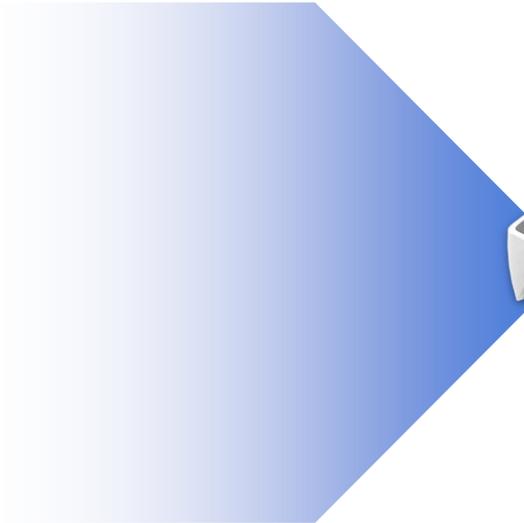
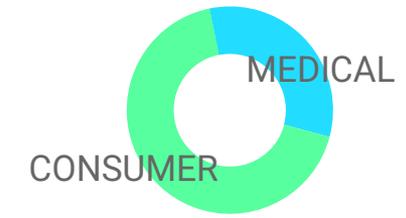
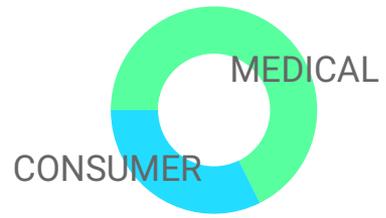
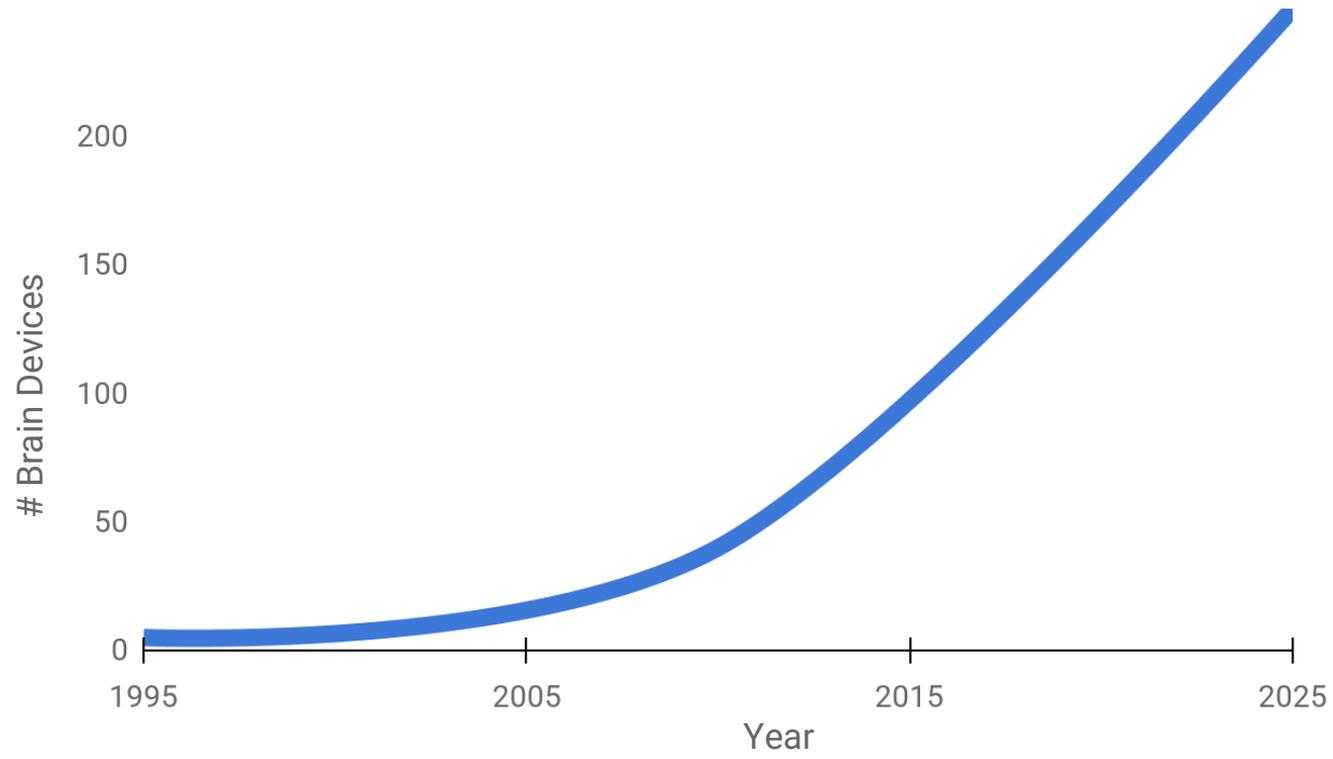


Inside the Mind: the Promise and Peril of Brainwave Technology

Nolan Beise, PhD
CEO
Circl Brain Health

Our Brain Function is Measurable





MEDICAL

NEURODEGENERATION

BRAIN INJURY

BRAIN FOG

FATIGUE

HEALTHY BRAIN

PEAK COGNITION



Dementia

Seizures

MCI

CTE

PTSD

Trauma

Delirium

Chronic fatigue
Syndrome

Long COVID

Depression

Over-work

burnout

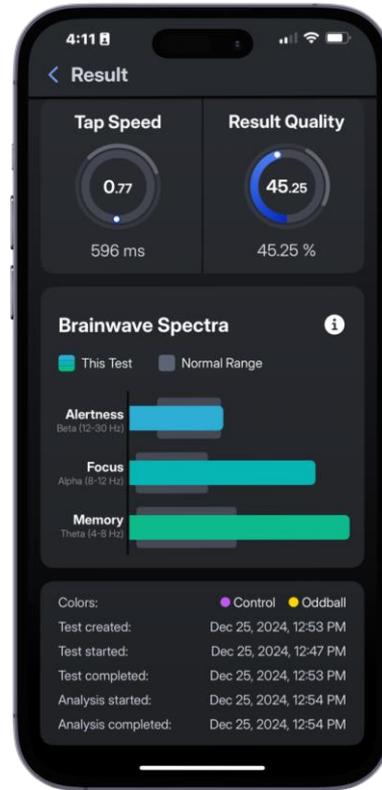
Focus

Resilience

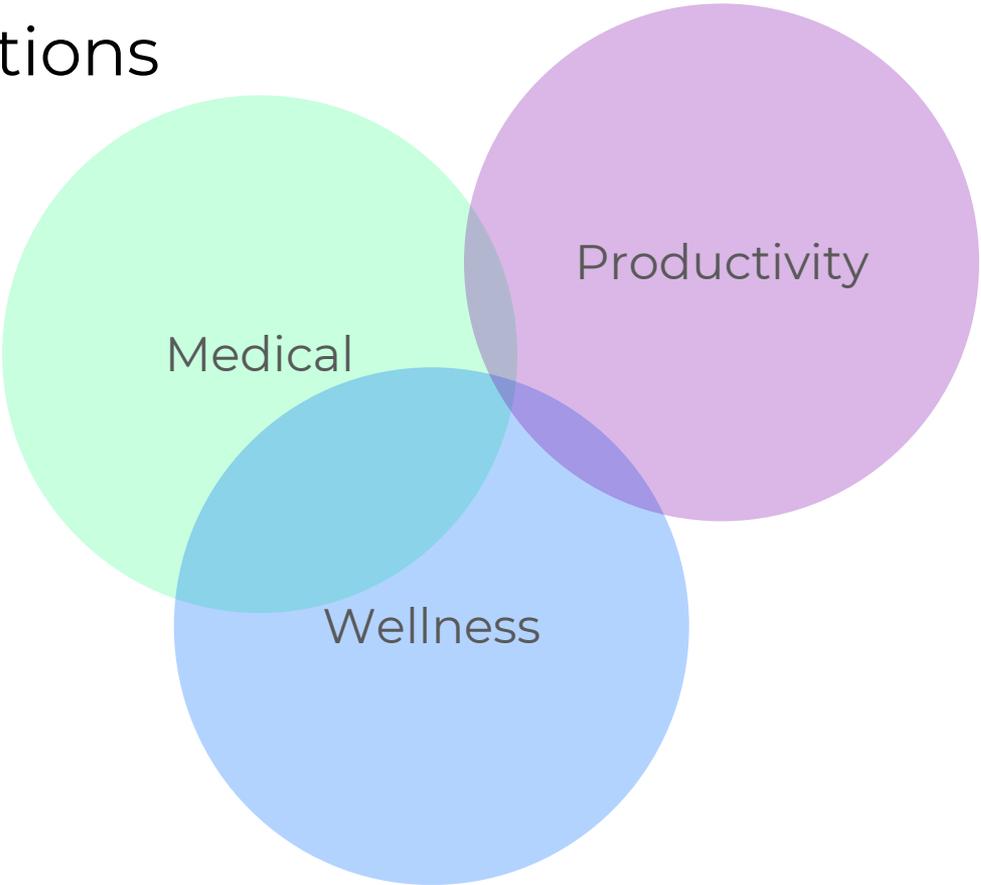
Intelligence

CONSUMER

Medical or Consumer?



EEG Applications



BRAIN HEALING

SLEEP

STRESS

MEDITATION

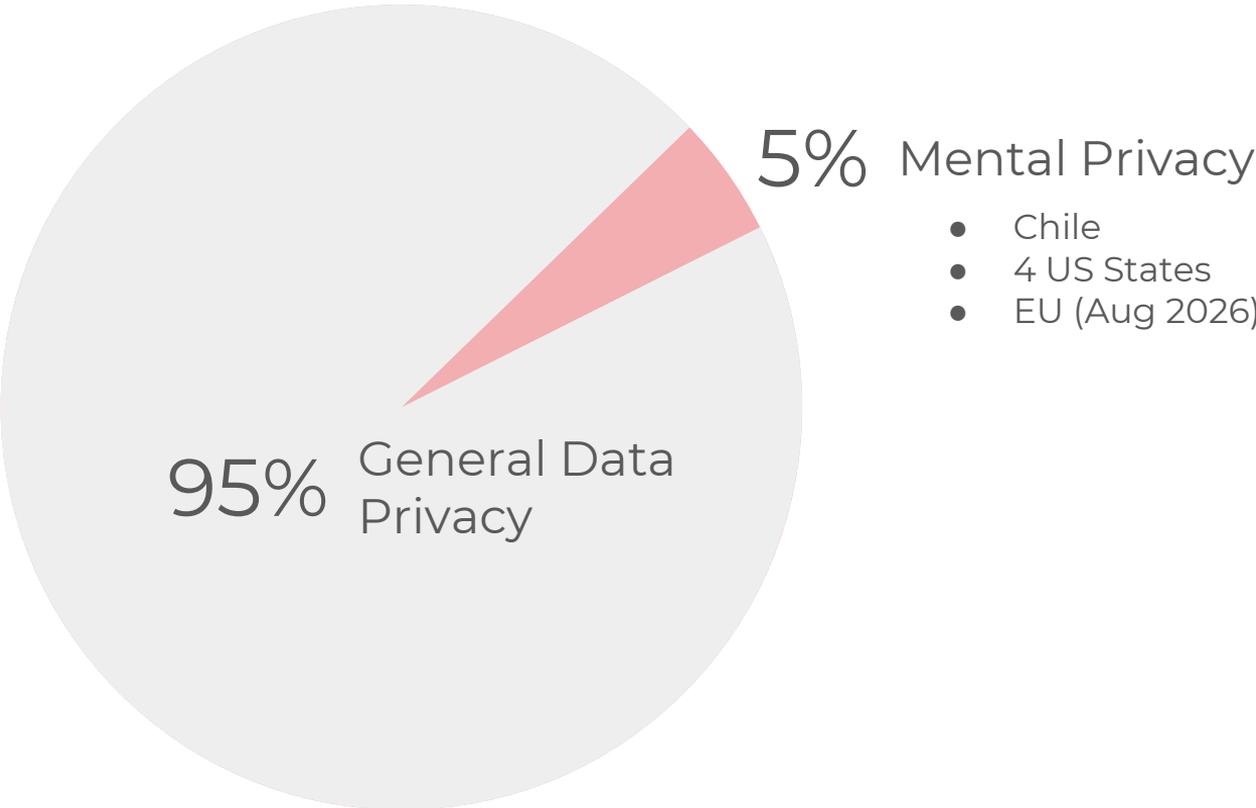
BRAIN TRAINING

FOCUS / FLOW STATE



CONSUMER

Brain Data Regulation is Not Widespread



Brain Data Gap: Inability to De-Identify

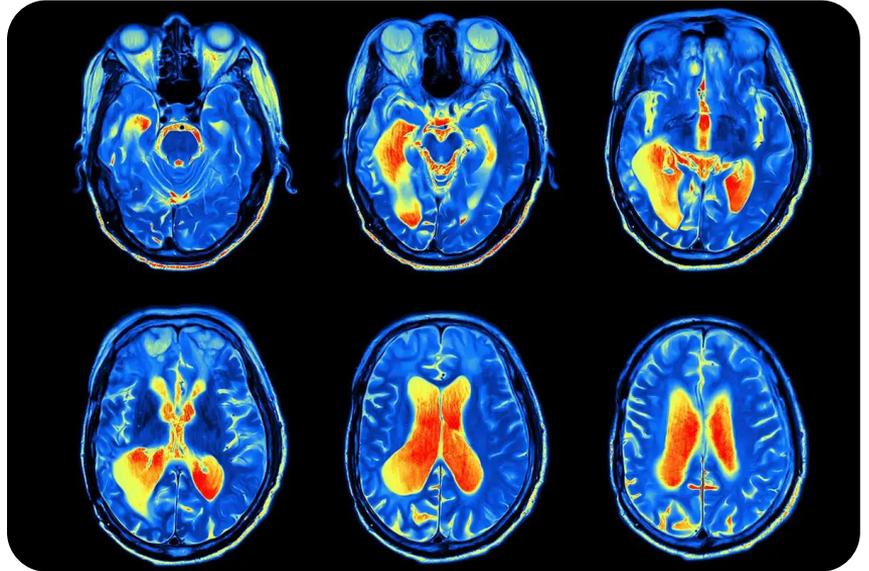


Your anonymized brain data can still be connected to you, now or in the future.

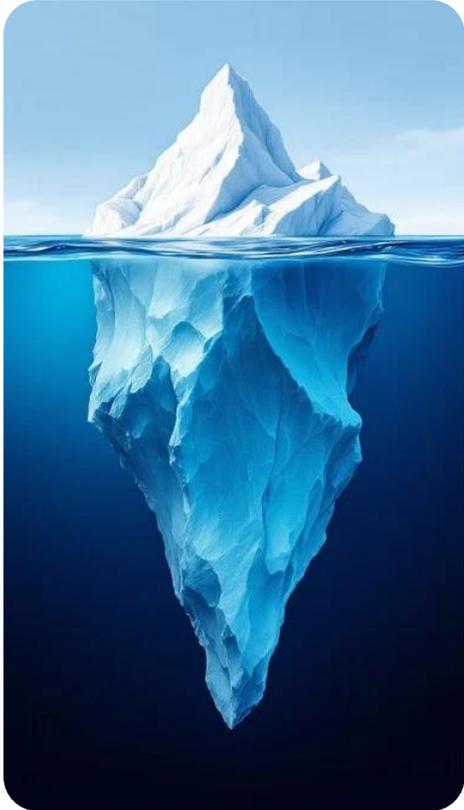
Your brain data from different devices, decades from now, could be linked to you.

Brain Data Gap: Inferences Not Protected

Even if the raw data is secure, inferred brain function issues can still be shared



Brain Data Gap: Mental Privacy



Your subconscious reactions and thoughts can be measured without your knowledge they have even occurred.

No consent.

Brain Data Gap: Commercial Data has Clinical Utility

Commercial



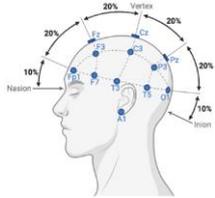
Clinical



Commercial Device Heterogeneity



Electrode composition (wet/dry) significantly changes data quality



Sensor position/density and temporal resolution change what brain functions we can measure



Type of brain recording impacts what we can infer about your brain function: Real-time vs Information Processing

So What Should Companies Do?



On-Device Processing (solves latency and data privacy issues)



Separate consent for functional use from secondary uses (users must explicitly opt-in for secondary uses)



Publicly commit and adhere to Mental Privacy (raw data storage, transparent inferences, protection from bias)

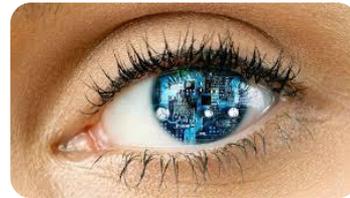
The Exciting Possibilities: Medical



Brain-controlled devices
Brain-to-speech synthesis



Closed-Loop
Neuropsychiatry



Digital vision and
touch

The Exciting Possibilities: Commercial



Peak human
cognition



Check engine light
lifestyle/work



Cognitive load
management

Thank you!