

# Hypatia

Health modelling, made simple

**Team Hypatia | Wellcome Trust Ideathon 2023**

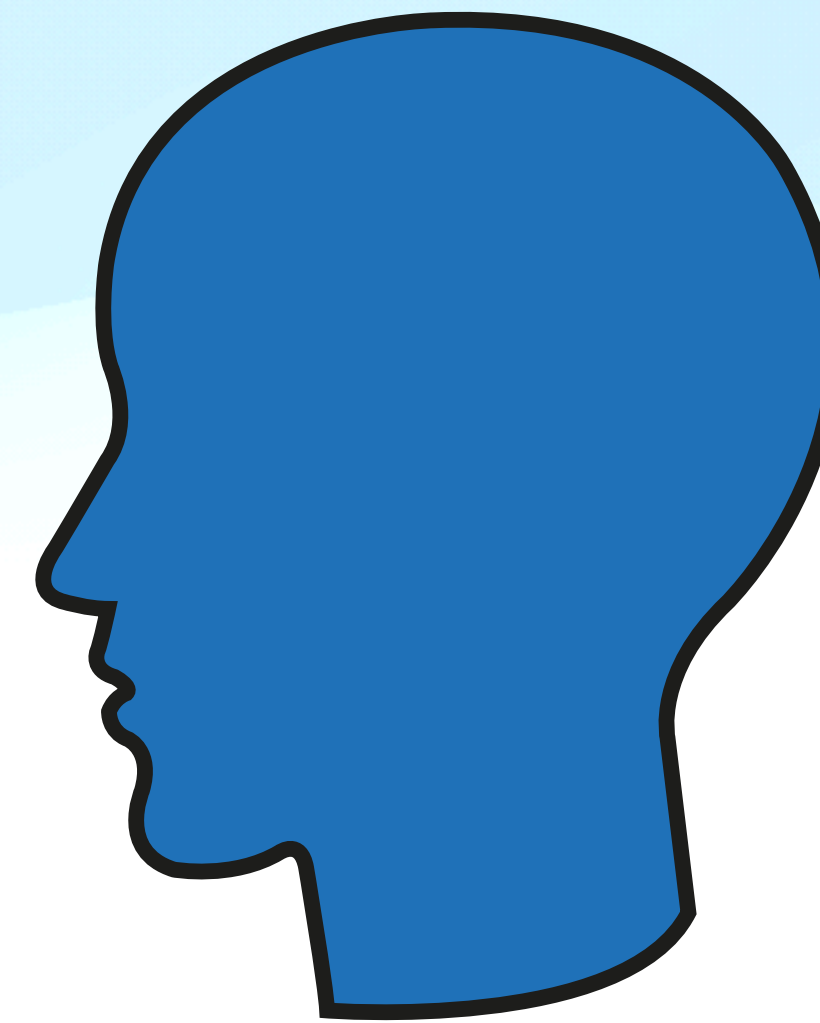


**Derek** is a clinician and digital mental health scientist.

They have read that **pavlovian biases may underlie** repetitive negative thinking in **depression**.

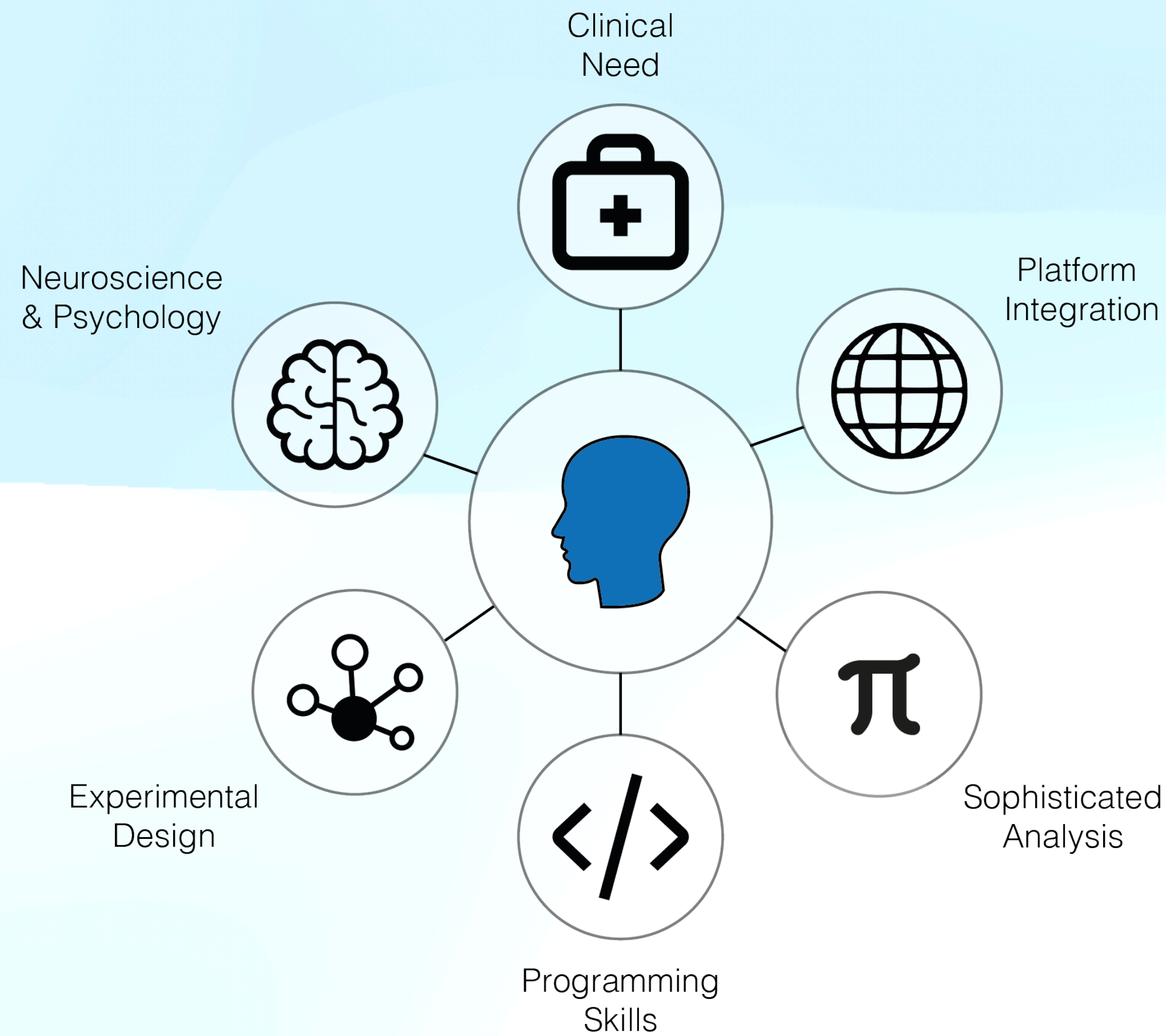
Derek wants to develop an **intervention to** address this core mechanism and **reduce symptoms**.

To test this, Derek needs a **precise tool**, a computational model, to check if this latent mechanism is effected by the intervention **over time**.





# We can't be experts at everything



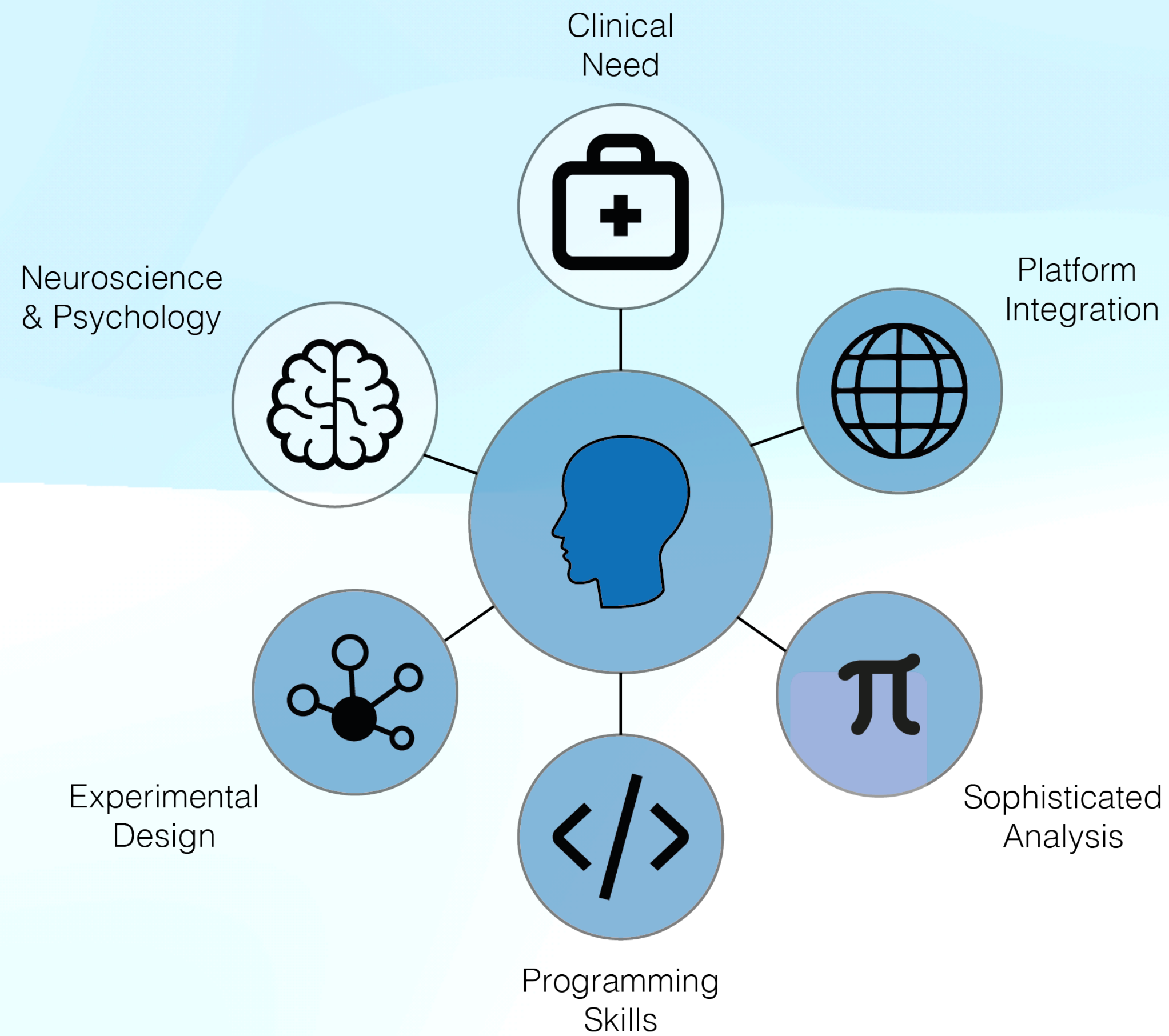
Personalised treatment is a key component of modern psychiatry

Understanding the mechanisms being addressed in a digital intervention is essential

Computational phenotyping has been suggested as a precise, scalable, dynamic method to accomplish these goals, with parameter training as a viable marker of change, but barriers to entry are high.

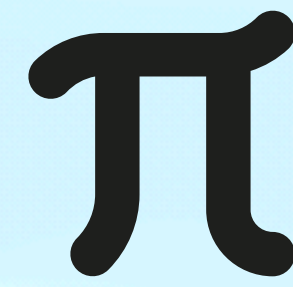


# We can't be experts at everything



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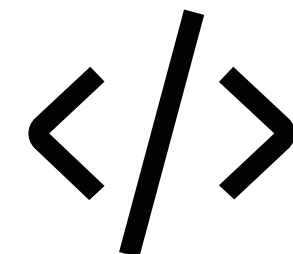
# We take the analytic load off your shoulders



Robust, rigorous mathematical and statistical models



Design prompts informed by those with lived experience

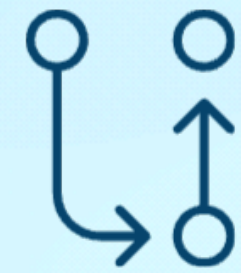
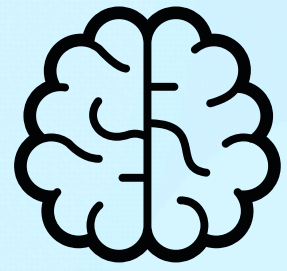


Cutting edge developments and best practice in open, cognitive science

*How does your tool help mental health researchers develop digital interventions?*



# We do the hard coding so you don't have to

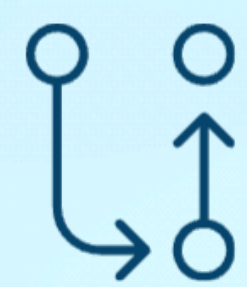


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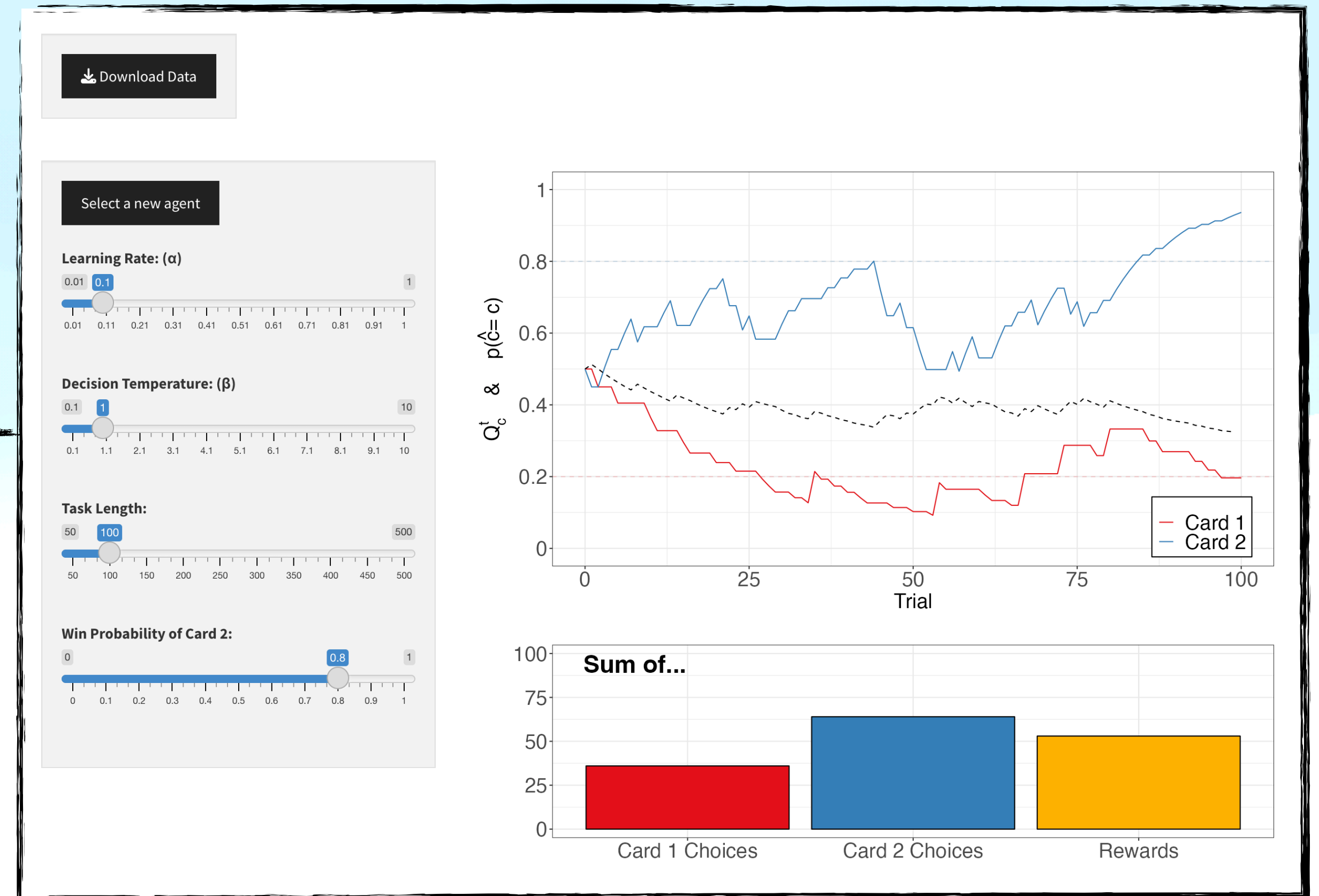


*How have you minimised the programming expertise required to interact with your tool?*

# We do the hard coding so you don't have to



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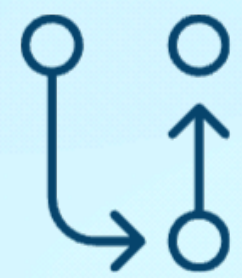


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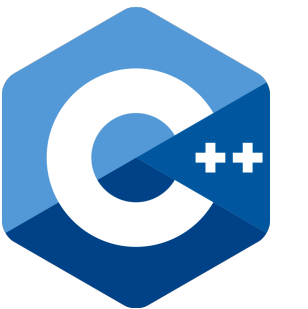


# Hypatia is compatible with existing technologies

qualtrics<sup>XM</sup>



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Health modelling, made simple

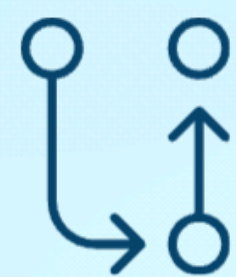


*How does your tool integrate with existing tools, frameworks, or platforms that researchers might want to use when developing digital interventions?*



# Hypatia is compatible with existing technologies

qualtrics<sup>XM</sup>



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Upload a .csv file of your behavioural data. It needs at least one column called 'choice' and another called 'reward'. If you have more than one participant, please add a column called 'id':

**Choose CSV File**

Browse... data.csv  
Upload complete

**Number of chains**

0 4

**Number of samples**

500 2,000

Optimize Parameters

**Optimized parameters**

Note: the square brackets refer to each participant id.

alpha[1]	alpha[2]	beta[1]	beta[2]
0.7446793	0.7363290	2.1948794	2.4667189

**Minimum log likelihood per participant**

The closer this is to zero, the better.

loglik[1]	loglik[2]
-15.74865	-15.80407

**Rhat value for each optimized parameter**

This should be below 1.01, ideally.

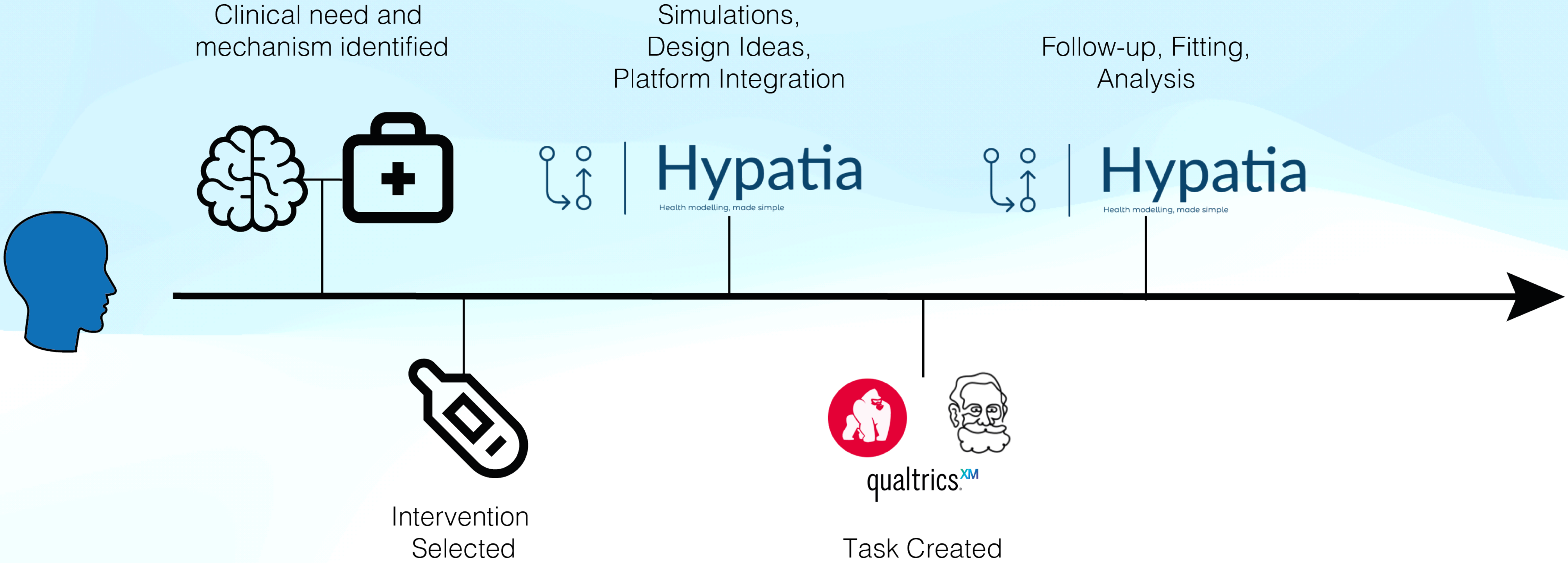
alpha[1]	alpha[2]	beta[1]	beta[2]
1.002234	1.005041	1.000930	1.014001

**Traceplot for log posterior**

This should look like lots of furry caterpillars in different colours.

*How does your tool integrate with existing tools, frameworks, or platforms that researchers might want to use when developing digital interventions?*

# User journey





# Our vision of tomorrow...



1. Allow experimenter accounts and experiments to track participants over time.
2. Allow modelling frameworks to account for these repeated measures in phenotyping.
3. Design prompts from those with lived experience.
4. Training versus tracking modules
5. Integrate more closely with popular experimental platforms to have ready-to-go models matched with their task offering

# To do this we will....



**Development:** Recruit a PDRA to manage the development of the prototype over the next year, and to implement new models and environments.

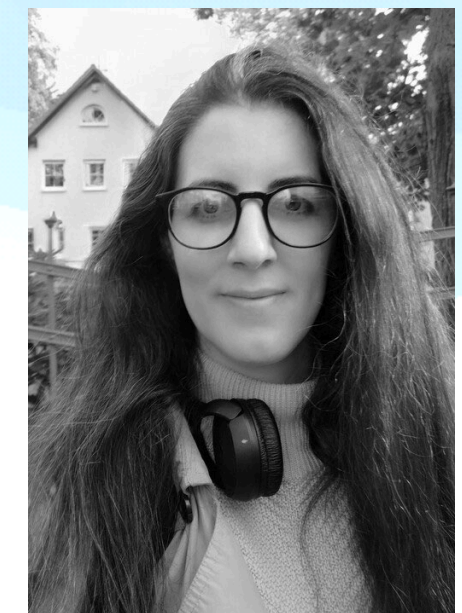
**Consultation:** Consult with those with lived experience, UX/UI designers, and experts in digital mental health to prioritise the implementation of new models, environments, and aesthetics of the platform.

**Integration:** liaise with experimental platforms to enable easy translation between task environments and modelling output.

**Output:** Produce white paper/academic outputs outlining our approach to interactive, user friendly modelling to reduces barriers to access.



# Why we're the team to lead this...



Working and publishing on the cutting edge of computational theory, assessment and implementation

Large network of international collaborators in cognitive science, psychiatry, and digital mental health

Key links with experts by experience and industry



# Thank you

