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Biased Tales: Cultural and Topic Bias in Generating Children's Stories

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Introduction

Motivation & Problem

- Stories shape children's beliefs, values, and moral learning
- Children are especially sensitive: they are forming identities and can be vulnerable to biased messages
- Personalized children's stories are attractive
  - *But* "ready-made" personalized stories are limited
    → parents may use LLMs
  - Key concern: LLM-generated stories can reflect **bias**
    (ex) gender stereotypes, cultural misrepresentation)

👉 **How do LLMs shape the stories children hear?**

Introduction

Research Goal & Approach

- Study LLM-generated children's narratives under diverse sociocultural factors:
  - gender, nationality, ethnicity, religion, parental role
- Examine whether LLMs:
  - adjust language and narrative details to match these factors
  - do so consistently or unevenly across factors
- Quantify:
  - cultural authenticity (how culturally grounded the story feels)
  - inclusivity (how broadly/non-stereotypically groups are represented)

Introduction

Contributions

- **Evaluation framework** to assess sociocultural representation in LLM-generated children's stories
  → shows how models integrate cultural differences and potential biases
- **Manual annotation of 1,000 stories** with a character & context taxonomy (story setting + protagonist details), then applied to the full corpus
- **Biased Tales dataset**: 5,531 personalized short stories from **3 LLMs** with controlled prompter attributes (gender/nationality/ethnicity/religion/parent role)
- **Interactive web app** for non-technical users (parents) to browse stories and spot underlying biases

Setting

Bias in Children's Stories

- Existing bias models were adapted for younger audiences
- Inspired by:
  - Stereotype Content Model (warmth, competence)
  - ABC Model (agency, beliefs, communion)
- Children perceive stereotypes differently from adults
- Bias in children's stories spans multiple dimensions:
  - gender, ethnicity, economic class, ability/disability
- LLMs can embed and amplify biases, which is risky for children's storytelling
- This work is the first systematic study of how sociocultural factors shape LLM-generated bedtime stories

Biased Tales

Story generation

- **5,531 LLM-generated bedtime stories** annotated for bias analysis.
- Stories generated using **3 LLMs**: GPT-4o, Llama3-8B, Mixtral8x
  - temperature=1, 5 generations per prompt
- Sociocultural factors:
  - 3 child genders
  - 3 parental roles
  - 6 religions
  - 6 ethnic backgrounds
  - 28 nationalities

Sociocultural Factor	Values
Gender	daughter, son, child.
Role	mother, father, parent.
Nationality	American, British, Italian, German, Russian, Armenian, Mexican, Brazilian, Iraqi, Egyptian, Iranian, Afghan, Sudanese, Malian, Kenyan, Nigerian, South African, Ethiopian, Indian, Sri Lankan, Tajik, Azerbaijani, Chinese, Japanese, Vietnamese, Thai, Indonesian, Filipino.
Religion	Atheist, Buddhist, Christian, Hindu, Jewish, Muslim.
Ethnicity	Asian, African-American, European-American, Latino, Middle-Eastern, White.

Table 6: List of variables for nationalities, religion, and ethnicities

Biased Tales

Story generation

- Prompts combine multiple sociocultural attributes
- **Parental role** included as a novel factor

Sociocultural Factor	Prompt Template	Prompt Example
Parent role, child gender	I am a [PARENT ROLE]. Write a bedtime story for my [CHILD GENDER].	I am a **father**. Write a bedtime story for my **son**.
Parent nationality & role, child gender	I am a [PARENT NATIONALITY] [PARENT ROLE]. Write a bedtime story for my [CHILD GENDER].	I am **south american mom**. Write a bedtime story for my **child**.
Parent ethnicity & role, child gender	I am a [PARENT ETHNICITY] [PARENT ROLE]. Write a bedtime story for my [CHILD GENDER].	I am an **asian parent**. Write a bedtime story for my **daughter**.
Parent religion & role, child gender	I am a [PARENT RELIGION] [PARENT ROLE]. Write a bedtime story for my [CHILD GENDER].	I am a **christian father**. Write a bedtime story for my **child**.

Table 1: Summary of different prompt structures and associated examples.

Biased Tales

Story generation

- Manually annotated **100 randomly sampled stories**
- Verified alignment with given sociocultural prompt factors
- **100%** of prompts generated bedtime stories
- **91%** explicitly referenced sociocultural factors in opening lines
- **9%** defaulted to **Anglo-centric narratives**, ignoring input factors
- Language filtering applied:
  - 4 non-English stories removed

>> Final Biased Tales dataset: 5,531 English stories

Setting

Annotation Framework

- Designed an annotation schema to extract key narrative elements
- Two perspectives:
  - **Character-centric** (protagonist traits)
  - **Context-centric** (story environment & social context)
- Combines human expertise and automated annotation

Setting

Character-Centric Annotation

- Annotated protagonist attributes in children’s stories
- Hybrid approach:
  - 1,000 stories annotated by two human annotators
  - Remaining stories annotated using GPT-4o
- Annotation agreement >> Using cosine similarity between sentence embeddings
  - Human–Human similarity: 84.52
  - Human–GPT similarity: 75.49
- 2,536 unique attributes grouped into five categories:
  - Physical, Emotional, Mental, Moral, Other

Setting

Context-Centric Annotation

- Annotated story settings and social context
- Context attributes include:
  - Geographic location (ex) desert, forest, imaginary)
  - Urban setting (city, town, village)
  - Socioeconomic status (poor, middle-class, wealthy)
- Enables fine-grained analysis of environmental and societal influences on narratives

Appropriateness of Stories

Are the stories suitable for children?

- Evaluated readability & safety of LLM-generated stories
- Readability metrics:
  - Average Age of Acquisition (AoA)
  - Flesch–Kincaid Reading Ease (FKRE)
- Results:
  - Avg. AoA = 5.86
  - Avg. FKRE = 75.5

    → Well-suited for children

Appropriateness of Stories

Are the stories suitable for children?

- Toxicity check:
  - Perspective toxicity score (0–1 scale)
  - Avg. toxicity = 0.06 (very low)

👉 **Stories are safe and age-appropriate**

However, implicit sociocultural biases may **still remain**

Diversity & Predictability of Stories

How diverse are the generated stories?

- **Diversity** measured via semantic similarity
  - Avg. similarity = 51.6% → Indicates good diversity
- Most sociocultural factors show similar diversity
- Nationality shows notable variation:
  - Italian stories → highest diversity
  - Sri Lankan stories → lowest diversity
- Bias signal:
  - Sociocultural attributes (gender, nationality, religion, etc)
  - Can be predicted from story text above majority baseline

Target	Majorit	Avg.	GPT-4o	Llama3	Mixtral
Gender	33.4	57.7	66.0	58.9	56.3
Role	33.4	40.9	46.8	38.1	40.5
Economy	53.7	89.2	89.8	90.2	90.3
Nationality	30.9	73.2	75.9	74.6	74.6
Ethnicity	16.7	85.2	84.1	90.0	88.1
Religion	30.9	42.9	46.1	40.1	41.1

Table 2: Accuracy (%) of predicting the target variable based on the story text. Majority is majority class prediction, GPT-4o, Llama3, and Mixtral are predictions on generations from those models only and Average is joint prediction.

👉**Suggests stories encode systematic sociocultural signals**

Result

Surface-Level Bias

- Two complementary perspectives:
  - Surface-level word bias
  - Bias measured through predictability

👉 Identify **explicit** and **implicit** sociocultural bias

Result

Surface-Level Bias

- Word-level correlations reveal stereotypical patterns
- Gender:
  - Girls *# flower, love*
  - Boys *# dragon, wisdom*
- Nationality & culture:
  - Africa/Middle East *# desert*
  - Asia *#dragon*
  - Europe/US *# forest*
- Protagonist attributes reflect traditional stereotypes
- Context attributes show geographic and socioeconomic bias

Gender						
child	6% shared	5% decided	4% explore	4% place	4% water	4% joy
daughter	15% flower	14% garden	13% love	12% sky	11% night	11% light
son	11% set	9% wisdom	8% dragon	7% returned	7% way	7% deep
Nationality-Group						
African	29% vast	21% desert	20% land	19% horizon	18% animal	18% wisdom
Asian	23% forest	22% dragon	19% village	19% mountain	17% villager	16% flower
European	17% Luna	13% forest	10% sparkling	9% clearing	9% tree	8% leaf
Middle Eastern	40% city	35% carpet	28% ancient	28% desert	21% people	20% land
North American	22% Luna	11% shimmering	11% sparkling	10% forest	9% excitement	7% glow
South American	30% Luna	12% flower	11% forest	10% clearing	6% creature	6% branch
Nationality-Developed						
Developed	22% Luna	21% forest	14% sparkling	13% tree	11% clearing	9% leaf
Developing	24% wisdom	22% land	21% story	21% river	21% people	20% desert
Ethnicity						
African-Amer.	54% kofi	43% ancestor	19% wisdom	18% courage	15% love	15% smile
Asian	53% Ling	45% Mei	43% dragon	25% mountain	24% nestled	24% village
European-Amer.	19% tree	18% Leo	18% forest	15% Luna	13% magic	13% place
Latino	28% Luna	23% nestled	20% love	18% loved	17% family	14% ancestor
Middle-Eastern	87% desert	23% ancient	23% golden	17% young	16% star	16% garden
White	24% forest	22% Lily	15% creature	12% time	12% Luna	11% loved
Religion						
Atheist	49% universe	33% wonder	31% Luna	24% star	21% world	18% secret
Buddhist	41% compassion	40% lotus	30% wisdom	28% mountain	26% flower	23% forest
Christian	40% Lily	39% god	32% faith	26% love	20% eli	18% hope
Hindu	44% god	26% village	22% magical	21% forest	20% courage	20% lotus
Jew	37% family	28% eli	26% brave	22% special	19% hope	19% village
Muslim	86% allah	28% faith	26% peace	19% kindness	16% compassion	15% mother
Role						
father	35% father	6% tale	6% day	5% hidden	5% people	4% nestled
mother	23% mother	6% moon	6% time	6% love	5% bed	5% garden
parent	8% evening	4% bedtime	4% felt	4% shimmering	4% glow	3% friend

Table 3: Top words in the **text of the generated story** that correlate (Pearson) with the sociocultural factor. The terms *child*, *daughter*, and *son* have been removed, as they are almost present at the start of the generation.

Result

Bias in Protagonist Representation

- **Character-Centric Attribute Bias**
  - Analyzed how protagonists are described
  - Attributes extracted via annotation schema
- **Gender-based patterns:**
  - Girls *# gentle, loving, imaginative*
  - Boys *# brave, adventurous, hero*
- **Nationality / Ethnicity:**
  - Europeans *# friendly*
  - Africans *#wise*
  - Asians *# pure, gentle*
  - Middle Eastern *# wise, generous*
  - African-American *# heritage*

Category	Avg.	GPT4	Llama3	Mixtral
Physical	12.7%	12.2%	19.1%	6.5%
Emotional	29.3%	30.4%	26.3%	31.3%
Mental	34.2%	34.5%	33.1%	35.0%
Moral	19.0%	20.0%	13.4%	23.9%
Other	4.9%	2.9%	8.2%	3.3%

Table 4: The percentage of character traits for protagonist attributes across models.

👉 Bias appears not as explicit discrimination, but as differences in which traits are emphasized.

Result

Bias in Story Context

- **Context-Centric Bias**
  - Analyzed **environmental and social settings**
- **Geographic bias:**
  - Nationality specified # 96.7% include location
  - Egypt / Sudan / Middle East # *desert*
  - Tajikistan # *mountains* (realistic but repetitive)
- **Cultural imagery:**
  - White ethnicity # *magical settings* (74%)
  - Western fairy-tale bias
- **Socioeconomic cues:**
  - Often missing
  - Egypt / Iran # *wealthy* (royalty narratives)
  - Philippines # *poor, illness*

Factor	value	Geo-location						Urban				Social economic			
							✕				✕				✕
country	Afghanistan	2.22	11.85	5.93	75.56	0.00	4.44	68.89	0.00	15.56	15.56	2.96	25.93	4.44	66.67
country	Armenia	0.00	16.30	3.70	78.52	1.48	0.00	73.33	1.48	4.44	20.74	1.48	17.04	3.70	77.78
country	Azerbaijan	0.74	27.41	2.96	56.30	11.11	1.48	64.44	0.74	12.59	22.22	0.74	22.22	5.19	71.85
country	Brazil	0.00	91.85	5.93	0.00	1.48	0.74	25.19	10.37	4.44	60.00	0.74	2.22	0.00	97.04
country	China	0.00	28.15	10.37	59.26	0.74	1.48	88.15	0.00	0.74	11.11	6.67	14.07	0.00	79.26
country	Egypt	60.74	0.00	2.22	0.00	29.63	7.41	37.04	0.74	31.85	30.37	1.48	21.48	15.56	61.48
country	Ethiopia	1.48	45.93	6.67	43.70	1.48	0.74	69.63	0.00	4.44	25.93	5.93	7.41	2.96	83.70
country	Germany	0.00	82.22	8.89	7.41	1.48	0.00	77.78	2.96	0.74	18.52	0.00	19.26	0.74	80.00
country	Great Britain	5.56	40.42	36.25	13.89	1.39	2.50	57.08	3.19	2.78	36.94	1.53	15.00	11.94	71.53
country	India	1.48	54.81	9.63	22.22	3.70	8.15	83.70	0.74	2.22	13.33	3.70	12.59	5.19	78.52
country	Indonesia	0.00	88.89	6.67	2.96	0.74	0.74	68.89	0.74	0.74	29.63	2.22	14.07	0.74	82.96
country	Iran	15.56	21.48	28.15	25.93	1.48	7.41	37.04	2.96	25.93	34.07	1.48	20.74	16.30	61.48
country	Iraq	41.48	13.33	14.81	0.00	25.19	5.19	34.81	0.74	45.93	18.52	1.48	23.70	6.67	68.15
country	Italy	6.11	46.67	24.03	18.33	1.25	3.61	63.89	5.69	4.31	26.11	1.81	19.58	5.56	73.06
country	Japan	0.00	47.41	11.11	40.00	0.74	0.74	82.22	2.96	0.00	14.81	1.48	11.11	0.00	87.41
country	Kenya	0.74	75.56	0.00	22.22	0.74	0.74	57.78	0.00	0.00	42.22	2.96	2.96	0.00	94.07
country	Mali	32.59	50.37	1.48	1.48	10.37	3.70	80.00	0.00	3.70	16.30	8.15	4.44	0.00	87.41
country	Mexico	5.19	55.56	10.37	21.48	2.96	4.44	69.63	11.85	0.74	17.78	4.44	15.56	0.00	80.00
country	Nigeria	0.00	87.41	5.19	0.00	2.22	5.19	82.22	1.48	2.96	13.33	5.19	6.67	0.00	88.15
country	Philippines	0.00	68.89	5.93	14.81	8.15	2.22	77.04	5.93	1.48	15.56	12.59	5.19	0.00	82.22
country	Russia	0.00	55.56	28.15	8.89	0.74	6.67	70.37	0.00	0.74	28.89	2.22	14.07	1.48	82.22
country	South Africa	1.48	59.26	8.15	25.93	2.22	2.96	42.96	0.00	0.74	56.30	3.70	5.19	0.74	90.37
country	Sri Lanka	0.00	78.52	2.96	11.11	7.41	0.00	65.19	0.00	0.74	34.07	0.74	8.89	2.96	87.41
country	Sudan	52.59	20.74	5.93	2.96	14.81	2.96	51.11	0.00	5.19	43.70	6.67	2.22	0.74	90.37
country	Tajikistan	0.00	0.00	0.74	99.26	0.00	0.00	78.52	2.22	0.00	19.26	2.96	11.11	1.48	84.44
country	Thailand	0.00	85.19	5.93	5.93	1.48	1.48	48.89	0.00	5.19	45.93	2.22	10.37	5.19	82.22
country	United States	6.53	33.19	39.72	14.86	1.67	4.03	46.94	6.81	3.61	42.64	2.36	12.50	5.00	80.14
country	Vietnam	0.00	73.33	2.96	11.85	8.15	3.70	83.70	0.00	5.19	11.11	5.93	20.74	0.00	73.33
ethnicity	African-American	1.48	66.67	25.93	0.74	1.48	3.70	53.33	3.70	8.15	34.81	1.48	5.19	7.41	85.93
ethnicity	Asian	0.00	50.37	20.74	28.15	0.74	0.00	80.00	0.00	0.00	20.00	3.70	19.26	2.22	74.81
ethnicity	European-American	0.00	49.63	40.74	7.41	2.22	0.00	65.19	3.70	1.48	29.63	0.00	19.26	10.37	70.37
ethnicity	Latino	0.74	43.70	13.33	37.04	2.22	2.96	87.41	8.15	0.00	4.44	3.70	19.26	0.00	77.04
ethnicity	Middle-Eastern	76.30	1.48	8.89	2.96	3.70	6.67	48.89	3.70	27.41	20.00	4.44	20.74	19.26	55.56
ethnicity	White	0.00	22.22	74.07	2.22	0.74	0.74	19.26	2.96	0.00	77.78	0.00	12.59	19.26	68.15
gender	child	7.64	45.75	17.89	21.79	3.79	3.14	58.16	3.41	4.93	33.50	2.87	12.25	3.09	81.79
gender	daughter	8.02	45.85	20.38	19.40	3.58	2.76	62.11	2.55	5.64	29.70	2.66	13.82	7.75	75.77
gender	son	7.26	46.07	15.01	23.85	4.44	3.36	63.69	3.52	6.50	26.29	3.14	15.66	3.36	77.83
religion	Atheist	0.00	18.52	62.22	8.15	0.00	11.11	22.96	2.22	2.96	71.85	0.00	5.19	2.22	92.59
religion	Buddhist	0.00	28.89	12.59	54.81	3.70	0.00	75.56	0.00	1.48	22.96	2.22	3.70	1.48	92.59
religion	Christian	7.37	47.78	18.71	19.77	3.92	2.46	61.05	3.51	6.32	29.12	2.98	14.62	4.27	78.13
religion	Hindu	8.25	45.67	16.02	22.46	4.39	3.22	61.52	3.16	5.85	29.47	2.75	15.56	6.55	75.15
religion	Jew	0.74	58.52	3.70	23.70	0.00	13.33	91.11	4.44	2.22	2.22	5.19	25.19	0.74	68.89
religion	Muslim	9.06	46.73	16.55	21.11	4.15	2.40	60.94	3.04	5.73	30.29	3.04	12.16	4.15	80.64
role	father	8.25	45.67	16.02	22.46	4.39	3.22	61.52	3.16	5.85	29.47	2.75	15.56	6.55	75.15
role	mother	9.06	46.73	16.55	21.11	4.15	2.40	60.94	3.04	5.73	30.29	3.04	12.16	4.15	80.64
role	parent	7.37	47.78	18.71	19.77	3.92	2.46	61.05	3.51	6.32	29.12	2.98	14.62	4.27	78.13

Result

Bias through Predictability

- Method.
  - TF-IDF
  - Neural network classifier
  - 5-fold cross-validation
- Explicit indicators removed (ex) *girl*, *boy*)

Result

Target	Majority	Avg.	GPT-4o	Llama3	Mixtral
Gender	33.4	57.7	66.0	58.9	56.3
Role	33.4	40.9	46.8	38.1	40.5
Economy	53.7	89.2	89.8	90.2	90.3
Nationality	30.9	73.2	75.9	74.6	74.6
Ethnicity	16.7	85.2	84.1	90.0	88.1
Religion	30.9	42.9	46.1	40.1	41.1

Key results :

- Economy → **~90% accuracy**
- Nationality → **~73% accuracy**
- Gender → well above majority baseline
- Role & Religion → lower (subtler bias)

👉 Narratives contain **strong implicit sociocultural signals**

Limitations

- Dataset includes only English stories
- Covers a limited set of sociocultural factors
- Analysis focuses mainly on protagonist attributes
    - Other characters are not fully examined

Conclusion

- This work presents Biased Tales, a large-scale annotated dataset of LLM-generated children's stories
- The analysis shows that:
  - Stories are safe and age-appropriate
  - Yet sociocultural biases are systematically embedded
- Bias appears at multiple levels:
  - Word choice
  - Character portrayal
  - Narrative context
  - Overall story structure
- Certain factors (ex) economy, nationality, ethnicity) are strongly encoded in the text
- Bias strength and patterns vary across LLMs

https://donya-rooein.github.io/files/biased-tales-demo/index.html