Comparing Novel vs Familiar Internalized Cues on Gait Variability in Younger and Older Adults and People with Parkinson's

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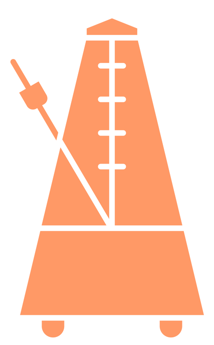
Background

People with Parkinson's disease (PwP) have **increased fall risk** due to shuffling, freezing, festination in gait[1]



External Cueing (metronome/music)

- PwP synchronize steps to the beat to support gait[2]
- However, external cues require technology and may not be safe in all environments[3]

Could internal cueing be effective? What are the effects of familiar vs novel internal cues on gait?

Hypothesis: Familiar internal cue → more stable walking (lower CoV) than novel internal cue

Exploratory Analysis: Which strategies did participants use for internal cueing?

Methodology

- Steps were recorded on a 16-ft pressure-sensitive mat
- 8 lengths per walking condition, 5 walks per participant

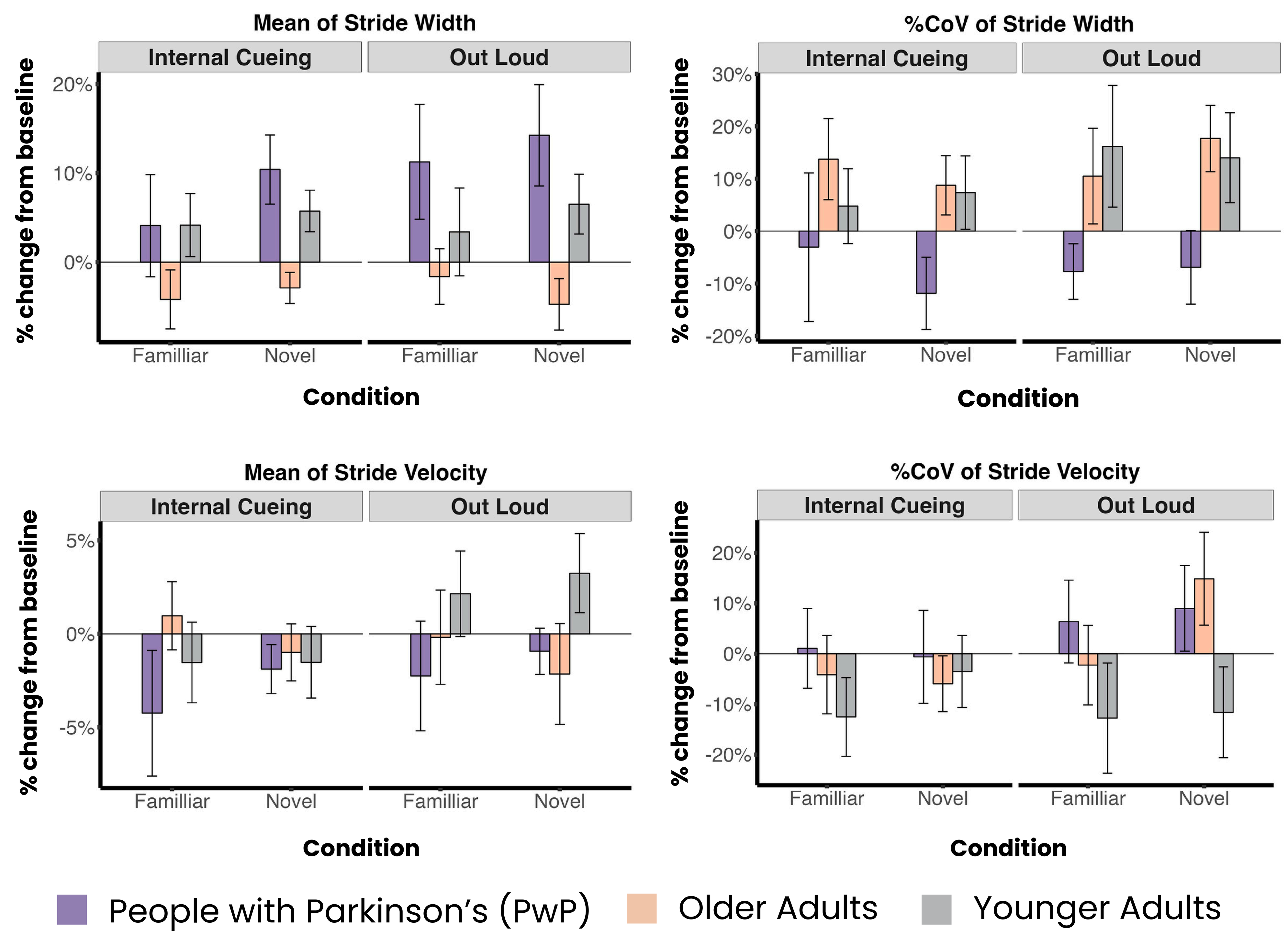
Conditions (*did not ask participants to synchronize*)

- Baseline: Walk with white noise
- Cued:

- Post-walk interviews captured participants' walking strategy (sung or spoken examples recorded)

Other: Hoehn and Yahr Stages, Gold-MSI, BAIS, DSI, BAT

Results



No significant effects of Group or Condition for stride length, stride velocity, or double-support time ($p > .05$)

PwP showed wider strides than older adults compared to baseline ($p < .05$)

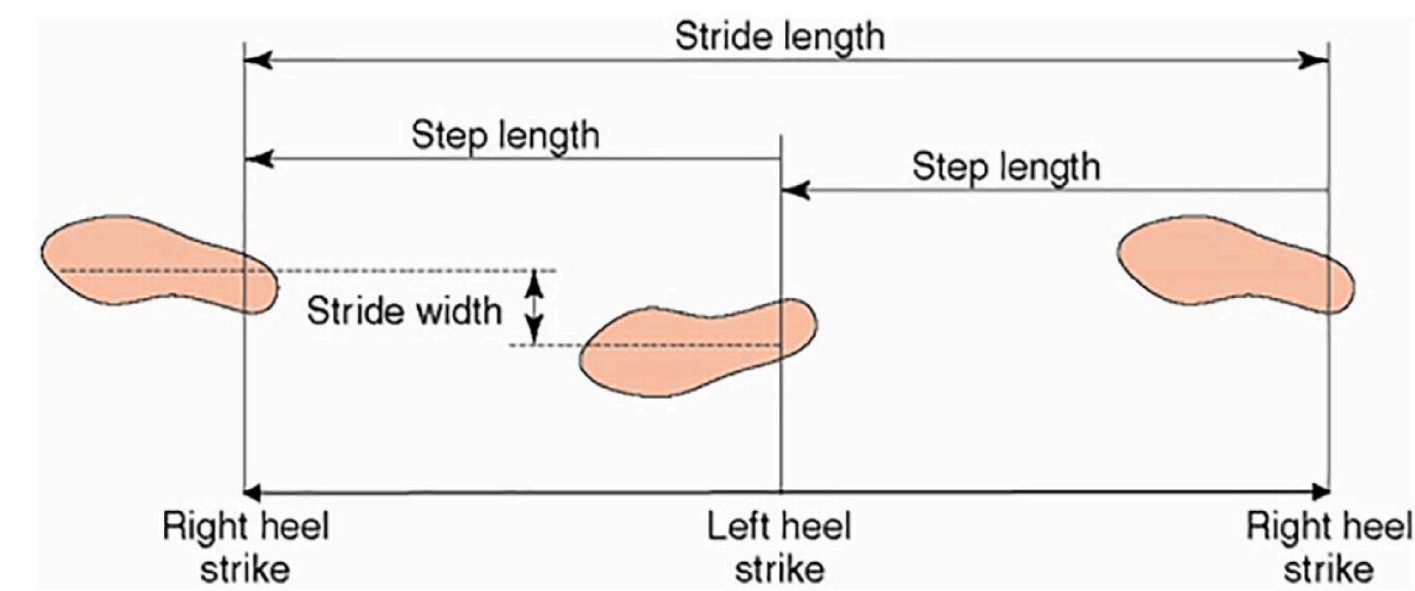
Strategy Description	PwP		Older Adults		Younger Adults	
Condition	Familiar	Novel	Familiar	Novel	Familiar	Novel
Synchronized on the beat	**36%**	**57%**	**64%**	**64%**	**80%**	**87%**
Synchronized off the beat	7%	7%	9%	-	13%	7%
Pace Setting	29%	21%	-	27%	-	-
Pace recapture/maintaining	22%	-	9%	-	7%	7%
Dissociated	7%	-	18%	-	-	-
Relationship not established	-	14%	-	9%	-	-

Audio recordings showed that most participants synchronized to the beat without instruction and PwP used a wider variety of strategies in the familiar condition compared to younger adults.

Participants

Younger Adults: n = 15, M_{age} = 21.40 yrs
Older Adults: n = 14, M_{age} = 69.57 yrs
People with Parkinson's (PwP): n = 13, M_{age} = 69.92 yrs

Gait Analysis



↑ Deviation of %CoV from baseline → ↑ variability

Discussion

- All groups could imagine and synchronize their steps, though PwP showed wider strides
- Strong auditory imagery vividness (BAIS) was linked to better synchronization
- Suggests internal cueing as a practical, self-directed gait strategy when external cues aren't available
- **Limitations:** short walkway, small sample size, and difficulty verifying imagery

Future research exploring individual differences may help tailor internal cueing strategies for People with Parkinson's

References

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