



International Society  
for Traumatic Stress Studies

# 41st Annual Meeting

# Frontiers in Traumatic Stress

*Global Perspectives and Creative Solutions*

**September 17-20, 2025**

Baltimore Marriott Waterfront  
Baltimore, MD



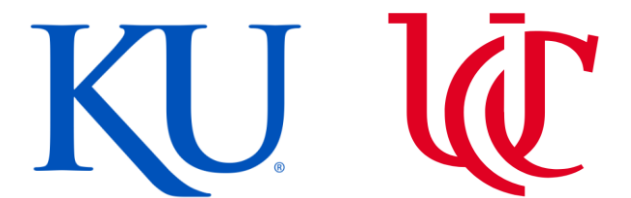


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## Computational Analysis of Multimodal Behavior in Telehealth Trauma Interviews

Yang, Jun, Welch, Sprunger, & Girard  
September 18, 2025



# Continuing Medical Education Financial Disclosure

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In the past 24 months, I (Yuanyuan Yang), have not had financial relationships with any ineligible companies.

# Assessment

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- **PTSD complexity:** high heterogeneity and high comorbidity.
- **Gold Standard CAPS-5 Interview:** resource-intensive, requires extensive training, and time-consuming in some settings.
- **Self-report PCL-5:** Scalable, but vulnerable to bias.
  - Clinician-patient gap in PTSD symptoms reporting
- Scalable and objective clinical assessment tool needed.

# Innovations

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- **Affective Computing:** methods to analyze emotion and affective behavior
- **Unimodal vs. Multimodal Measurement**
  - **Verbal:** word count, lexicon, syntax, semantics
  - **Vocal:** pitch variability, speech rate, voice quality/tension
  - **Visual:** facial expressions, body pose, head movements
- **Scalable tools:** microphones, webcams, telehealth, smart phones



# Methods

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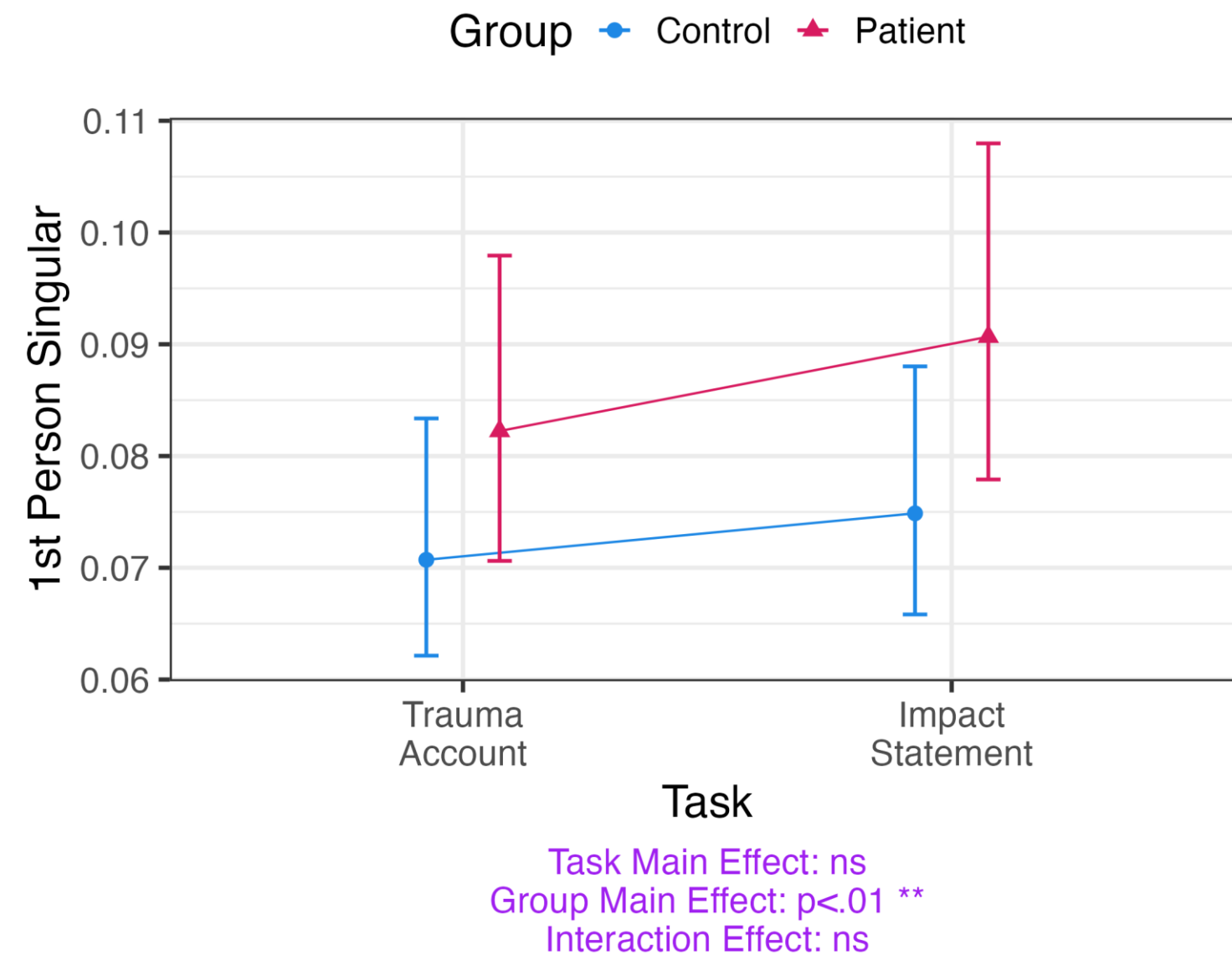
- Two groups of participants (verified by CAPS-5) for a pilot study:
  - **53 Patients:** treatment-seeking individuals *with* PTSD
  - **40 Controls:** trauma-exposed individuals *without* PTSD
- All completed behavioral tasks (~20 min) and were video-recorded via Zoom
  - **Trauma Account:** what happened and what did you think and feel?
  - **Impact Statement:** why did it happen and how has it impacted your life?

Verbal	Vocal	Visual
<b>Sentiment</b> emotional tone (– to +)	<b>Pitch Variability</b> rises and falls in pitch	<b>Facial Action Units</b> e.g., AU6 cheek raiser
<b>LIWC word categories</b> e.g., first-person pronouns	<b>H1-H2</b> reflects vocal tension	<b>Head Pose</b> up-down and left-right
<b>Word Count</b> total number of words	<b>CPPS</b> reflects vocal clarity	<b>Head Movement</b> pose changes over time
<i>(LLaMA 3.3, LIWC-22)</i>	<i>(OpenSMILE 3.0, Praat 6.4)</i>	<i>(OpenFace 2.0)</i>

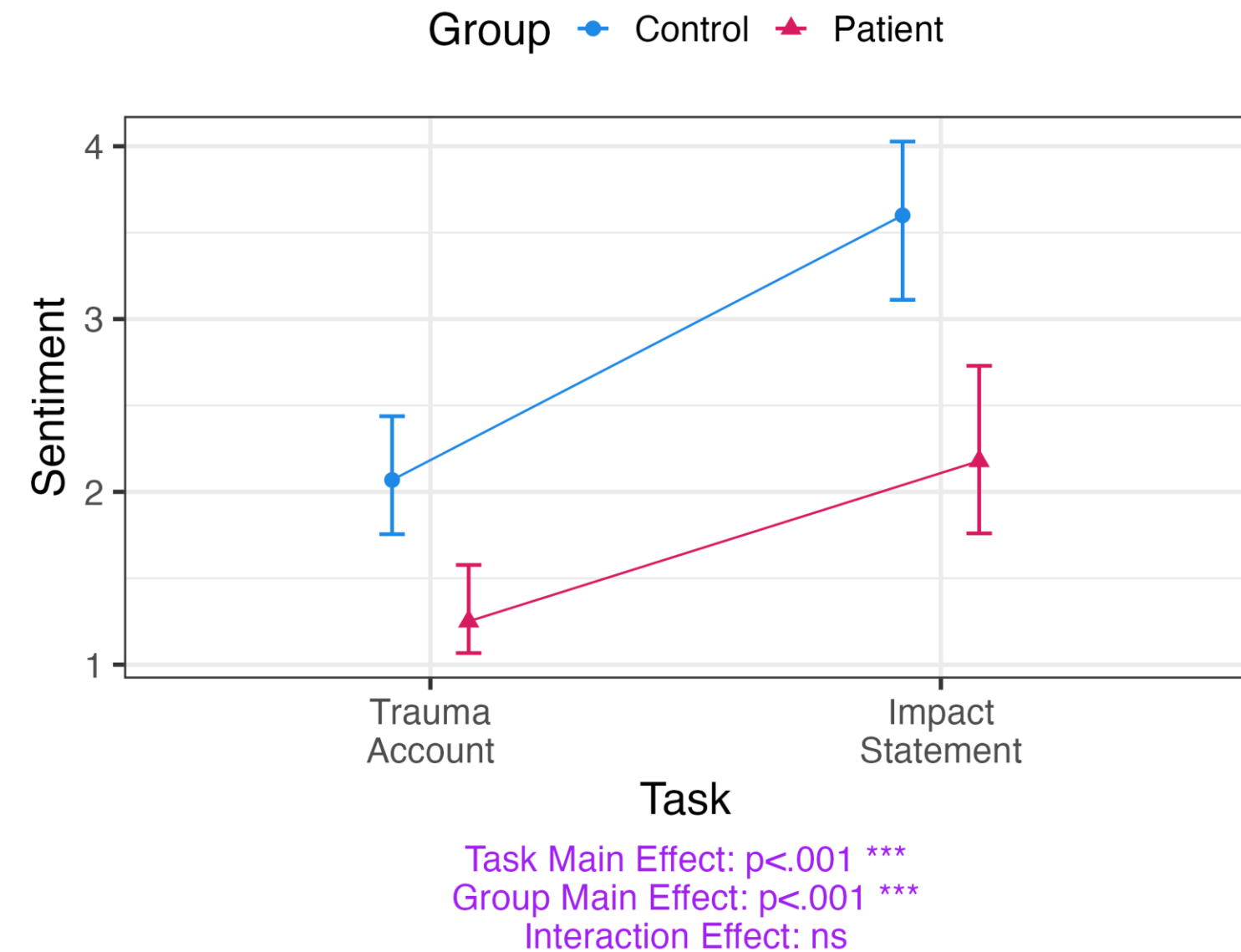
Bayesian multilevel models estimated group and task effects with demographic controls:

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brm(feature ~ 1 + task*group + age + sex + (1 | participant), ...)
```

# Results: Verbal



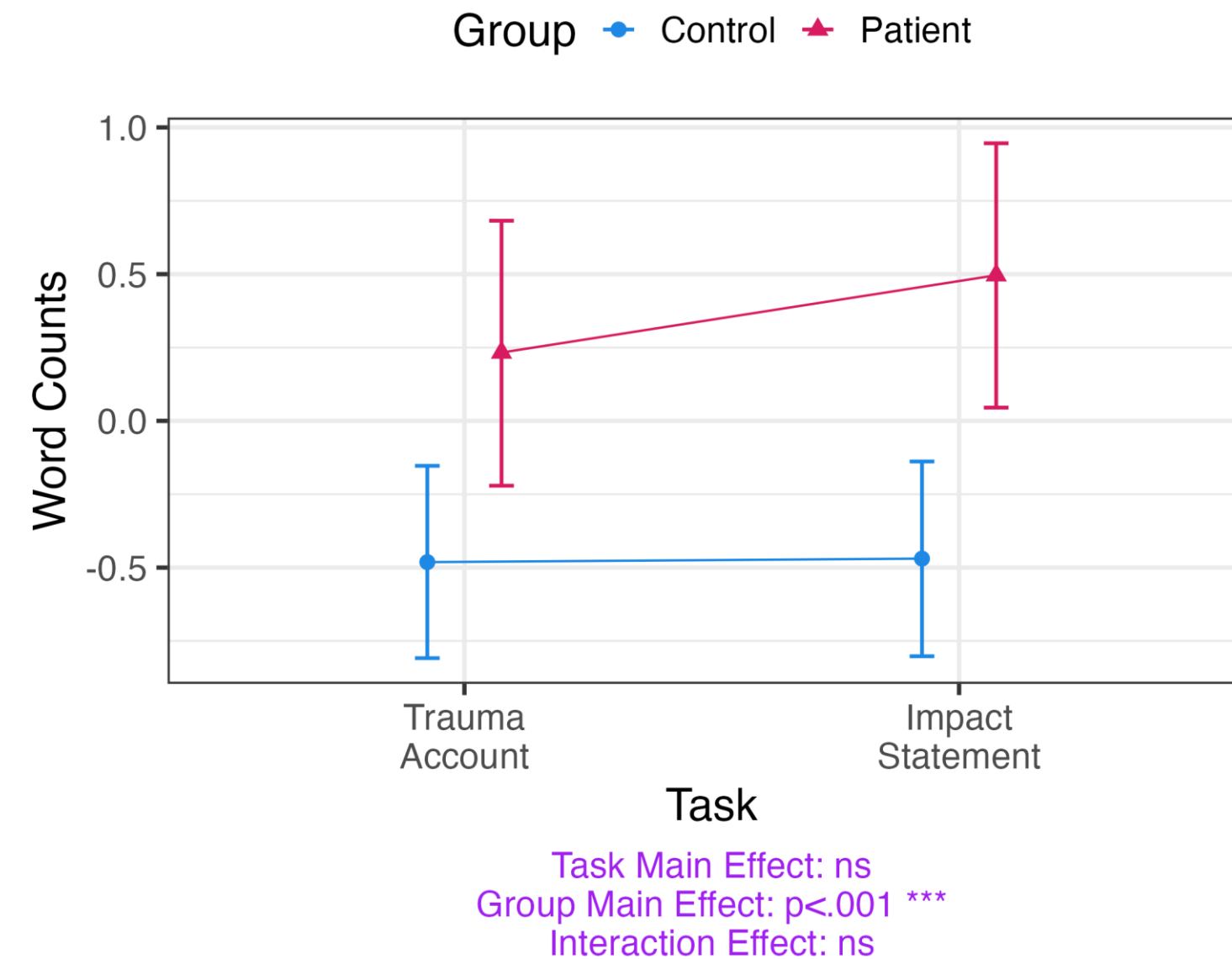
Patients used **more first-person singular pronouns** (e.g., I, me, my) than Controls



Patients had **lower sentiment** (more negative emotional tone) than Controls

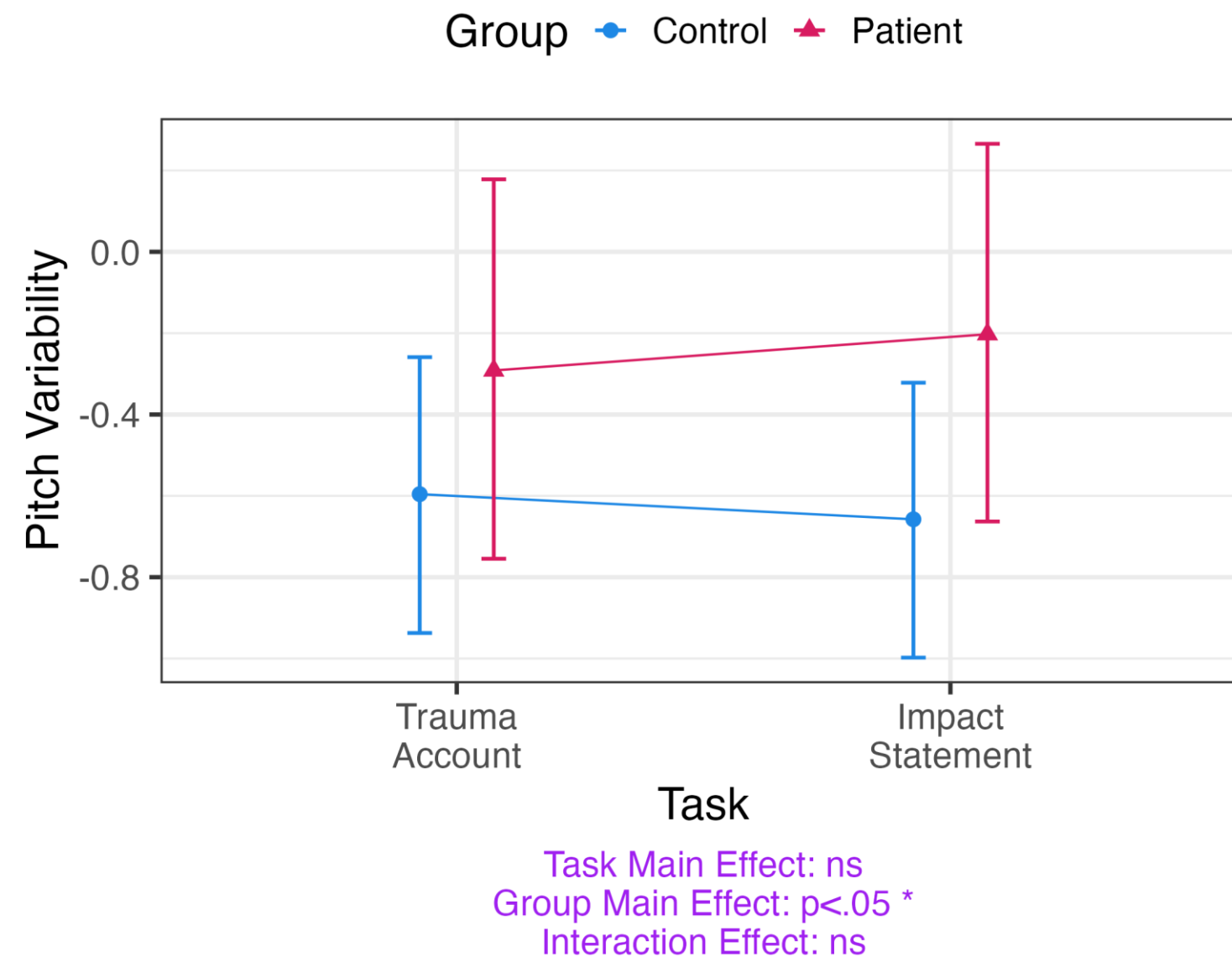


# Results: Verbal

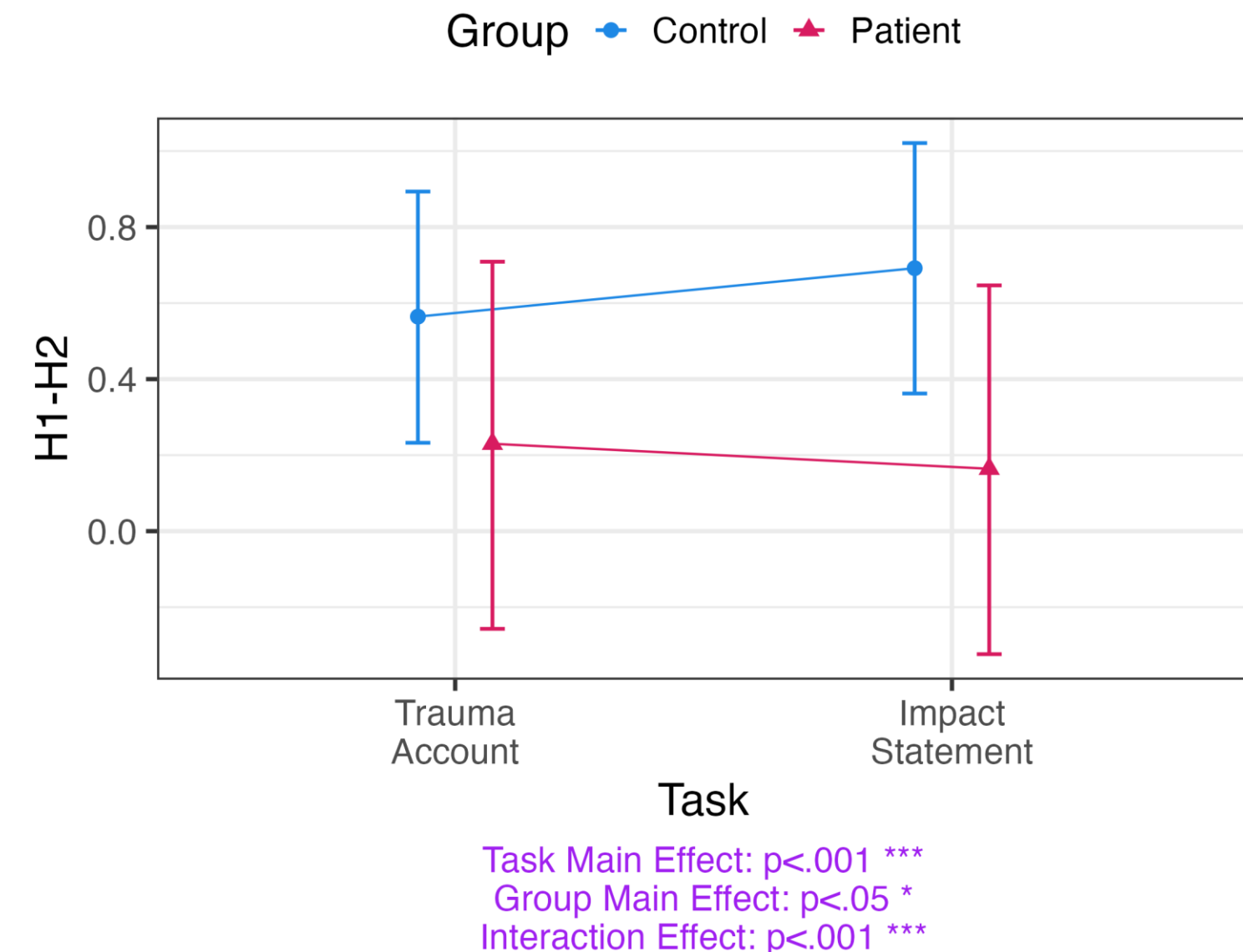


Patients had **higher word counts** (used more words overall) than Controls

# Results: Vocal

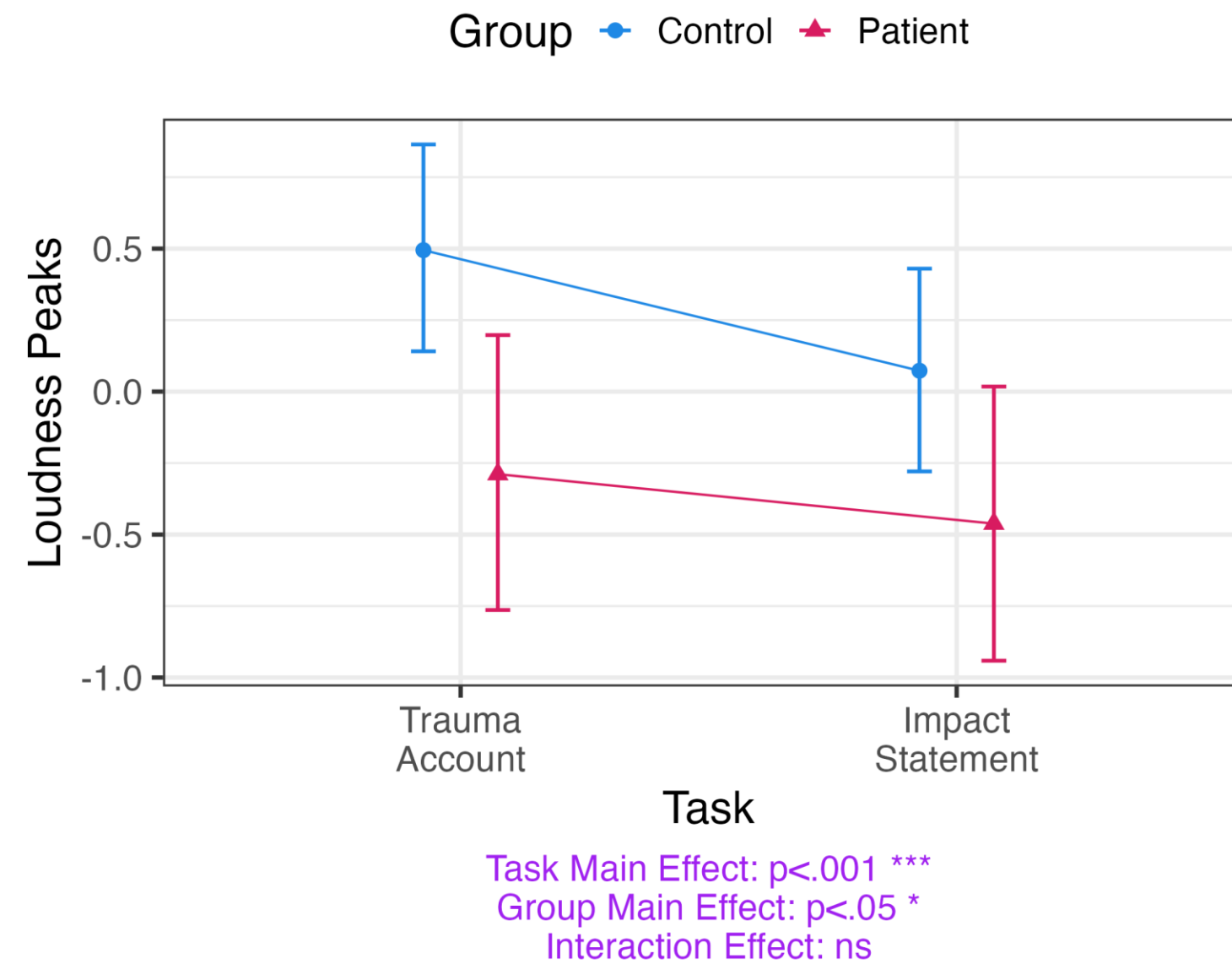


Patients exhibited **more variability in vocal pitch** (greater rises and falls in pitch) than Controls



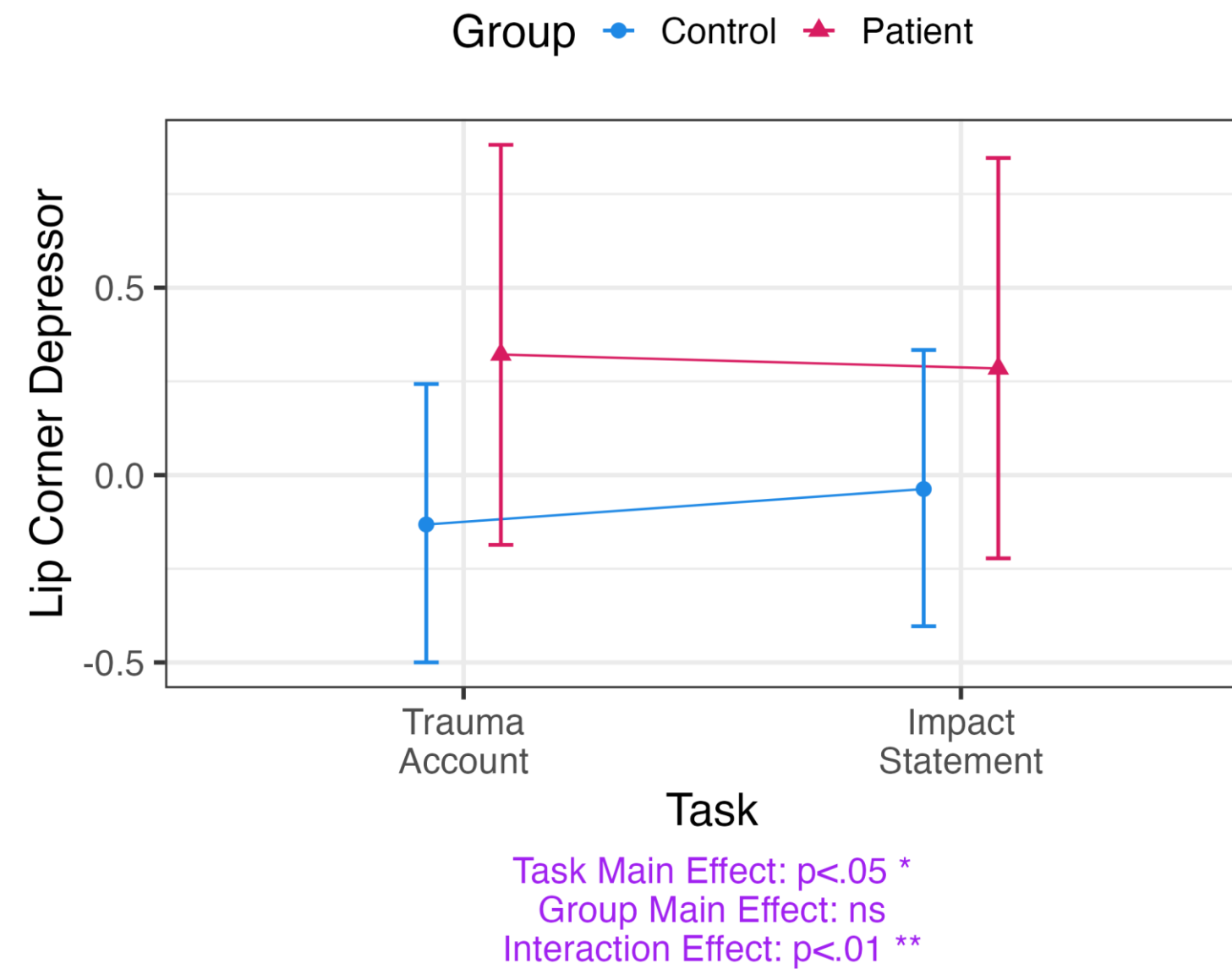
Patients had **lower H1-H2** (suggesting greater vocal tension) than Controls, especially in the Impact Statement task

# Results: Vocal



Patients produced **fewer loudness peaks** (reflecting less variation in vocal emphasis) than Controls

# Results: Visual



Patients had **higher AU15 activation** (more mouth frowning) than Controls, but only during the Trauma Account.



# Discussion

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- Behavior significantly differed between PTSD Patients and trauma-exposed Controls
  - Group differences were found in all three modalities/channels of communication
- Both behavioral tasks (Impact Statement and Trauma Account) were informative
  - Some patterns generalized across both tasks, while others were task-specific
  - Future PTSD research and assessment should include multiple task contexts
- We hope to improve the scalability, efficiency, and objectivity of PTSD assessment



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# THANK YOU!

Yang, Y., Jun, D., Welch, B. M., Sprunger, J. G., & Girard, J. M.

Learn more at: [affcom.ku.edu/posts/istss2025](https://affcom.ku.edu/posts/istss2025)

