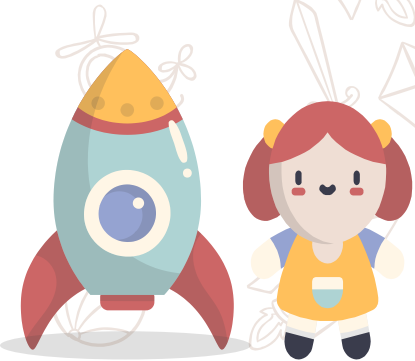


Fire Dragon and Unicorn Princess Gender Stereotypes and Children's Products in Search Engine Responses

Amifa Raj and Michael D. Ekstrand
Boise State University



People and
Information
Research
Team



BOISE STATE
UNIVERSITY grant IIS 17-51278





<https://sociologyinfocus.com/target-toys-and-gender-how-much-do-words-matter-2/>

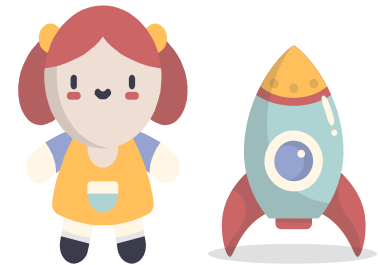


<https://www.lettoysberetoys.org.uk/thats-for-girls-and-thats-for-boys/>





Gender stereotypes are common beliefs and social expectations associated with specific genders



Naomi Ellemers. 2018. Gender stereotypes. Annual review of psychology 69 (2018), 275–298

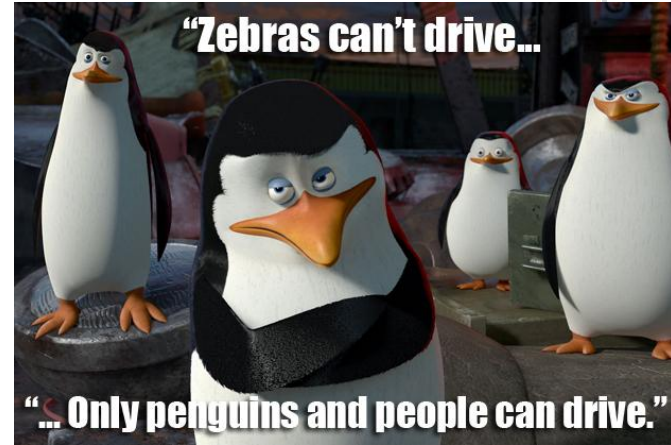
IMPACT OF EARLY CHILDHOOD EXPOSURE OF GENDER STEREOTYPES



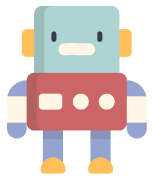
GENDER ROLES



BEHAVIORAL NORM



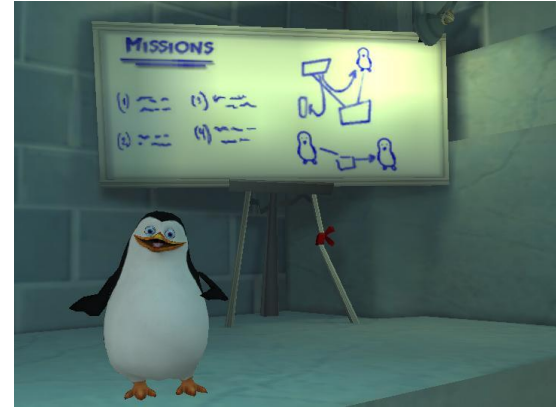
SKILLS



THIS IS A SERIOUS PROBLEM!



SOCIAL CAMPAIGNS

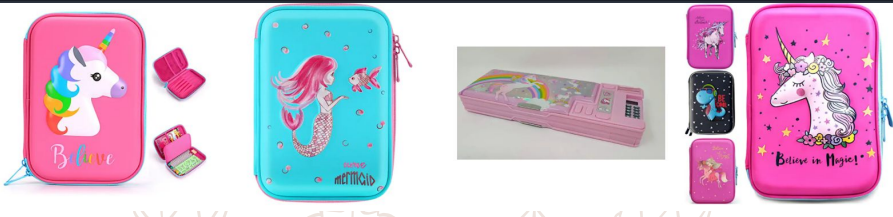


RESEARCH



WHAT ARE WE MISSING?





- Best Selling
- dollhouse for little girls**
- in Toys & Games
- dollhouse for toddlers
- dollhouse for girls
- dollhouse for boys
- dollhouse for 4 year old girl
- dollhouse for 3 year old girls
- dollhouse for little girls 3 yrs

- Best Selling
- lego cars**
- in Toys & Games
- lego cars for boys age 8-12**
- lego cars for boys age 4-7**
- lego cars for adults
- lego cars speed champions
- lego cars lamborghini
- lego cars for boys 6-12



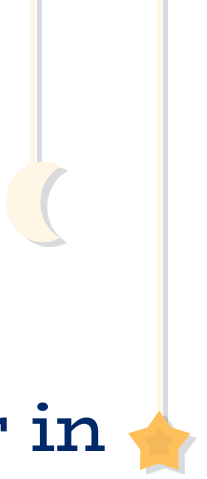
IR FOR CHILDREN



BIAS AND FAIRNESS IN IR SYSTEMS



GOAL



Identify how gender-stereotypes may appear in **query suggestions** and **search results** when searching for kids' products in e-commerce sites



CONTRIBUTION



An aggregated list of gender-stereotyped kids' products



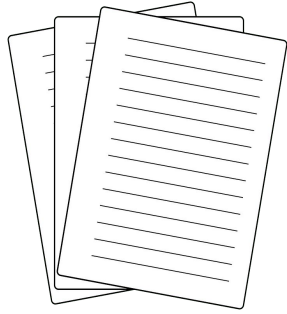
Preliminary methods to quantify gender associations with children's products in query suggestions and search results in e-commerce settings



Identify the potential existence of gender stereotypes in query suggestions and search results of search engines, across multiple e-commerce systems, showing the importance of attending to this problem



LIST OF GENDER-STEREOTYPED KIDS' PRODUCTS



RESEARCH PAPERS



CAMPAIGNS

Boys	toy vehicles; military toys; race cars; outer space toys; construction toys; car toys; video games; building blocks; dinosaur toys; lego cars; lego toys; depots; machines; doll-humanoid; action figures...
Girls	doll; domestic toys; educational art; clothes; dollhouses; clothing accessories; doll accessories; furnishing; ballerina costume; barbie costume; barbie doll; barbie jeep; play makeup...
Neutral	toy animals; educational teaching; musical games; games; books; live animals; candy land; winnie the pooh; karaoke machine; elmo; gardening tools; crayons; doctor kit; tricycle...

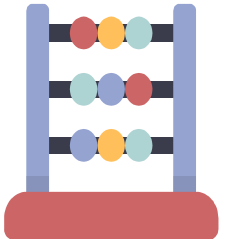
DATA COLLECTION

Seed Toys

- Previously-documented gender-stereotyped item list

E-commerce Sites

- Amazon
- Target



DATA COLLECTION (QUERY SUGGESTIONS)



Query: <item> for

SEARCH 

334 Query Suggestions sets

fake-useragent

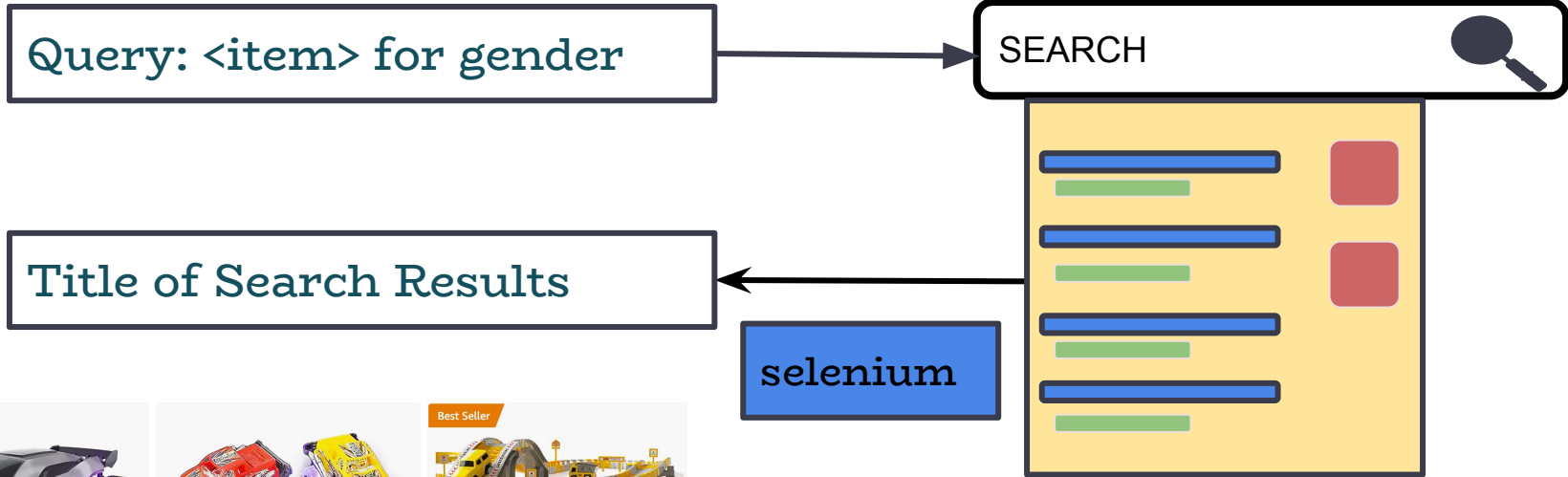


cars for

- cars for **kids**
- cars for **toddlers 1-3**
- cars for **kids ages 4-8**
- cars for **toddlers**
- cars for **boys**
- cars for **2+ year old boys**
- cars for **2 year old boys**
- cars for **3+ year old boys**
- cars for **3 year old boys**
- cars for **kids to drive**



DATA COLLECTION (SEARCH RESULTS)



EpochAir Remote Control Car - 2.4GHz High Speed Rc Cars, Offroad Hobby Rc Racing Car with Colorful Led Lights and Rechargeable...

Light Up Monster Truck Set for Boys and Girls by ArtCreativity - Set Includes 2, 6 Inch Monster Trucks with Beautiful Flashing LED Tires - ...

iHaHa 236 PCS Construction Race Tracks for Kids Boys Toys, 6 PCS Construction Car and Flexible Track Playset Create A Engineering Road...



DO QUERY SUGGESTIONS REFLECT GENDER STEREOTYPES ASSOCIATED WITH CHILDREN'S PRODUCTS?

Determining System Label

1. **Scoring Item:** Count the number of times gender terms appeared in the query suggestion
2. Measure the difference between boy score and girl score
3. Generated a list of system specific gendered products

1. Boys_score(5) > Girls_score(0)
2. Item is labeled as "for boys"

cars for
cars for kids
cars for toddlers 1-3
cars for kids ages 4-8
cars for toddlers
cars for boys
cars for 2+ year old boys
cars for 2 year old boys
cars for 3+ year old boys
cars for 3 year old boys
cars for kids to drive



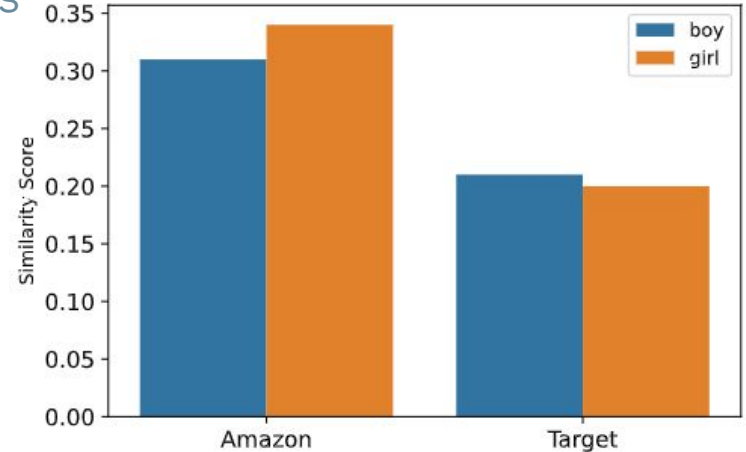
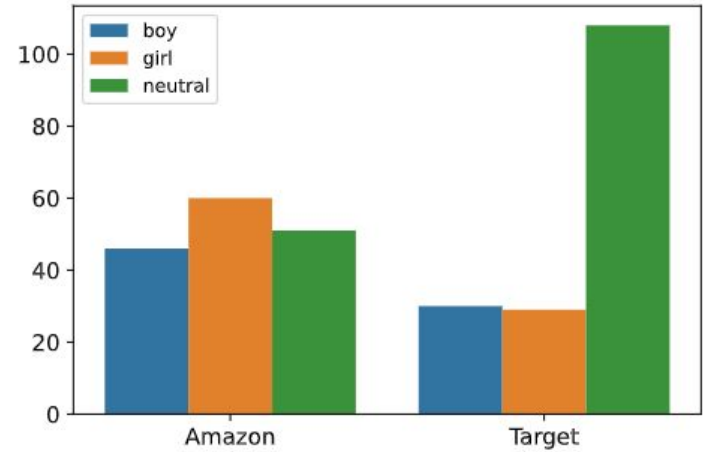


→Do e-commerce search systems associate gender with children's products in query suggestions?

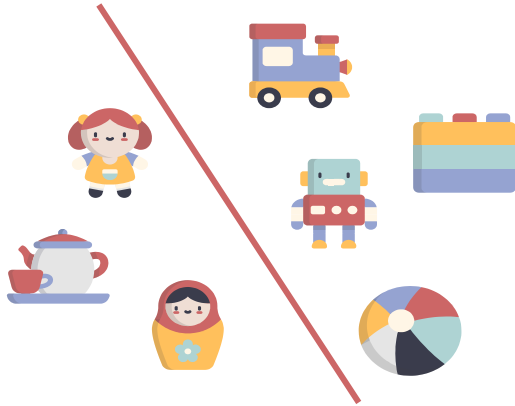
→Do e-commerce search systems replicate stereotypes associated with children's products through query suggestions?

- Jaccard similarity with previously documented list

→Does the prevalence of gender stereotypes vary between query suggestions of different systems?



KEY FINDINGS



E-commerce search systems frequently target gender for children's items through query suggestions.



PRE-DOCUMENTED STEREOTYPE

Gender stereotypes associated with children's products persist in search systems in e-commerce settings to at least some extent

DO SEARCH RESULTS MANIFEST GENDER STEREOTYPES ASSOCIATED WITH CHILDREN'S PRODUCTS?



How do search results show stereotypical responses to the gender mentioned in the query?

- Extract keywords by analyzing retrieved results using NLTK packages
- Identified unique terms that are commonly associated with gender
- “toys for boys” → “truck”, “car”, “airplane”, “arrow”, etc.
- “toys for girls” → “princess”, “makeup”, “doll”, etc
- Observed clear distinctions between genders which reflect the gender-stereotyped categorization of products in previous studies.

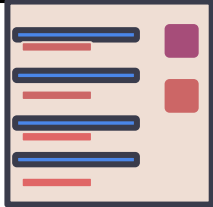


DO SEARCH RESULTS MANIFEST GENDER STEREOTYPES ASSOCIATED WITH CHILDREN'S PRODUCTS?

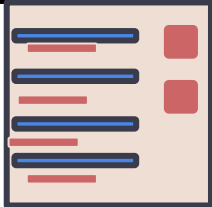
Do e-commerce search systems associate items with genders through search results?

- Considered both gender-specific and gender-neutral query
- Compared the gender-targeted search results with gender-neutral search results
- Jaccard-similarity between results
- Generate gender label for items based on similarity score

dolls for girls 🔍



dolls for kids 🔍



dolls for boys 🔍

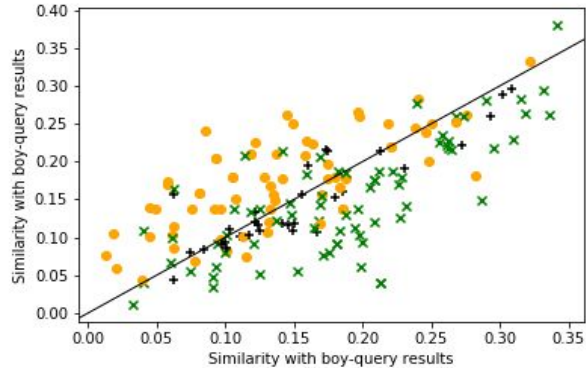


DO SEARCH RESULTS MANIFEST GENDER STEREOTYPES ASSOCIATED WITH CHILDREN'S PRODUCTS?

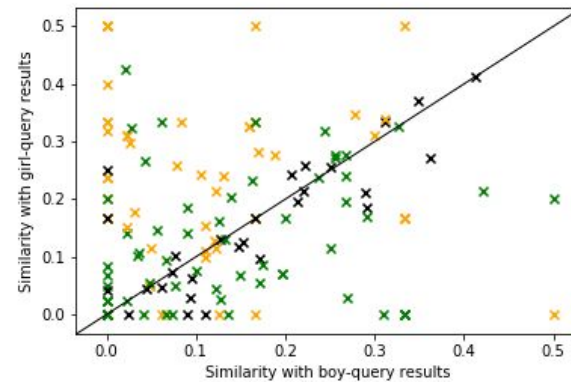
Do e-commerce search systems associate items with genders through search results?



Amazon



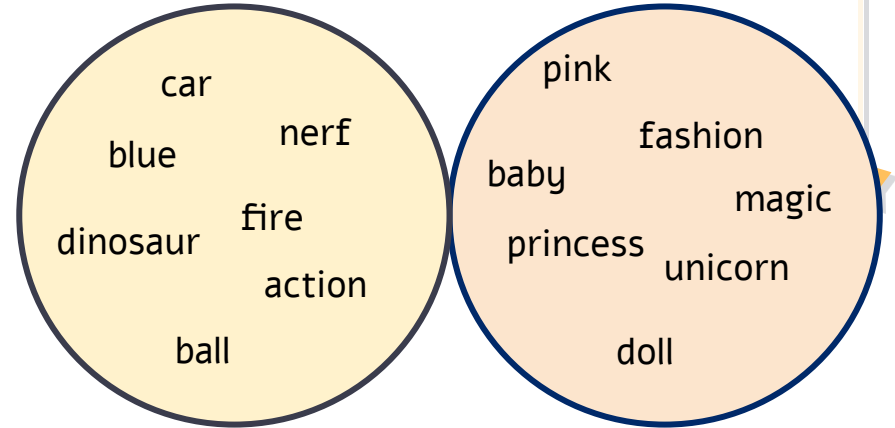
Target



KEY FINDINGS



For the same item, retrieved results change with the presence of gender in the query



Products are often associated with gender stereotyped keywords

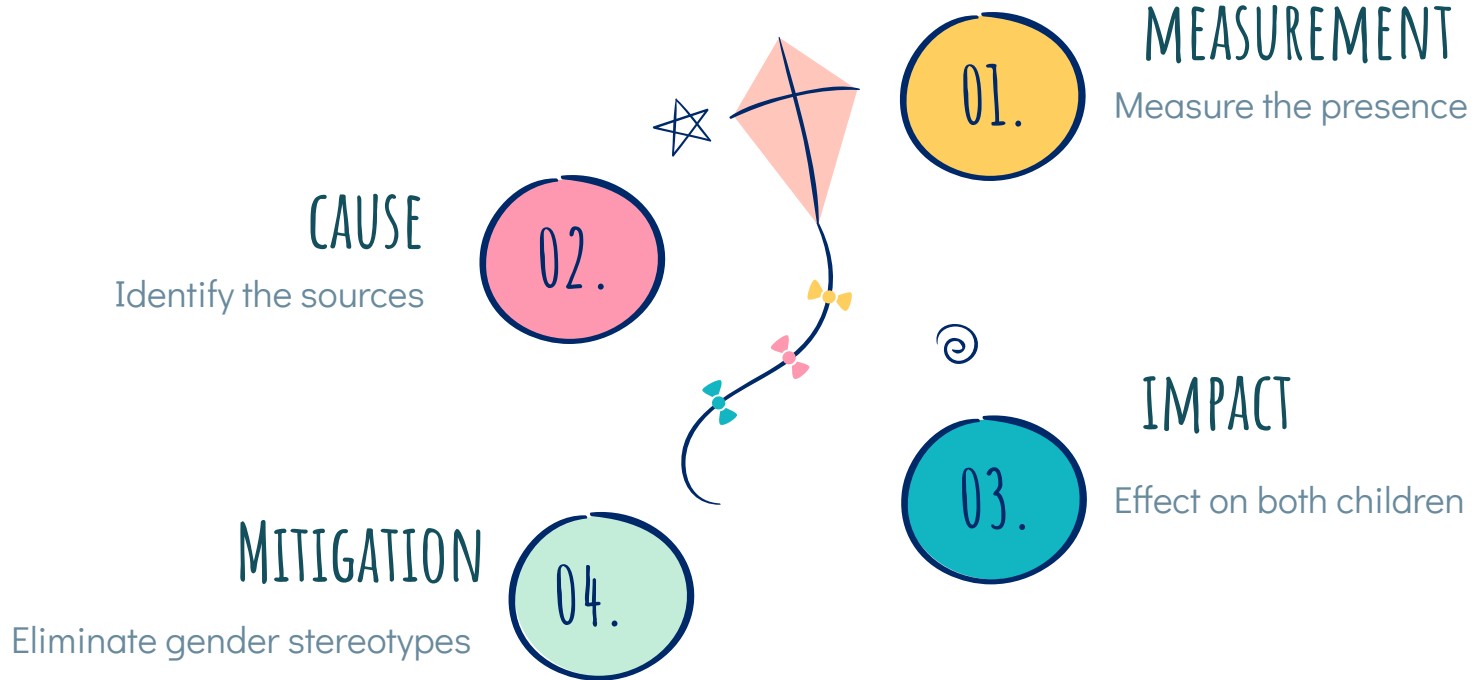


SUMMARY

- Provided initial evidence that search systems can propagate stereotypical gender associations into search results and query suggestions particularly for children's products
- Need to investigate if and how gender stereotypes manifest in e-commerce systems considering
 - Broader product collection
 - Using actual queries from children
 - User studies to understand perspective of parents and teachers
 - Product image and other contents
 - Recommendations
 - More e-commerce search systems



RESEARCH AGENDA





Thank You!

CREDITS: Diese Präsentationsvorlage wurde von **Slidesgo** erstellt, inklusive Icons von **Flaticon** und Infografiken & Bilder von **Freepik**