

Fire Dragon and Unicorn Princess

Gender Stereotypes and Children's Products in Search Engine Responses

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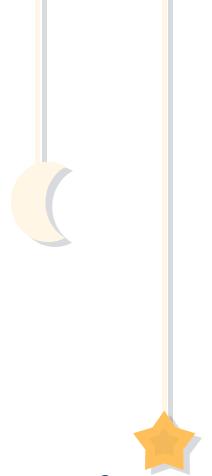


<https://sociologyinfocus.com/target-toys-and-gender-how-much-do-words-matter-2/>

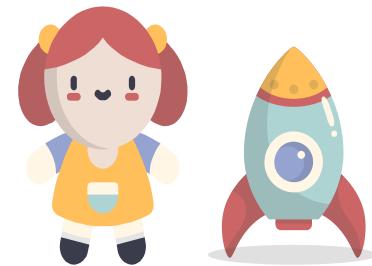


<https://www.lettoysbetoys.org.uk/thats-for-girls-and-thats-for-boys/>





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

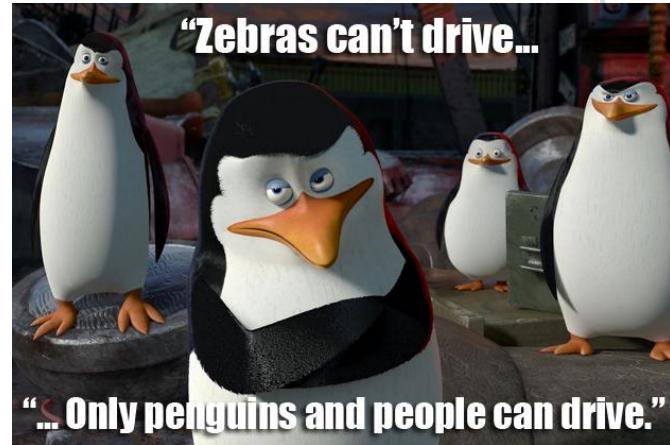
IMPACT OF EARLY CHILDHOOD EXPOSURE OF GENDER STEREOTYPES



GENDER ROLES



BEHAVIORAL NORM



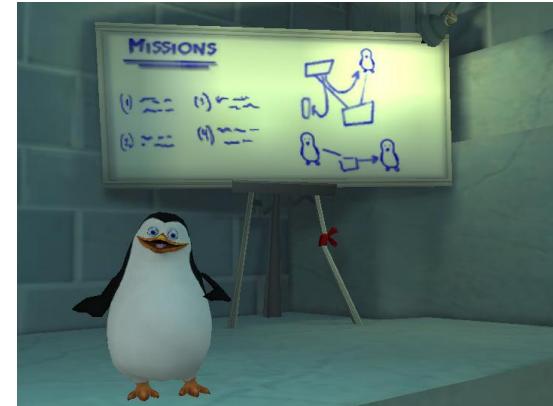
"Zebras can't drive...

... Only penguins and people can drive."

SKILLS



THIS IS A SERIOUS PROBLEM!



SOCIAL CAMPAIGNS



RESEARCH



WHAT ARE WE MISSING?



amazon

All

pencil box for girls



amazon

All

pencil box for boys



Google

LEGO for girls



amazon

All

dollhouse for |

Hello
Select your address

Best Sel

Shop all holiday gifts

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



amazon

All

lego cars|

Hello
Select your address

Best Sel

Shop all holiday gifts

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



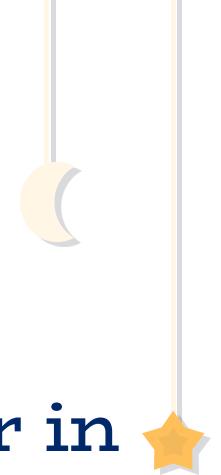
IR FOR CHILDREN



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



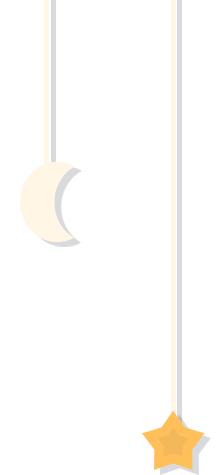
RESEARCH PAPERS



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

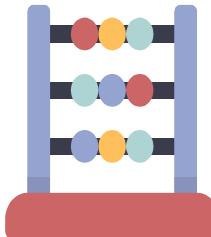
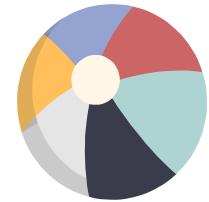


Seed Toys

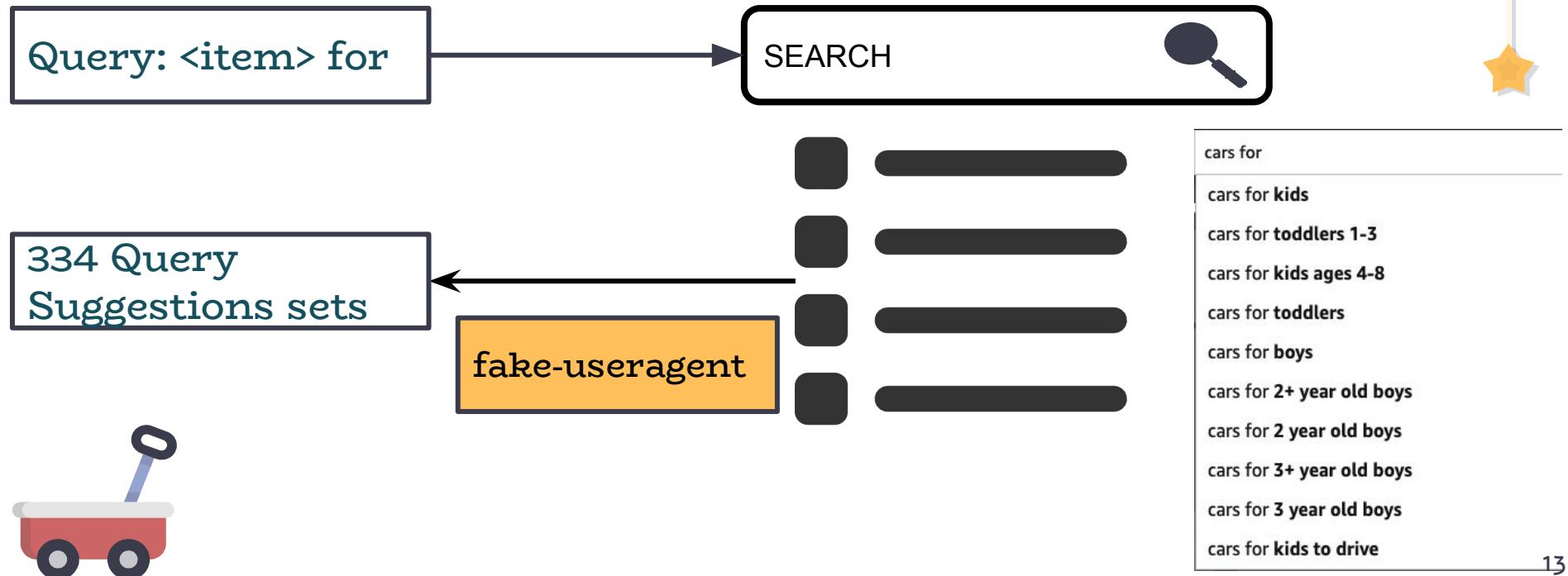
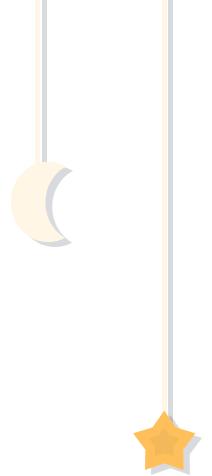
- Previously-documented gender-stereotyped item list

E-commerce Sites

- Amazon
- Target



DATA COLLECTION (QUERY SUGGESTIONS)



DATA COLLECTION (SEARCH RESULTS)

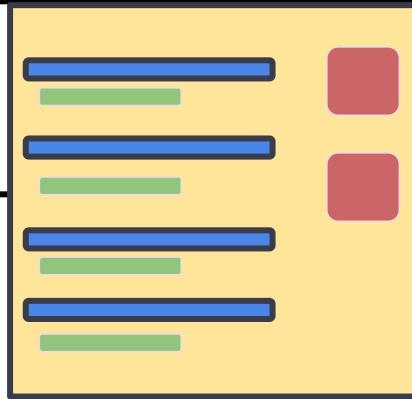
Query: <item> for gender

SEARCH



Title of Search Results

selenium



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

1

2

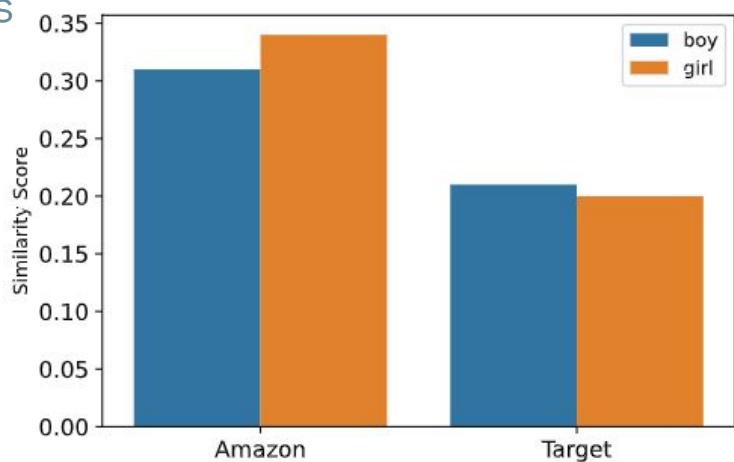
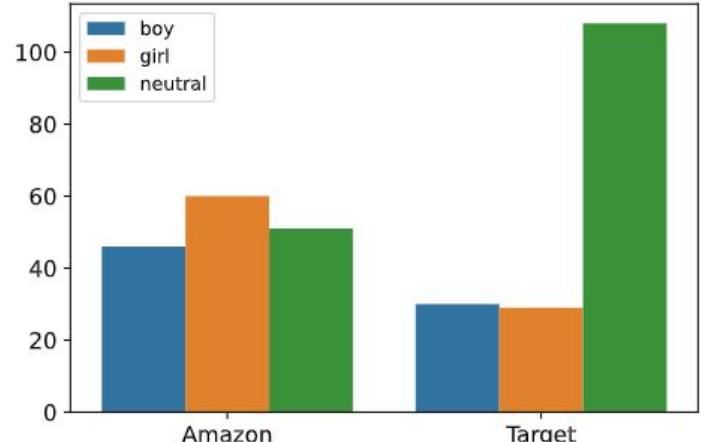
3

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

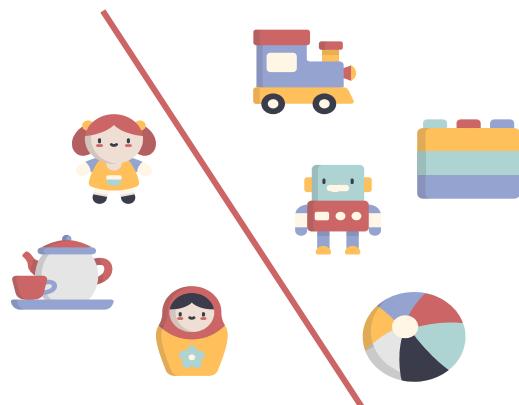
→ Do e-commerce search systems replicate stereotypes associated with children's products through query suggestions?

- Jaccard similarity with previously documented list

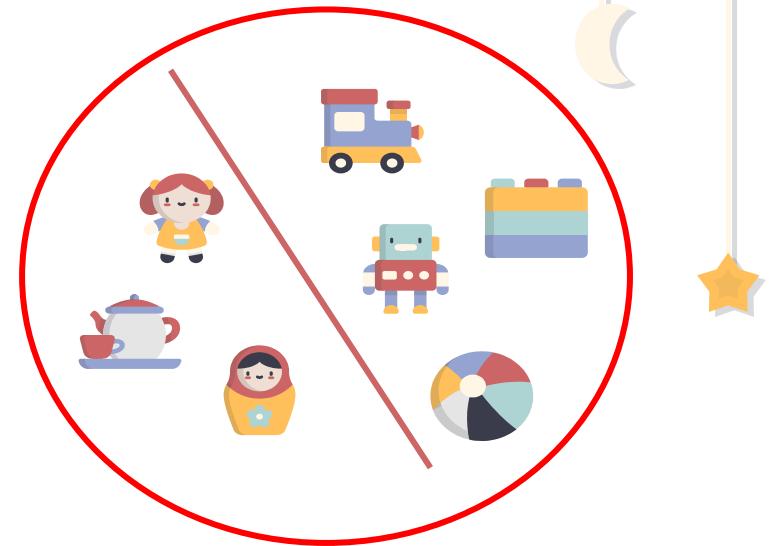
→ Does the prevalence of gender stereotypes vary between query suggestions of different systems?



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.



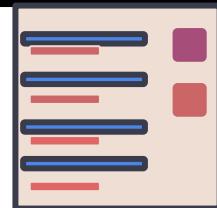
DO SEARCH RESULTS MANIFEST GENDER STEREOTYPES ASSOCIATED WITH CHILDREN'S PRODUCTS?



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

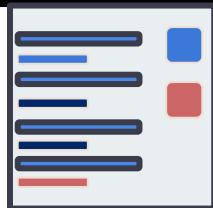
dolls for girls



dolls for kids



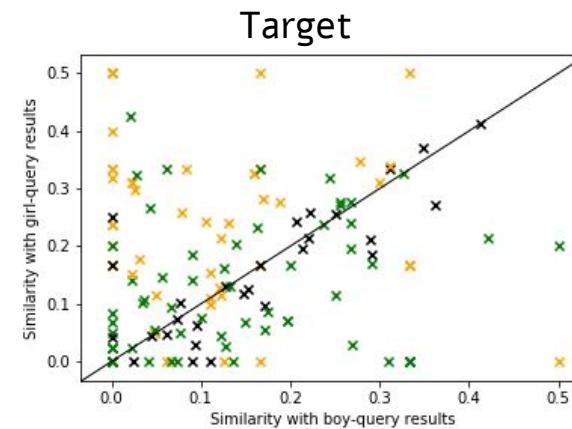
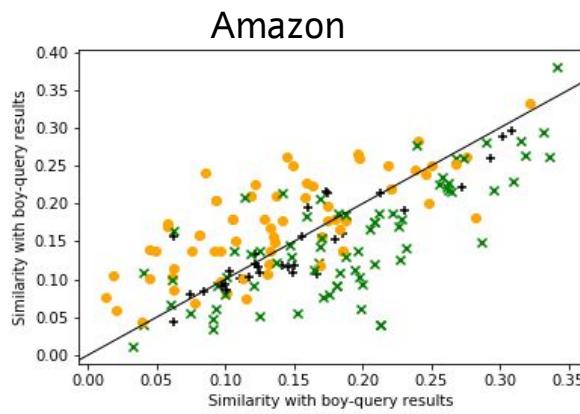
dolls for boys



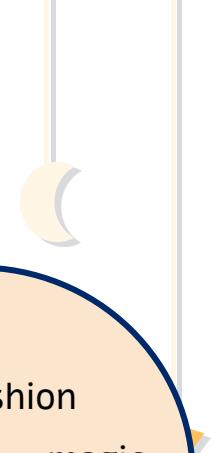
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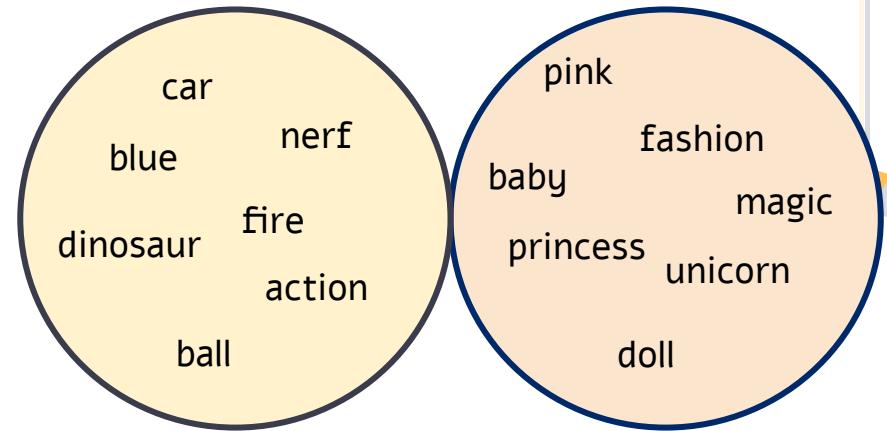
Do e-commerce search systems associate items with genders through search results?



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

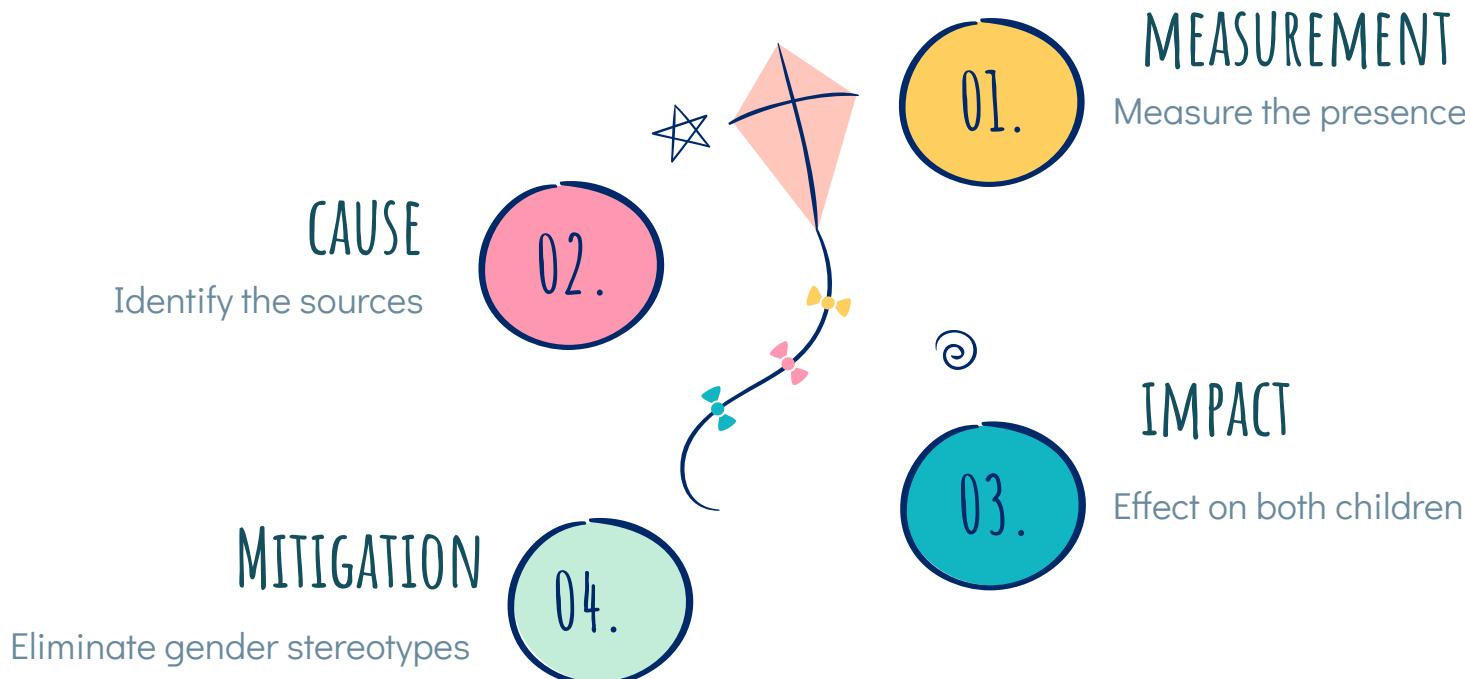


SUMMARY

- 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!

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