





Unpacking Gender Stereotypes in Film Dialogue

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Abstract. The representation of gender stereotypes in films profoundly impacts societal values and beliefs since they reflect and can potentially reinforce prevailing social norms. Hence, it is crucial to unravel how such stereotypes arise from gender portrayal in films. In this paper, we decompose the gender differences portrayed in movies along several socio- and psycho-linguistic dimensions. In particular, we consider gender disparities in four dialogue dimensions: 1) the degree of assertion, 2) the degree of confirmation, 3) the valence of emotions, and 4) the topic. Empirical analyses show that the valence of emotions expressed in the dialogue explains the most variation in gender disparity. Moreover, for certain kinds of dialogue, such as those occurring between different gender actors, the topic of discussion is also a strong predictor of gender differences.

Keywords: Computational social science · Gender inequality · Movie

1 Introduction

The construct of gender and its portrayal in popular media has attracted researchers in various disciplines. Of particular interest are gender depictions in film dialogue since movies profoundly impact individual beliefs and help shape the social mores [2]. Films specifically and media more generally are known to reflect as well as reinforce prevailing social norms [10]. All these factors, coupled with the easy availability of dialogue data, make movies a perfect testbed for studying gender differences by computational social scientists [5, 11, 18–20].

Several social, cultural, and psychological factors are known to determine gender differences. Past research has shown that the correlates of gender identity including occupations, gender roles, and interpersonal relationships are some such factors [3, 12–14, 17]. One can summarize these factors along four key conversational dimensions, 1) *the degree of assertion*, 2) *the degree of confirmation*, 3) *valence of emotions*, and, 4) *the topic of dialogue*. [9, 21] discuss how these four dimensions can capture gender differences. For *degree of assertion*, they find that women have a higher tendency to use tentative words, whereas men are more assertive in expressing their opinions [3, 13, 15]. Women also tend to give positive responses to their interlocutors, unlike men, who are more likely to interrupt their interlocutors, which leads to women having a *higher degree*

of *confirmation* in their interactions [12]. As far as *valence of emotions* is concerned, women express more positive emotions, while men show more negativity in their emotions, e.g., anger [17]. Finally, in terms of *dialogue topics*, women tend to discuss their families, friends, and acquaintances, whereas men are more preoccupied with showing off their work and achievements [13].

We conjecture that these socio-cultural dimensions of gender stereotype also apply to movie dialogues since they represent innate gender propensities in conversations. So, in this paper, we test the hypothesis of how these four socio-cultural and psychological dimensions of gender differences explain femininity (as measured by gender ladenness) in movies. In particular, we ask two research questions in this paper: **RQ1:** Which of the four dimensions of gender stereotype are associated with femininity in film dialogues? **RQ2:** How is femininity perceived in same and mixed-gender conversations in movies? How do the various stereotypes differentially associate with femininity in mixed- and same-gender interactions in movies?

2 Empirical Setup

We seek to unpack the impact of the four socio-cultural dimensions of gender stereotype just discussed on the representation of femininity in movie dialogues. Next, we decompose these estimates to compute the differential impact of the stereotypes on femininity depiction in mixed- and same-gender conversations. However, before we dive deep into our analyses, we describe our data and feature extraction pipeline.

Table 1. Description of various socio-cultural dimensions. Men and women stereotypes listed are the LIWC categories, e.g., tentative, certain, etc. The words in the brackets are examples of words in that specific stereotype LIWC category.

Socio-cultural dimension	Women Stereotype (LIWC Category)	Men Stereotype (LIWC Category)
Degrees of assertion	Tentative (e.g., wonder, unknown, confusing)	Certain (e.g., absolute, definitely, fact, must)
Degrees of confirmation	Assent (e.g., agree, indeed, okay)	Negate (e.g., can't, cannot, doesn't)
Valence of emotion	Positive (e.g., excellent, amazing)	Negative (e.g., emptiness, irrational, unfair)
Dialogue topics	Home (e.g., bed, garden, house)	Work (e.g., project, achieve, agent)

2.1 Data

Our dataset comes from the Cornell Movie-Dialogues Corpus [5], which is a collection of dialogues from 617 film scripts. The dataset was automatically generated from publicly available movie scripts, and to the best of our knowledge,

it is the largest available dataset of its kind. The dataset contains 304,713 lines of dialogue from English-language movies from 1930 to 2010. Most scripts are tagged with cast lists, IMDB information, genre, release year, and conversation label. Every line of dialogue is also tagged with the speaker (character name) and speaker gender. Since we are interested in studying the differential expression of stereotypes in movies, we only considered movies with both male and female characters. It left us with a total of 503 movies.

2.2 Feature Extraction

Below we describe how we featurize the femininity and gender stereotype variables.

Femininity: We define *femininity* as the difference in feminine-associated words used by females in their movie dialogue compared to males. We use the *gender ladenness* lexicon, which captures a specific word’s underlying feminine or masculine association. The lexicon scores the gendered tendency of each word on a scale from -1 to +1. More negative values are generally associated with masculine words, and positive values are associated with femininity. For example, the gender ladenness score of the word “actor” is -0.182 and for the word “actress” is +0.675. The gender-ladenness lexicon was generated via crowdsourced annotations on 925 words [4]. Later, the dictionary was expanded from 925 words to 274,596 words by scoring the unlabeled words based on semantic similarity [16]. We use the gender ladenness lexicon to compute femininity, as shown in Eq. 1. μ_{GL}^F represents the average gender ladenness of a movie calculated using just the female dialogue, and μ_{GL}^M is the average gender ladenness of a movie computed using just the male dialogue.¹

$$\text{Femininity} = \mu_{GL}^F - \mu_{GL}^M \quad (1)$$

We chose to represent the femininity score as the difference between the averaged gender ladenness score of female and male dialogues since we want to capture the directional change in femininity. Female dialogue typically has a higher femininity score than male dialogue; however, through exploratory analysis, we found that many male conversations had higher gender-ladenness scores (or were more feminine) than female conversations. Pinpointing this directional change can help us better understand language usage in the movies.

Dimensions of Gender Stereotype: As described earlier, we calculate gender stereotypes in movie dialog along four key socio-cultural dimensions. These dimensions are 1) degrees of assertion, 2) degrees of confirmation, 3) valence of emotion, and 4) dialogue topics. These four dimensions are motivated by the fact that they are highly representative since: First, they cover various words that

¹ We compute the gender ladenness scores using only the 274,596 words in the lexicon and dropped out-of-vocabulary words. We also removed stopwords as well as words that occurred less than 50 times in the movie scripts.

are used to indicate essential aspects of gender identities, including occupations, gender roles, interpersonal relationships, and psychology and emotions. Second, the four dimensions contain words that mean both semantics and moods. Thus we can measure both the literal meanings of words and the unspoken implications of language. Third, these socio-cultural dimensions have been shown to effectively reflect gender differences in the feminist linguistics literature [9, 21].

We use the Linguistic Inquiry and Word Count (LIWC) dictionary to compute stereotypes corresponding to the socio-cultural dimensions [23]. Essentially, we define the female and male stereotypes in each of the four dimensions using a LIWC category. For example, for the dimension *degree of assertion*, we define the women stereotype using the LIWC category “tentative” and the male stereotype using the category “certain”. Recall that [3, 13, 14] showed women tend to be tentative in their speech, whereas men are more likely to be certain. Similarly, we identify LIWC categories for other stereotypes. The full list (along with sample words from each LIWC category) is shown in Table 1. Next, based on the LIWC categories, we compute the variable *stereotype* similarly as we computed *femininity*. The calculation is shown in Eq. 2.

$$\text{Stereotype} = \mu_{LIWC}^F - \mu_{LIWC}^M \quad (2)$$

μ_{LIWC}^F represents the averaged LIWC output for each of the eight stereotypes shown in Table 1 using just the female dialogue and μ_{LIWC}^M represents the corresponding output for the male dialogue.

2.3 Model Specifications

We use a simple linear model—ordinary least squares (OLS) regression—to quantify the relationship between the various gender stereotypes and femininity in the movie dialogues. We chose OLS regression owing to its simplicity and its statistical properties [1]. Of course, we do not rule out non-linearity in the relationship, but we are less interested in higher-order effects, typically captured by non-linear models. Our model specification is shown in Eq. 3.

$$\text{Femininity}_i = \alpha + \sum_{k=1}^8 \text{Stereotype}_{ik} + \epsilon_i \quad (3)$$

Femininity and Stereotype describe the femininity and stereotype variables, which are calculated as described earlier. The subscript i indexes the movies and k indexes the stereotypes described in Table 1. α is the movie-specific intercept, and ϵ represents the Gaussian error term.

Next, we are interested in assessing the differential impact of the stereotypes on femininity based on whether the dialogue was between mixed-gender or same-gender actors. Our model specification for the second research question is shown in Eq. 4.

$$\begin{aligned}
 \text{Femininity}_j = & \alpha + \text{MixedGender}_j + \sum_{k=1}^8 \text{Stereotype}_{jk} \\
 & + \sum_{k=1}^8 \text{Stereotype}_{jk} \times \text{MixedGender}_j + \epsilon_i
 \end{aligned}
 \tag{4}$$

The binary variable MixedGender_j denotes whether the dialogue is between actors of different genders ($\text{MixedGender}_j=1$) or between same-gender actors ($\text{MixedGender}_j=0$). j indexes the various dialogues in a movie; they can either be mixed-gender or same-gender. The various *interaction terms* estimate the differential impact of a particular stereotype on femininity for mixed-gender conversations in the movie.

Table 2. Regression estimates obtained from Eqs. 3,4. *Note:* 1) Heteroskedasticity Robust standard errors are shown in parenthesis next to the coefficient, 2) *** $p \leq .01$, ** $p \leq .05$, * $p \leq .1$

	Femininity (Eq. 3)	Femininity (Eq. 4)
Intercept	0.47***(.042)	1.17***(0.11)
PosEmotion	0.32***(0.05)	0.36**(0.14)
NegEmotion	-0.27***(0.04)	-0.11***(0.02)
Assent	-0.07(0.05)	-0.052(0.182)
Negate	-0.13***(0.05)	0.08(0.09)
Tentative	0.04(0.04)	-0.05(0.10)
Certain	0.06(0.04)	-0.07(0.11)
Home	0.05(0.05)	-0.16(0.12)
Work	-0.14***(0.04)	-0.08(0.12)
MixedGender	-	-1.07***(0.12)
PosEmotion × MixedGender	-	-0.18(0.15)
NegEmotion × MixedGender	-	-0.09(0.12)
Assent × MixedGender	-	-0.04(0.19)
Negate × MixedGender	-	-0.03(0.10)
Tentative × MixedGender	-	0.05(0.11)
Certain × MixedGender	-	0.12(0.12)
Home × MixedGender	-	0.26**(0.13)
Work × MixedGender	-	-0.08(0.13)
Number of Observations	503	597
R-squared	0.226	0.293
F-statistic	14.51	12.01

3 Results and Discussion

RQ1-Gender Stereotype Decomposition: Looking at the first column of results in Table 2 we can make a few observations. First, we can see that gender stereotypes corresponding to three of the four socio-cultural dimensions (valence of emotion, dialogue topic, and degree of confirmation) have a significant association with the representation of femininity in movie dialogues. These associations are not only statistically significant, but they are also practically significant, which is evident based on the substantial point estimates of these variables. The positive point estimate of the “PosEmotion” suggests a unit increase in its value results in an increase (0.32) in the value of “Femininity.” Along similar lines, we see unit increases in “NegEmotion,” “Negate,” and “Work” being associated with corresponding decreases in “Femininity.” These results confirm our hypothesis that an increase in female-related socio-cultural stereotypes leads to increased femininity in the movie dialogue. Conversely, an increase in male-related stereotypes results in a decrease in femininity.

Among the three stereotypes that are significantly associated with femininity, *valence of emotion* has the most substantial impact on the degree of femininity depiction in movie dialogue. This finding corroborates similar findings by media scholars who have called the film “an emotional machine” that uses intense emotion to construct the plot, create characters, and elicit viewers’ affective responses [7, 22].

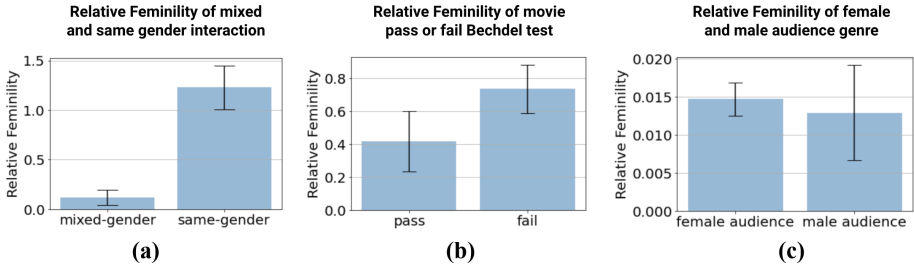


Fig. 1. Plots showing standardized mean of femininity with 95% confidential interval in (a) mixed and same-gender interaction (b) movies pass or fail Bechdel test (c) movies in genres favored by female audiences (f-aud) and male audiences (m-aud)

RQ2-Differential Impact of Stereotype in Same and Mixed-gender Interactions: We can make two key observations by examining the results from the second column in Table 2. First, the negative coefficient on the “MixedGender” variable suggests that same-gender conversations are associated with larger femininity depiction in movie dialogues. This observation is consistent with the “chameleon effect” in language, which indicates that a speaker will adapt more to their interlocutor in a mixed-gender conversation than in a same-gender conversation [5]. Moreover, women are believed to possess more interpersonal sensitivity and are more willing to show respect or support their interlocutors [15].

Based on these findings, we can conclude that in mixed-gender conversations, women tend to get assimilated to how their male interlocutors speak either out of the unconscious “chameleon effect” or out of their interpersonal sensitivity, hence resulting in the decrease in femininity in mixed-gender conversations. Second, we observe that the feature *Home* has a positive coefficient. This deviates from our prediction: while it is significantly associated with an increase in femininity in mixed-gender conversations (the coefficient of interaction term “Home \times MixedGender”), it associates with a decrease in femininity in same-gender conversations (the coefficient of “Home”). A potential explanation for this phenomenon is the “actor effect,” which posits that in mixed-gender conversations, speakers tend to use masculine- or feminine-preferential language per their biological sex due to traditionalism and prevalent social norms [8]. Although the “chameleon effect” and the “actor effect” seem to produce opposite results, they account for different components of mixed-gender conversations, including the speaker’s sensitivity to interpersonal relationships and the influence of prevalent gender norms on language use.

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