BIASsist = Bias + Assist

Empowering News Readers via Bias Identification, Explanation, and Neutralization

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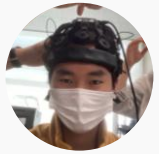
MinJu Han



Junryeol Jeon

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CHI 2025

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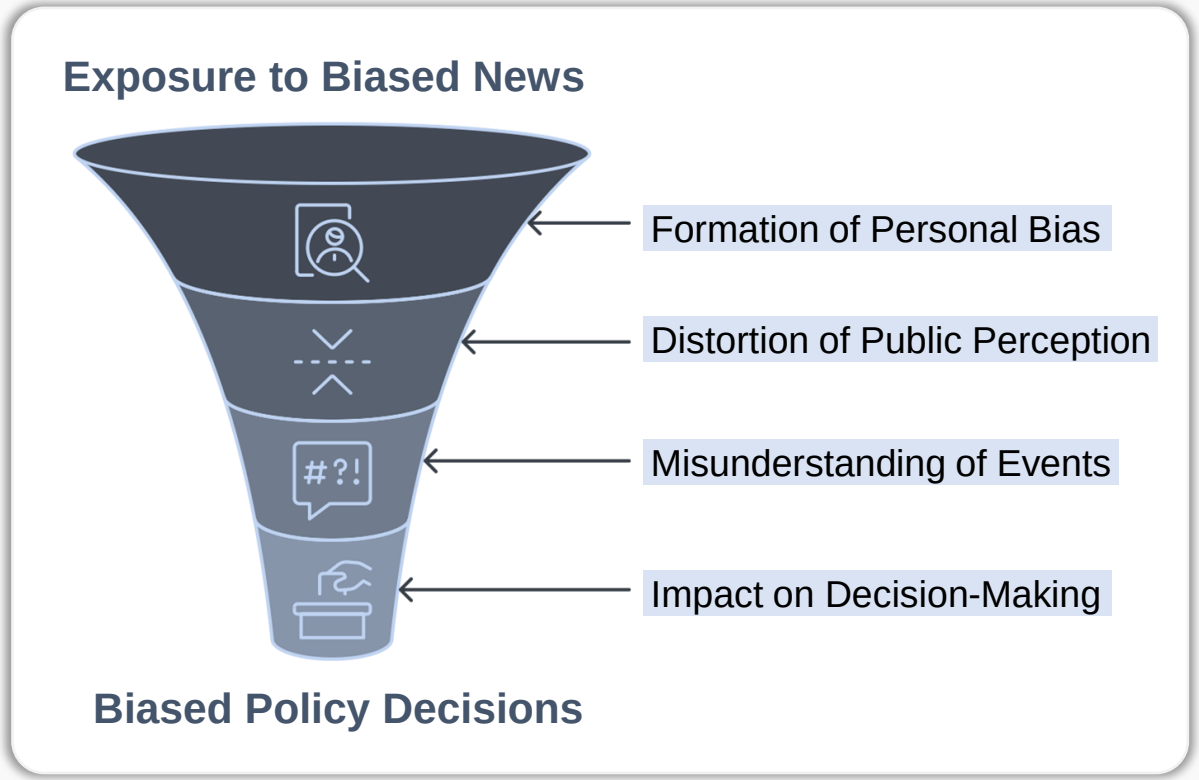
Introduction & Motivation

Biased news articles can distort readers' perceptions

• Negative Consequences of Exposure to Biased News



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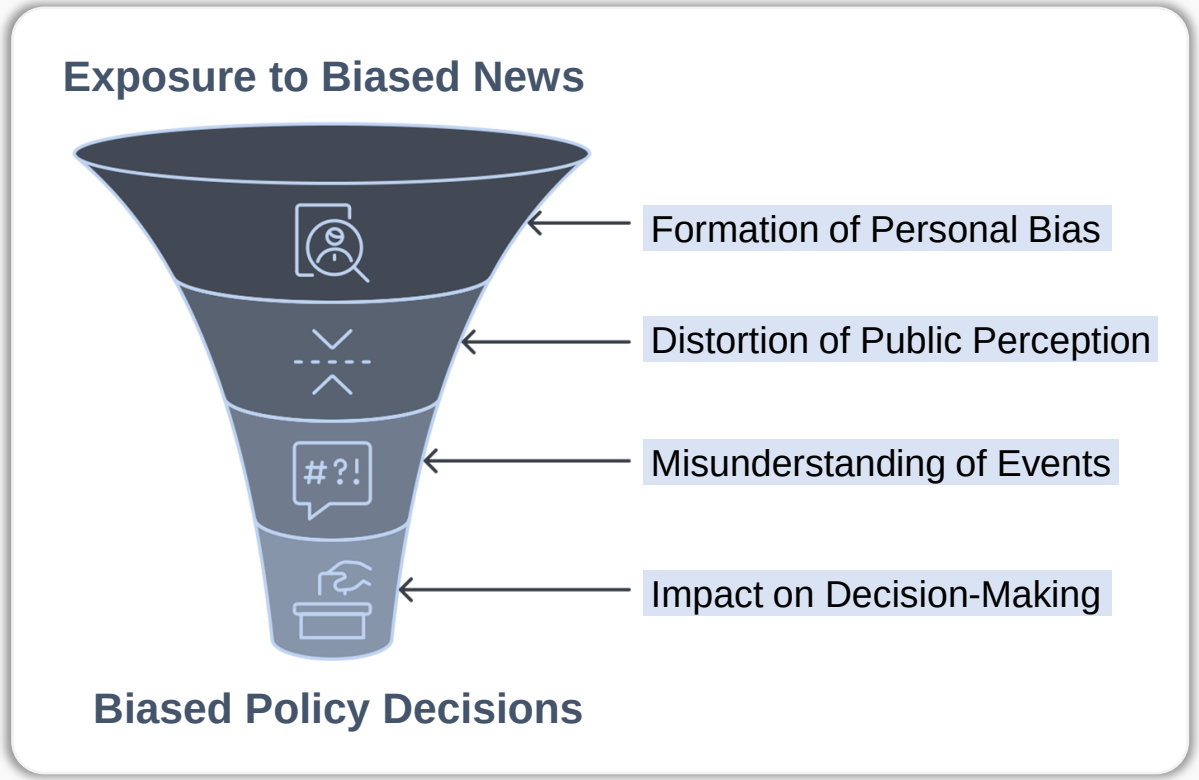
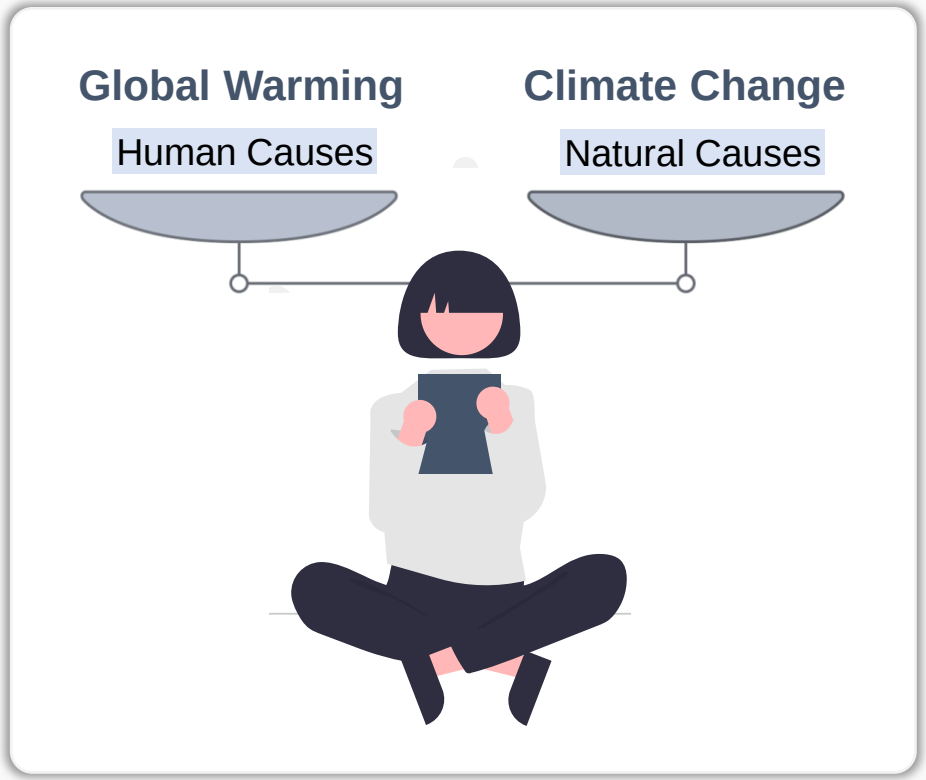


• The Impact of Terminology on Perception

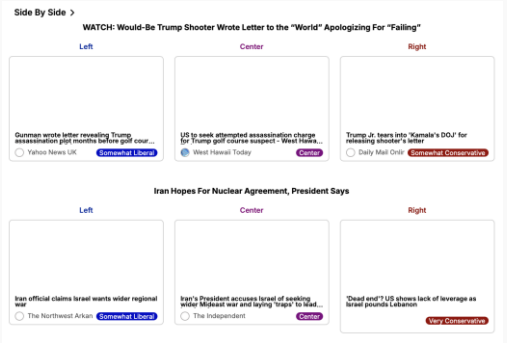


Related Works

Many tools assist with article comparison or search but offer limited explanation of various bias types

Comparison-based tools

Biasly [8]



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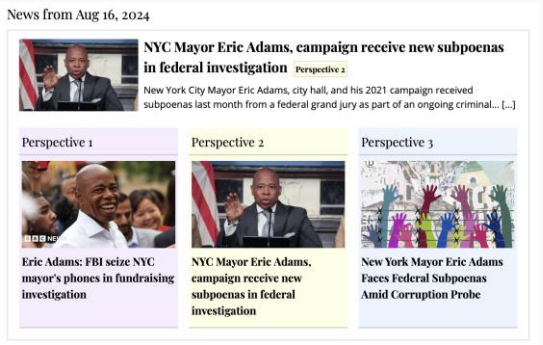
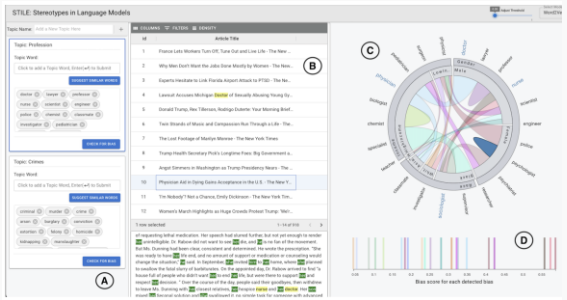
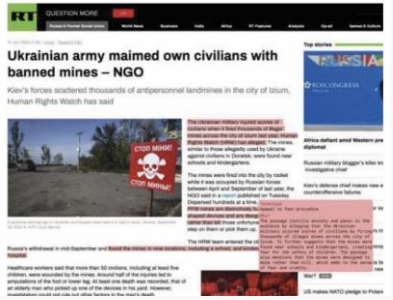


Interactive tools

STILE [10]



ClarifAI [11]



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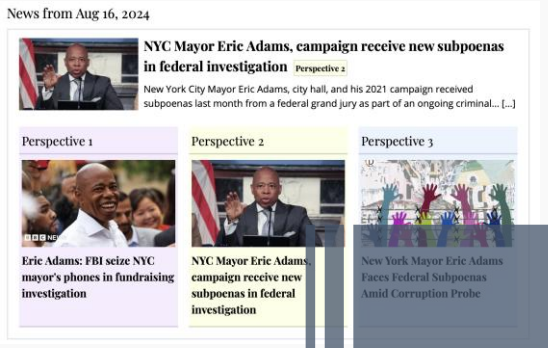

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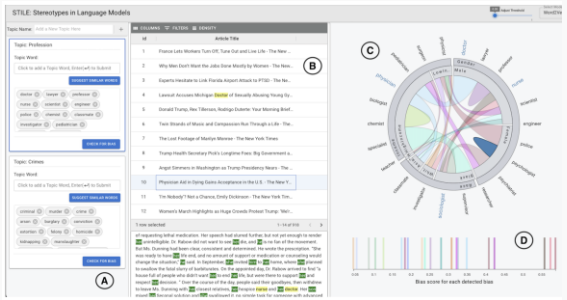

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BIASsist

Contributions

The key contributions of this work are:

(1)BIASsist Development

: Designed an LLM-based tool to enhance **bias identification, explanation, and neutralization** across **six bias types**.

(2) Empirical Insights

: Conducted a **mixed-method study** to assess user perception changes and validate the tool's effectiveness.

(3) Implications & Future Research

: Highlighted the **tool's role** in fostering critical reading and discussed **potential concerns**.

Key Concept of BIASsist

Six Types of Bias & Three Assistive Components

- **Word Choice / Expression**
  - 1 **EMX** — Emphasizing/Mitigating Expression
  - 2 **EmoX** — Emotional Expression
- **Authors' Involvement**
  - 3 **AOV** — Author's Opinion or Viewpoint
  - 4 **SpecIE** — Speculation based on Insufficient Evidence
- **Selective Attention to Sources**
  - 5 **ASC** — Attention to Specific Cases
  - 6 **APS** — Attention to Particular Standpoint

Example of EMX

Biased	This incident is a **major disaster caused by** the government's **severe incompetence.**
Neutral	This incident is **evaluated as a challenge in** the government's **response**.

Example of AOV

Biased	Thib bill **will certainly make** people's lives more **difficult.**
Neutral	**Analyses by experts have rasied concerns** about the impact of this bill on peoples's lives.

Example of ASC

Biased	The drunk driving of athlete A caused a social uproar. **Similary, last year, athelet B and C also...**
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Six Types of Bias & **Three Assistive Components**

Original Article

Prosecutors missed capturing a high-priority fugitive they had been pursuing for four months, letting him slip away in an absurdly careless manner right before their eyes. Although they knew in advance that that the fugitive was at a motel with this woman, they attempted an arrest too casually and ended up failing.

Asasistive Component

(1) Identification

Bias Type

The detected bias type is 'Emotional Expression(EmoX)'.

(2) Explanation

Explanation

The reasons for detecting bias in this article are as follows. The expression 'letting him slip away in in an absurdly careless manner' uses an emotional and dramatic tone to describe the incident, making it appear more sensational. This may evoke emotional responses from readers, potentially hindering objective reporting.

(3) Neutralization

Neutralized Article

Prosecutors missed capturing a high-priority fugitive they had been pursuing for four months, as he managed to escape during the arrest attempt. Although they knew in advance that that the fugitive was at a motel with this woman, they failed to apprehend him.

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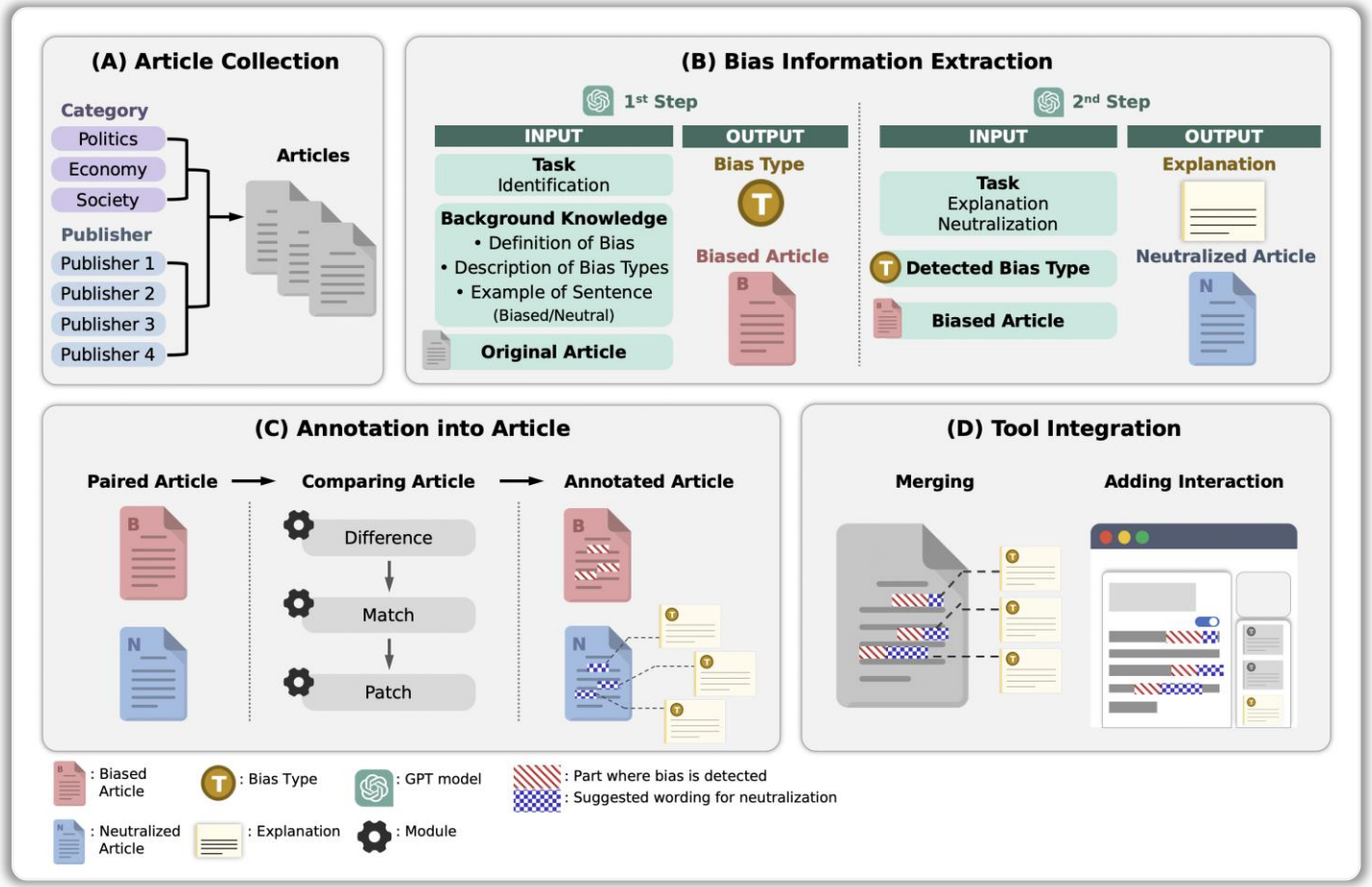
System Overview

BIASsist pipeline and Implementation



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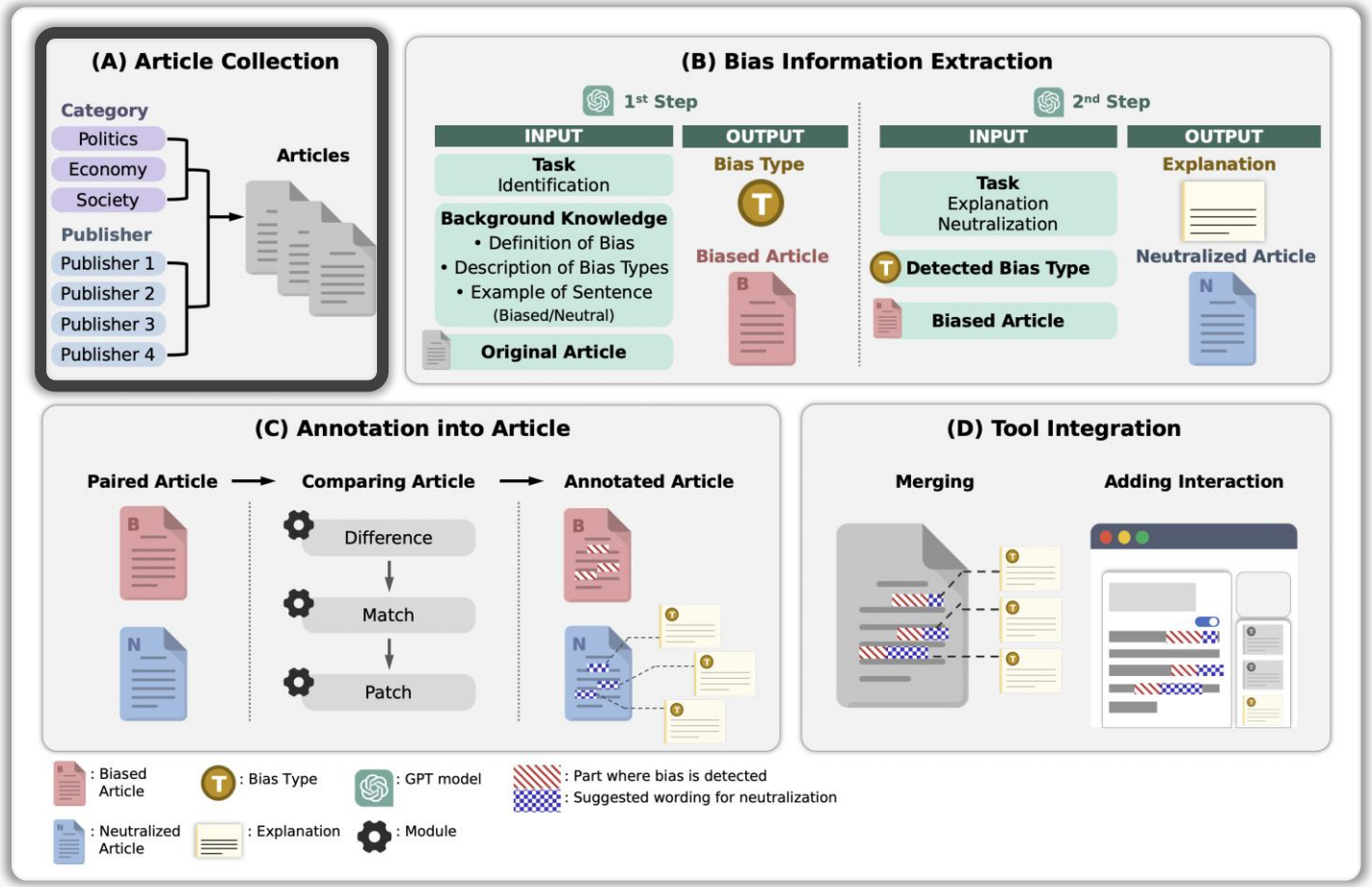

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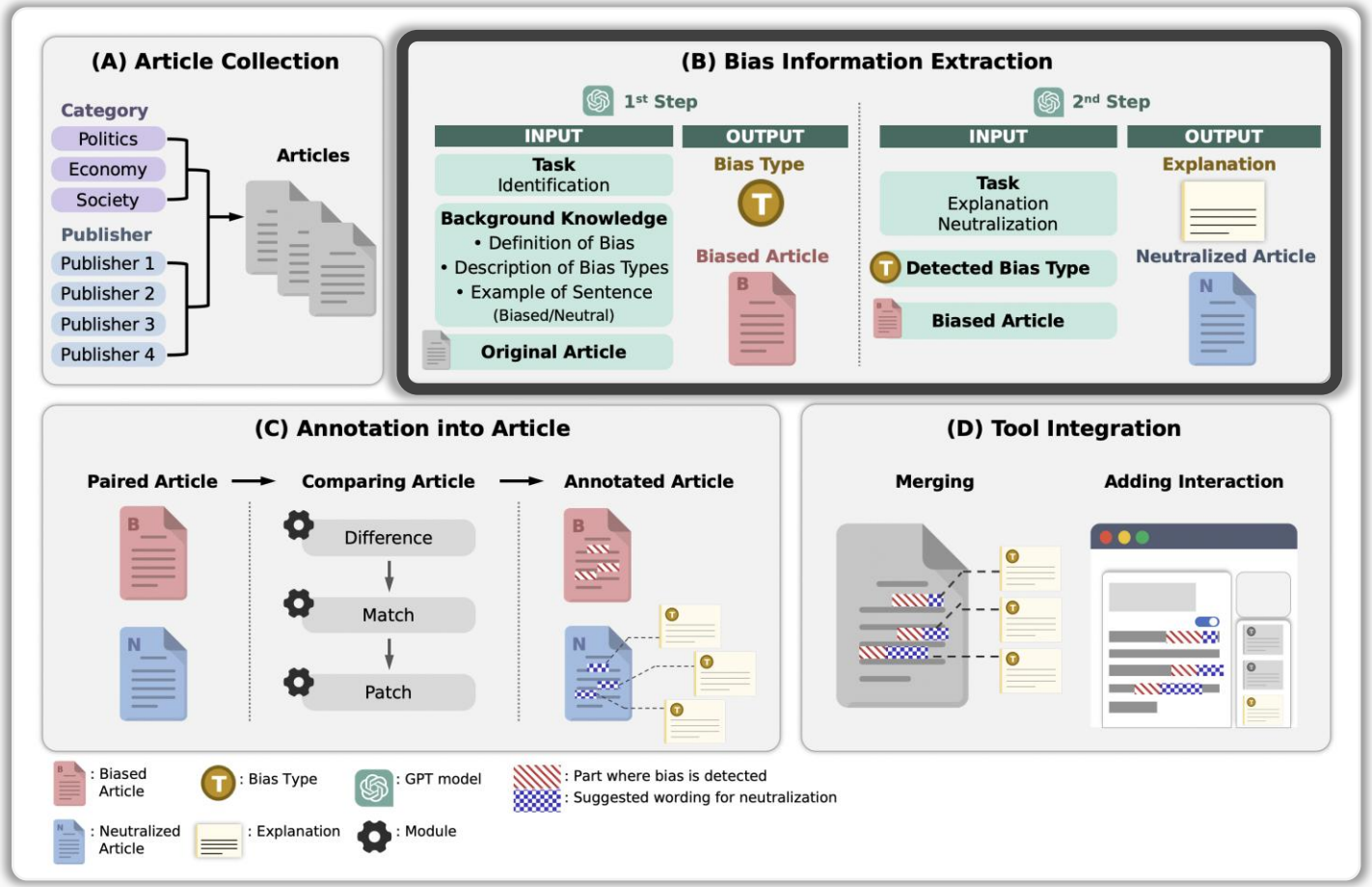

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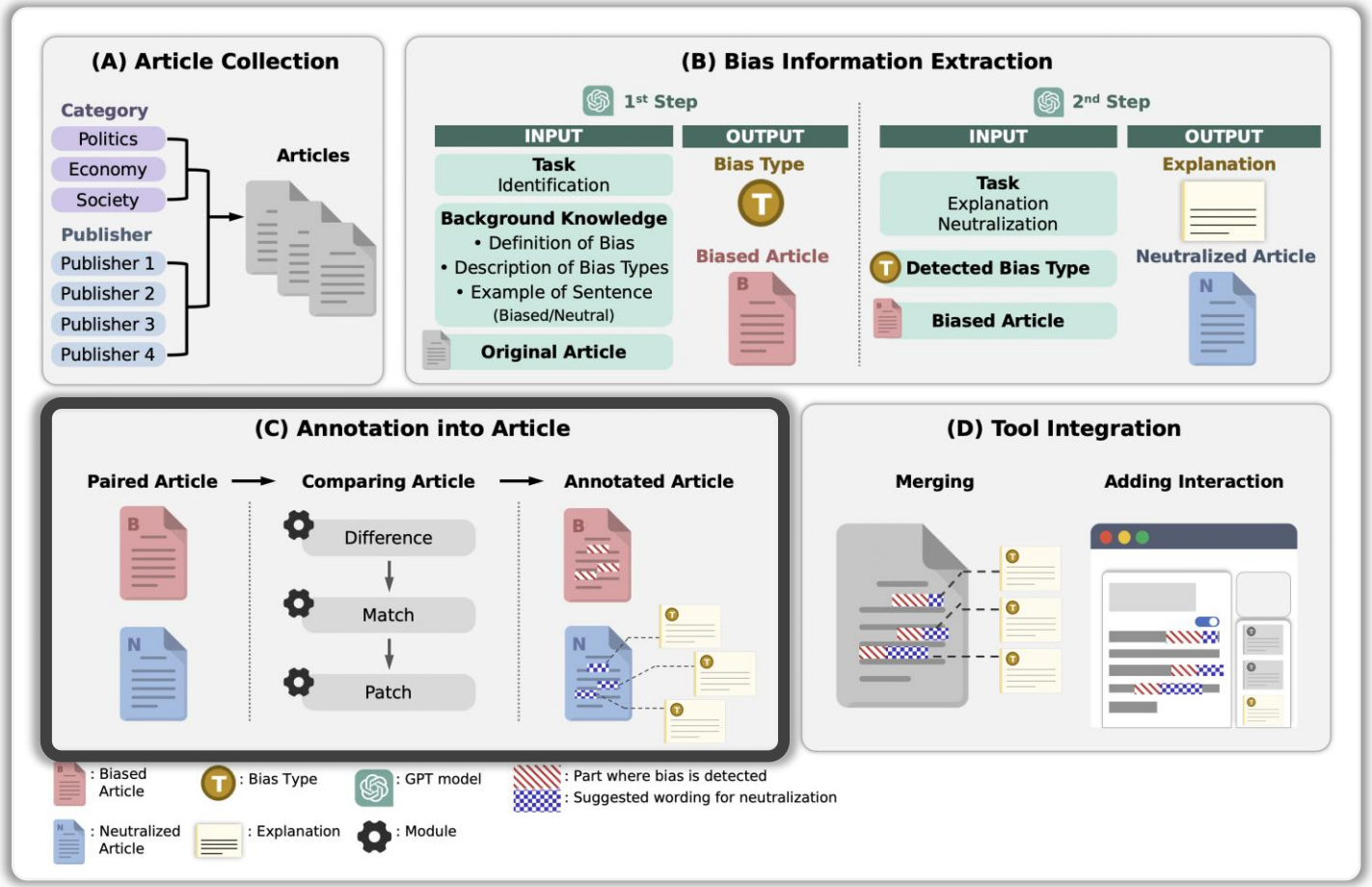

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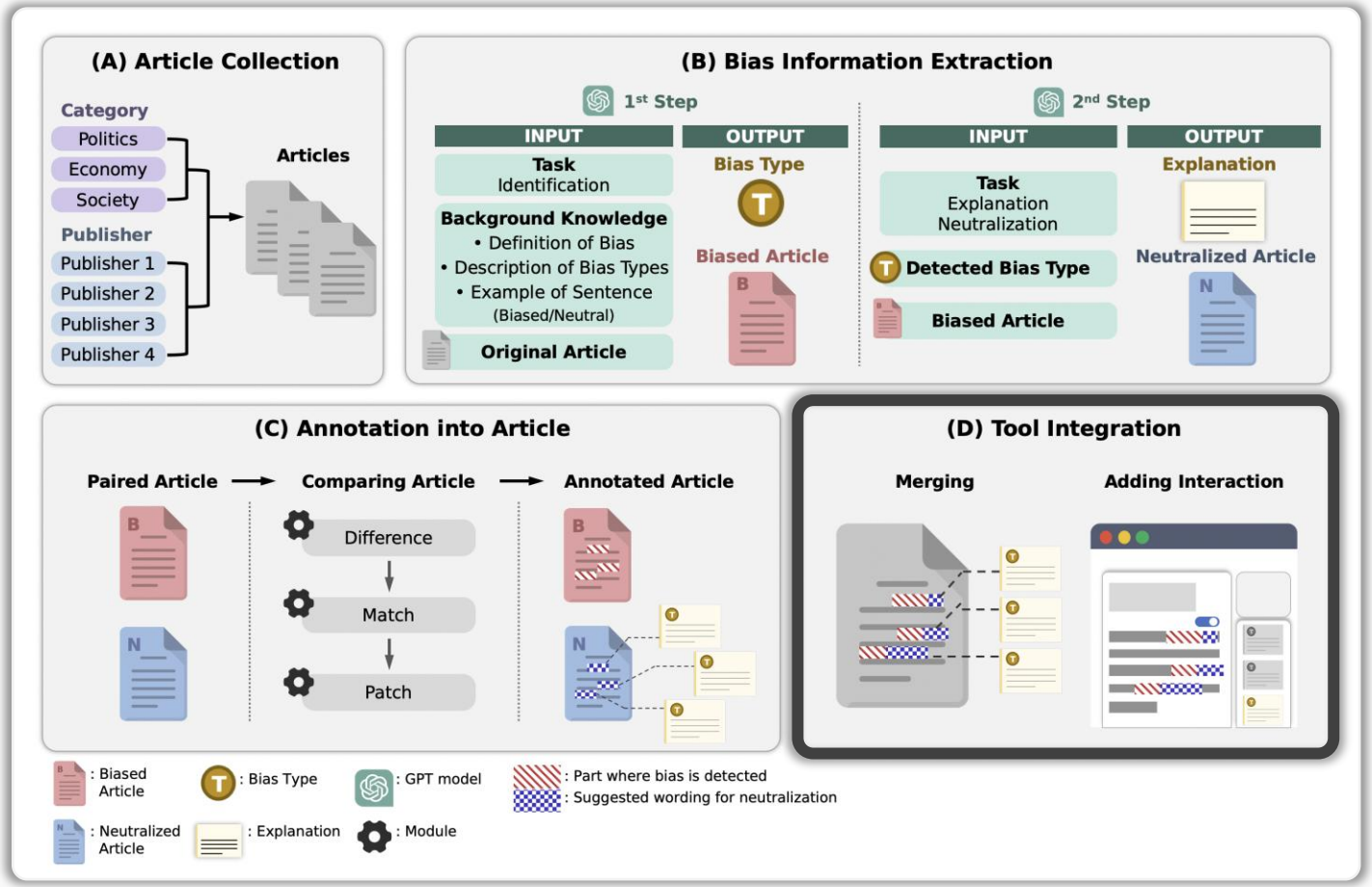
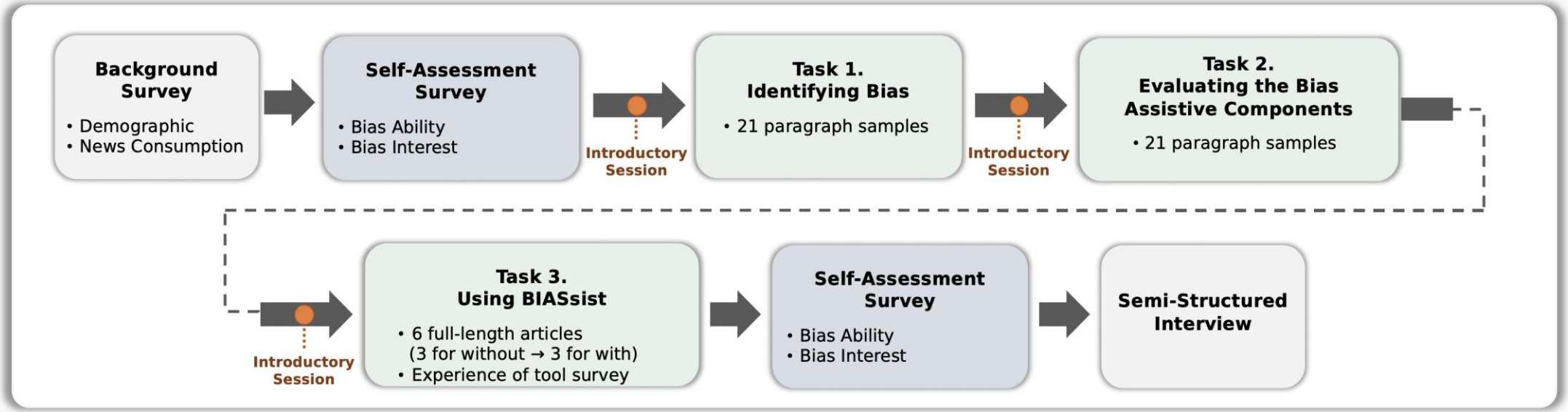


User Study

• Study Design

- **Within-subjects** design
- **36 participants** recruited
  - age from 18 to 55 years (M=25.3, SD=8.2)
  - 21 females (58.3%) and 15 males (41.7%)

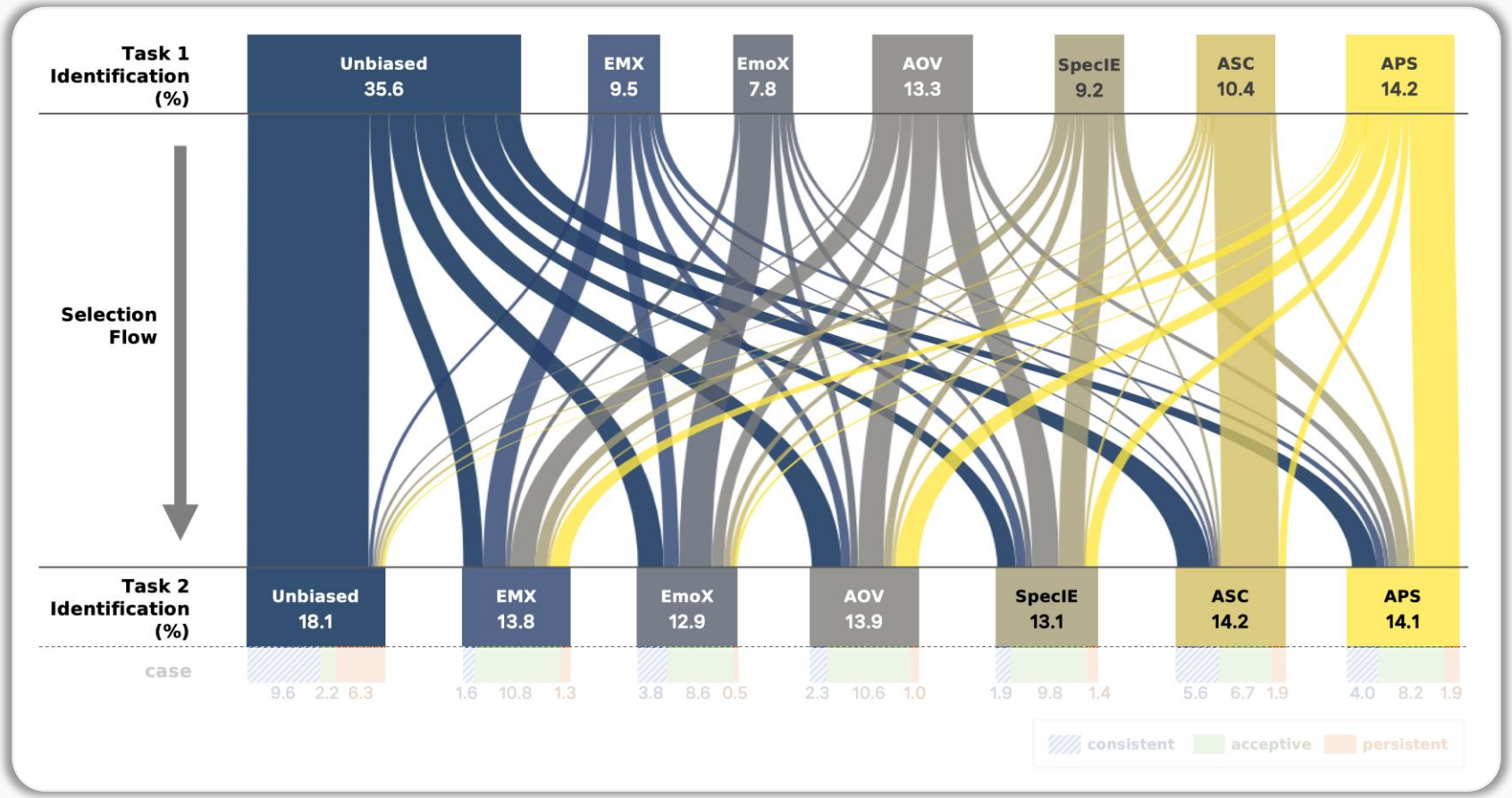
• Procedure



Result 1 : Selection Flow between Initial Choice to Assisted Choice

Task 1 Task 2

- Re-assessing the bias in articles initially judged as unbiased reduced the proportion considered unbiased from 35.6% to 18.1%.



(For detailed results of Task 1 and Task 2, refer to Table 4 and Table 5.)

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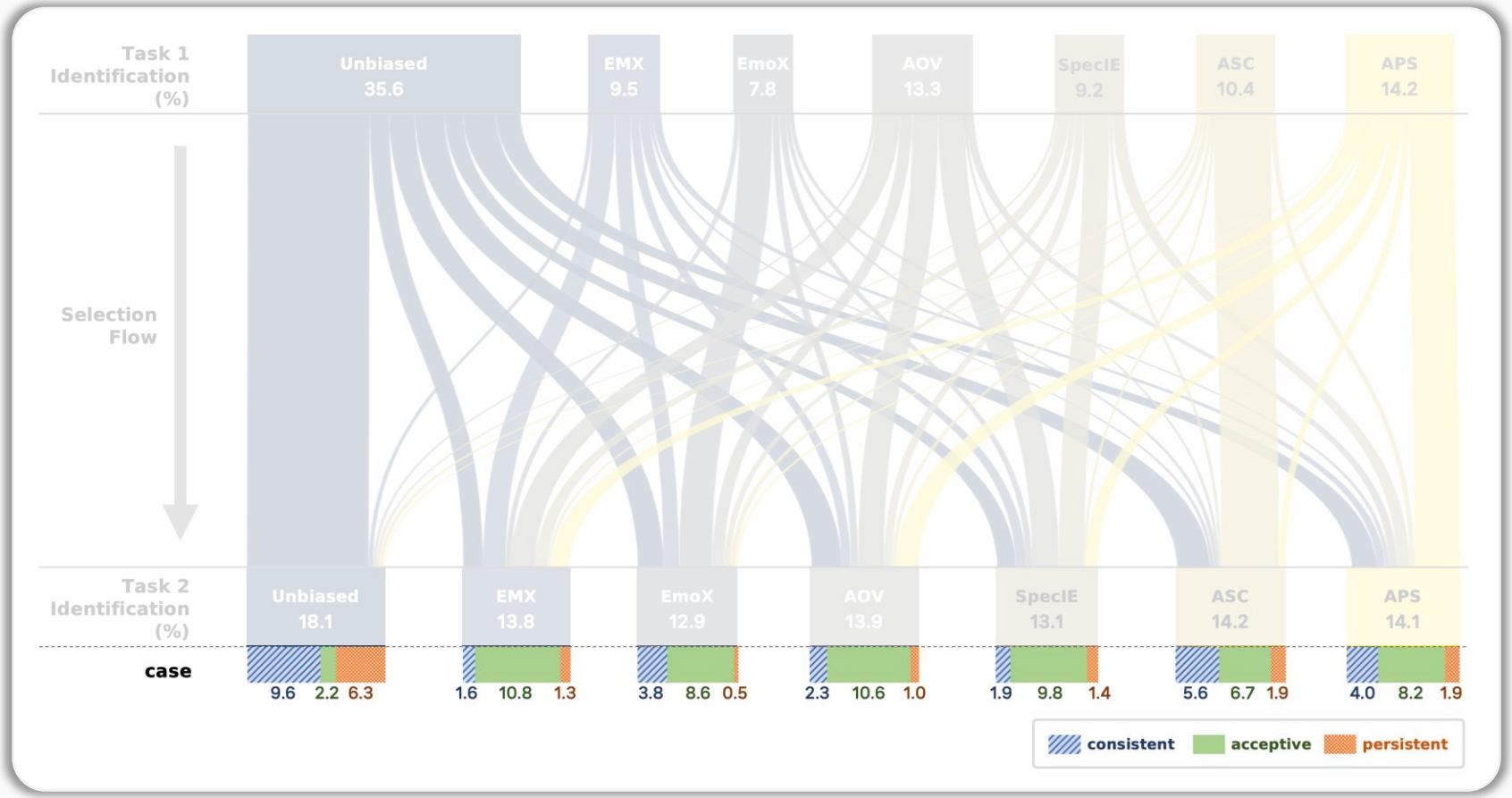
Task 1 Task 2

- Reflecting flexible opinion adjustments, three response categories emerged—consistent (28.8%), acceptive (56.9%), persistent (14.3%)

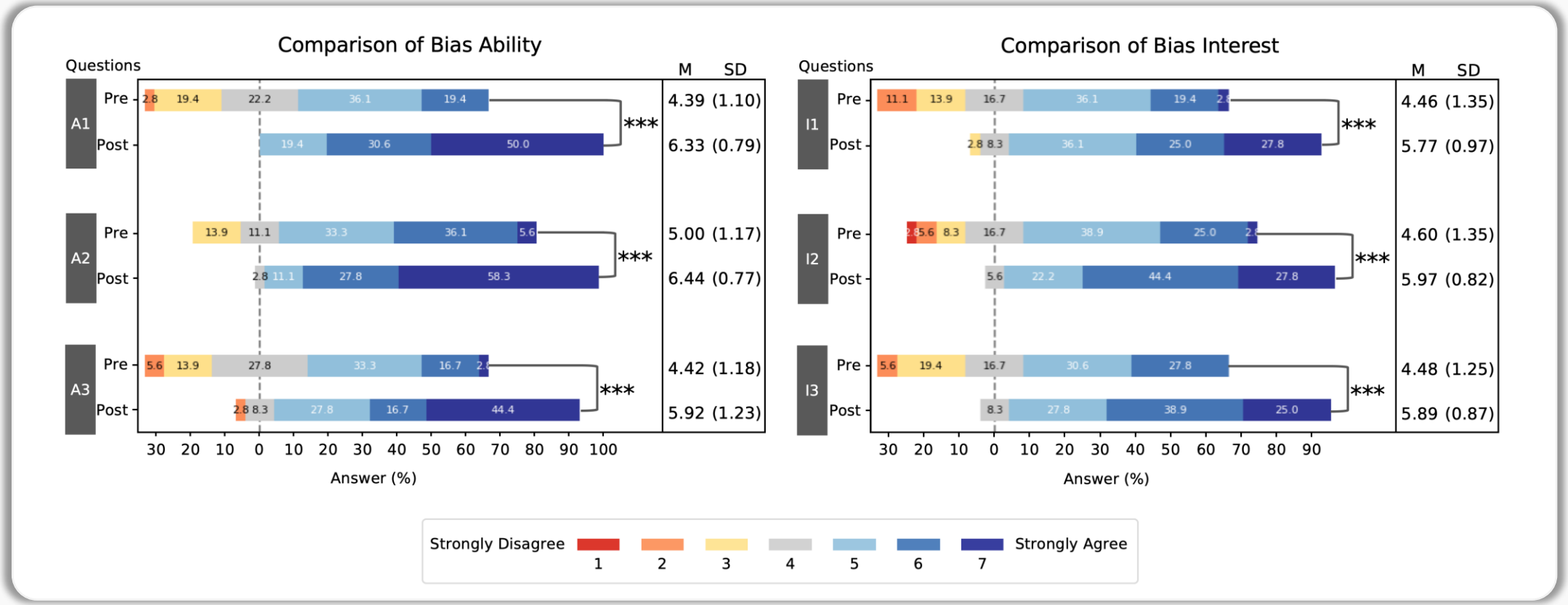


(For detailed results of Task 1 and Task 2, refer to Table 4 and Table 5.)

Result 2 : Bias Self-Assessment Survey

Comparison between pre and post experience

- Paired-t test showed significant differences ($p < .001$) across all items in both the Ability and Interest categories



Result 3 : Findings from the Interviews (1/2)

Enhanced Bias Awareness & Perspective Broadening

• Initially overlooked subtle biases – enhanced recognition through direct comparison with neutralized expressions.

P35 - *"If you've already seen a biased article, it can be **hard to imagine a neutral expression** on your own. But seeing the same content expressed neutrally made it clearer to me."*

Balancing Content Understanding & Bias Detection

• Simultaneously understanding content and detecting bias was challenging—BIASsist empowered both.

P4 - *"When I didn't know much about the topic, I **focused too much on understanding** the content and couldn't think about bias. This tool has been really **helpful**."*

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Result 3 : Findings from the Interviews (2/2)

Encouraging Critical Thinking & Reader Autonomy

• Averting forced corrections and censorship—empowering user autonomy to critically assess

P6 - *"I felt more **empowered** using the toggle because it reflected my intention to judge bias, **rather than just passively reading the article**."*

Concerns & Improvements

• Expert quote removal—raising information loss concerns.
• Suggestions include credibility scores and adjustable neutralization intensity.

P21 - *"If it could tell me **numerically** how biased it is, I would trust the tool much more. An **absolute score** would also allow me to compare it with other articles"*

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Limitations & Future Work

1. Beyond Textual Bias

- Does not analyze headlines, images, or article layouts, which also influence perception.

2. Real-World Application & Long-Term Study Needed

- Study conducted in a controlled environment with short-term user exposure.
- Requires longitudinal studies to assess long-term effects on media literacy

3. Personalized Bias Neutralization

- Users have different tolerance levels for bias neutralization intensity.
- Future work: Allow users to adjust the level of rephrasing based on preferences.

4. Hallucination Risks

- LLM-generated explanations and rewordings may introduce hallucinations.
- Retrieval-Augmented Generation (RAG) could help ground neutralization in factual sources.

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