other groups as one group—a few key insights emerge. The tenure distribution depicted in the boxplot reveals that Group 161 has a marginally higher median tenure than Group 162, suggesting that examiners in Group 161 may have longer employment durations. Other groups exhibits a broader range of tenure, indicated by a wider interquartile spread and numerous outliers, which implies a diverse set of employment lengths within this category (Figure 1.1). The histogram of tenure distribution shows that workgroup 162 has a notable concentration of examiners with longer tenure, suggesting greater retention or a cohort of long-serving employees. In contrast, workgroup 161 displays a more uniform distribution of tenure, indicating a broader mix of employment durations. This suggests differences in the employment dynamics of the two groups, with group 162 potentially having more experienced examiners or a lower turnover rate. (Figure 1.2)

For gender diversity, the bar chart elucidates that Group 161 has the highest proportion of female employees, which suggests that this group might have a more gender-diverse workforce. Group 162 has a slightly lower proportion of female employees, with the other category trailing behind both. (Figure 2)

Racial demographics, as showcased in the clustered bar chart, demonstrate a relatively even distribution of White employees across all groups, albeit with a subtle majority in Group 161. Interestingly, Group 162 appears to have a notably higher proportion of Asian employees in comparison to the others, whereas the other groups has the highest proportion of Black employees, followed by Group 162 and then Group 161. (Figure 3)

For the advice network analysis, betweenness and closeness are chosen. Closeness centrality reflects the efficiency with which an individual can gather and spread information across the network, showcasing how quickly an examiner can access necessary knowledge or share their expertise. This measure not only highlights the potential influence of individuals due to their shorter communicative paths to all others but also indicates their level of integration within the network. High closeness centrality suggests that an individual is a well-known, trusted, and essential figure for advice within the network.

Besides, betweenness centrality focuses on an individual's role as a bridge within the network. It quantifies the extent to which a person controls the flow of information, connecting different clusters or subnetworks. High betweenness centrality individuals are crucial for maintaining the network's connectivity and enabling collaboration. This measure also helps identify potential bottlenecks in the network, where the removal or absence of key individuals could significantly disrupt information flow.

For gender, closeness centrality scores reveal that males are more central than females, indicating that they are better positioned for efficient information dissemination within the network for both groups. This suggests that males might have quicker access to advice and are likely pivotal in spreading information. Conversely, betweenness centrality presents a contrast, with females exhibiting higher scores than males in both groups. This implies that female examiners are crucial in connecting disparate parts of the network, acting as gatekeepers of information flow. Notably, workgroup 162 shows significantly lower betweenness scores on average compared to 161, indicating a less pronounced gatekeeping role among its members. Despite these differences in betweenness, closeness centrality remains relatively consistent,

underscoring a similar degree of network integration across genders in both groups. (Figure 4.2 & 5.2)

The centrality metrics by race highlight distinct patterns of network position and influence. In workgroup 161, Asian examiners lead in closeness centrality, followed by Hispanic, Black, and White individuals, suggesting Asians are the most efficiently connected within the advice network. However, Hispanic examiners dramatically surpass other races in betweenness centrality, potentially due to a smaller sample size, which might exaggerate their network role as critical connectors. Conversely, workgroup 162 exhibits a different closeness order, with Hispanics at the top, indicating varied levels of network integration across the two groups. Betweenness centrality for 162 is dominated by White, followed by Asian, and Black examiners. This marked difference in betweenness, especially with workgroup 161 displaying significantly higher scores, suggests differing dynamics in how racial groups bridge network segments, with 161 exhibiting a more pronounced reliance on certain racial groups as intermediaries. (Figure 4.3 & 5.3)

For tenure, in workgroup 161, examiners with 3-4 years of tenure exhibit the highest closeness centrality, suggesting that members at this stage of their tenure are most central to the network's information exchange. This contrasts with workgroup 162, where those with more than four years of tenure show the highest closeness centrality, indicating that as examiners gain experience, they become more integral to the network. The absence of data for less than one year and specific tenure categories points to potential gaps in network integration for newer members or those in transition periods. This tenure-related centrality variation underscores the evolving nature of an examiner's role within the advice network over time, reflecting how

established connections and accumulated knowledge contribute to one's centrality and, consequently, their influence within the network.

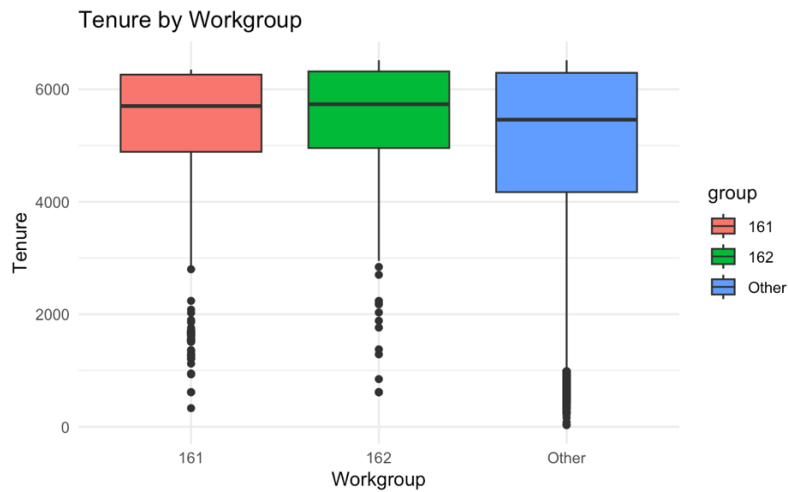


Figure 1.1

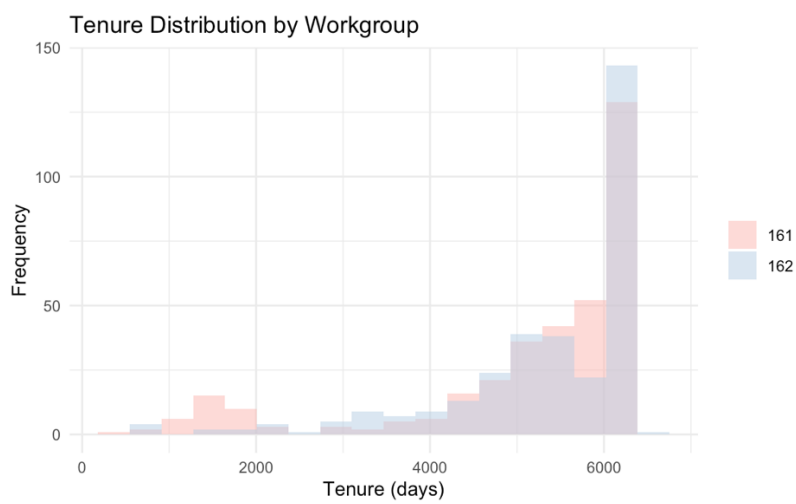


Figure 1.2

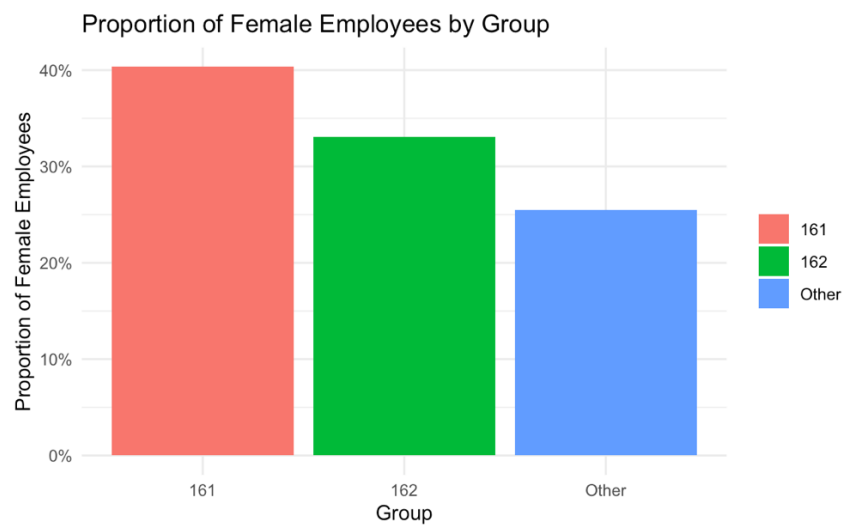


Figure 2

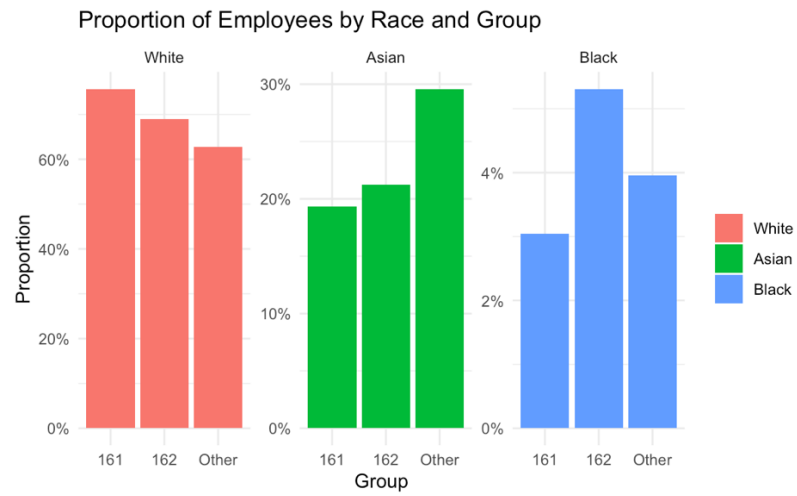


Figure 3

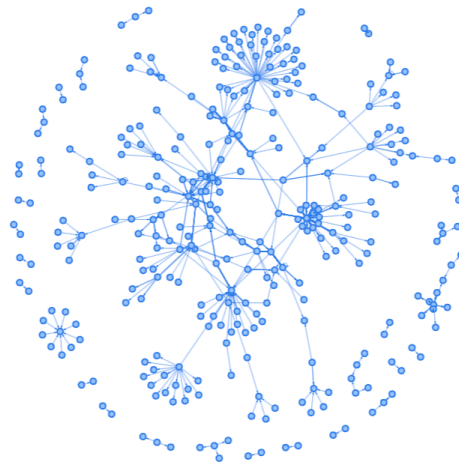


Figure 4.1 – Network for group 161

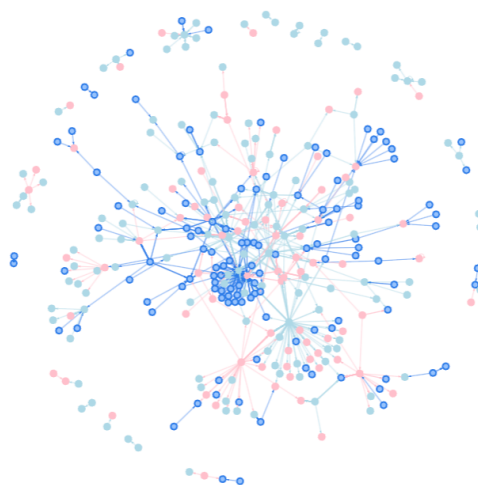


Figure 4.2 - Network for group 161- gender colored

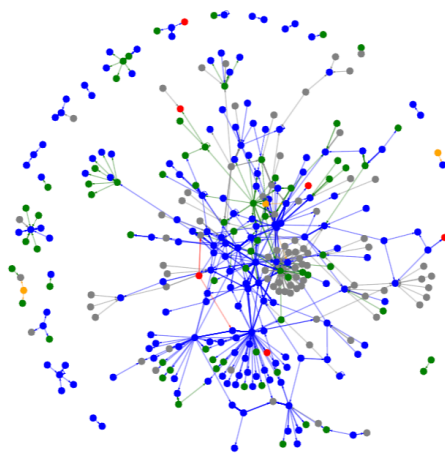


Figure 4.3 – Network for group 161 – race colored

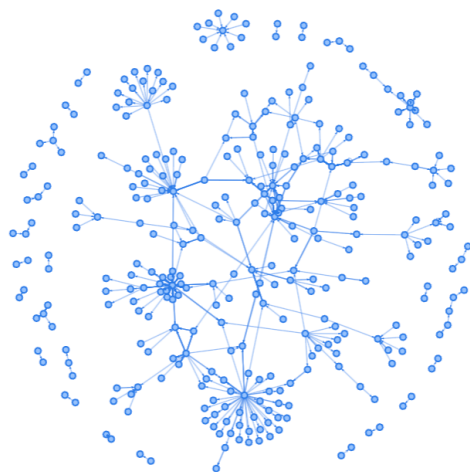


Figure 5.1 – Network for group 162

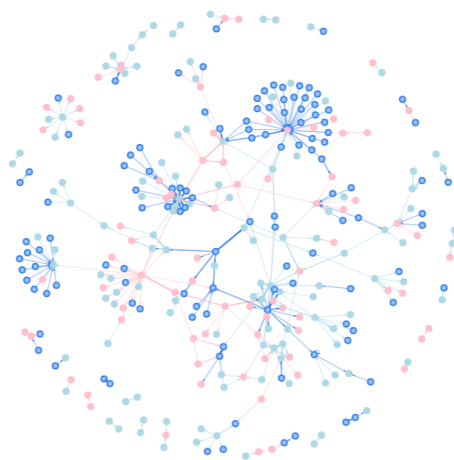


Figure 5.2 – Network for group 162 – gender colored



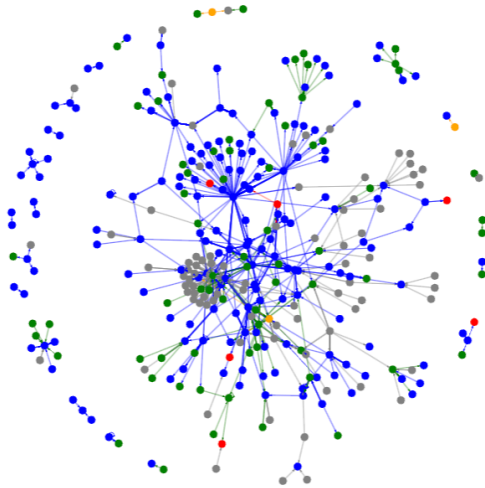


Figure 5.3 – Network for group 162 – race colored