

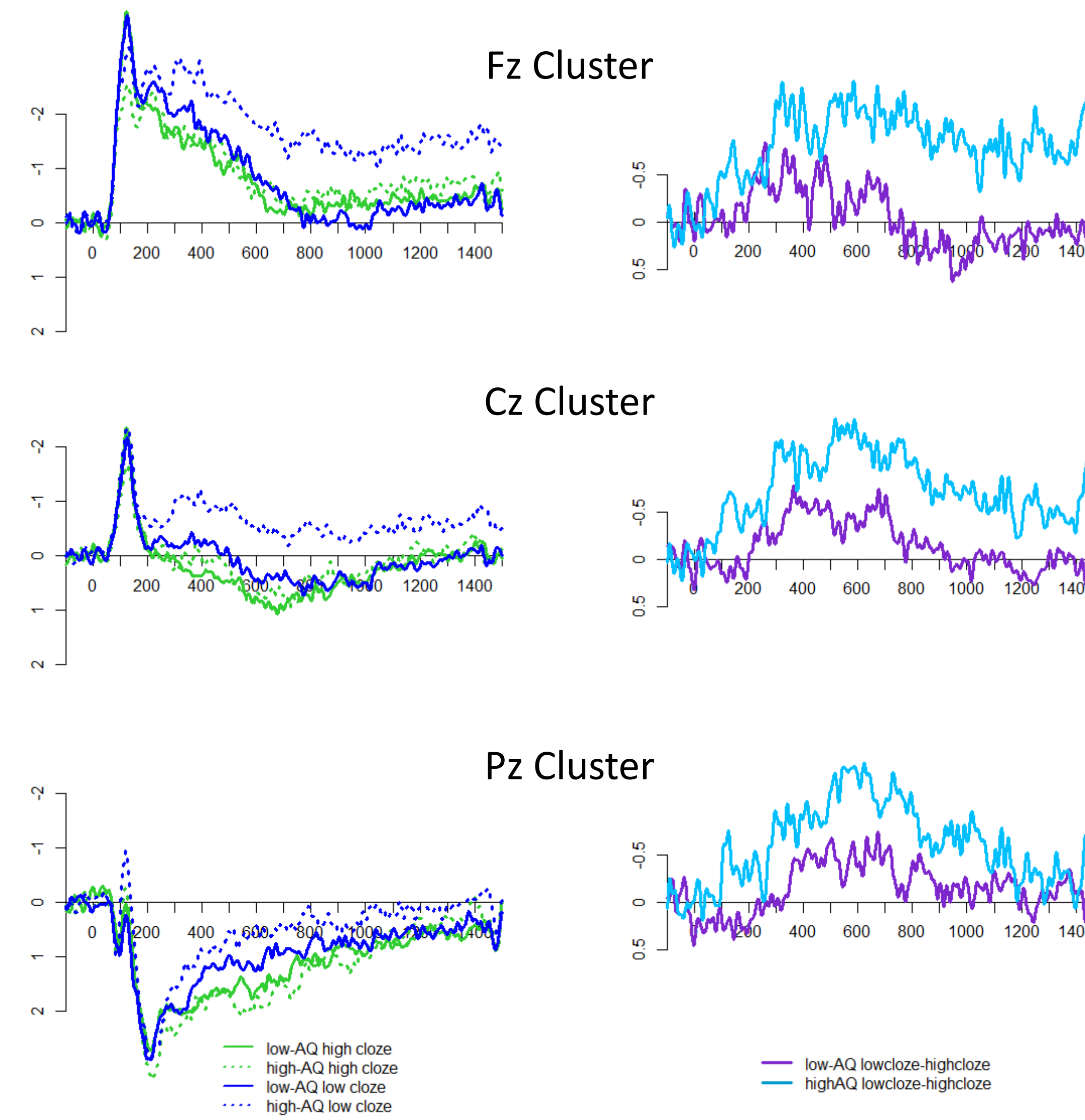
INTRODUCTION

- The **Visual Ease Assumption (VEA)** refers to the idea that pictures are “easier” to understand than language [1]. This idea underlies many educational and clinical interventions for autistic individuals.
- Visual advantages in single image-processing in autism may not extend to comprehension of image sequences, like visual narratives (e.g., comics).
- Story comprehension relies on using context to predict upcoming events; however, predictive abilities may be affected in autism [2].
- In ERPs, highly predictable (“high-cloze”) words/panels elicit smaller N400 amplitudes compared to less predictable (“low-cloze”) ones [3, 4].
- **We used a cloze probability ERP paradigm to examine whether predictive processing in visual and linguistic narratives is affected by autistic traits.**

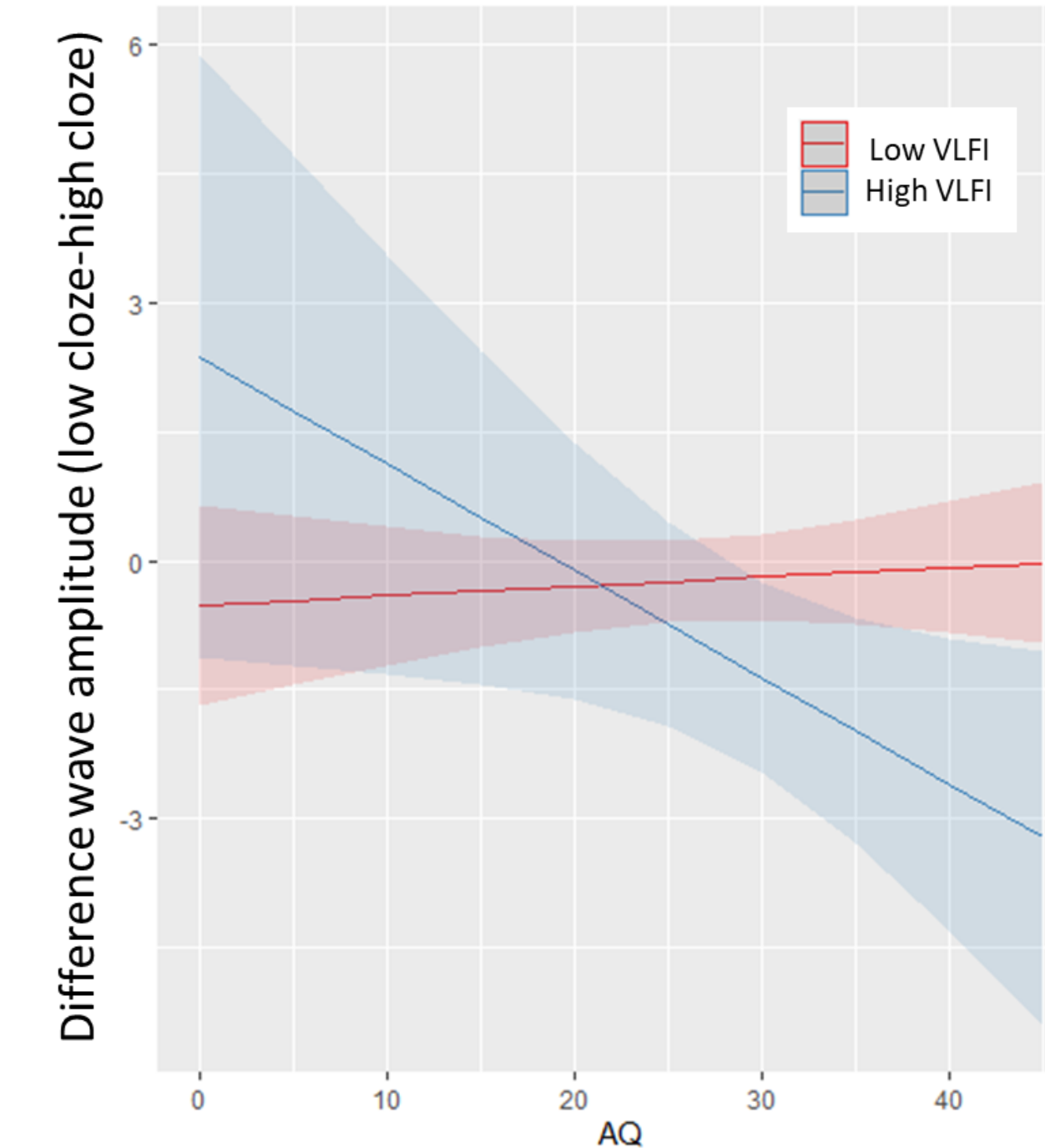
RESULTS

VISUAL (COMIC STORIES)

Difference-wave (low cloze – high cloze) amplitude analyzed at the Target panel in 100 ms time bins from 100-1000 ms using linear mixed effects models (LMMs) with fixed effects of *AQ*, *VLFi*, *site* (frontal, central, parietal), and *laterality* (left, midline, right) and *subject* as a random effect.



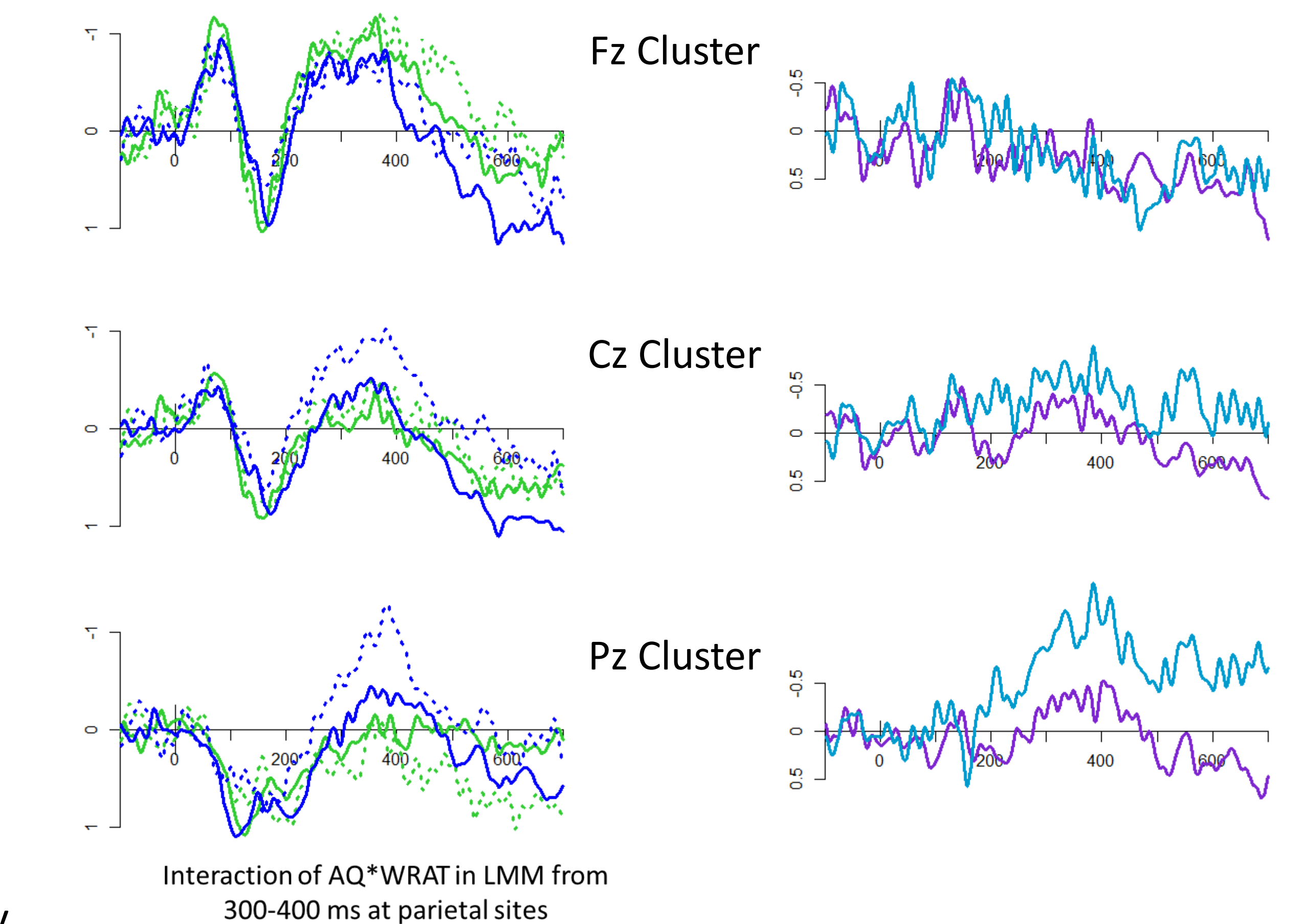
Interaction of AQ*VLFi in LMM from 800-900 ms in the left hemisphere



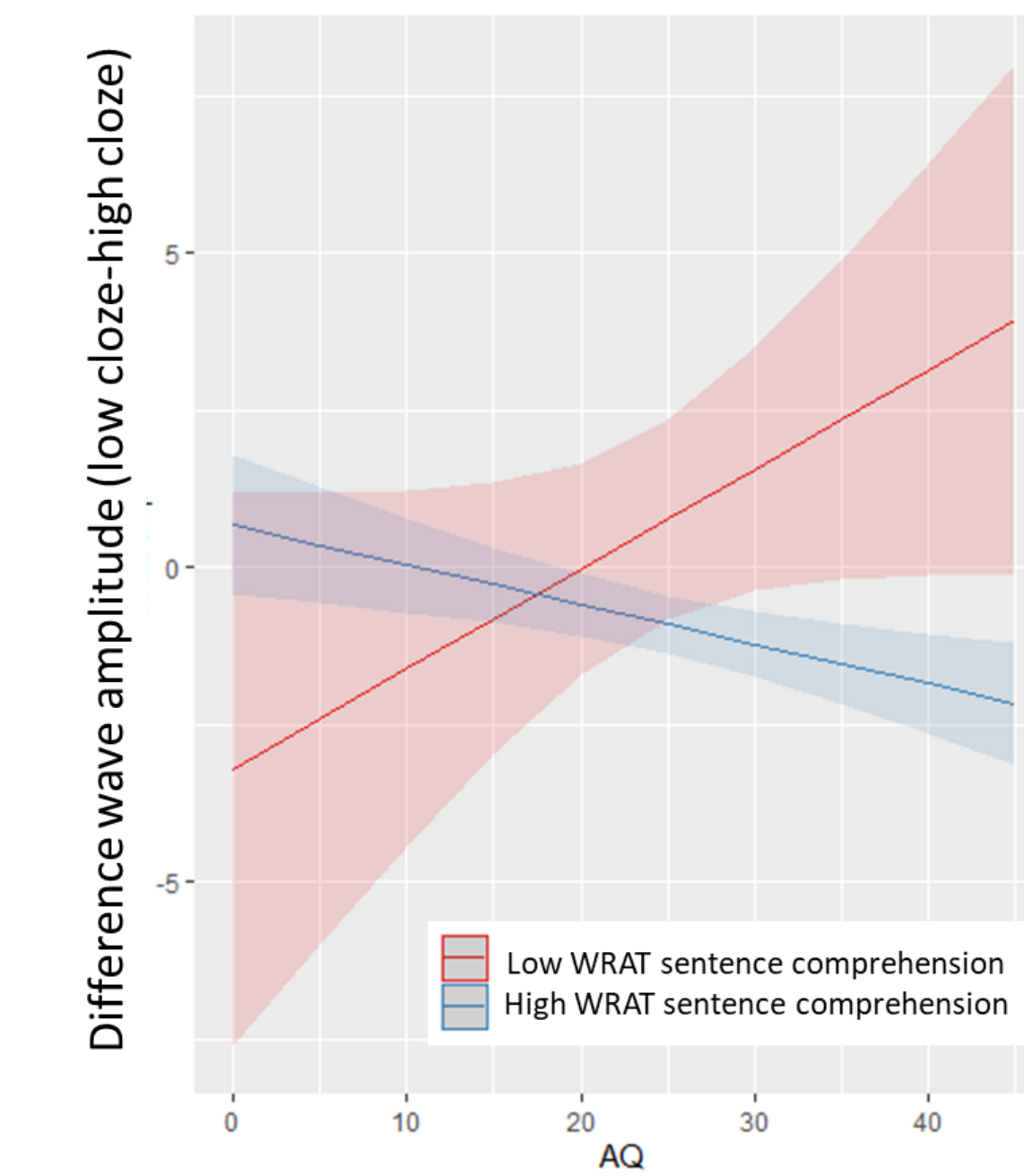
Fluency interacted with autistic traits in late time windows (800-900 ms) in left hemisphere sites: as AQ score increased, participants with high fluency showed greater negative difference waves, while participants with low fluency showed minimal effects

VERBAL (WRITTEN STORIES)

Difference-wave (low cloze – high cloze) amplitude analyzed at the Target word in 100 ms time bins from 100-700 ms using linear mixed effects models (LMMs) with fixed effects of *AQ*, *WRAT sentence comprehension*, *site* (frontal, central, parietal), and *laterality* (left, midline, right) and *subject* as a random effect.



Interaction of AQ*WRAT in LMM from 300-400 ms at parietal sites



Reading comprehension interacted with autistic traits from 300-400 ms at parietal sites: as AQ score increased, participants with higher reading comprehension showed greater negative difference waves, while those with lower reading comprehension showed greater positive difference waves.

METHODS

Participants

- 87 adults (ages 18-65, M=28, SD=14)
- Autistic traits measured by Autism Quotient (AQ) [5] (range = 4-44, M=24, SD=11)
- Visual language fluency measured by Visual Language Fluency Index (VLFi) [6] (range = 1.75-32.25, M=10.16, SD = 6.86)
- Reading ability measured by Wide Range Achievement Test (WRAT) [7] Sentence Comprehension subtest (range = 88-132, M=115, SD = 10)

EEG Procedures

- EEG recorded at 500 Hz using an EGI GES 400, 128-channel Geodesics Sensor nets, and NetStation 5.4.
- Visual stimuli: panels presented for 1350 ms with 350 ms ISI; Verbal stimuli: sentences 1-4 self-paced, sentence 5 RSVP with each word 400 ms with 400 ms ISI
- ERPs analyzed at 9 electrode clusters
- ERPs time-locked to target panel/word

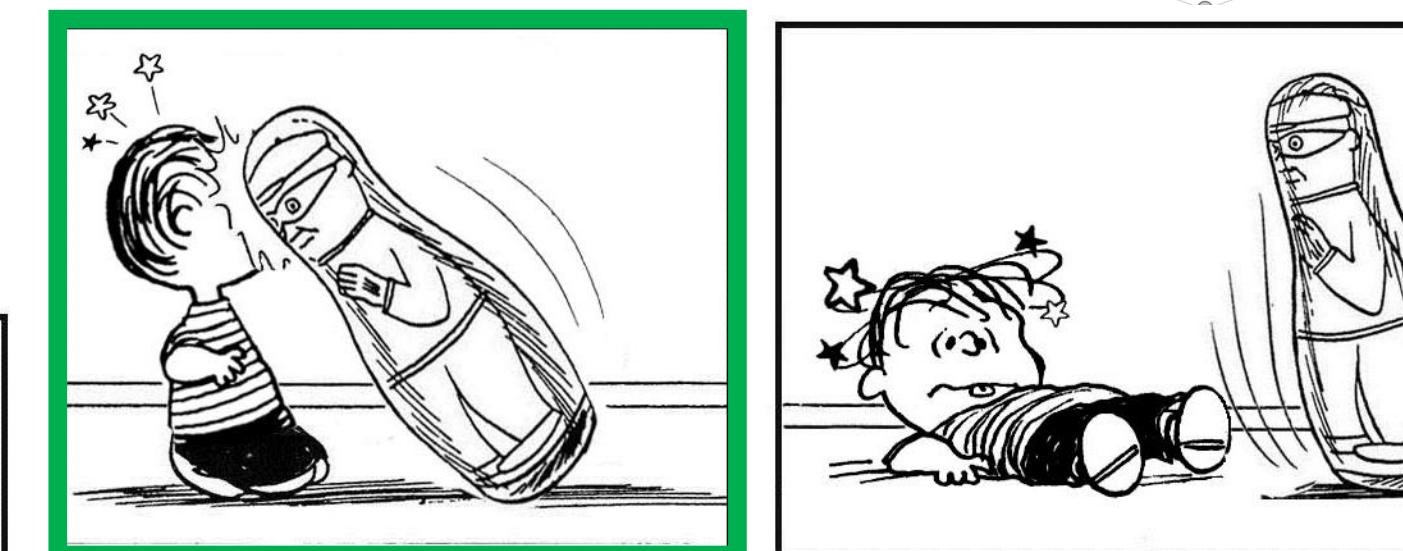
Stimuli and Procedure

High and low cloze narratives (48 per condition) created based on pre-test cloze rating survey asking subjects to predict which word/event came next in the story.

Visual stimuli: High cloze: range = 0.25 – 1, M = 0.59; **Low cloze:** range = 0 – 0.25, M = 0.03



High cloze target panel



Low cloze target panel

Verbal stimuli:

High cloze:
range = 0.48 – 1
M = 0.89

Low cloze:
range = 0 – 0.13
M = 0.01

Fido is very hungry and wants something to eat.
He walks over to his food bowl and finds that it is empty.
Fido barks for Jeremy and Sarah to feed him.
Jeremy and Sarah come out of the living room when they hear Fido's barking.
They fill up his **water** and Fido is quiet again.

DISCUSSION

- Across visual and verbal presentation types, autistic traits interacted with fluency in affecting the cognitive processes used for prediction, albeit in different directions and different time windows.
- The interactions of fluency and autistic traits occurred in earlier time windows for linguistic narratives (300-400 ms) than for visual narratives (800-900 ms) and showed opposite patterns of effects.

REFERENCES

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