SciDataCon 2025

Data for Cognitive Health Equity: Shaping Global Data Ecosystems for Healthy Aging

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INTERNATIONAL DATA WEEK
13-16 October 2025
Brisbane, Australia

16th of October, Brisbane, 2025

This session opened with reflections on why cognitive health must be recognized as a global priority.

With approximately 57 million individuals living with dementia worldwide and nearly 10 million new cases annually (World Health Organization, 2020), cognitive decline stands among the most urgent public health challenges of the 21st century.

As societies age, especially in rapidly aging regions, **age-related cognitive impairments are expected to grow substantially**, underscoring the need for early detection, prevention, and equitable data-driven interventions.

We live longer, but the quality of life does not always improve with age.

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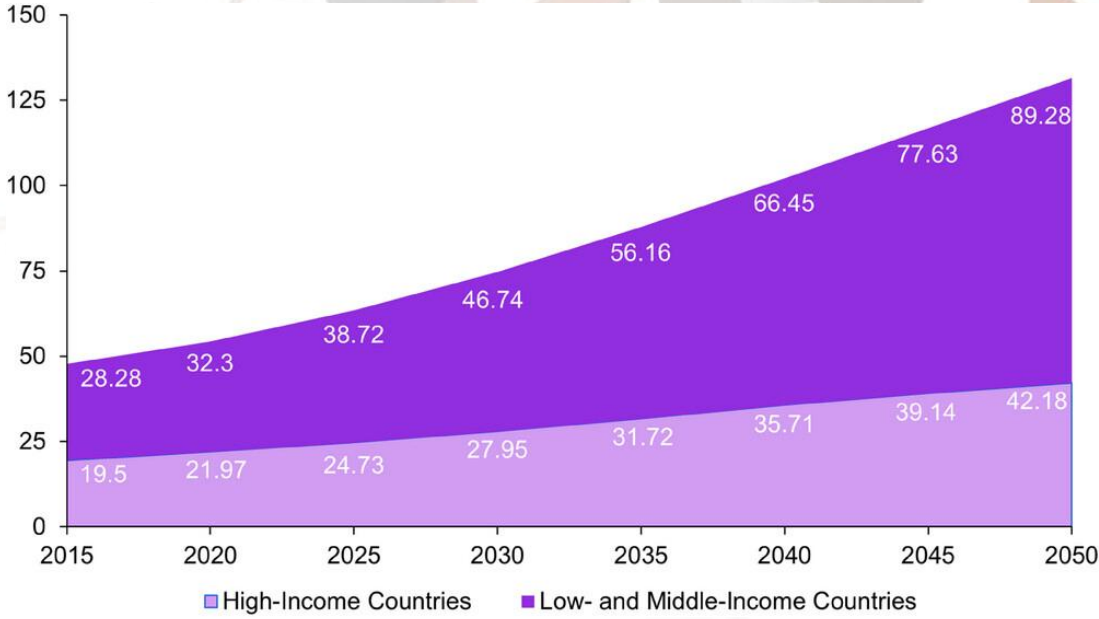
Challenge: A Global Research Gap

Most large-scale and longitudinal datasets originate from high-income settings, leaving low- and middle-income countries (LMICs), ethnically diverse populations, and marginalized groups significantly **underrepresented**.

Moreover, existing infrastructures often emphasize clinical endpoints, overlooking behavioral, social, and environmental factors that are crucial for understanding early cognitive change.

→ *This imbalance leads to a skewed evidence base and limits the development of interventions that are culturally relevant, inclusive, and globally applicable.*



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Cognitive aging is a global issue,
but our data isn't global yet.

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Challenge: A Global Research Gap

Aspect	High-Income Countries (HICs)	Low- and Middle-Income Countries (LMICs)
Data Infrastructure	Well-established national census systems and digital health registries; frequent updates and interoperability between institutions.	Census data often incomplete or outdated; health data fragmented and rarely digitized.
Health Surveillance	Comprehensive systems for tracking diseases, disability, and cognitive decline through hospitals and insurance databases.	Limited or absent national surveillance for aging and dementia; underreporting is common.
Research Studies	Longitudinal aging studies (e.g., HRS, SHARE, ELSA, JAGES) follow individuals for decades, integrating behavioral, biological, and social data.	Few or no longitudinal studies; rely mainly on cross-sectional surveys (e.g., WHO SAGE, LASI in India).
Use of Technology	High use of electronic health records, wearables, and a huge interest in AI-based monitoring tools.	Low penetration of digital tools; health data often paper-based.
Funding and Resources	Strong public and private investment in prevention, early detection, and cognitive health research.	Limited research funding; most resources directed toward basic healthcare and infectious diseases.
Policy Integration	Evidence-based policies using data modeling, prevention planning, and technology-driven interventions.	Policy decisions often constrained by limited data; less capacity for data-driven prevention.
Representation in Global Data	High—forms the basis of most global cognitive health research and AI models.	Low—large populations remain underrepresented in global datasets.
Key Challenge	Managing costs of long-term care for a rapidly aging population.	Building basic data infrastructure to even quantify the scale of aging-related challenges.
Outcome	Detailed understanding of aging trajectories; supports precision prevention.	Major data gaps; aging trends and cognitive decline remain poorly characterized.

Source: Self-elaboration by Wolf and Otake-Matsuura

To really understand aging globally, we need to build local cohorts, share know-how, and adapt existing research models to different cultural and economic contexts.

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Opportunity: Cross-Domain Data Integration

The session highlighted the transformative potential of cross-domain data (clinical, behavioral, social, physiological, and environmental) when ethically governed and culturally adaptive.

Such integration can support early risk detection, personalize prevention strategies, and promote cognitive health as a **global public good**.

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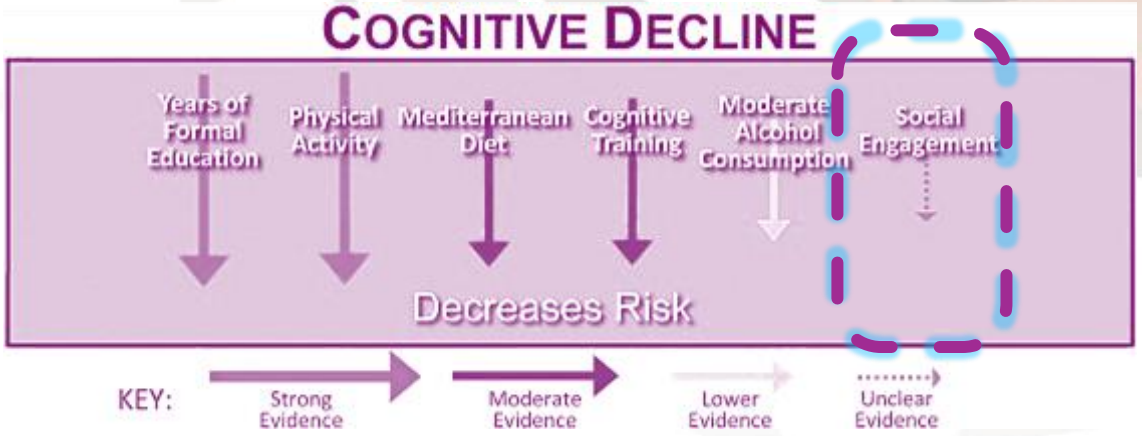
Learning from Japan's Super-Aging Society (part 1)

Japan served as a case study illustrating how interdisciplinary innovation and community-centered approaches can guide global practice.

Conversation-based interventions

(Dr. Otake-Matsuura):

Insights were shared on how structured conversational programs can enhance social engagement, cognitive stimulation, and overall well-being among older adults.



Source: Halma et al. (2024)

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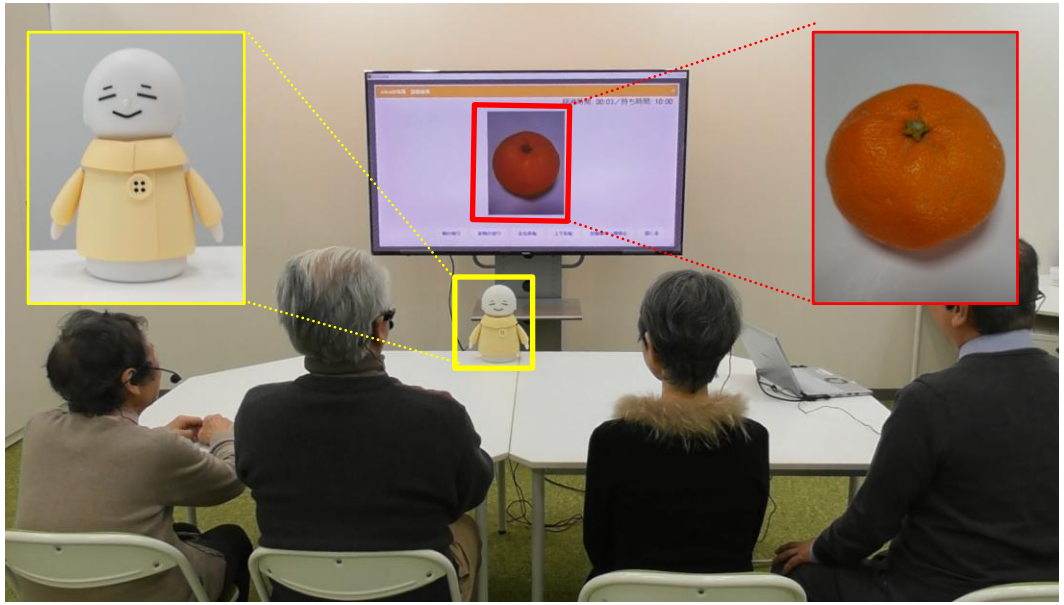
PICMOR Program

Verbal data serve as a sensitive and dynamic proxy for an **individual's cognitive state**.



frontiers in Robotics and AI

CLINICAL TRIAL
published: 12 April 2021
doi: 10.3389/frobt.2021.633076

Cognitive Intervention Through Photo-Integrated Conversation Moderated by Robots (PICMOR) Program: A Randomized Controlled Trial

Mihoko Otake-Matsuura[1], Seiki Tokunaga[1], Kumi Watanabe[1], Masato S. Abe[1], Takuya Sekiguchi[1], Hikaru Sugimoto[1], Taishiro Kishimoto[1,2] and Takashi Kudo[1,3]*

[1]*Center for Advanced Intelligence Project, RIKEN, Chuo-ku, Japan,* [2]*Department of Neuropsychiatry, School of Medicine, Keio University, Tokyo, Japan,* [3]*Department of Psychiatry, Graduate School of Medicine, Osaka University, Suita, Japan*

OPEN ACCESS

Edited by:
Hidenobu Sumioka,

Social interaction might prevent or delay dementia, but little is known about the specific

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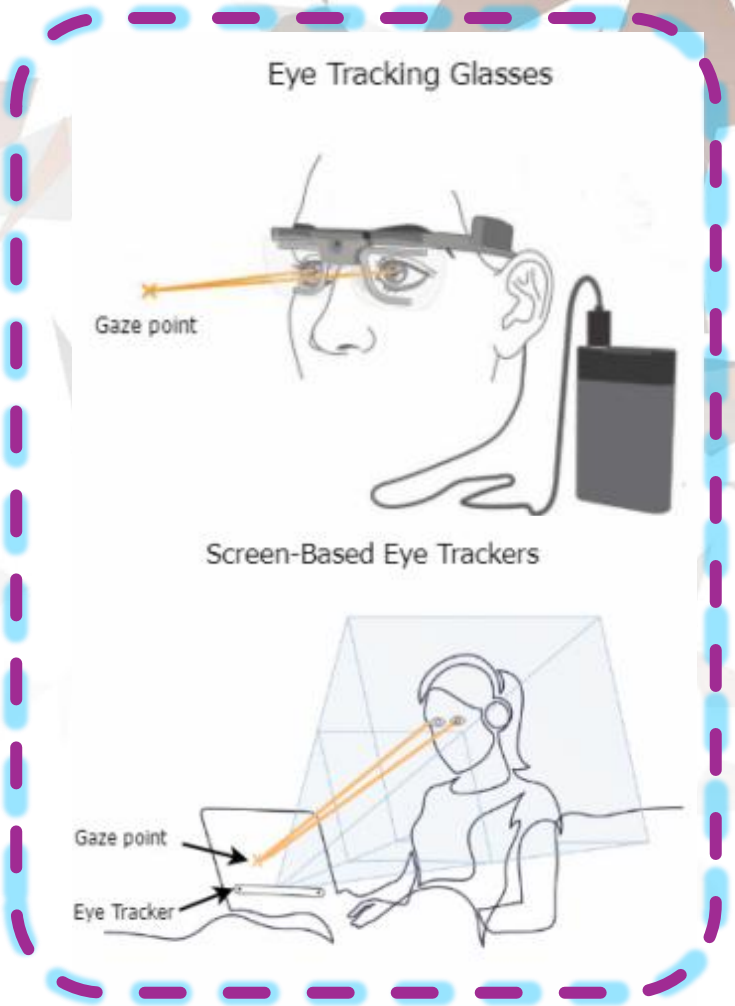
Learning from Japan's Super-Aging Society (part 2)

Early detection via non-invasive eye-tracking

(Dr. Alexandra Wolf):

Emerging evidence from behavioral methodologies demonstrates how **subtle changes in gaze patterns can support early identification of cognitive decline**, offering a low-burden and culturally adaptable approach to assessment.



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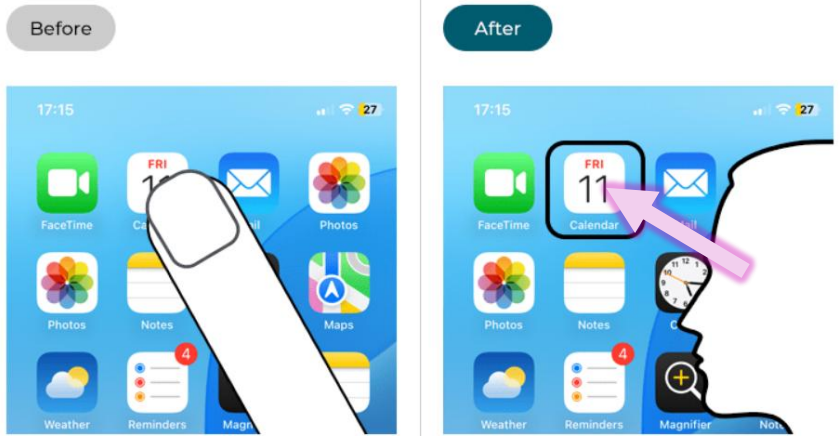

Reflecting a growing trend, smartphones now use eye-tracking via the front camera

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Group Discussions:
Shared Insights and Future Directions

1. Food and Cognitive Health Across Regions

How do traditional diets and food quality affect brain health across generations?

Example: In Poland, fermented dairy products like kefir or buttermilk are staples. Research highlights how fermented foods improve the gut microbiome, which in turn strengthens the brain–gut connection, a pathway increasingly linked to cognitive resilience and healthy aging.

If you had to recommend one food habit from your culture that supports healthy aging, what would it be and why?

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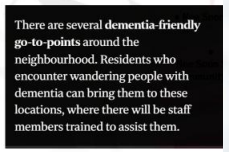
2. Designing Age-Friendly Cities

Cities can help (or hinder) cognitive health through design.

Example 1: Singapore is often cited as a model "age-friendly city," with barrier-free public transport, and dementia-friendly wayfinding systems.

Dementia Singapore is proud that its wayfinding initiatives continue to inspire transport operators and towns to make the environment more dementia-friendly.



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2. Designing Age-Friendly Cities

Example 2: In Poland, many cities run community clubs where older adults join activities like crafts, language lessons, memory training workshops, and intergenerational exchanges.

*These intergenerational hubs **foster lifelong learning**, **social connection**, and **cognitive well-being** through shared creativity and understanding.*

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3. Technology and Trust

From AI to wearable devices, technology promises early detection – but raises issues of trust, privacy, and usability.

Example: Non-invasive monitoring tools are being piloted to detect early cognitive decline. While promising, they also raise questions: How much personal data are people willing to share? And how do we ensure this technology feels empowering rather than intrusive?

Would you be comfortable sharing personal data (like sleep, activity, or memory patterns) if it meant earlier detection of cognitive decline?

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4. Culturally Connected Recommendations

Different cultures have different approaches to aging.

Example: In Scandinavia, winter swimming in icy lakes or seas is more than a tradition — it's a practice of resilience, stress reduction, and enhanced physiological balance, including improved antioxidant defenses. While not every culture dives into frozen waters, each has its own rituals — from close-knit family gatherings to lifelong hobbies — that can nurture cognitive and physical well-being in unexpected ways.

In your culture, what tradition or social habit best supports older adults, and how could it be adapted elsewhere?

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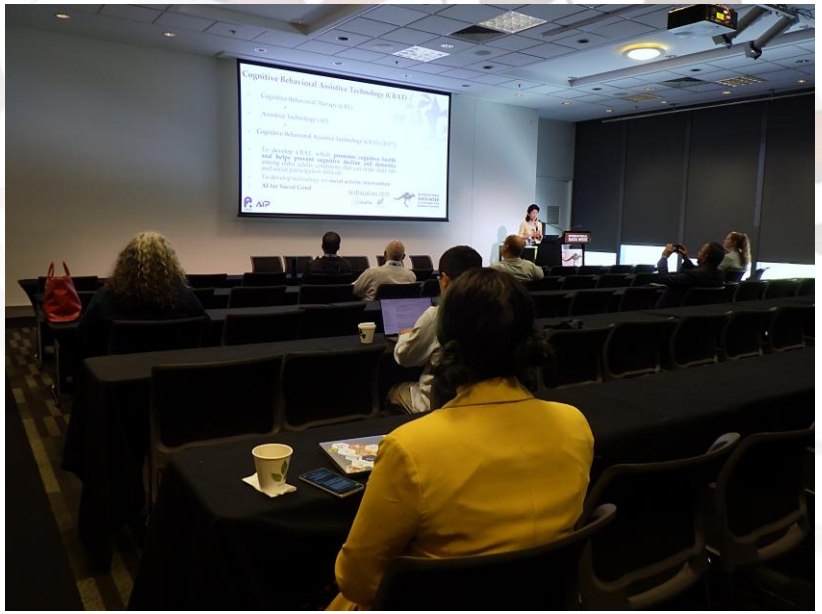

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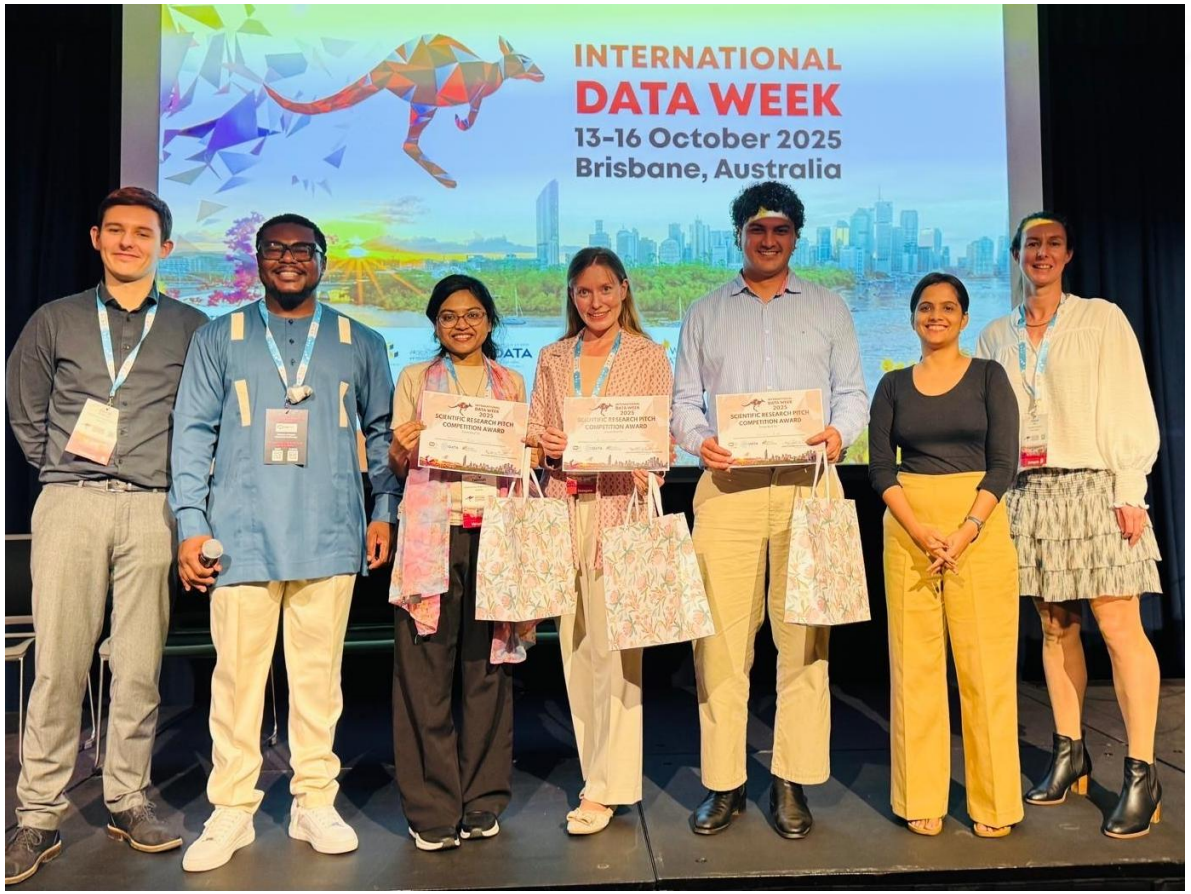
3-Minute Scientific Research Pitch Competition at the IDW2025



From Gaze to Diagnosis: Eye-Tracking Cognitive Changes from Healthy Aging to Mild Cognitive Impairment (MCI)

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We would be grateful for Your opinion!

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