

# 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.

Table 1: Results of Model 1

<b>Film</b>		<b>Terms</b>	<b>Odds Ratio</b>	<b>CI 95% (Low, High)</b>			
Pocahontas	1	edges	0.04	0.01	0.2		***
	2	nodefactor.gender.1	0.58	0.22	1.53		
	3	nodecov.n_words_total	1	1	1		***
	4	nodematch.gender	5.05	1.52	16.79		**
Mulan	1	edges	0.05	0.03	0.09		***
	2	nodefactor.gender.1	0.63	0.44	0.91		*
	3	nodecov.n_words_total	1	1	1		***
	4	nodematch.gender	2.27	1.29	3.99		**
The Princess and the Frog	1	edges	0.06	0.02	0.15		***
	2	nodefactor.gender.1	0.41	0.23	0.75		**
	3	nodecov.n_words_total	1	1	1		***
	4	nodematch.gender	1.54	0.73	3.25		
Toy Story 3	1	edges	0.03	0.02	0.04		***
	2	nodefactor.gender.1	0.65	0.46	0.92		*
	3	nodecov.n_words_total	1	1	1		***
	4	nodematch.gender	1.61	1	2.57		*
Confidence Intervals: CI, p0.000: ***, p0.01: **, p0.05: *							

Table 2: Results of Model 2

Film		Terms	Odds Ratio	CI 95% (Low, High)		
Cinderella	1	edges	2.35	0.87	6.37	.
	2	nodefactor.gender.1	0.32	0.17	0.62	***
	3	nodefactor.n_words.lower	0.42	0.23	0.77	**
	4	nodematch.gender	1	0.44	2.27	
Pocahontas	1	edges	1.33	0.42	4.2	
	2	nodefactor.gender.1	0.48	0.19	1.2	
	3	nodefactor.n_words.lower	0.22	0.12	0.41	***
	4	nodematch.gender	4.5	1.46	13.95	**
Mulan	1	edges	0.45	0.24	0.84	*
	2	nodefactor.gender.1	0.58	0.39	0.86	**
	3	nodefactor.n_words.lower	0.13	0.08	0.22	***
	4	nodematch.gender	2.5	1.39	4.48	**
Little Mermaid 2	1	edges	1.85	0.94	3.61	.
	2	nodefactor.gender.1	0.36	0.23	0.58	***
	3	nodefactor.n_words.lower	0.1	0.05	0.17	***
	4	nodematch.gender	0.88	0.48	1.61	
The Princess and the Frog	1	edges	1.76	0.89	3.47	
	2	nodefactor.gender.1	0.39	0.23	0.66	***
	3	nodefactor.n_words.lower	0.15	0.09	0.26	***
	4	nodematch.gender	1.17	0.61	2.26	
Frozen	1	edges	1.33	0.61	2.9	
	2	nodefactor.gender.1	0.46	0.25	0.84	*
	3	nodefactor.n_words.lower	0.12	0.07	0.21	***
	4	nodematch.gender	0.95	0.45	1.99	
Frozen 2	1	edges	1.48	0.74	2.95	
	2	nodefactor.gender.1	0.47	0.29	0.77	**
	3	nodefactor.n_words.lower	0.14	0.08	0.24	***
	4	nodematch.gender	0.94	0.5	1.78	
Raya and the Last Dragon	1	edges	1.34	0.49	3.64	
	2	nodefactor.gender.1	0.37	0.17	0.8	*
	3	nodefactor.n_words.lower	0.18	0.1	0.33	***
	4	nodematch.gender	0.74	0.3	1.87	
Confidence Intervals: CI, p0.000: ***, p0.01: **, p0.05: *						