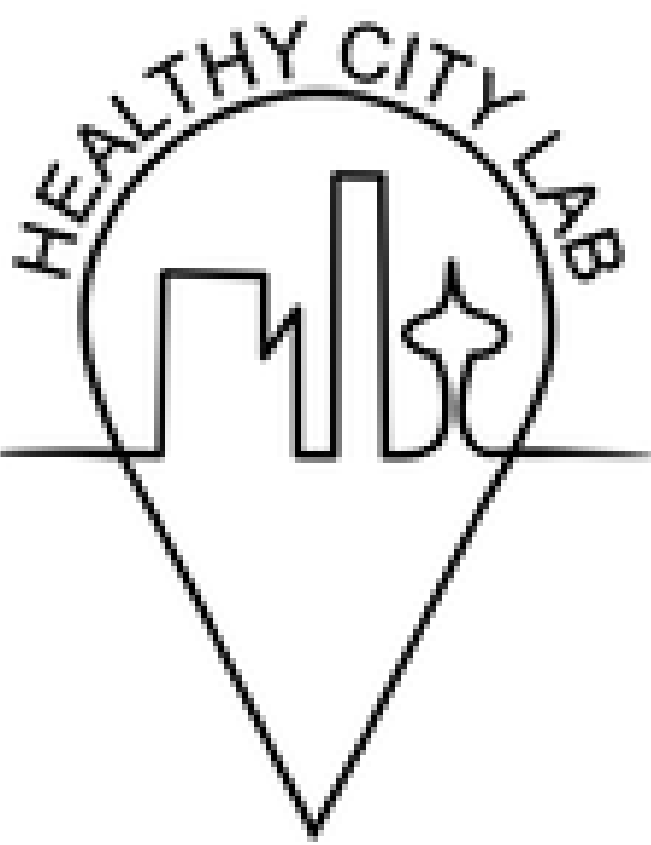


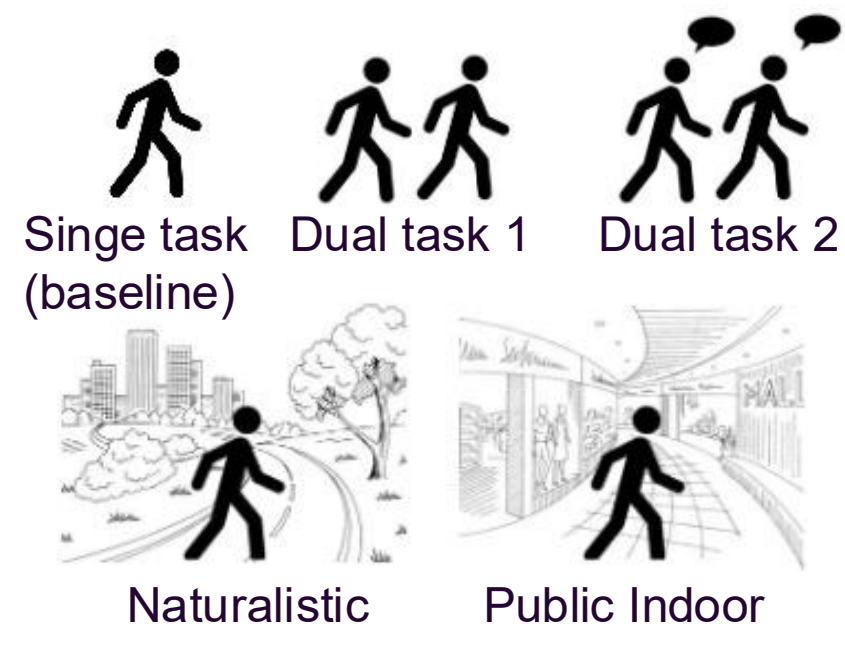
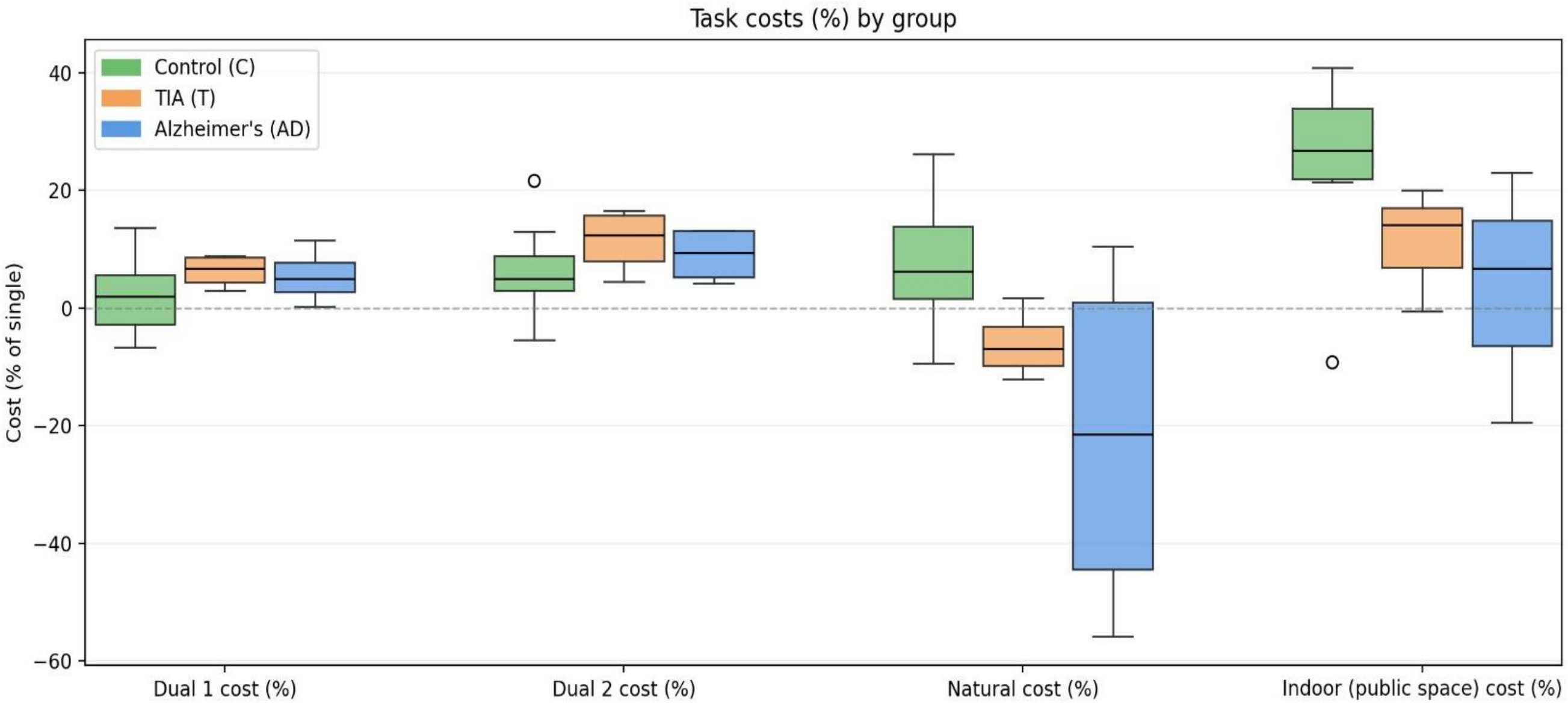
Context-Dependent Gait Cost Across Laboratory and Naturalistic Walking in Alzheimer's Disease



Dr. Rashmita Chatterjee¹, Shimaa Aboudeif¹, Britney Denroche², Bhavana Gill², Armin Ghayur Sadigh¹, Dr. Philip A. Barber², Dr. Sayeh Bayat¹.

¹Schulich School of Engineering, University of Calgary, Canada; ²Cumming School of Medicine, University of Calgary, Canada

- Gait changes under cognitive or environmental demands depended on walking context.
- All groups slowed during lab-based dual-task walking. In contrast, participants with AD showed less slowing, or even faster walking, in everyday environments.
- These findings suggest that real-world context is important for understanding mobility changes in AD.

INTRODUCTION	METHODS	RESULTS	REFERENCES
• Walking depends on both motor and cognitive function. • When walking is paired with a mental task, such as talking, attention is divided and gait may slow [1]. • This slowing is measured as gait cost: Gait cost (%) = [(single-task speed – dual-task speed) / single-task speed] × 100 • Higher gait cost indicates greater slowing under cognitive demand. • Elevated gait cost may be an early marker of cognitive decline, including Alzheimer's disease (AD) [2]. • However, lab-based gait tasks may not fully reflect real-world walking [3]. • This study compares laboratory and real-world walking measures to better understand mobility changes in AD.	• Pilot study including 3 groups: healthy controls (HC; n = 8), transient ischemic attack (TIA; n = 4), and AD (n = 4). • Walking speed was measured across multiple laboratory and real-world condition. • Free-living walking was recorded over 2 weeks. • Public indoor walking was defined as a subset of free-living walking occurring in indoor public spaces, such as grocery stores and malls. Exposure to these environments varied across participants.  Fig 1. Laboratory and real-world walking Scenarios	 Fig 2. Gait Cost Across Groups and Walking Scenarios CONCLUSIONS • Conversational dual-tasking increased gait cost across groups. • In naturalistic settings, gait cost was reduced or even reversed in the AD and TIA groups. • HCs showed the highest gait cost in complex indoor public environments. • Gait cost was highly context-dependent and shaped by environmental exposure. • These exploratory findings highlight the need for ecologically valid gait assessments in larger, more standardized studies.	[1] Al-Yahya, E. et al. Cognitive motor interference while walking: A systematic review and meta-analysis. <i>Neurosci. Biobehav. Rev.</i> 35, 715–728 (2011). [2] Montero-Odasso MM, Sarquis-Adamson Y, Speechley M, et al. Association of Dual-Task Gait With Incident Dementia in Mild Cognitive Impairment: Results From the Gait and Brain Study. <i>JAMA Neurol.</i> 2017;74(7):857–865. doi:10.1001/jamaneurol.2017.0643 [3] Poleur M, Tychon C, Gilbert S, Daumer M and Servais L (2026) Real-world walking speed as a digital biomarker and outcome measure for clinical trials—a systematic review, regulatory status and future directions. <i>Front. Digit. Health</i> 8:1726549. doi: 10.3389/fdgth.2026.1726549 CONTACT Dr. Rashmita Chatterjee rashmita.chatterj1@ucalgary.ca https://rashmitachatterjee.wordpress.com/ Healthy City Lab https://www.healthycitylab.ca/