

The background features several hand-drawn food items: a frying pan with a sunny-side-up egg and seeds on the left; a chef's hat at the top center; a branch of green leaves on the top right; a cleaver and a smaller knife with red handles on the right; a wooden spoon and green leaves on the bottom right; and a mortar and pestle with green leaves on the bottom left. Scattered seeds are also visible.

Othering of Immigrant Cuisines in US Restaurant Reviews

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Implicit Attitudes Toward Food

Food is one of the many aspects of culture that people use to ethnically identify things.

Stereotypes about different ethnic foods can negatively impact a restaurant's economic outcome.

Representational harms - when systems or media misrepresent, stereotype, or fail to acknowledge certain social groups, leading to negative impacts on their reputation and social standing.





Previous Research

- Use of numerical restaurant ratings or studied language used in reviews within smaller datasets
- Larger scale studies ignored neighborhood related factors such as racial diversity in an area
- No differentiation between contextually different use of words
 - "stinky restaurant" vs. "stinky tofu" which is a dish



Research Questions



01

How are restaurants serving immigrant cuisines framed compared to restaurants serving non-immigrant cuisines?







02

Are cuisines of more assimilated immigrant groups framed differently than those of less assimilated groups?



03

Do LLMs transmit the same framing disparities as Yelp reviewers?



Methodology

Real Reviews

- Corpus used: Yelp open dataset
- 2.1 million reviews of 16 thousand restaurants in 14 US states
- 3 largest immigrant cuisines in the US: European, Asian, and Latin American

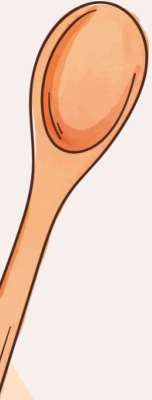
	Region	Cuisine
Non-imm.	US	american traditional (3.6K, 546K), american new (3.1K, 561K), cajun/creole ⁴ (0.5K, 161K), southern (0.5K, 141K), soul food (0.3K, 43.7K)
	LAT	mexican (1.7K, 184K), latin american (0.4K, 42.9K), cuban (0.1K, 14.4K)
Immigrant	EUR	italian (2.2K, 228K), mediterranean (0.5K, 63.4K), greek (0.3K, 32.9K), french (0.2K, 26.2K), irish (0.1K, 10.1K), spanish (60, 11.6K)
	AS	chinese (1.6K, 122K), japanese (1.1K, 146K) thai (663, 81.6K), vietnamese (527, 57.3K) indian (442, 46.1K), korean (306, 36.4K)

Table 1: Summary of Yelp cuisine categories, associated geographic regions, and (#restaurants, #reviews) in our dataset.

LLM Reviews

- Corpus used: 58 thousand LLM prompted reviews
- Gpt-3.5-turbo-0613 and gpt-3.5-turbo-1106
- Varied prompts comparable to yelp reviews
- Left out LLM commentary

“As an AI language model, I can say that this customer seems happy with their experience at a French restaurant. They specifically mention that the prices are affordable [...]”



Extracting Linguistic Features

- 3 restaurant attributes : food, staff, venue
- Analyzed adjectives used to describe these categories instead of overall sentiment
- Differentiated between true and false positives:

“a regular Mexican place; the restaurant was stinky”

“I am a regular, I had the stinky tofu”



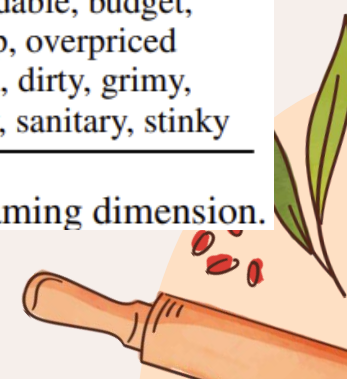


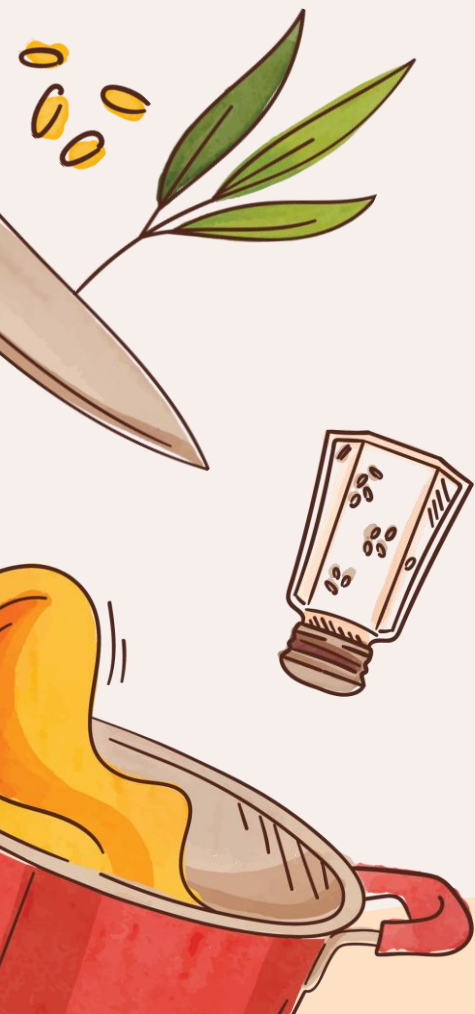
Quantity Framing

- Dictionaries – contain keywords that represent different concepts
- Observe how many times dictionary words show up in reviews, then categorize

Construct	Frame	Example features
Othering	Exoticism	different, distinctive, exotic, foreign, odd
	Prototypicality	archetypal, classic, stereotypical, usual
	Authenticity	authentic, handmade, legit, traditional
Status (high)	Luxury	alluring, classy, elegant, posh, refined
Status (low)	Cost	affordable, budget, cheap, overpriced
	Hygiene	clean, dirty, grimy, nasty, sanitary, stinky

Table 2: Example lemmas for each framing dimension.

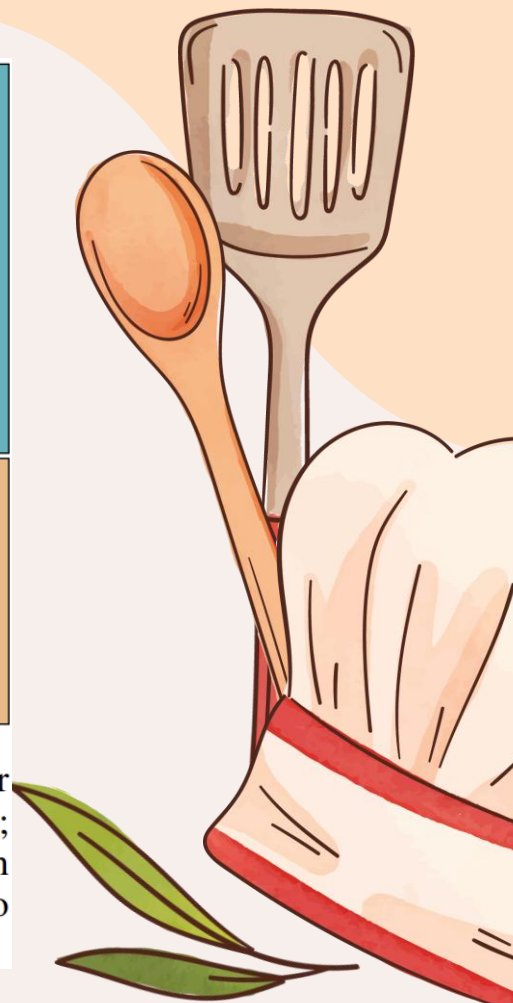




(Chinese) Their menu includes the **usual** American Chinese flairs like sweet and sour (fill in the blank), and (fill in a meat) with black/white or sweet and sour sauce. But they also have a lot of actual **authentic** Chinese dishes [...] dim sum is the **usual** stuff, I'm not sure if they push it around in a cart at lunch since I only go there for dinner. The service is pretty good, but because I been going there for a while the owner is even nicer to my party if she happens to be our server. The place is very nice and **clean** [...]

(Italian) [...] currently my favorite local Italian-American restaurant by far. Their food is made with care and focus on presentation. The prices are more than reasonable for the **breathtaking** feasts sent to your table with each entree. Wonderful **classic** dishes and surely the most impressive chicken-parm you will find in the state.

Figure 1: Example reviews showing frames detected in our analysis (**blue**: luxury; **green**: prototypicality; **pink**: hygiene; **gray**: authenticity). Both customers gave 4 stars and both restaurants are designated as \$ (on the 4-point scale \$ to \$\$\$\$) with the same mean rating.



Controlling For Confounds in Real World Reviews

- Control variables to make sure results aren't distorted by other factors:
 - Pricing
 - Ratings
 - Neighborhood income
 - Neighborhood diversity



Qualitatively Measuring Framing

- Wanted to understand *how* different cuisines are described
- Used “Fightin’ Words” method (crazy looking formula that computes which words are more common in reviews of one review compared to all other cuisines)
- Can’t account for confounding variables, but good way to see which cuisines are described with certain words

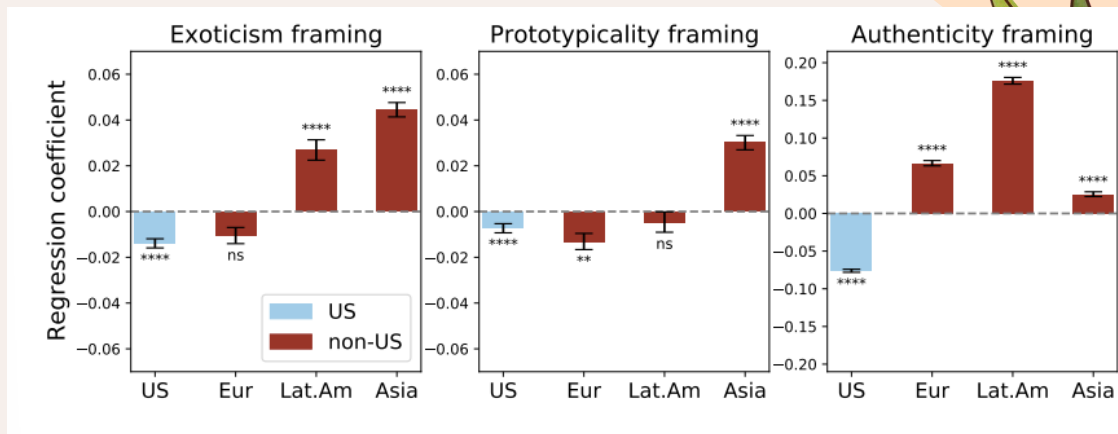


Results



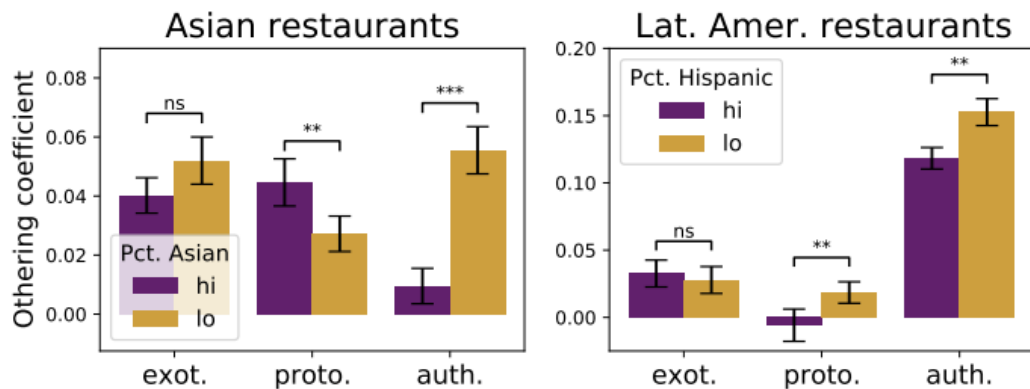
Study 1A: Othering of Immigrant Cuisines in Yelp Reviews

- Looked at whether immigrant cuisines were being described in “othering” ways
- Found that Asian and Latin American cuisines were described as more exotic and stereotyped, while European cuisines were framed as familiar, high-status, and authentic




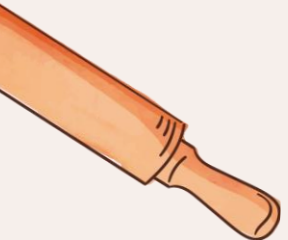

Study 1B: Othering by Cultural Outsiders

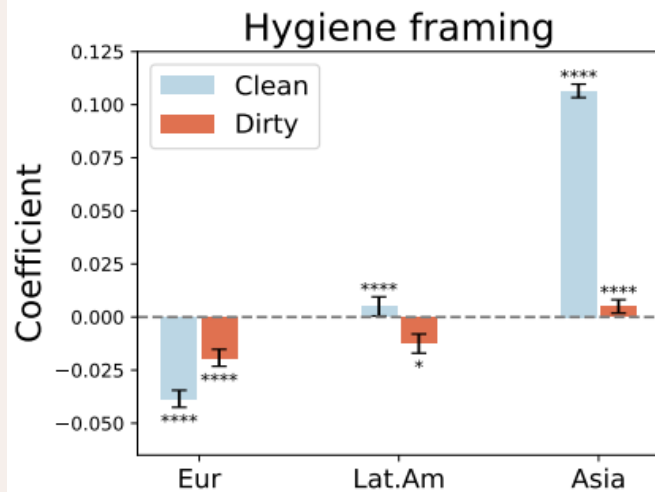
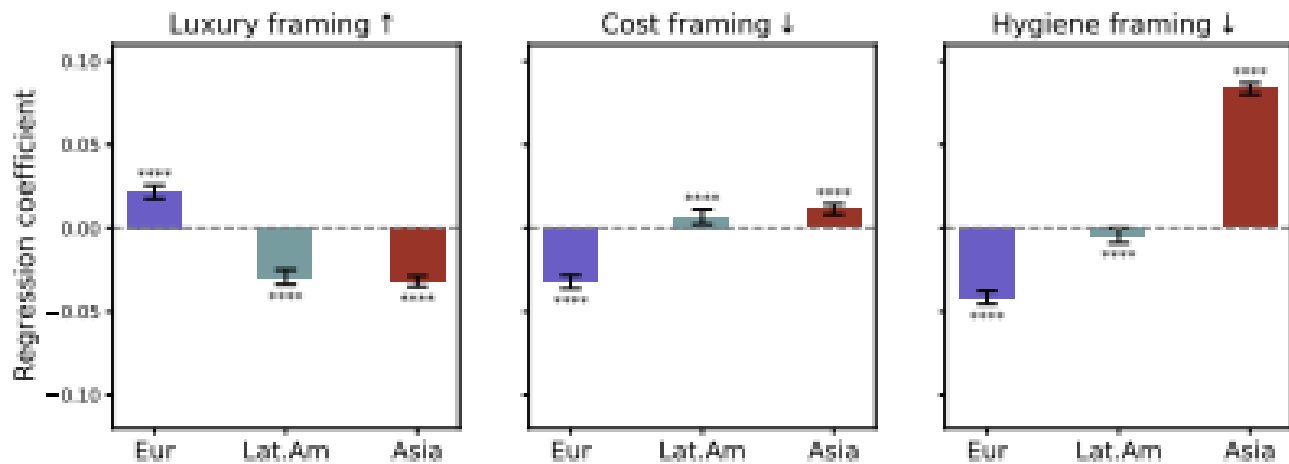
- Asked whether “othering language is more common when reviewers were cultural outsiders
- Found that Asian and Latin American cuisines were described as authentic when more of the reviewers were also Asian or Latin American, but descriptions such as exotic were inconsistent






Study 2: Low Status Framing of Non-European Cuisines


- Observed whether Asian and Latin American cuisines get described as low status
 - Found that they are described as less luxurious even if the prices are high
 - Cost words used to describe European cuisine imply expensive, for Asian and Latin American cuisines they imply cheap
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Study 3: Reporting Bias in LLMs



- Observed whether stereotypes in Yelp reviews appear in LLM generated reviews
 - Found that LLMs trained on online text tend to reproduce the same cultural and status stereotypes found in human reviews
 - Could introduce additional stereotypes as well
- 



French and Korean cultures exhibit significant differences shaped by their unique histories, societal norms, and traditions. Here are some key distinctions: 1. Cultural Orientation: French culture tends to be more individualistic [...] 5. Cuisine: French cuisine is renowned for its sophistication, emphasis on quality ingredients, and intricate preparation methods. Korean cuisine is characterized by bold flavors, a variety of side dishes (banchan), and a reliance on staples like rice and kimchi [...]

My Thoughts

- Shows how everyday restaurant reviews quietly reinforce cultural hierarchies in the US
- I think it's a little unsettling that LLMs reproduce the same patterns of “othering”, sometimes even amplifying them
- Bias in AI isn't just a technical issue
- Something as seemingly insignificant like restaurant reviews can represent racialized framing









QUIZ!



1. Which aspect of restaurant reviews do the authors analyze to detect status framing?





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- A. Adjectives and descriptive language used for different cuisines
 - B. Star ratings only
 - C. The number of photos included
 - D. The length of the review
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2. What do the authors observe about sentiment differences toward various cuisines?

- A. Sentiment is unrelated to cultural framing
- B. All cuisines receive nearly identical sentiment scores
- C. Immigrant cuisines receive higher sentiment but fewer reviews
- D. High-status cuisines receive more uniformly positive sentiment



3. How do large language models (LLMs) tend to reproduce biases found in human restaurant reviews?

- 
- A. They avoid describing any cultural food differences
 - B. They always generate neutral descriptions without emotional tone
 - C. They mirror existing human patterns of othering and status framing
 - D. They prioritize immigrant cuisines over American cuisines
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4. What broader issue does the paper connect to linguistic framing in food reviews?

- A. Economic inflation in the restaurant industry
- B. The reproduction of cultural hierarchies and social inequalities
- C. The decline of printed restaurant guides
- D. The popularity of celebrity chefs



Questions?

