

Figure 5: Online connotation frame visualization tool, available at <http://homes.cs.washington.edu/~msap/movie-bias/>. Interactively visualize a movie from our corpus for power and agency breakdowns by gender.

The man(+,↑) with the roses **beckons** Irene(↓) forward. Another man(+,↑) steps in behind her, **trapping** her(↓). He(+,↑) closes in to **grab** her(↓)——and WHAP!WHAP!WHAP! Gets three cosh-strikes across the chin, dropping him immediately. Still holding the roses, the man(=,↓) **finds** himself(↓) smacked up against the bricks with Irene's hand over his mouth. Quick as a snake, she(+) **slices** upwards with a razor-sharp knife, cutting his belt, then his clothes, all the way to his collar. The move ends with Irene's finger(+,↓) over her own mouth, **signalling** the mugger(↓) to be quiet. He(-) **obeys**, eyes bulging. Irene(+,↑) **frisks** him(↓) expertly. She's(+,↑) **mugging** the mugger(↓). There is excitement in her eyes; this turns her on.

Figure 6: Unabridged text from Figure 1. Taken from *Sherlock Holmes* (2009), which grossed \$524 million. **Bolded** words are verbs being examined, solid underlined phrases are the agent of the verb, and dashed words denote the theme. Parentheticals are connotation frame annotations, with ↑, ↓, and ↓ denoting a power gradient (or lack thereof) and +, -, = denoting high agency, low agency, and neutral agency, respectively. Note that *Sherlock Holmes* did not pass the Bechdel test.

Task Description: For each verb, determine whether the subject or the object seems to have more authority (higher status) relative to each other.

Examples:

- **X has more authority:**
 - "X vetoes Y" --> X is clearly presumed to outrank Y.
- X and Y have similar authority:
 - "X loves Y" --> X and Y are mutually involved and appear to be similar status
- **Y has more authority:**
 - "X idolizes Y" --> Y is presumed to have some power over X.

More Examples:

X has more authority	X and Y have similar authority	Y has more authority
X overrules Y, X vetoes Y	X fights Y, X marries Y	X idolizes Y, X salutes Y

For the following verbs, which has higher authority:

1) X rescues Y: ☐ X has more authority ☐ similar ☐ Y has more authority

2) X serves Y: ☐ X has more authority ☐ similar ☐ Y has more authority

Figure 7: Example annotation task for authority. Each verb was annotated by three crowdworkers. Each verb was rated using placeholders (e.g., X,Y), to prevent context biasing rater’s perception of the verb.

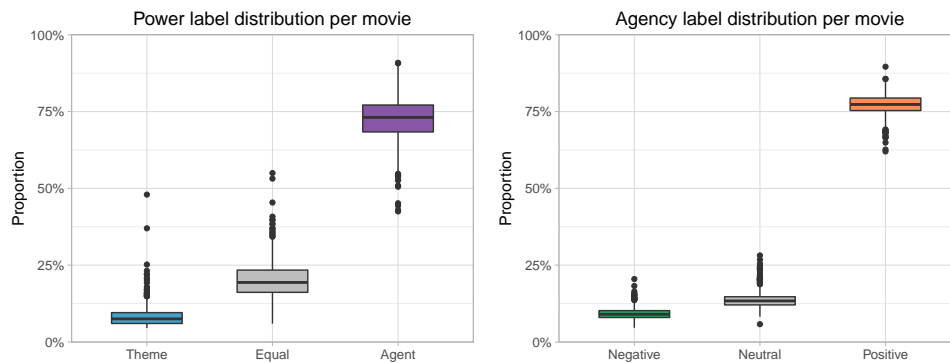


Figure 8: Label distributions for power and agency frames. Each datapoint represents a movie’s aggregated frame counts (aggregated over all characters’s dialogue and narrations). The distributions are consistent with the annotation distributions in Figure 4, and variance across movies is relatively low. Note that our analyses in Section 3 are performed at the character level, but these distributions show that our results are likely not swayed by specific outlier movies.

metric	β	gender
Presence		
# Words	-0.126	M**
# Scenes Present	-0.054	
# Talk Turns	0.308	F**
# Sentences	0.203	
Spoken features		
assent	0.202	F**
filler	0.231	F**
nonfl	0.070	
Function words		
adverb	0.904	F**
article	-1.557	M**
auxverb	1.844	F**
conj	0.571	F**
funct	3.124	F**
future	-0.154	M*
i	0.835	F**
ipron	0.180	
negate	0.746	F**
number	-0.397	M**
past	0.418	F**
ppron	1.97	F**
preps	-1.188	M**
present	1.174	F**
pronoun	2.131	F**
quant	-0.225	M*
shehe	0.327	F**
they	-0.16	M**
verb	2.215	F**
we	-0.361	M**
you	0.405	F**

Table 4: Gender association of various standardized metrics in dialogue. All metrics are LIWC categories, except those starting with “#”. β represents the change in log-odds of a character being male/female were the corresponding frame to change by one unit. Significant results (** : $p < .001$) are in bold. “Male” was coded as 0, “Female” as 1.

metric	β	gender
Affective processes		
affect	0.601	F**
anger	-0.463	M**
anx	0.2	F**
negemo	-0.178	M*
posemo	0.758	F**
sad	0.253	F**
swear	-0.392	M**
Biological processes		
bio	0.016	
body	-0.172	M**
health	0.093	
ingest	0.157	F**
sexual	0.026	
Cognitive mechanisms		
# Hedges	0.165	F*
# Imperative Sent.	-0.232	M**
cause	0.077	
certain	0.178	F*
cogmech	0.968	F**
discrep	0.423	F**
excl	0.731	F**
incl	-0.46	M**
inhib	-0.171	M**
insight	0.41	F**
tentat	0.219	F*
Perceptive processes		
feel	0.039	
hear	0.15	F*
percept	0.238	F*
see	0.022	
Personal concerns		
achieve	-0.365	M**
death	-0.125	M*
home	0.264	F**
leisure	-0.011	
money	-0.269	M**
relig	-0.033	
work	-0.344	M**
Relativity		
motion	-0.075	
relativ	-0.679	M**
space	-1.136	M**
time	0.559	F**
Social processes		
family	0.231	F**
friend	0.088	F*
humans	-0.317	M**
social	0.592	F**

Table 5: continuation of Table 4

Frames		Pearson r
<i>agency</i> (AG)=−	<i>agency</i> (AG)=−	0.067 **
<i>agency</i> (AG)=−	<i>agency</i> (AG)=+	−0.209 **
<i>agency</i> (AG)=−	<i>power</i> (AG>TH)	−0.023 *
<i>agency</i> (AG)=−	<i>power</i> (AG<TH)	0.399 **
<i>agency</i> (AG)=−	<i>power</i> (AG=TH)	0.086 **
<i>agency</i> (AG)=−	<i>agency</i> (AG)=+	<i>not sig.</i>
<i>agency</i> (AG)=−	<i>power</i> (AG>TH)	0.023 *
<i>agency</i> (AG)=−	<i>power</i> (AG<TH)	0.043 **
<i>agency</i> (AG)=−	<i>power</i> (AG=TH)	0.069 **
<i>agency</i> (AG)=+	<i>power</i> (AG>TH)	0.406 **
<i>agency</i> (AG)=+	<i>power</i> (AG<TH)	−0.095 **
<i>agency</i> (AG)=+	<i>power</i> (AG=TH)	<i>not sig.</i>
<i>power</i> (AG>TH)	<i>power</i> (AG<TH)	0.024 *
<i>power</i> (AG>TH)	<i>power</i> (AG=TH)	−0.043 **
<i>power</i> (AG=TH)	<i>power</i> (AG<TH)	0.049 **

Table 6: Partial correlation between connotation frames in the narrations for characters in our dataset (controlled for number of words). Significant results (* : $p<.05$; ** : $p<.001$, Holm corrected) are in bold. Most frames have low correlations with others, signifying that the dimensions captured are different. We find mild correlations between negative agency and theme empowering verbs, as well as for positive agency and agent empowering verbs.

	# Imper. Sent.	# Hedges
<i>agency</i> (AG)=+	0.268 **	−0.146 **
<i>agency</i> (AG)=−	−0.056 **	0.245 **
<i>agency</i> (AG)=−	0.134 **	<i>not sig.</i>
<i>power</i> (AG>TH)	<i>not sig.</i>	−0.062 **
<i>power</i> (AG<TH)	0.02 *	0.019 *
<i>power</i> (AG=TH)	−0.084 **	0.087 **

Table 7: Partial correlation on our movie corpus between frames and select dialogue features (controlling for number of words). Holm p-value correction is applied (* : $p<.05$; ** : $p<.001$). Most power frames have low correlations with the two dialogue features, though the correlations are all in the expected directions. We find that agency frames are moderately correlated with imperatives and hedges, as expected.