

# Hypatia

Health modelling, made simple

**Team Hypatia | Wellcome Trust Ideathon 2023**

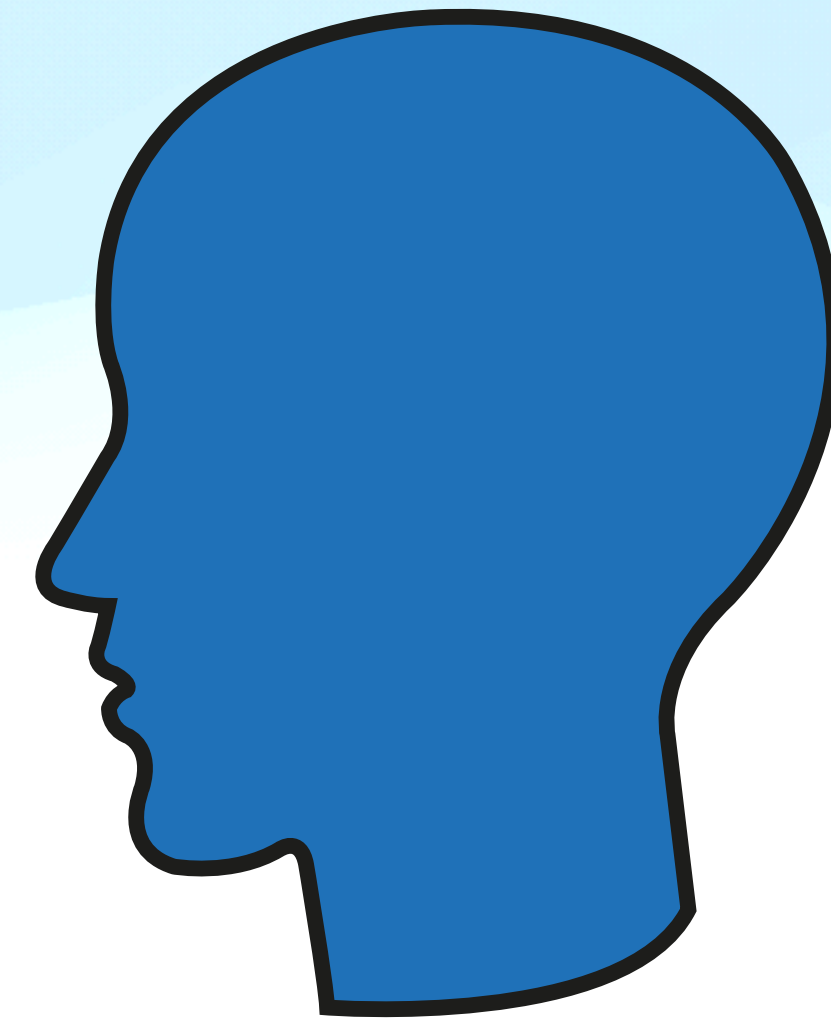


**Derek** is a clinician and digital mental health scientist.

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

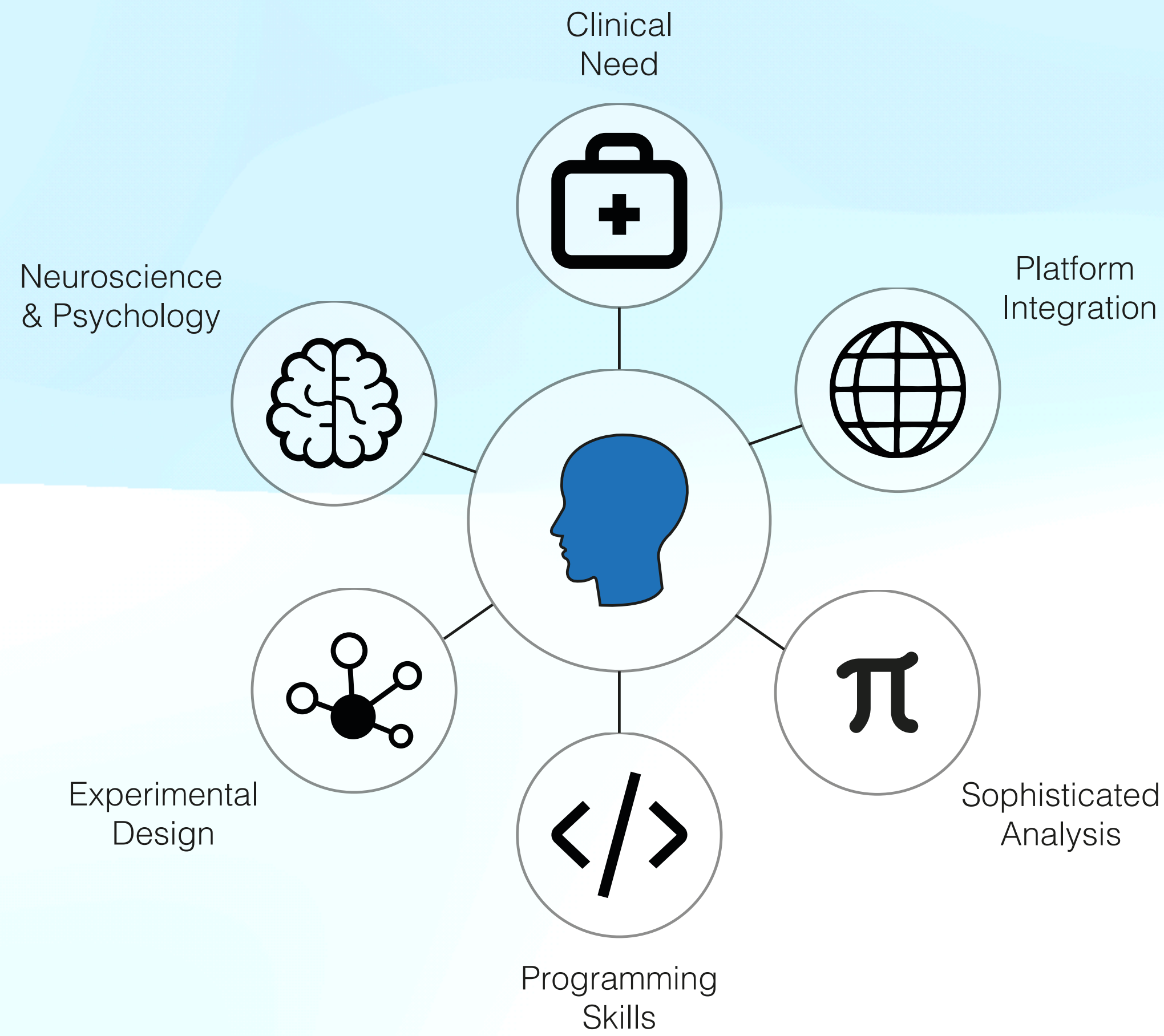
Derek wants to develop an **intervention to** address this core mechanism and **reduce symptoms**.

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





# We can't be experts at everything

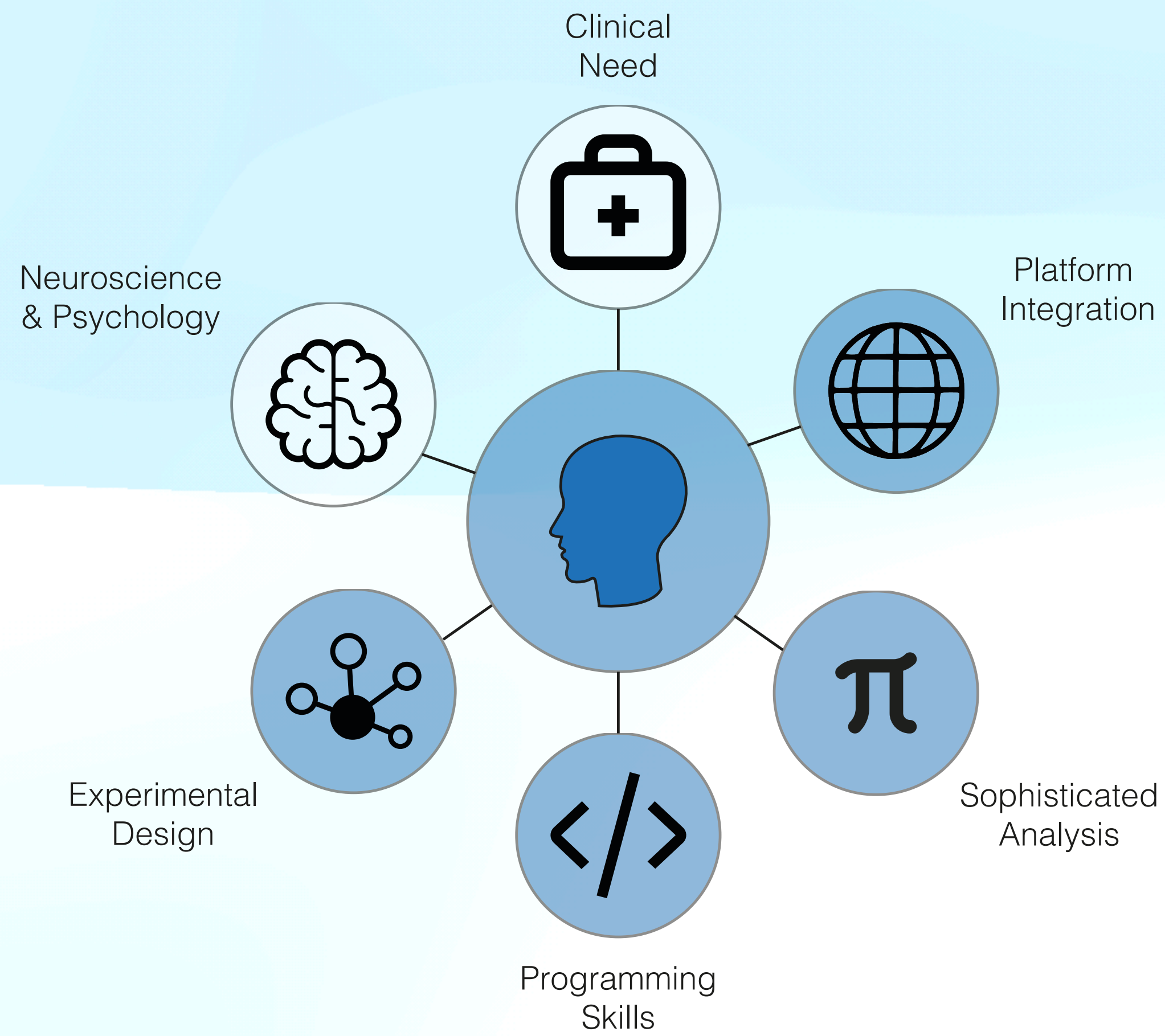


Personalised treatment is a key component of modern psychiatry

Understanding and changing computational mechanisms is the most promising direction for digital interventions

Barriers to computational modelling in psychiatry are high. **This field is young; the first ever conference was last week.**

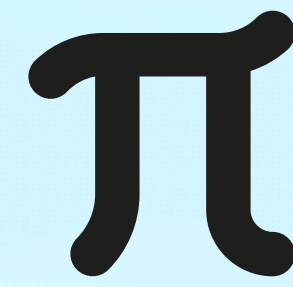
# We can't be experts at everything



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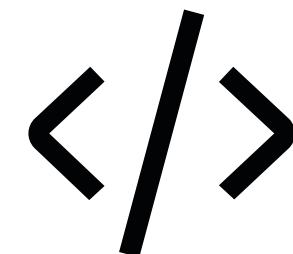
# We take the analytic load off your shoulders



Robust, rigorous mathematical and statistical models



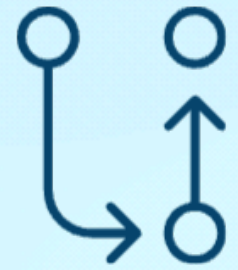
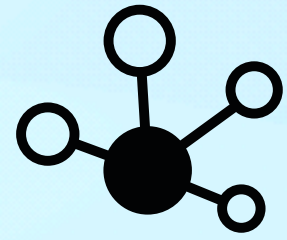
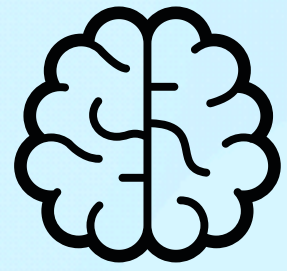
Design prompts informed by those with lived experience



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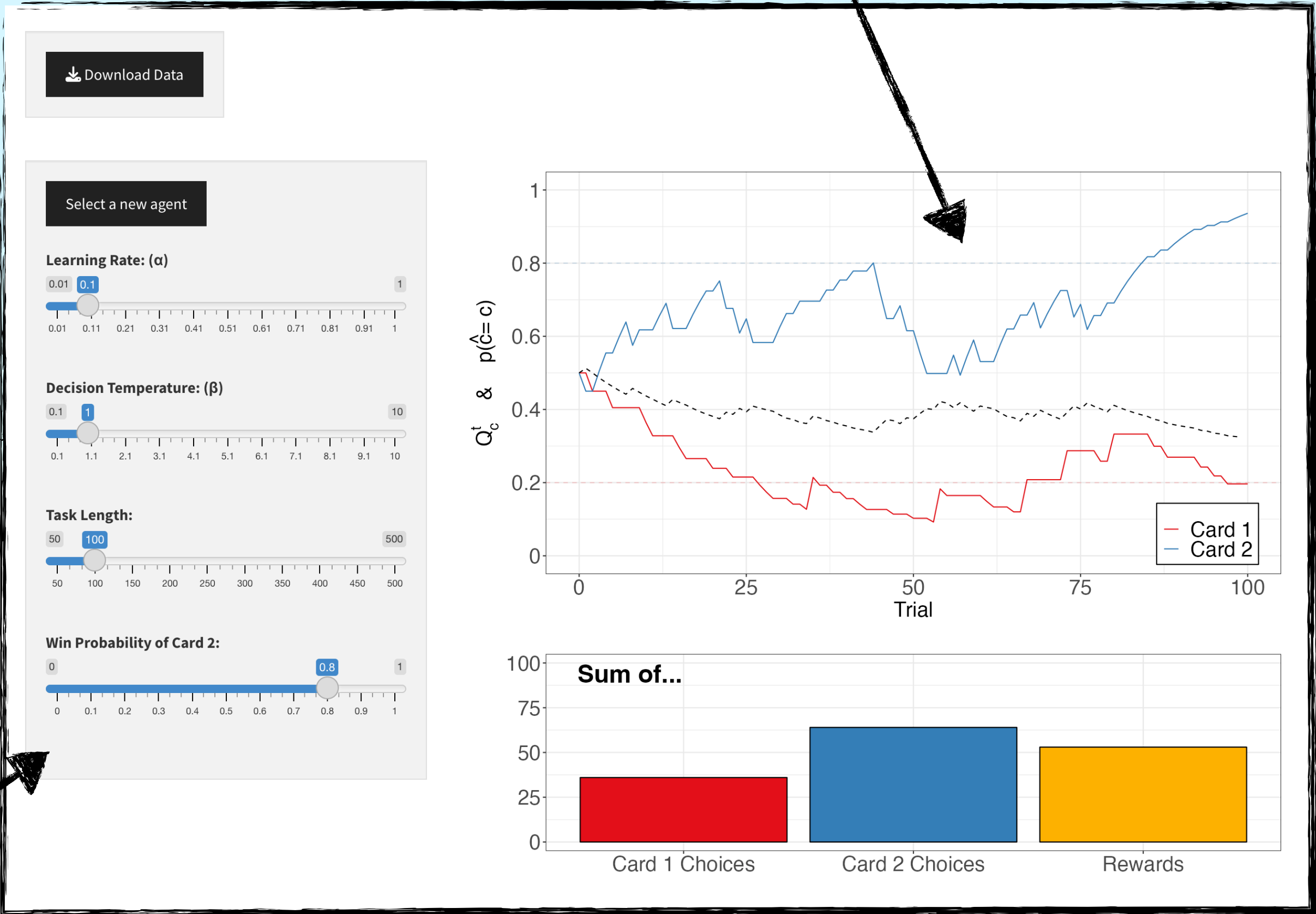
*How have you minimised the programming expertise required to interact with your tool?*



# Our current prototype...



Feedback learning task

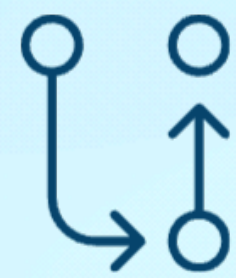


Visual scales to change values

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

# Hypatia is compatible with existing technologies

qualtrics<sup>XM</sup>



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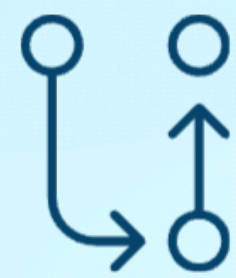


*How does your tool integrate with existing tools, frameworks, or platforms that researchers might want to use when developing digital interventions?*



# Our current prototype...

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



#### Number of samples

500



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

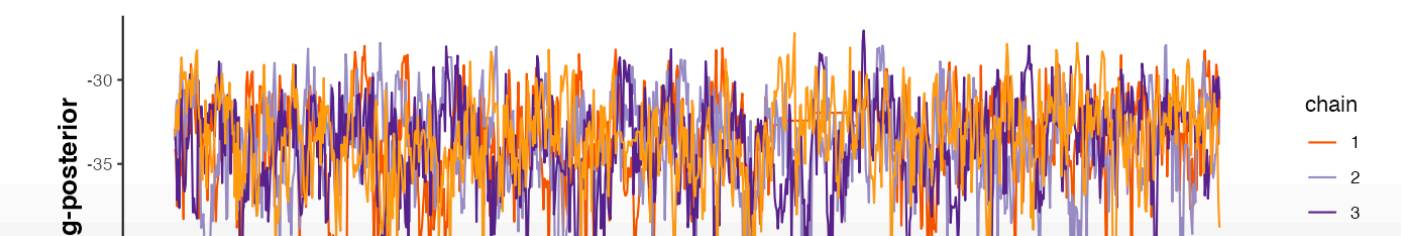
#### Rhat value for each optimized parameter

This should be below 1.01, ideally.

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

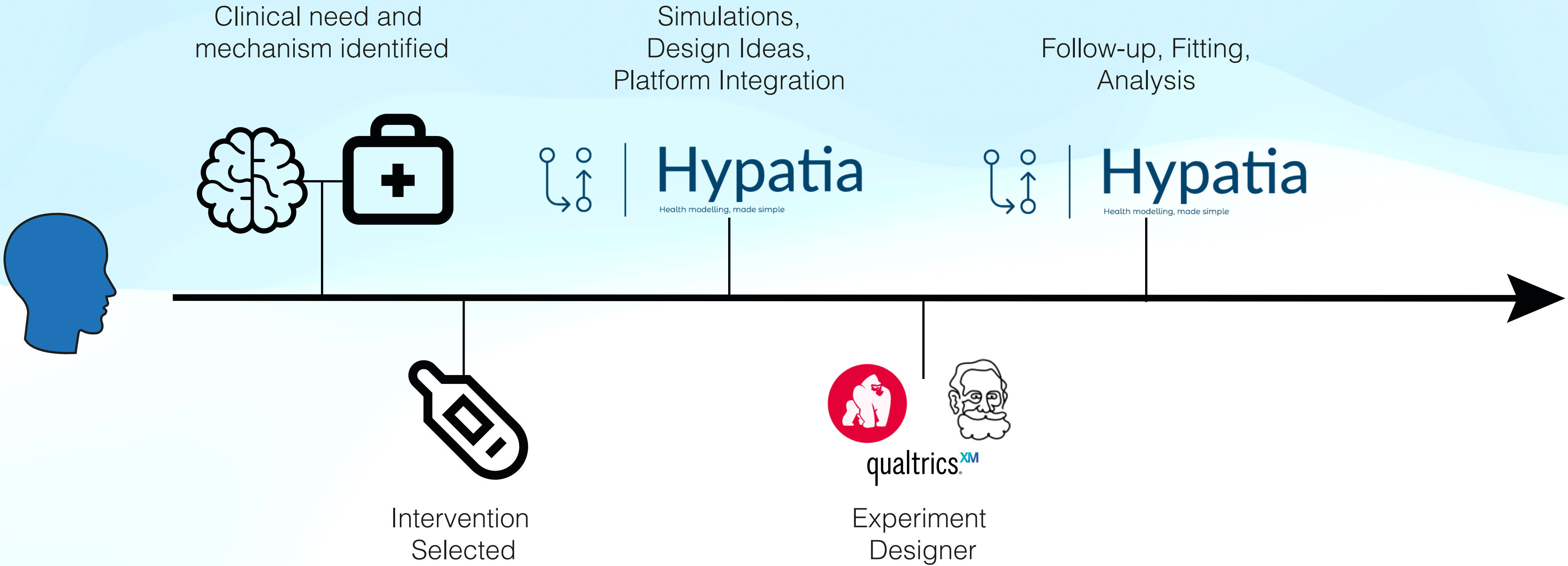
#### Traceplot for log posterior

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 to track participant parameters over time.
2. Allow modelling frameworks to account for repeated measures.
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 work locally or remotely

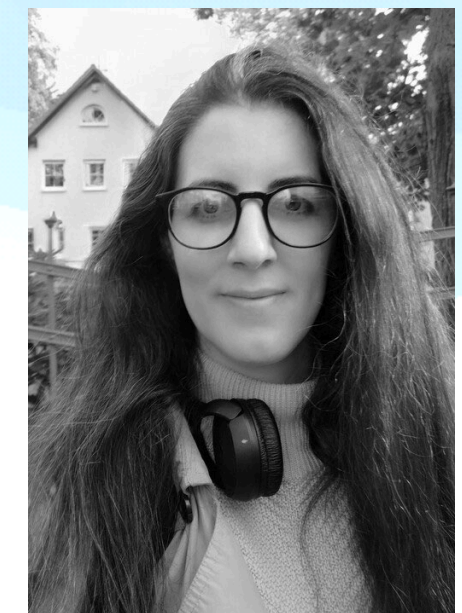
**Consultation:** Consult with those with lived experience, UX/UI designers, and experts in digital mental health

**Integration:** Liaise with experimental platforms to enable easy translation

**Output:** Produce white paper/academic outputs of our approach, and have a beta-version of our tool



# 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

We all have a track record of adherence to rigorous open scientific practice and promoting positive research culture



# Thank you

