



# Building resilience in young people through sensing technology

Project update

He Waka Eke Noa Better Together 2022

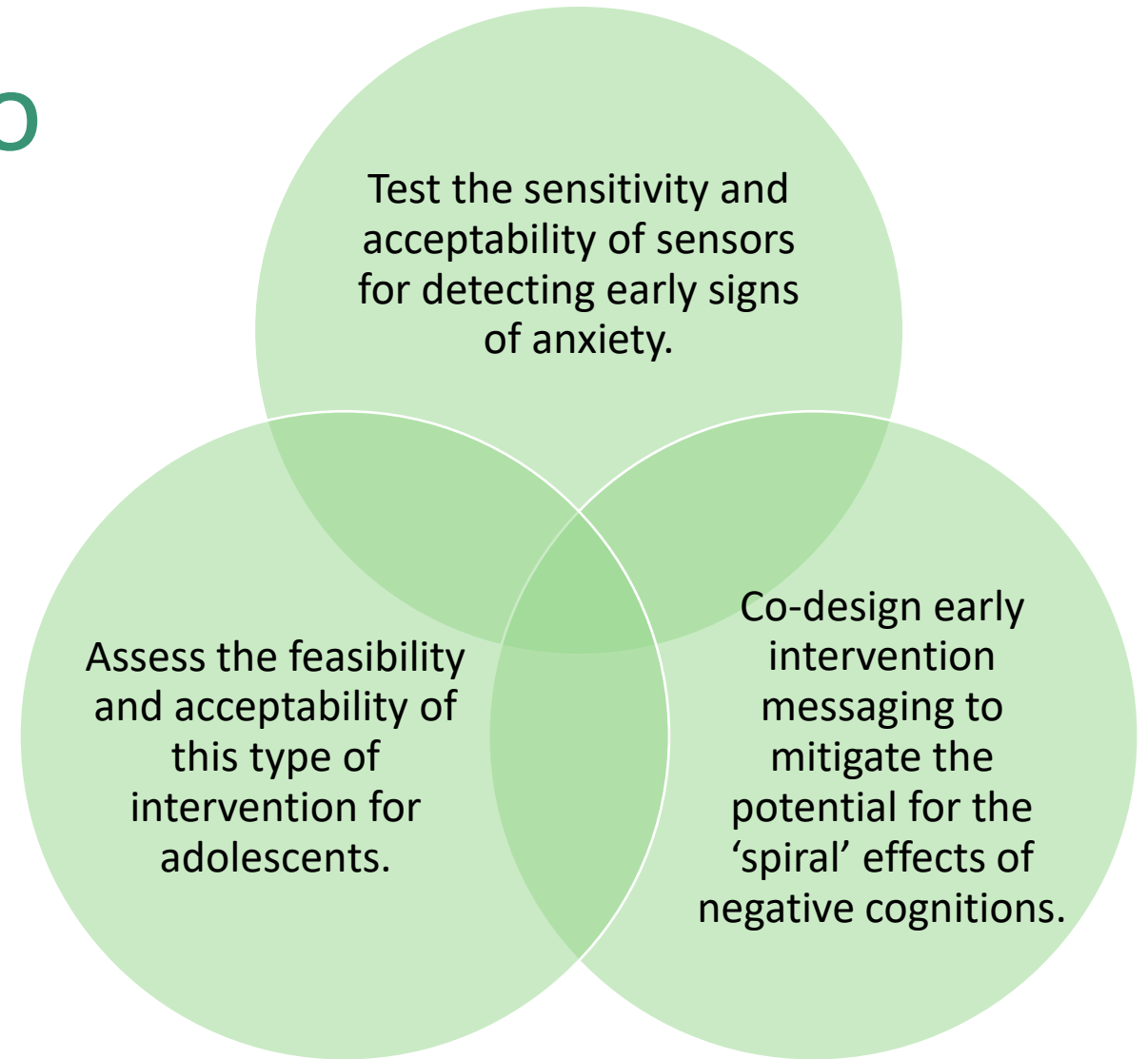
Thursday 10 November



**MEDICAL AND  
HEALTH SCIENCES**  
SCHOOL OF POPULATION HEALTH

# What we set out to do

Investigate how sensors can be used to identify the early changes associated with an anxiety episode in adolescents, in order to provide the opportunity for earlier brief intervention.



# Kaitiaki rōpū

Bringing together

**Academic, Clinical,  
Community and Industry**

expertise from across

**Tāmaki Makaurau and Te Tai Tokerau**

to provide guidance and lead decisions on  
all stages of the proposed project.

Māori  
researchers

Pacific  
researchers

Psychologists  
and mental  
health experts

Bioengineers

Data Scientists

mHealth and  
digital health  
experts

Youth and  
community  
workers

Teachers

Computer  
scientists

# Current evidence

## Scoping systematic review

- Examine the role of sensors in detecting the physiological signs of anxiety to initiate and direct interventions for its management.
- 11 studies were included in the review.
- The results showed:
  - Wide variation in types of sensors used, physiological measures and sensor-linked interventions.
  - Most studies successfully demonstrated improvements in their target variables e.g., anxiety and stress levels
  - Many studies lab based and sensors not over the counter

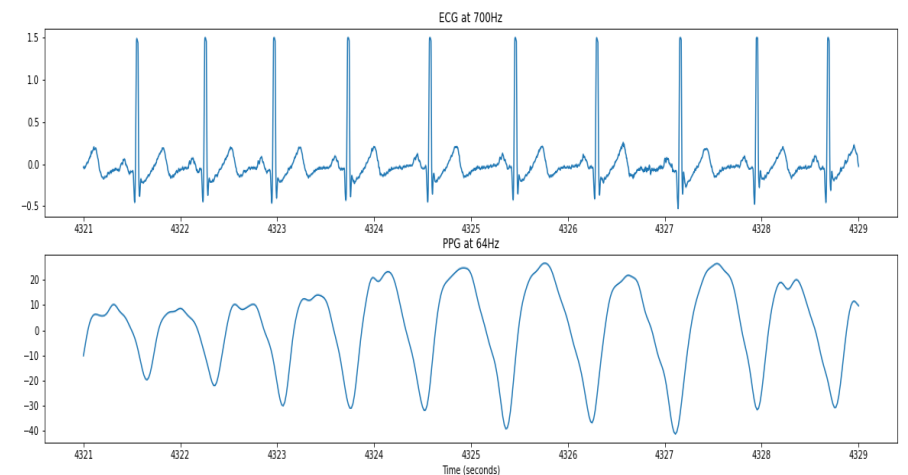
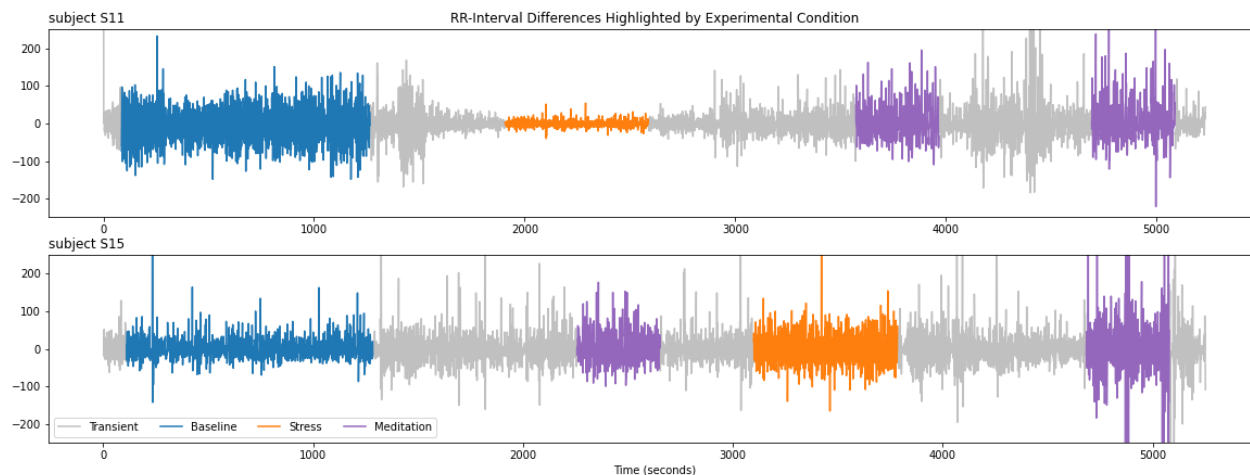
*Lily Li*

# Feasibility – Data Science Project

**To assess the feasibility of using wearable data to calculate heart rate variability to detect stress.**

- When individuals experience stress the impact to their autonomous nervous system can be detected by HRV.
- HRV metrics were compared across baseline, stress and meditation experimental conditions and then a Long Short-Term Model trained to classify the stress samples.
- The model was able to accurately predict stress across subjects.
- The results of this analysis showed the potential viability of using HRV metrics to detect stress.
- Key considerations include the variation across individuals and the quality of the signal recorded.

*Jo Gillespie*



# Feasibility – Field testing study

**To establish whether available wearable sensors can identify physical signs of stress and anxiety.**

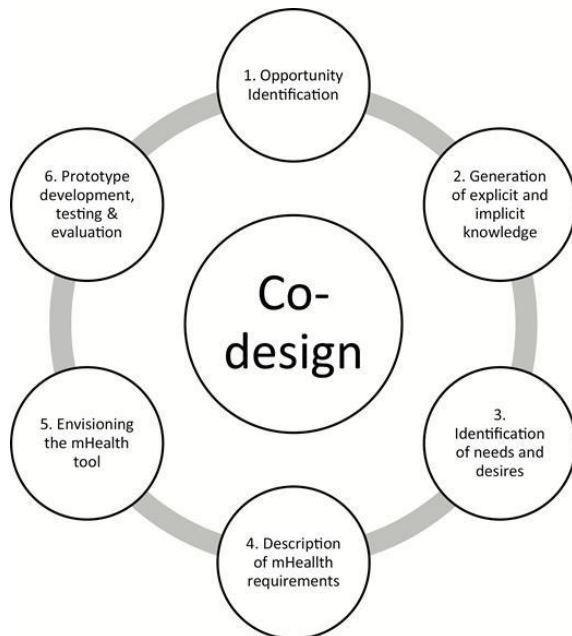
- Cohort study of young people who have mild-moderate anxiety.
- Participants will wear a sensor while self-reporting mood at regular intervals.
- Sensitivity of the sensors to measure changes in physiological measures associated with changes in self-reported stress/anxiety levels are explored.



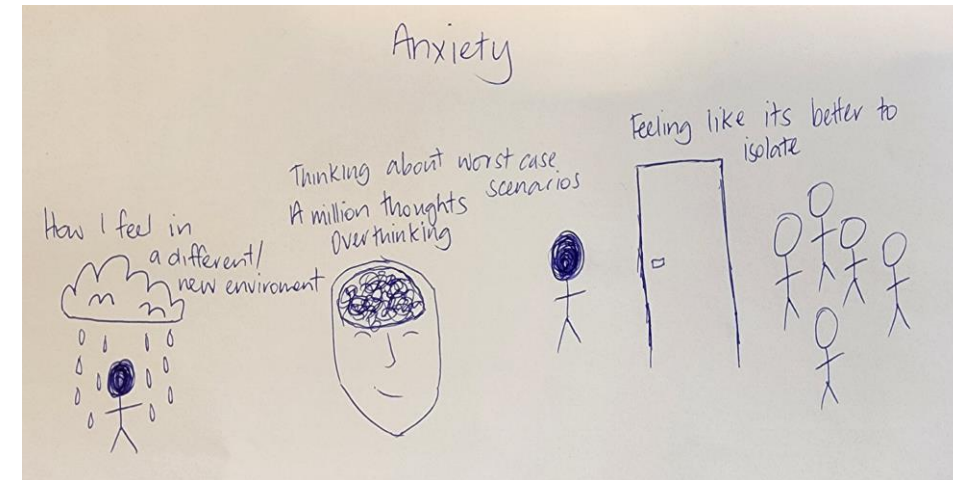
# Co-design of intervention

## Codesign of early intervention messaging for anxiety mitigation.

- Workshops with rangatahi with lived experience of anxiety and their whānau
- Dargaville and Whangarei, Te Tai Tokerau
- Targeted recruitment of Māori/takatāpui/lived experience of disability



Participatory codesign cycle adapted from Bratteteig et al.



# Key learnings so far...



# Acknowledgements



- Study participants
- End users involved in end-user consultation
- **Kaitiaki rōpū members:** Haana Bovaird, Ella Dixon, Jo Gillespie, Sarah Hetrick, Anu Kaur, Sierra Tane, Nalei Taufua, Ngaire Tihema, Andrew Wong, Jim Warren.
- **Co-investigators:** Taria Tane, Robyn Whittaker, Judith McCool
- **Project team:** Elaine Umali, Lin Ni, Georgia Best
- **Students:** Lily Li, Jo Gillespie
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