

# A Moral- and Event- Centric Discovery of Gender Bias in Fairy Tales at A Large Scale

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## Extended Abstract

Fairy tales are a common resource for young children to learn a language or understand how a society works. However, gender bias, e.g., stereotypical gender roles, in this literature may cause harm and skew children’s world view. Instead of decades of qualitative and manual analysis of gender bias in fairy tales, we computationally analyze gender bias in a fairy tale dataset containing 624 fairy tales from 7 different cultures. We specifically examine gender difference in terms of moral foundations, which are measures of human morality, and events, which reveal human activities associated with each character. We have the following results: (1) The number of male characters (N=4,405) is two times that of female characters (N=2,125), showing a disproportionate gender representation. (2) Stereotypical portrayals of both male and female characters in terms of moral foundations and events are prevalent. (3) Gender bias in terms of moral foundations shows an obvious difference across cultures. Based on the results, we propose implications for children’s literature and early literacy research.

**Modeling Gender Bias** Gender bias is naturally a multidimensional construct. In this study, we propose to model gender bias in fairy tales from two dimensions: moral foundations and events. Moral foundations are measures of human morality. Five innate, universal moral foundation pairs are care/harm (concerning intuitions of sympathy, compassion, and nurturance), fairness/cheating (concerning notions of rights and justice), loyalty/betrayal (concerning moral obligations of patriotism and “us versus them” thinking), authority/subversion (concerning traditions and maintaining social order), and sanctity/degradation (concerning moral disgust and spiritual concerns related to the body). Essentially, human activities can be seen as sequences of events, which are crucial to understanding gender portrayals. Events have been used as a lens to understand gender bias in other corpus, e.g., Wikipedia profiles. We adopt a similar approach and enhance it by extracting event chains, i.e., sequences of events, which help us understand how a certain gender is consistently portrayed in a sequence of events.

**Data and Method** We use a fairy tale dataset consisting of 624 stories crawled from Project Gutenberg for analysis. A series of data processing steps are implemented, including character co-reference using BookNLP, extracting and grouping sentences of each character, deciding each character’s gender by comparing the counts of male pronouns (i.e., he/him/his) and female pronouns (i.e., she/her) co-referent with them, extracting events of each character using EventPlus, sorting events in temporal order based on the temporal relations output by EventPlus, and obtaining 11 moral foundation scores ( $\{\text{probability, sentiment}\} \times \{\text{care, fairness, loyalty, authority, sanctity}\}$  as well as the ratio of moral words and non-moral words) using eMFD. To reveal gender differences in moral foundations, we compare average eMFD scores for female and male characters using a t-test. After obtaining two dictionaries of events for male and female characters with EventPlus, we use the metric of odds ratio (OR), i.e., the odds of having it in the male event list divided by the odds of having it in the female event list, to identify events, event types, and event chains specific to different genders. We further make a comparison of the gender bias across different cultures.

**Gender Bias in Moral Foundations** The gender differences regarding mentions of moral foundations are confirmed by the t-test on probability scores: female characters are more associated with care, loyalty, and sanctity, while male characters are more associated with fairness and authority. According to the ratio of moral words to non-moral words, female characters are more associated with moral words, suggesting more moral narratives around female characters in fairy tales. The gender differences regarding moral foundation sentiments are also confirmed by the t-test on sentiment scores. A higher sentiment score means being more positively framed regarding a moral foundation dimension in fairy tales. It is found that female characters are more positively framed in moral foundations than male characters in the care and fairness dimensions. No significant differences are found in other dimensions. Average moral foundation probabilities and sentiments for both genders are listed in Table 1.

**Gender Bias in Events** We examine top events for both genders in terms of odds ratio. Events in the portrayal of female characters are more about emotion (e.g., lament), appearance (e.g., comb), care (e.g., soothe), loyalty (e.g., betray), household (e.g., bake), femininity (e.g., blush), etc. On the other hand, male characters are more associated with events about profession (e.g., hunt), violence/masculinity (e.g., shoot), indulgence (e.g., entertain), travel/motion (e.g., leap), justice (judge), etc. Event types are high-level summaries of events associated with different genders. Notably, female characters are narrated more on life-related event types including Life:Marry, Life:Be-Born, etc. Male characters are narrated more on personnel/profession- and conflict- related event types including Personnel:Start-Position, Personnel:Elect, Conflict:Attack, etc. Top 20 events and event types for both genders are listed in Table 2. Further, we notice different events before/after common events in the gendered portrayal of characters. For example, “marry” is a power-equal and agency-neutral event. Interestingly, women weep, and men kill before their marriage, showing a clear discrepancy in masculinity/femininity.

**Cultural Difference in Gender Bias** Different cultures have varying social norms and values, and gender bias is not likely to be the same. To understand the narratives of gender roles in different cultures, we adopt Hofstede’s cultural dimensions theory to compare gender bias in different cultural contexts. Specifically, we apply a Pearson’s correlation to understand the relationship between the gender discrepancy in moral foundation scores/events and cultural indices. Gender bias varies across cultures. For example, male characters are more associated with fairness and authority in higher power distance cultures which believe there is nothing wrong with inequality and everyone has specific positions. Female characters are more associated with care and sanctity in higher uncertainty-avoidance cultures where there is a greater emphasis on rules, structure, and order. Regarding moral foundation sentiments, female characters are more positively framed regarding care in higher uncertainty-avoidance cultures.

**Implications for Children’s Literature and Early Literacy Research** Gender bias is common in fairy tales, thus there is an urgent need to *adapt classical fairy tales* to be more suitable for the modern society. Sporadic efforts have been seen, such as the book *Gender Swapped Fairy Tales*. While such storytelling may not truly reflect the reality, more fine-grained adaptations can be made. For instance, given the large volume of gender stereotypes carried by events, one can adjust the number of masculine or feminine events for the protagonists. It is also important to *enable critical reading of children*. Toward raising children’s awareness of gender bias in fairy tales, one can build an end-to-end gender bias detector searching and presenting stereotypical events or moral words to children, along with a brief discussion of more modern gender roles (e.g., “nowadays, women are no longer passive as narrated here, but instead equal decision makers”). Such a tool may help children understand how gender bias works and critique stereotypical gender roles in fairy tales. When similar gender bias is expressed in other contexts, they are equipped to respond.

Attributes (Avg)	Male	Female	Ratio (M/F)	<i>p</i> -value	<i>t</i> -statistic
Care_p	0.1090	0.1109	0.9831	<0.05	-3.2
Care_sent	-0.0896	-0.0851	1.0519	<0.05	-2.0
Fairness_p	0.0950	0.0940	1.0116	<0.05	2.4
Fairness_sent	-0.0294	-0.0126	2.3272	<0.05	-7.9
Loyalty_p	0.0919	0.0935	0.9829	<0.05	-3.8
Loyalty_sent	-0.0045	-0.0012	3.7753	>0.05	-1.6
Authority_p	0.0910	0.0881	1.0325	<0.05	6.6
Authority_sent	-0.0174	-0.0175	0.9942	>0.05	0.0
Sanctity_p	0.0859	0.0891	0.9650	<0.05	-7.3
Sanctity_sent	-0.0588	-0.0596	0.9854	>0.05	0.4
Moral_nonmoral_ratio	1.4941	1.5663	0.9539	<0.05	-2.6

Table 1: Gender difference in moral foundation scores. *p*-probability, sent-sentiment.

Event	Gender	Top-20
Event word	Male	arise, shoot, hit, leap, chop, land, stick, describe, judge, entertain, descend, cross, hunt, thrust, disturb, borrow, destroy, appoint, praise, bethink
	Female	spin, comb, bake, reveal, dry, soothe, starve, dive, enable, lament, adorn, quarrel, foretell, foresee, clean, blush, perish, stray, betray, kindle
Event type	Male	Justice:Release-Parole, Personnel:Start-Position, Justice:Execute, Personnel:Elect, Justice:Arrest-Jail, Conflict:Attack, Transaction:Transfer-Money, Conflict:Demonstrate, Personnel:End-Position, Contact:Meet, Justice:Sentence, Business:Start-Org, Life:Die, Transaction:Transfer-Ownership, Contact:Phone-Write, Life:Injure, Movement:Transport, Personnel:Nominate, Life:Be-Born, Justice:Charge-Indict
	Female	Justice:Sue, Life:Marry, Justice:Charge-Indict, Life:Be-Born, Personnel:Nominate, Movement:Transport, Life:Injure, Contact:Phone-Write, Transaction:Transfer-Ownership, Life:Die, Business:Start-Org, Justice:Sentence, Contact:Meet, Personnel:End-Position, Conflict:Demonstrate, Transaction:Transfer-Money, Conflict:Attack, Justice:Arrest-Jail, Personnel:Elect, Justice:Execute

Table 2: Top 20 events and event types for male and female characters (selected by odds ratio).