



**Tracking mental wellness &  
cognitive health with clinical  
accuracy**

thymia

# OVERVIEW

Welcome to the exploration of helios - thymia's ground-breaking wellness products. Our mission at thymia is to transform mental health by making it as objectively measurable as physical health, and this document serves as a window into our innovative approach.

Within these pages, you will find an in-depth look at what thymia helios currently offers, including a deep dive on the different cognitive domains we assess from Emotional State to Physical State (Energy Dynamics). The wellness scores within thymia helios are mapped to each of these cognitive domains and are available via our Activity Plug-in or Media API.

The cognitive domains of Emotional State and Physical State (Energy Dynamics) are already available and new domains will be coming soon in December 2023.

In addition to our cognitive analysis, this white paper provides insight into our robust compliance considerations. From our full alignment with GDPR and HIPAA regulations to our esteemed recognition as a UK government vendor under the GCloud13 framework and the highest levels of cybersecurity certifications (ISO27001; NHS Toolkit), we demonstrate our unwavering commitment to security and ethical practices when handling sensitive personal information.

Also included is a vital disclaimer section, clarifying the intended usage of thymia's wellness tools. While rich in insights, they are not designed to replace professional mental health diagnostics.

As you proceed through this document, we invite you to discover how thymia is not only meeting but exceeding standards in mental wellness monitoring, bridging technology, ethics, and innovation to redefine the mental health landscape. This document is intended to be a starting point for further discussion, so please do let us know any queries that come up whilst reading it.

*thymia team*

# INTRODUCTION

## WHAT GOES INTO OUR HELIOS SCORES?

Although thymia helios measures a user's mental wellbeing and is not intended to be used as a clinical assessment, each helios score is in fact derived from our proprietary clinical datasets and assessments.

## WHAT DATASETS ARE THE HELIOS SCORES BASED ON?

We have gathered speech, video and behavioural samples from **6,100+** individuals from around the world spanning different languages, accents, ethnicities and cultures using our proprietary, best-in-class thymia data collection platform. In English alone, we have looked at British, American, Australian, South African and non-native accents. Our dataset is additionally balanced for age (18 - 93) and birth sex.

**To date, we have gathered a total of 260,000+ activities on our platform, totalling 400,000+ minutes (or 6,600+ hours), making this the largest dataset of its kind in the world.**

Given that voice, facial and body movements and behaviour can be influenced by a variety of factors, not just mental state, for each individual we gathered as much information as possible on multiple relevant factors, including for instance if they have any physical or mental health conditions, what medications they are on (if any), whether they have a cold, whether they have slept enough etc. This allows us to isolate the effects on voice, facial movements and behaviour of mental state, which is what we are interested in, rather than the effects of other, confounding variables, which we are not interested in.

Our rigorous methodology is based on best clinical trial practices in the areas of Neuroscience and Psychology and is meticulously assessed and approved by an independent ethics committee operating under the auspices of ARMA.

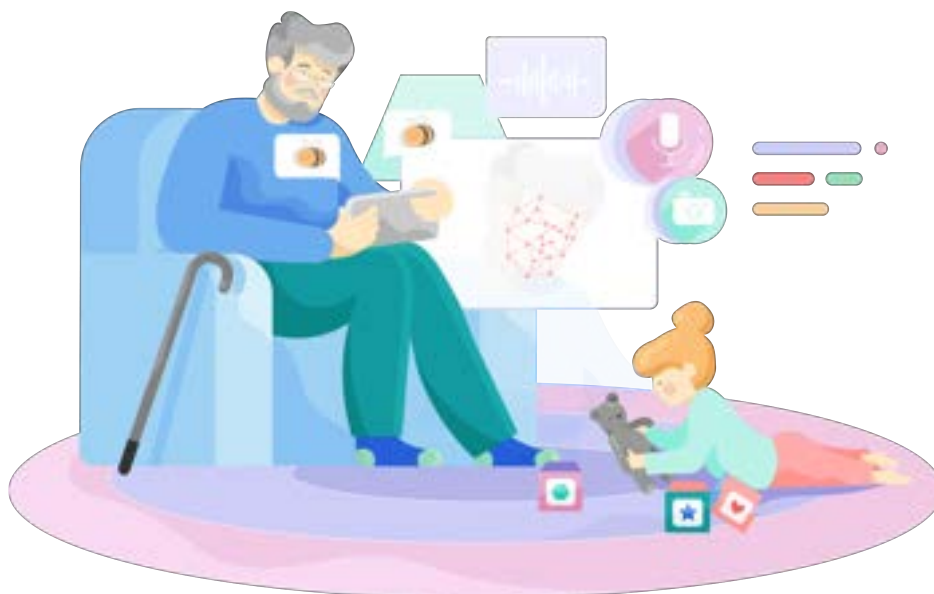
## HOW ARE THE HELIOS SCORES CALCULATED?

Leveraging our world-leading expertise in Cognitive Neuroscience, Psychology, Linguistics and Multi-modal Artificial Intelligence, each helios score is created by combining measures from globally accepted, standardised and clinically validated assessments spanning physical and mental health and wellbeing, including but not limited to assessments of major depressive disorder, generalised anxiety disorder, fatigue, autism spectrum disorder and attention deficit hyperactivity disorder.

## WHAT GOES INTO OUR HELIOS SCORES?

### ARE THE HELIOS OUTPUTS CONTEXTUALISED?

Yes! In order to provide users with a comprehensive perspective, we benchmark each score against a curated subset of individuals within our dataset who share the same age, gender, language, and accent as the user. In other words, users are told whether their helios scores are similar to others of their demographic group, lower, or higher. This comparison, rooted in extensive data analysis, facilitates a more personalised and contextual understanding for our users, reinforcing the validity and utility of our scores in real-world scenarios.



### WHAT DATA STREAMS HAVE GONE INTO CREATING HELIOS?

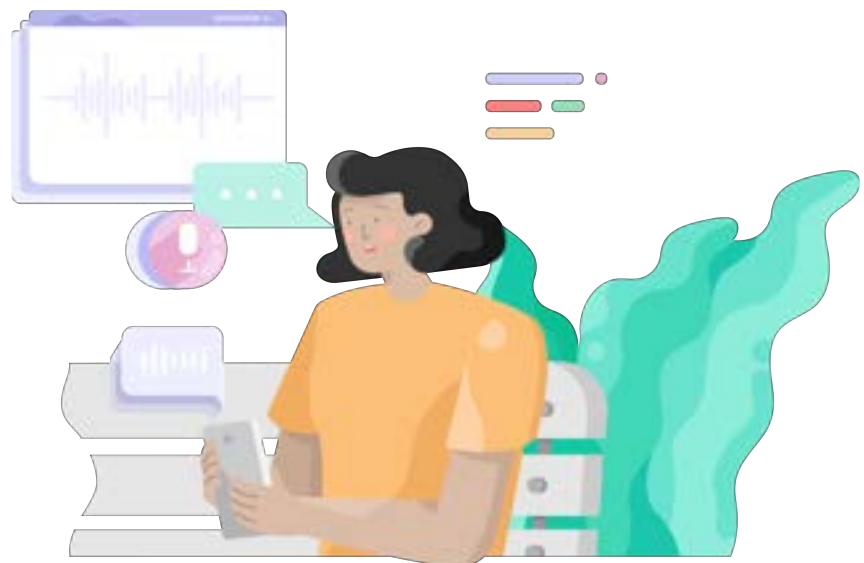
Just like our clinical insights, thymia helios was created using our breakthrough technology that combines voice, video and behavioural data:

# WHAT GOES INTO OUR HELIOS SCORES?

## VOICE (ACOUSTICS AND CONTENT)

Your voice is more than just words; it's a symphony of emotions, thoughts, experiences, and identity. At thymia, we listen to that symphony to better understand your mental health, meticulously analysing two distinct yet intertwined aspects of your voice: acoustics and content.

The acoustics of your voice, encompassing tone, pitch and intonation changes, pauses, loudness levels, modulation and much more, reveal a plethora of subtle emotional cues. Just as a maestro discerns every instrumental shift and nuance in an orchestra, our AI detects and decodes these emotional symphonies, turning the subtle ebb and flow of your vocal patterns into tangible insights.



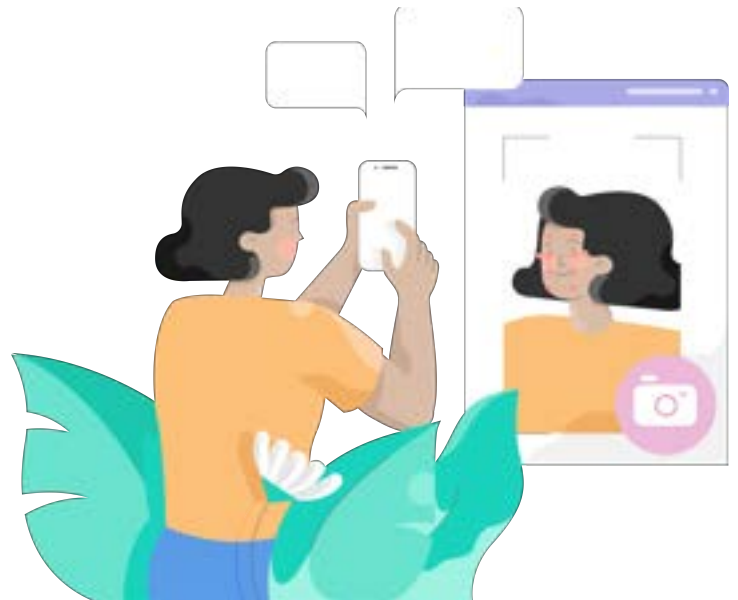
Concurrently, the content of your speech paints a rich picture of your cognitive state. Beyond just the words you say, we delve into the depth of their significance. Do you use more personal pronouns, signalling introspection? Are your words predominantly positive or lean towards the negative spectrum? How complex are your sentence structures, and are they semantically congruent? By examining these facets and more, we're not just hearing you - we're deeply understanding you. In a world that often asks us to 'speak our mind,' thymia ensures that every facet of your voice, from its acoustic nuances to its content layers, is comprehensively understood and valued.

# WHAT GOES INTO OUR HELIOS SCORES?

## VIDEO

**(EYE-GAZE PATTERNS, FACIAL MICRO-EXPRESSIONS, HEAD ANGLE, UPPER BODY MOVEMENTS AND MORE)**

Every facial twitch, every subtle shift in gaze, and every nuanced movement tells a story. At thymia, we've mastered the art and science of deciphering these stories through the power of video analysis. Our pioneering AI algorithms sift through the realm of the unseen, capturing fleeting facial micro-expressions, gauging the significance of your eye-gaze patterns, and observing your body's natural language. Just as an astute observer might notice when someone's feeling uneasy by their fidgeting or a diverted gaze, our AI picks up on these, providing a holistic picture of your mental state. In a world where the smallest of expressions can speak volumes, thymia ensures that none of these stories go unnoticed.



## BEHAVIOUR

**(SWIPING, TYPING, REACTION TIMES, ERROR RATES AND MORE)**

Every tap, swipe, or keystroke on your device is a digital footprint, revealing intricate patterns about your cognitive and emotional state. When you interact with our games, your behaviour paints a picture of your mental health.

How fast are you swiping? Are there changes in your typing speed or reaction times? Are you reacting how we expect in this game or not? Such subtle behavioural shifts signal crucial insights about your mental state.

In a digital age, where our screens are an extension of ourselves, thymia ensures that every interaction becomes an opportunity for understanding.



# THE HELIOS SCORES

## EMOTIONAL STATE

Emotional State refers to the complex psychological conditions that encapsulate a person's mood, feelings, and overall emotional well-being. It includes indicators of more acute anxiousness, nerves, cognitive load, self-esteem, and mood regulation, and can be influenced by a range of physiological and environmental factors.



Disturbed emotional state is a common complaint in many mental health conditions, including depression, bipolar disorder and more, but it is also frequent in individuals without those conditions. Life's everyday challenges can also cause shifts in emotional state, with some individuals being more susceptible or more resilient to their effects compared to others.

## ASSOCIATED SCORES

Score	Scientific Definition	User-Facing Definition
<b>Mental Strain</b>	A comprehensive metric reflecting an individual's overall mental well-being, encompassing aspects of anxiety, depression, fatigue, and other psychological factors. It may include indicators of emotional resilience, coping strategies, and cognitive functioning.	A score that shows how your mind is doing overall, considering feelings like sadness, worry, tiredness, and how well you're handling things. Use the other scores provided to dive deeper into what may be driving your mental strain score.
<b>Distress</b>	A state of emotional suffering often characterized by symptoms of anxiety and depression, reflecting an inability to adapt or cope with challenging circumstances.	Feelings of nervousness, worry or being on edge, like something's not quite right.  Distress is a sharper, short-term emotional response to recent challenges.  This is different to stress, which is a more chronic, physical response.
<b>Confidence</b>	A psychological state reflecting belief in one's abilities, self-worth, and the ability to successfully engage with life's challenges.	How sure you feel about yourself and what you can do, confidence in tackling challenges.

## PHYSICAL STATE (ENERGY DYNAMICS)

Energy Dynamics refers to the interplay between mental and physical exertion, effort, feelings of burnout and sleep patterns, as well as physiological effects of chronic stressors or challenges. It examines how sustained cognitive and physical labour can lead to a state of depletion or exhaustion, potentially affecting overall well-being and performance.

### Physical State (Energy Dynamics)

*Available now*



It explores how exertion and sleep intertwine, impacting overall energy levels, well-being, and readiness to engage in daily activities. It also assesses how life's challenges or other stressors can lead to a more chronic physiological response, known as stress.

## ASSOCIATED SCORES

Score	Scientific Definition	User-Facing Definition
<b>Stress</b>	A physiological and psychological response to perceived challenges or threats, potentially leading to anxiety or other mental health problems if chronic.	<p>A sense of anxiousness, tenseness or feeling wound up.</p> <p>Stress is a form of chronic or long term physical response to pressures.</p> <p>This is different to distress, which is more of an acute, emotional response.</p>
<b>Burnout</b>	A multidimensional state of physical and mental weariness that results from prolonged or intense cognitive or physical work, not merely a lack of sleep. Examines how sustained cognitive and physical labor can lead to a state of depletion or exhaustion, potentially affecting overall well-being and performance. This is not tied to sleep habits.	<p>How worn out or tired you feel from work or thinking hard for a long period of time. This relates to both mental and physical tiredness, but is not related to your sleep patterns.</p>
<b>Tiredness</b>	A measure of an individual's propensity to fall asleep or experience sleepiness, potentially indicative of sleep disorders or sleep-related health problems. This is tied to recent sleep habits.	<p>How likely you are to feel tired, sleepy or to fall asleep when given the opportunity. This is tied to your recent sleeping habits and patterns.</p>

# SCORE INTERPRETATION

- Each score is linked to its own AI model.
- All models produce a score from 0 to 1. Mental strain produces a continuous score as a percentage and all other scores are presented in four distinct buckets:
  - **Low (0.0);**
  - **Moderately Low (0.33);**
  - **Moderately High (0.66); and**
  - **High (1.0).**
- Bucketing is based on **benchmarking against relevant users** in our database matching the assessed individual in age, gender and language (with accent). In other words, a low score means that the score is low in comparison to other users in our database with the same age, gender and accented language.

Score	0 (Low)	0.33 (Moderately Low)	0.66 (Moderately High)	1 (High)
<b>Emotional State</b>				
<b>Mental Strain</b>	Low Strain	Mild Strain	Moderate Strain	High Strain
<b>Distress</b>	Low Distress	Mild Distress	Moderate Distress	High Distress
<b>Confidence</b>	Low Confidence	Growing Confidence	Good Confidence	High Confidence
<b>Physical State (Energy Dynamics)</b>				
<b>Stress</b>	Low Stress	Mild Stress	Moderate Stress	High Stress
<b>Burnout</b>	Energised	Slightly Fatigued	Moderately Fatigued	Exhausted
<b>Tiredness</b>	Not Tired	Slightly Tired	Moderately Tired	Very Tired

# **COMPLIANCE & DISCLAIMERS**

# COMPLIANCE - DATA PROTECTION LAWS

At thymia, we recognise the profound responsibility that comes with handling sensitive personal data. Upholding the privacy and security of our users' information is paramount, and we have rigorously aligned our processes and protocols to meet and exceed the stringent standards set forth by key data protection regulations.

That is why the general principles we follow are Privacy by Design and Security by Design.



## GDPR COMPLIANCE

Our tools and services are fully compliant with the General Data Protection Regulation (GDPR), the European Union's landmark privacy law. We prioritize transparency, user consent, and the right to data access and correction. From collection to processing and storage, every aspect of our data handling respects individual privacy rights and adheres to the highest European standards.



## HIPAA COMPLIANCE

In addition to GDPR, we are also fully compliant with the Health Insurance Portability and Accountability Act (HIPAA) in the United States. This means we employ meticulous safeguards to protect the confidentiality, integrity, and accessibility of healthcare information. By rigorously observing these legal frameworks, we affirm our commitment to operating with integrity and trustworthiness in the global healthcare space.

# COMPLIANCE - CYBERSECURITY CERTIFICATIONS AND GOVERNMENT RECOGNITION

In an era where cyber threats are ever-evolving, thymia places utmost priority on implementing robust cybersecurity measures. Our commitment to safeguarding user data is further augmented by our status as a recognised vendor with the UK government and our attainment of industry-leading certifications.



HM Government  
**G-Cloud**  
Supplier

## ISO27001

thymia is proud to have achieved and be maintaining (2020 to present) the ISO27001 certification, a globally recognised standard for information security management. This certification attests to our comprehensive and rigorously audited approach to managing information security risks and maintaining the confidentiality, integrity, and availability of all data processed through our tools and services.

## NHS TOOLKIT COMPLETION

We have successfully completed the NHS Toolkit, an essential requirement for organisations working with the National Health Service (NHS) in the UK. This completion underscores our adherence to best practices in information governance and confirms our readiness to collaborate with healthcare providers within the NHS framework.

## RECOGNISED UK GOVERNMENT VENDOR (G-CLOUD13)

thymia is honored to be a recognized vendor under the UK government's GCloud13 framework. This esteemed recognition validates our commitment to delivering secure and reliable solutions, and it positions us as a trusted partner for public sector organizations in the United Kingdom.

## DISCLAIMERS

thymia's tools, products, and services ("Tools") as described within this whitepaper are intended to provide insights and understanding into various cognitive domains and wellbeing parameters. While based on scientific principles and crafted with the utmost care and accuracy, these Tools are not designed to be used as standalone diagnostic instruments for any mental health or medical conditions.

### **NOT A SUBSTITUTE FOR PROFESSIONAL MEDICAL EVALUATION**

While the Tools may offer valuable insights into mental well-being and cognitive domains, they are not designed or intended to replace professional medical evaluation or serve as a standalone diagnostic tool. The Tools should be used in conjunction with, and not in place of, assessments made by qualified mental health professionals. They should also not be used as a substitute for an in-depth clinical assessment where necessary.

### **CONTINUOUS DEVELOPMENT**

thymia continuously strives to enhance and update the Tools in line with scientific advances and feedback. Regular updates are part of our service packages. However, users and partners should always exercise caution and sound judgment in interpreting and utilising the insights provided.

### **COLLABORATION WITH HEALTHCARE PROFESSIONALS**

Where clinically significant findings are anticipated, it is strongly encouraged that the Tools be utilised in collaboration with or under the guidance of qualified healthcare professionals who can interpret the data within the context of individual medical histories and needs.

### **INFORMED CONSENT**

Thymia operates with full GDPR and HIPAA compliance (see compliance section). Partners must obtain informed consent from individuals whose data is being analysed, in accordance with relevant privacy and data protection laws.