

# Gender inequality in Disney Princess and Pixar films: social network analysis

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## Abstract

Women are often under-represented in media. Gender representations based on screen time or how much they speak, however, are not the only aspect of gender inequality in films. How much characters participate in the story is also crucial. Dialogue relationships between characters are fundamental elements of a story, thus can be used as a measure of participation. Meanwhile, children learn gender roles from the media which can influence their future decisions. There has yet been, however, studies on exploring the representation and participation of characters in children's media using social network analysis. This study aimed to identify any gender inequalities in children's media by focusing on the dialogue relationships between characters in 26 Disney Princess and Pixar films. This study particularly explored how Disney films changed throughout time. Character networks for each film were first visualized for analysis, then the total number of words and centrality metrics for each gender were computed. Three centrality metrics were used: out- and in-degree, betweenness, and closeness centrality. Next, exponential random graph models (ERGM) were fitted to determine whether gender is a significant factor in having dialogue relationships. Although the results of this study did not find a significant time trend

of gender representations among the sample, it found that almost all women characters from films between 1989 and 2009 consistently spoke less than men, the out- and in-degree centralities of women gradually increased with fluctuations, and women characters in all except one group spoke more in sequels or live-action adaptations than the originals. The results of ERGMs found that in some films men characters had significantly less dialogue relationships than women and characters with the same gender had significantly more. One explanation is that there are more minor men characters, who speak less than major ones, than women. The finding of this study can be used in further research on gender representations in the media focusing on the relationship between characters.

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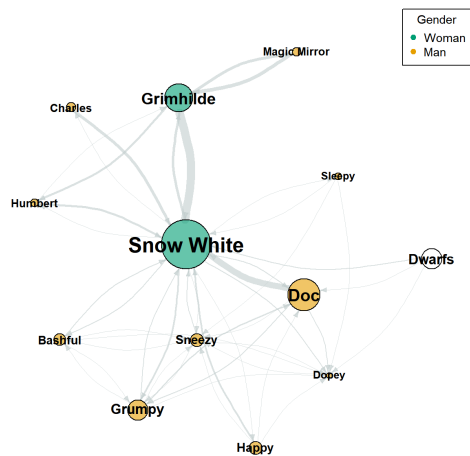


Figure 1: Snow White and the Seven Dwarfs

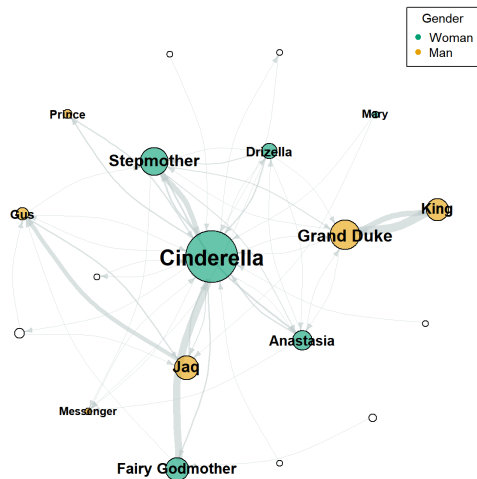


Figure 2: Cinderella

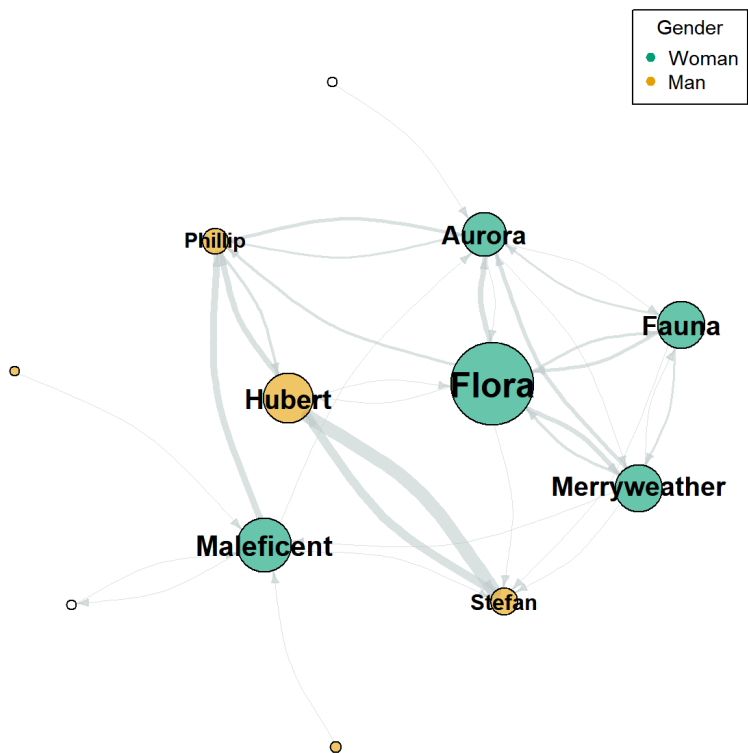


Figure 3: Sleeping Beauty

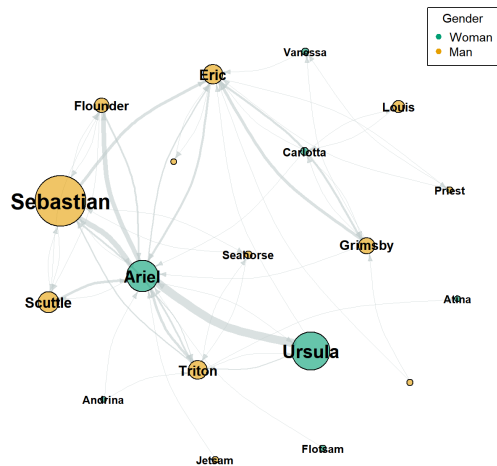


Figure 4: Little Mermaid 1

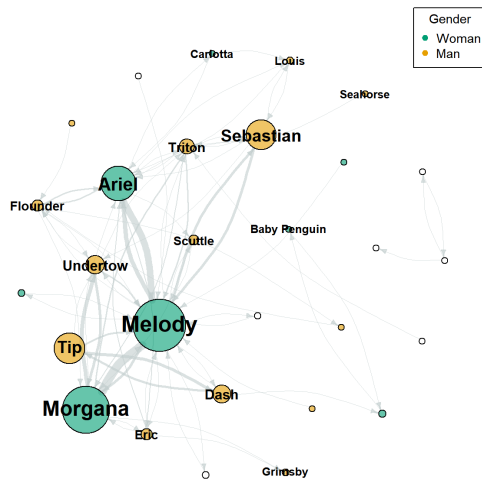


Figure 5: Little Mermaid 2

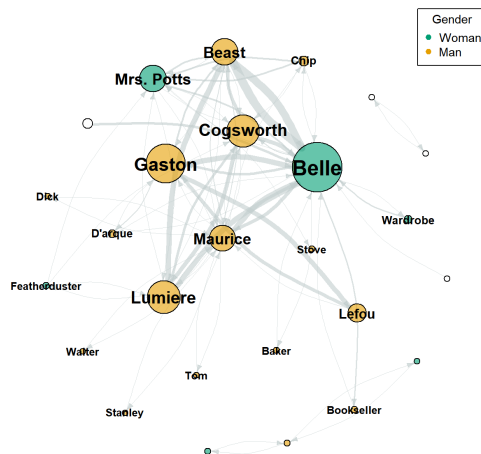


Figure 6: Beauty and the Beast

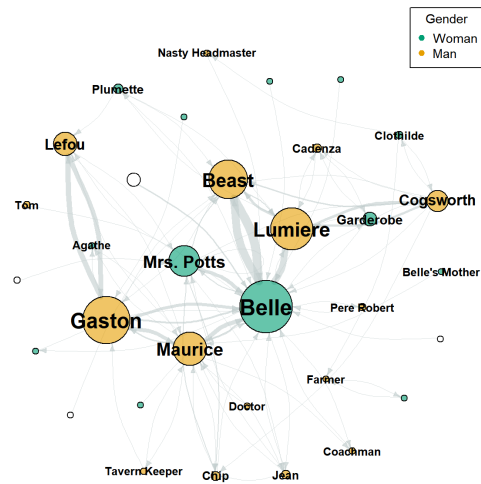


Figure 7: Beauty and the Beast (live action)

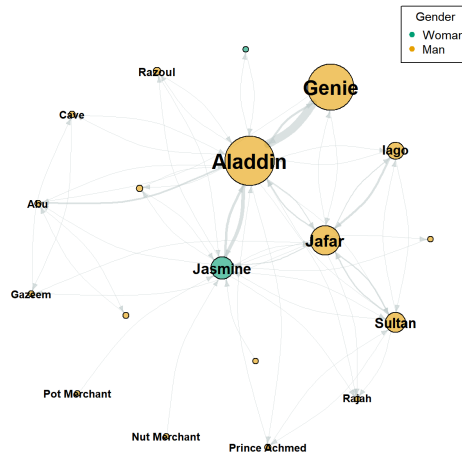


Figure 8: Aladdin

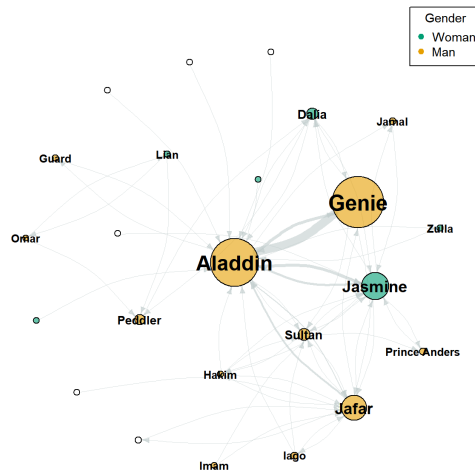


Figure 9: Aladdin (live action)



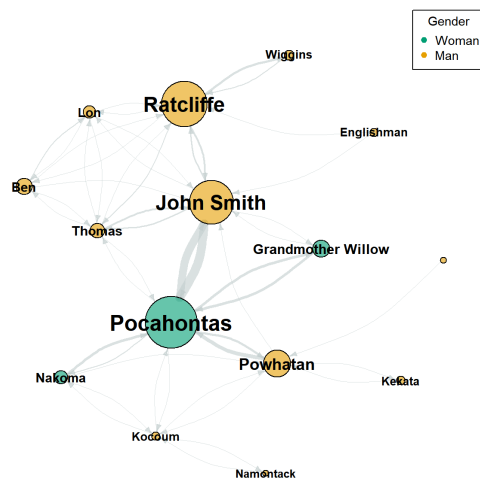


Figure 10: Pocahontas

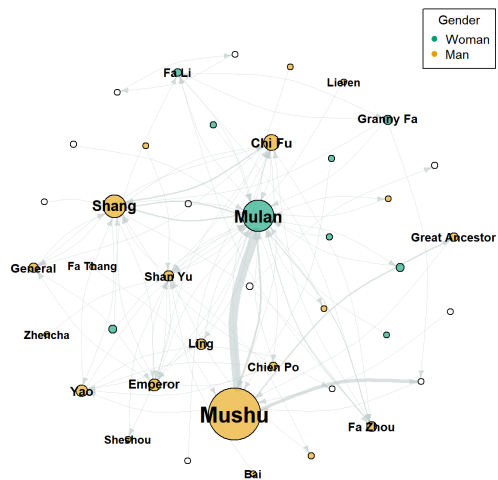


Figure 11: Mulan

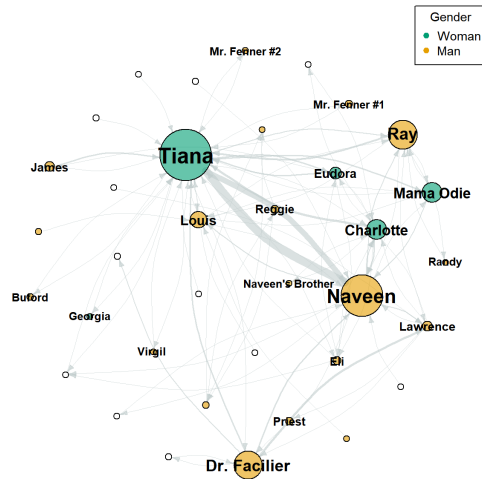


Figure 12: The Princess and the Frog

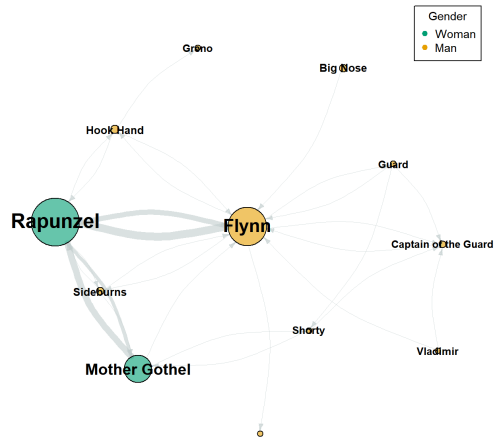


Figure 13: Tangled

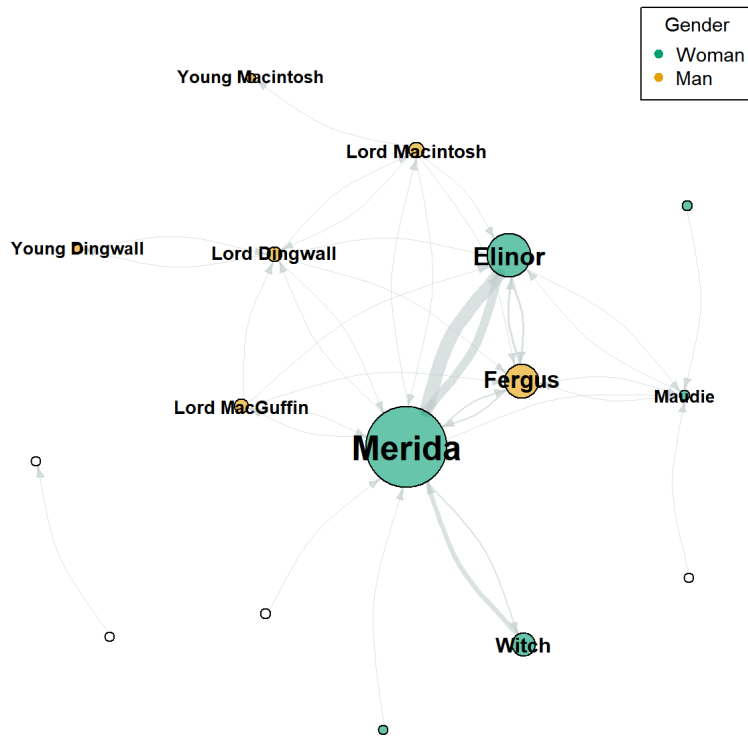


Figure 14: Brave

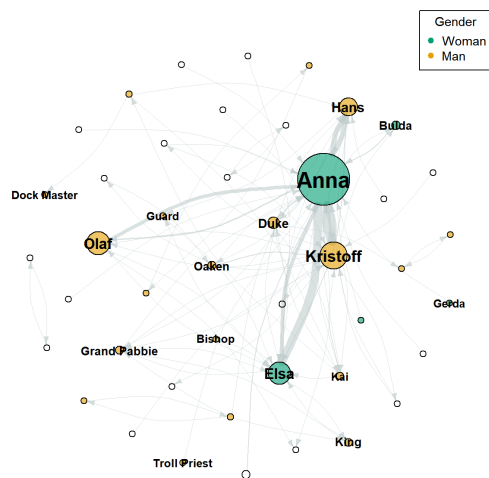


Figure 15: Frozen

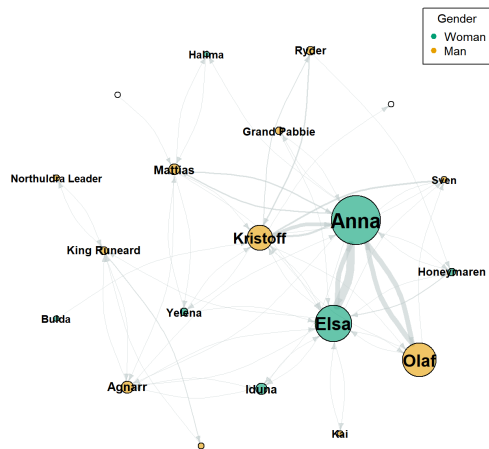


Figure 16: Frozen 2

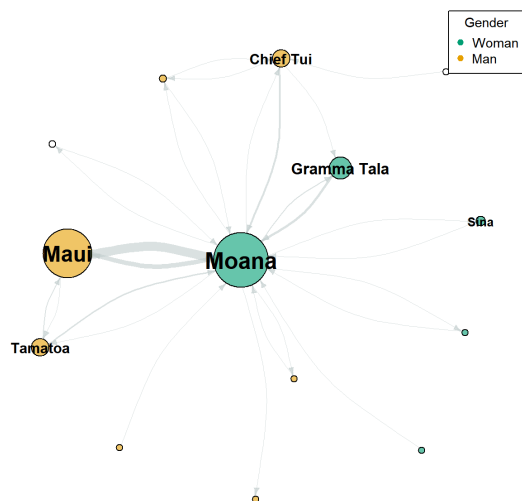


Figure 17: Moana

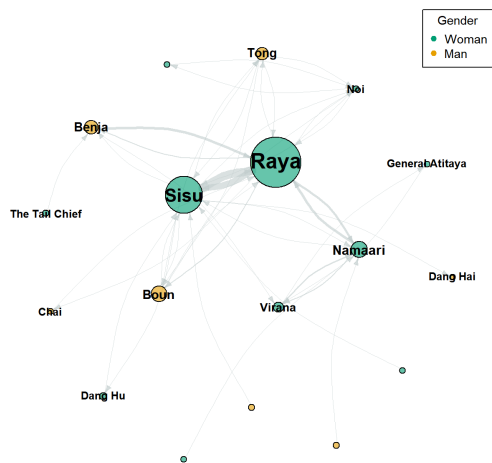


Figure 18: Raya and the Last Dragon

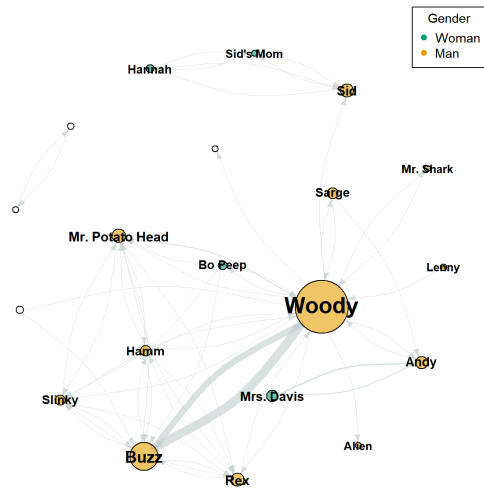


Figure 19: Toy Story 1

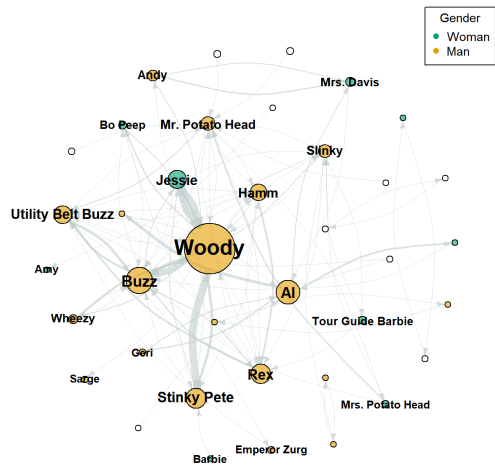


Figure 20: Toy Story 2

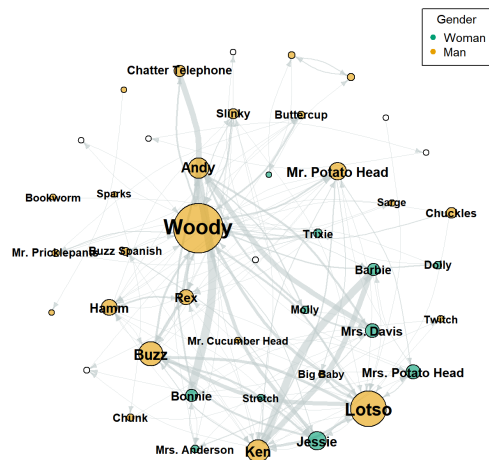


Figure 21: Toy Story 3

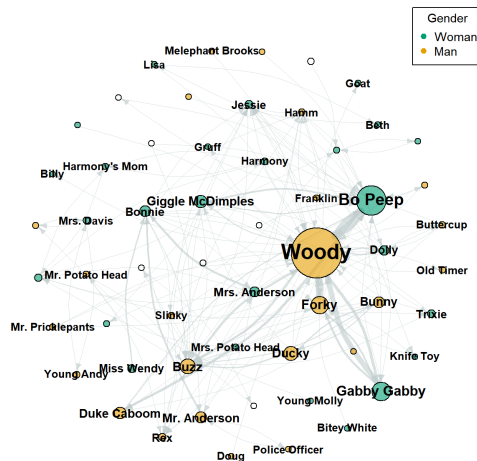


Figure 22: Toy Story 4

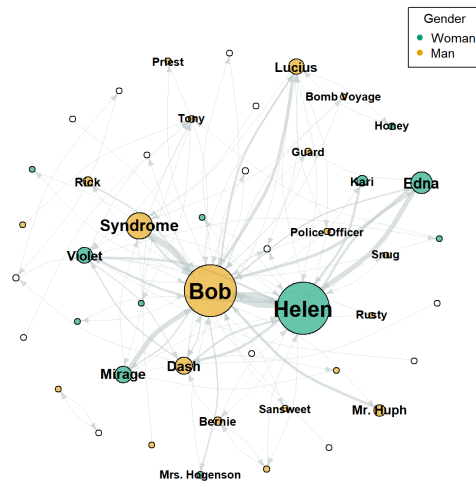


Figure 23: Incredibles 1

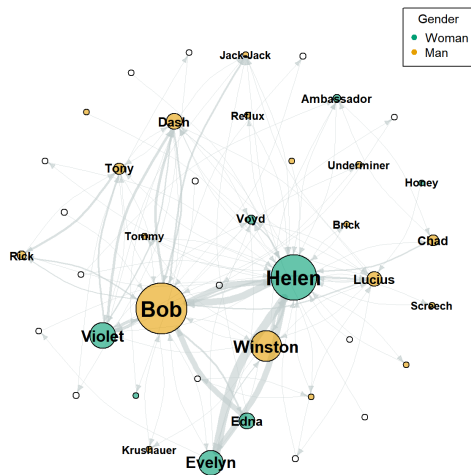


Figure 24: Incredibles 2



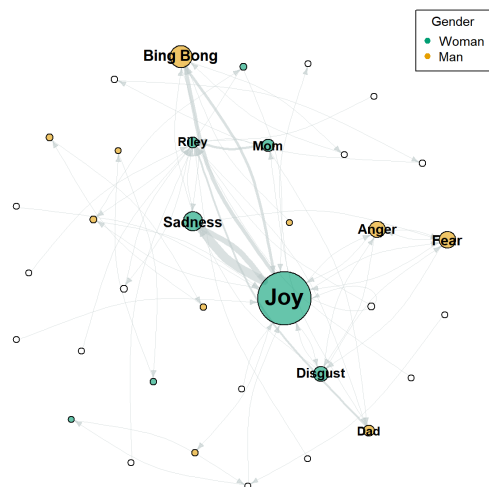


Figure 25: Inside Out

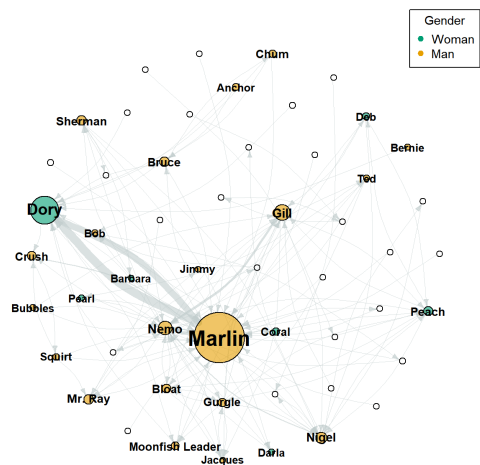
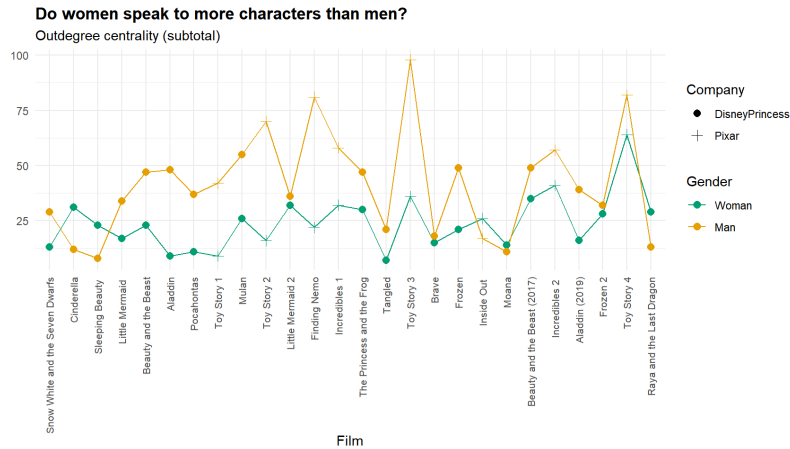
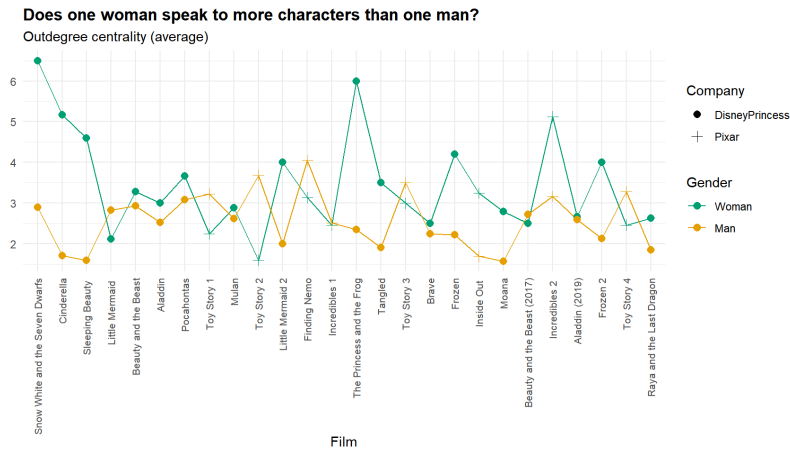


Figure 26: Finding Nemo

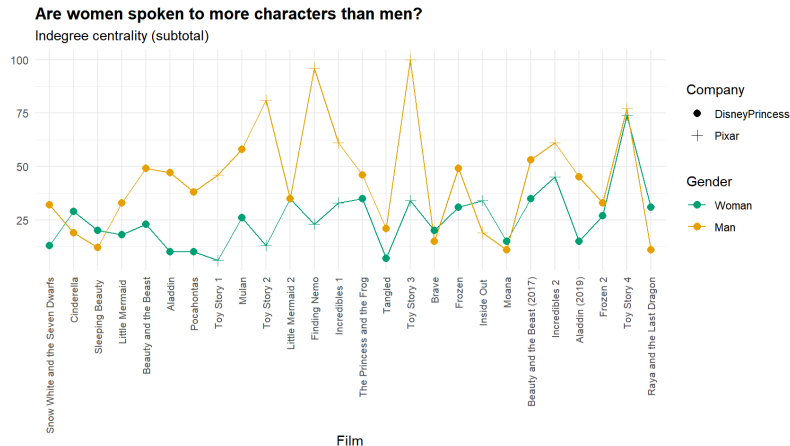


(a) Aggregated

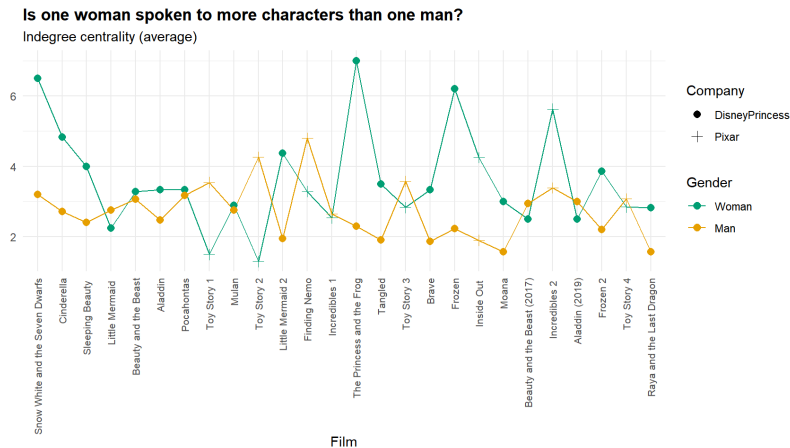


(b) Averaged

Figure 27: Out-degree centrality for each gender (aggregated and averaged)

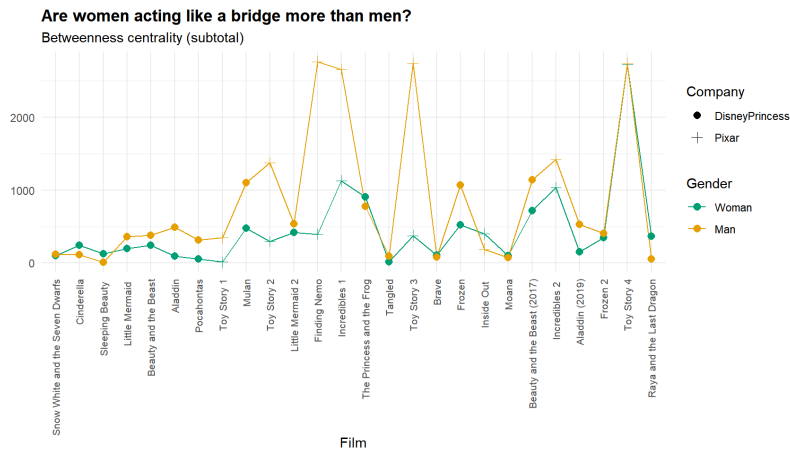


(a) Aggregated

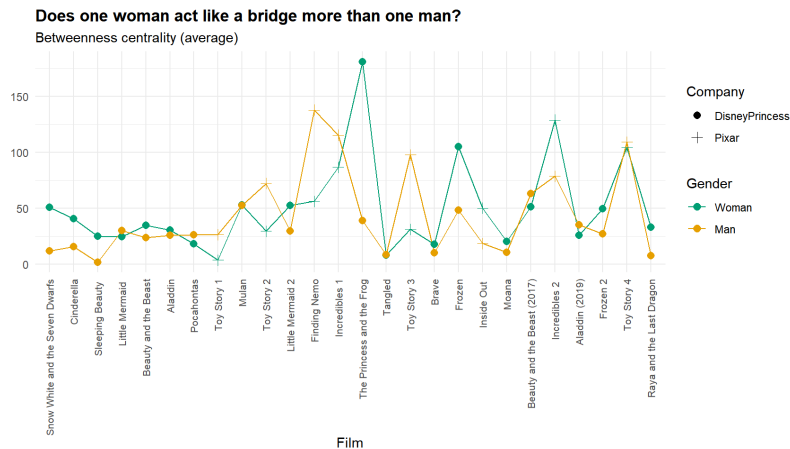


(b) Averaged

Figure 28: In-degree centrality for each gender (aggregated and averaged)



(a) Aggregated

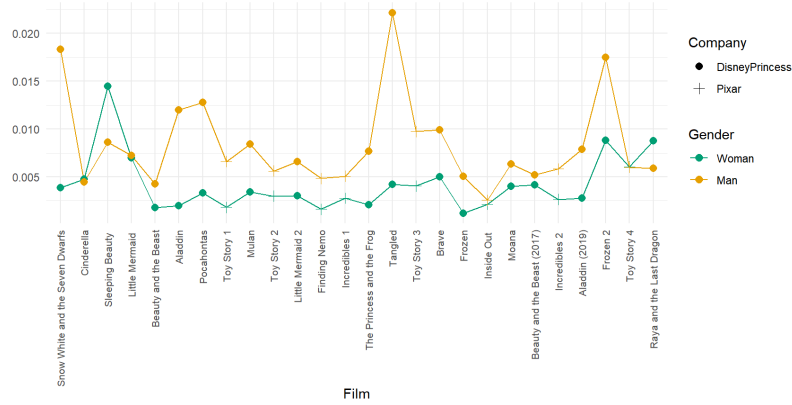


(b) Averaged

Figure 29: Betweenness centrality for each gender (aggregated and averaged)

### Are women in the center of the network?

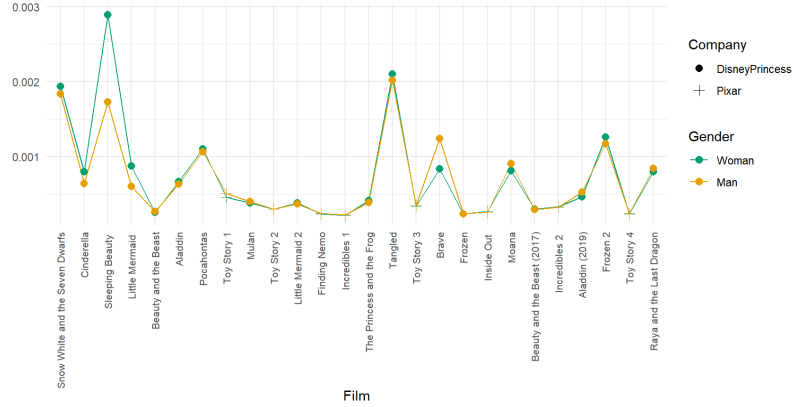
Closeness centrality (subtotal)



(a) Aggregated

### Is one woman in the center more than one man?

Closeness centrality (average)



(b) Averaged

Figure 30: Closeness centrality for each gender (aggregated and averaged)