



🔊 Everything We Hear: Towards Tackling Misinformation in Podcasts

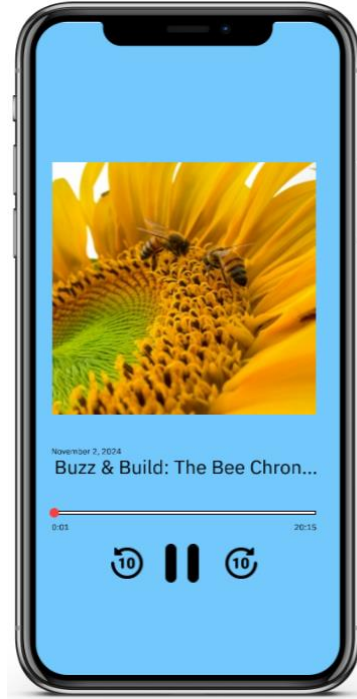
Sachin Pathiyan Cherumanal, Ujwal Gadiraju, Damiano Spina

—
What's next...



Acknowledgements

Podcast



Background



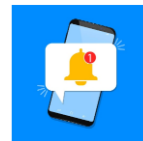
...questions about how well these programs work, ...
...how after these operations would have fallen any ...
...and her colleagues indicated that cloud seeding ...
...unclear how much the technique can increase ...

In-Text Citations [3]



Warning Labels [1,2]

VS



Notification Pings [5]



Chimes [6]

[1] Guo et al. Seeing is Not Believing: A Nuanced View of Misinformation Warning Efficacy on Video-Sharing Social Media Platforms, CSCW2 '23.

[2] Aaron S Kesselheim, John Connolly, James Rogers, and Jerry Avorn. 2015. Mandatory Disclaimers on Dietary Supplements Do Not Reliably Communicate the Intended Issues. Health Affairs.

[3] FactCheck.org <https://www.factcheck.org/2024/10/baseless-claims-proliferate-on-hurricanes-and-weather-modification/>

[4] Tobin et al. 2022. Why people listen: Motivations and outcomes of podcast listening. Plos one (2022).

[5] Stavros Garzonis, Simon Jones, Tim Jay, and Eamonn O'Neill. 2009. Auditory Icon and Earcon Mobile Service Notifications: Intuitiveness, Learnability, Memorability and Preference, CHI'09.

[6] Ke Duan, Xuedong Yan, Xiaomeng Li, and Junyu Hang. 2023. Improving Drivers' Merging Performance in Work Zone Using an In-Vehicle Audio Warning. Transportation Research Part F: Traffic Psychology and Behaviour 95

Problem

Given, a fact-checked podcast transcript:

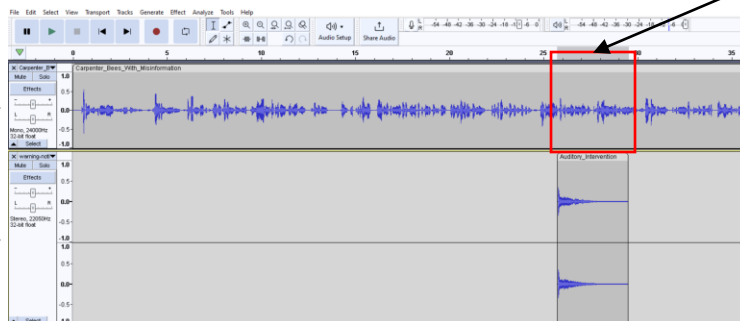
Misinformation

abdomens; carpenter bees have shiny ones, while bumblebees' abdomens are fully covered in do
hair. **bumblebees have hairy abdomens, while carpenter bees have shiny abdomens and more bees know it**

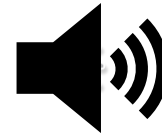
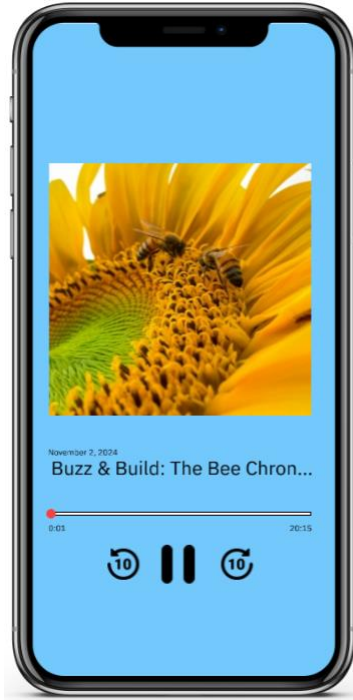
“How can we warn users of misinformation in a podcast snippet?”

Podcast Snippet with Misinformation

Podcast
+
Auditory
Intervention



Proposed Solution



... carpenter bees **aren't always solitary..**

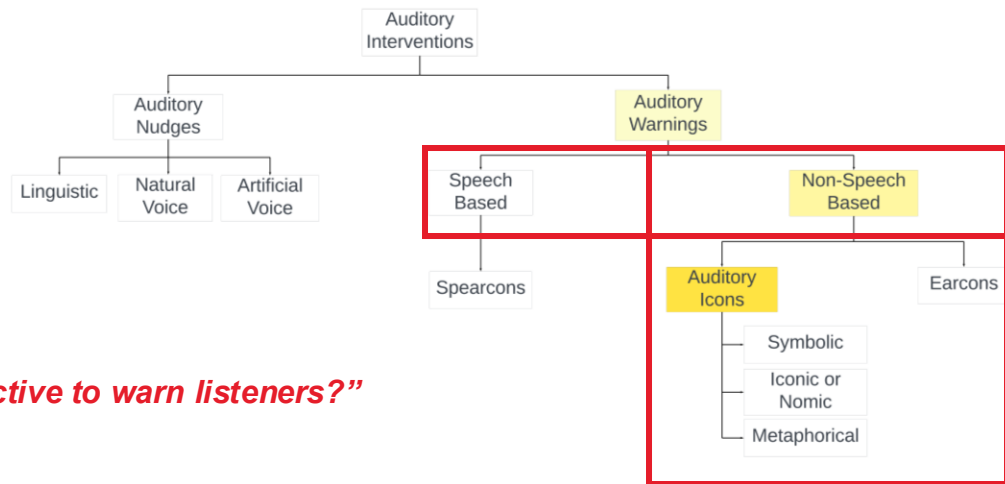
... carpenter bees are **more independent and solitary ..**



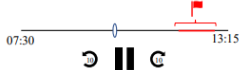
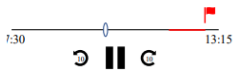
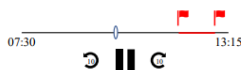
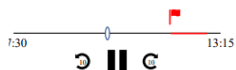
Auditory Interventions

Non-Speech-Based vs Speech-based [1,2,3]:

- more confidentiality
- speech independence
- wider applicability in different countries, languages, and dialects [1].



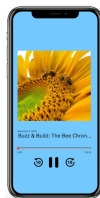
“Which type of auditory icon would be the most effective to warn listeners?”



“Where do we place the such interventions in a podcast ?”

- [1] Zhaoli Lei, Shu Ma, Hongting Li, and Zhen Yang. 2022. The Impact of Different Types of Auditory Warnings on Working Memory. *Frontiers in Psychology* 2022
- [2] Lai Jian Ming, Faieza Abdul Aziz, and Barkawi Sahari. 2008. A Study on Real-Time Auditory Feedback Technique in Manipulation Task. In 2008 International Symposium on Information Technology
- [3] Michael A Nees and Eliana Liebman. 2023. Auditory Icons, Earcons, Spearcons, and Speech: A Systematic Review and Meta-Analysis of Brief Audio Alerts in Human-Machine Interfaces. *Auditory Perception & Cognition* (2023)

Research Questions



1. Can auditory interventions in podcasts assist users in recognizing misinformation?
2. What type of auditory intervention would be the most effective design choice?
3. Where do we position such auditory interventions in a podcast?

4. What is the impact of auditory interventions on listeners?
5. Can users conceptually map the auditory interventions to misinformation?
6. Does users' pre-existing beliefs/cognitive biases impact the effectiveness and perception of such interventions?

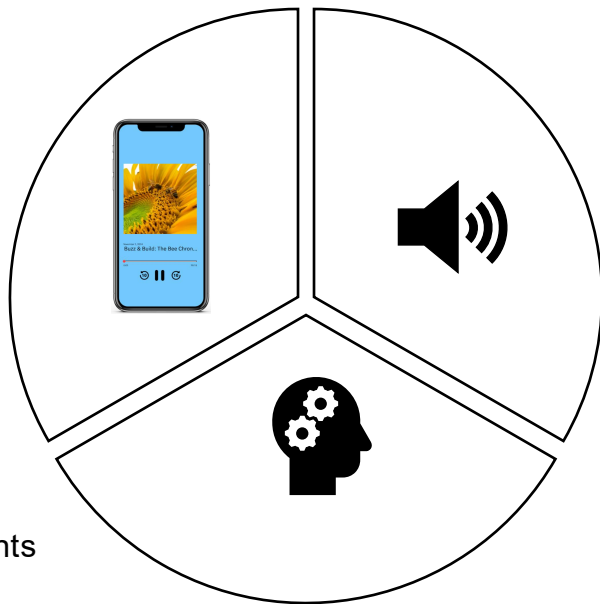
Experimental factors to consider

- Number of speakers
- Topic complexity
- Language comprehensibility
- Length of podcast
- Background music
- ...

➡ Towards controllable generation of synthetic podcasts

- Topical interest and familiarity
- Listening comprehension
- Physical/Neurological impairments
- Pre-existing belief/stance
- ...

➡ Towards understanding human factors in podcast misinformation



- Type
- Position
- Acoustic indicators (e.g., Pitch, Loudness, Sharpness, Tonality, Duration, Roughness)
- ...

➡ Towards exploring optimal acoustic attributes

Pilot (N=15)

Auditory Icons: Tackling Misinformation in Podcasts

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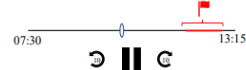
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Misinformation Detection Rate

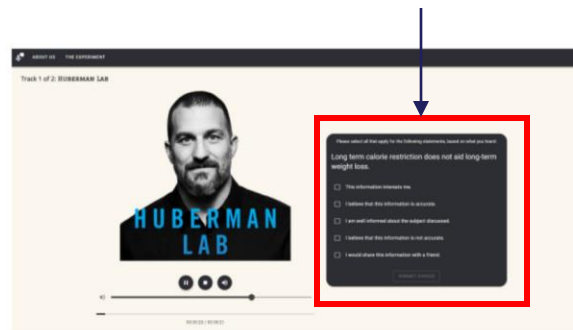


Figure 7: Listening Experience With Questions

Pilot (N=15)

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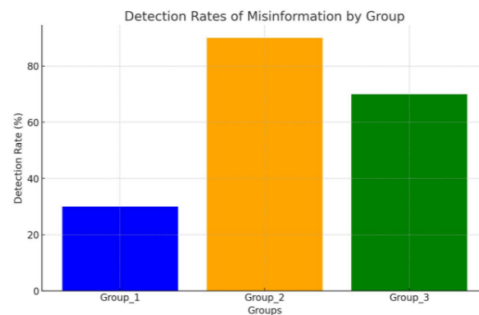
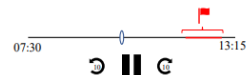
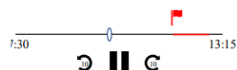
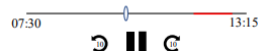
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Key Findings:

Pilot (N=15)

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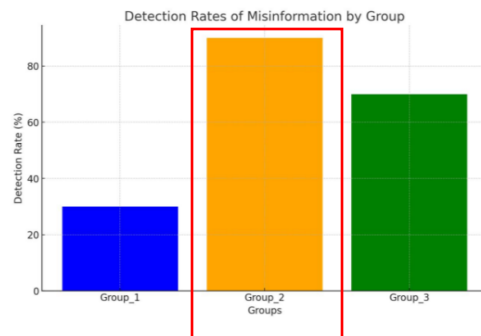
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Key Findings:

- Higher misinformation detection in case of earlier warnings.

Pilot (N=15)

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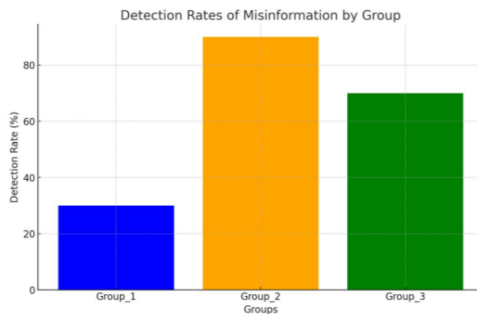
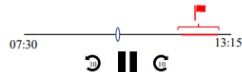
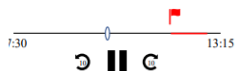
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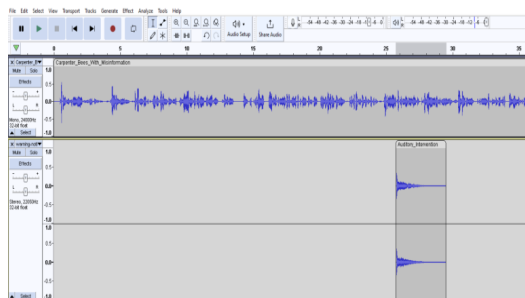
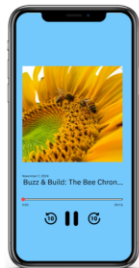
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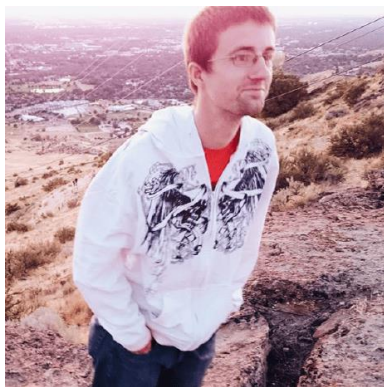


Key Findings:

- Higher misinformation detection in case of earlier warnings.
- Interventions were disruptive.
- But also hinted the listener that something was wrong.

Summary





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Thank You!

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Towards Investigating Biases in Spoken Conversational Search

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Background

- 320 million smart speakers were being used globally in 2020, estimated to grow to 409.4 million by 2024 [1].
- The popularity of ChatGPT and Bing Copilot are clear testament to users' preference for engaging in conversational search instead of the traditional ten-blue link approach.
- It comes with its own challenges.



[1] <https://www.statista.com/statistics/1122201/smart-speaker-unit-shipment/>

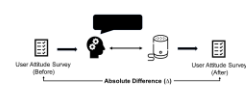
Challenges

- Constraints in quantity of information that can be transmitted over a voice-only channel [2].
- Biases in information consumption can negatively impact society especially in cases of controversial topics [3].
- User attitude can be influenced due to System Induced Bias as well as Cognitive Bias [4].

[2] Johannes R. Trippas, Damiano Spina, Mark Stockman, and Laurence Gordon. 2019. Research Presentation Abstract for a Spoken Conversational Search System. (2019 March 16).
[3] Sachin Pathiyan Cherumanal, Damiano Spina, Falk Scholer, and M. R. Suresh. 2023. Evaluating Fairness in Argument Retrieval. (ICAAI '23).
[4] M. R. Suresh, Mark Stockman, David Schuler, Johannes Trippas, and Damiano Spina. 2023. This is How We Hear: Exploring Why Biased Search Result Rankings Affect User Attitudes in Spoken Search. (CHI '23).

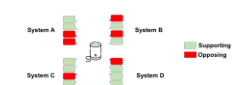
Methodology

- Simulate a search scenario controlling the System Induced Biases.
- Users are made to interact with systems of varying levels and types of bias.

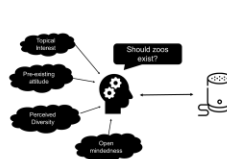


Controlled Biases

- The order in which information is presented in an interaction (System A and System B).
- The exposure of different perspectives in an interaction (System C and System D).



Variables



Expected Outcomes

- Increased system bias correlates with greater shifts in user attitudes in a voice-only search.
- Varying the exposure of different perspectives, rather than the order of presentation correlates with greater shift in user attitude and higher perceived diversity.

Proposed Future Work [5]:

- Can physiological signals provide more granular insights and help mitigate such biases?



[5] Kaito A. Sachin Pathiyan Cherumanal, Johannes R. Trippas, Damiano Spina, Falk Scholer, and Damiano Spina. Towards Detecting and Mitigating Cognitive Bias in Spoken Conversational Search. (CHI '23).

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