Understanding Society
THE UK HOUSEHOLD LONGITUDINAL STUDY

Use of an app to collect physical measures: The selection and measurement effects compared to alternate methods of collecting hip and waist measures

Paulo Serodio (University of Essex)
Jonathan Burton (University of Essex)
Mick P. Couper (University of Michigan)
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MASS Workshop, London, 4-5 June 2025.

University of Essex

ISER

UKRI Economic and Social Research Council

An initiative by the Economic and Social Research Council, with scientific leadership by the Institute for Social and Economic Research, University of Essex, and survey delivery by Verian and NatCen.

Context

- Understanding Society: The UK Household Longitudinal Study
  - Annual, whole-household
  - Mixed-mode – mostly web-first, rest CAPI-first
- Innovation Panel (smaller, GB)
  - Same design (mostly) as main survey
  - Used to test/experiment

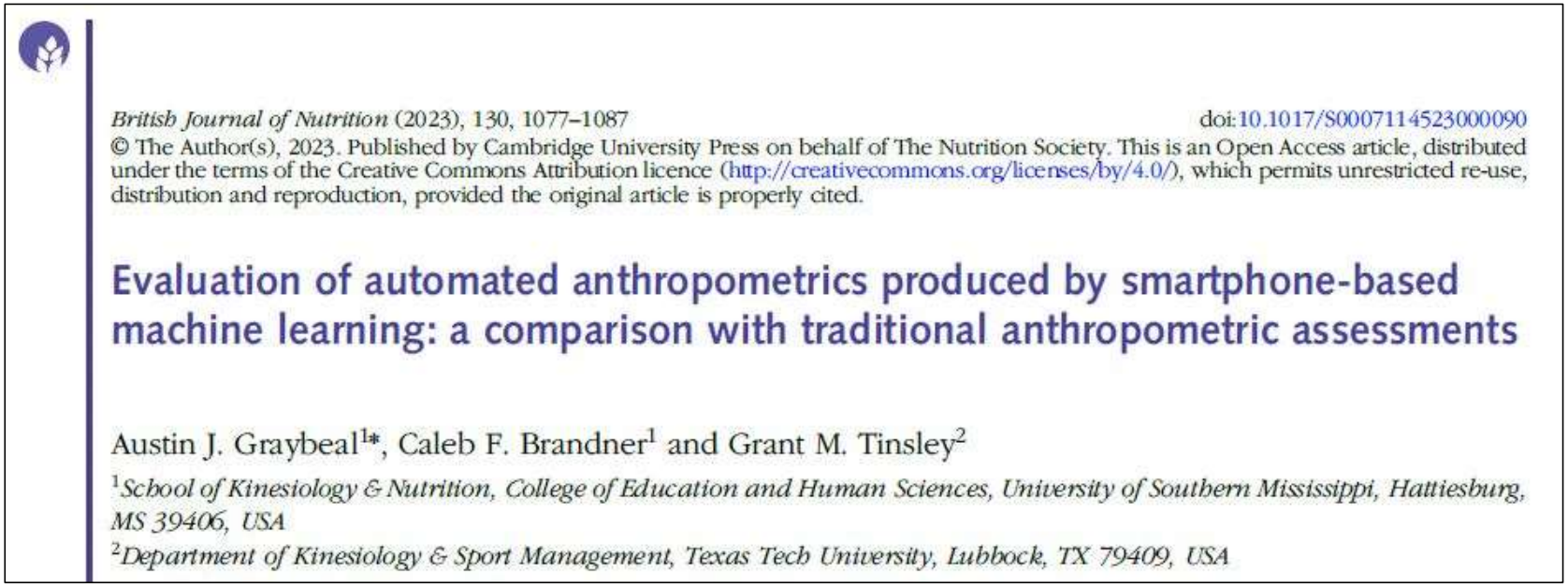
IP15

- 15th Wave of the Innovation Panel (2022)
- Set of experiments
  - https://www.understandingsociety.ac.uk/wp-content/uploads/working-papers/2023-10.pdf
- Including “Body Volume” app
  - Created by Select Research
  - Compatible with iOS/Android, smartphone/tablets
  - Calculate body measurements

What did we ask participants to do?

- Self-measurement of hips/waist pre-interview (all)
- Interviewer-observed self-measurement (CAPI only)
- Use BodyVolume app (all)
  - Take two full-body scans (face-on, side-view)

Some good results using BVI apps



British Journal of Nutrition (2023), 130, 1077–1087 doi:10.1017/S0007114523000090

Evaluation of automated anthropometrics produced by smartphone-based machine learning: a comparison with traditional anthropometric assessments

Austin J. Graybeal[1]*, Caleb F. Brandner[1] and Grant M. Tinsley[2]

[1]*School of Kinesiology & Nutrition, College of Education and Human Sciences, University of Southern Mississippi, Hattiesburg, MS 39406, USA*

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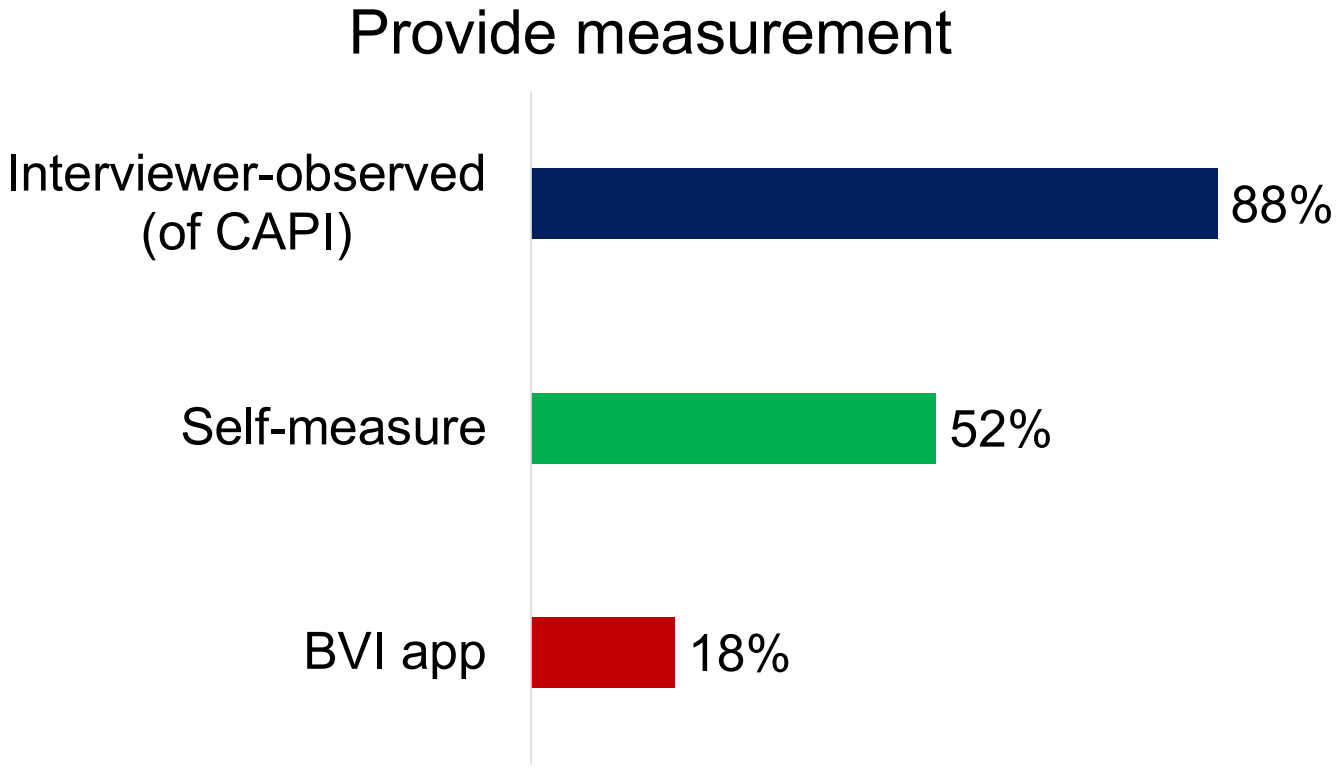
"All mobile applications across smartphone types produced **reliable estimates**…"

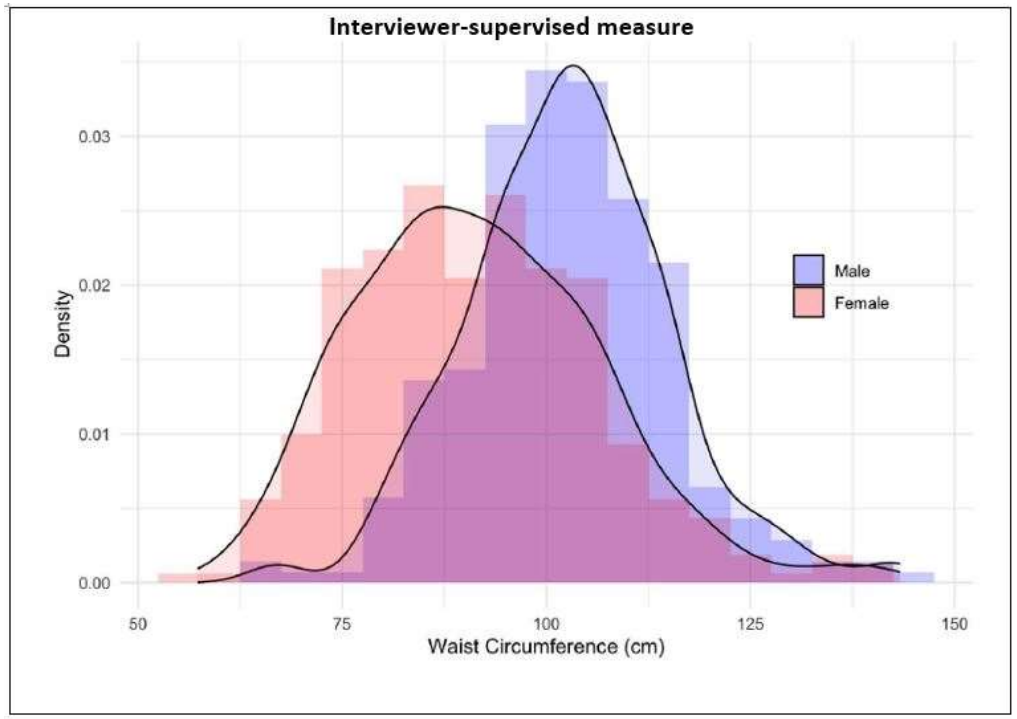
"Considering that this degree of precision was produced simply from **two two-dimensional pictures on highly accessible mobile applications**, it is plausible that these applications be considered **reliable and comparable** with traditional methods."

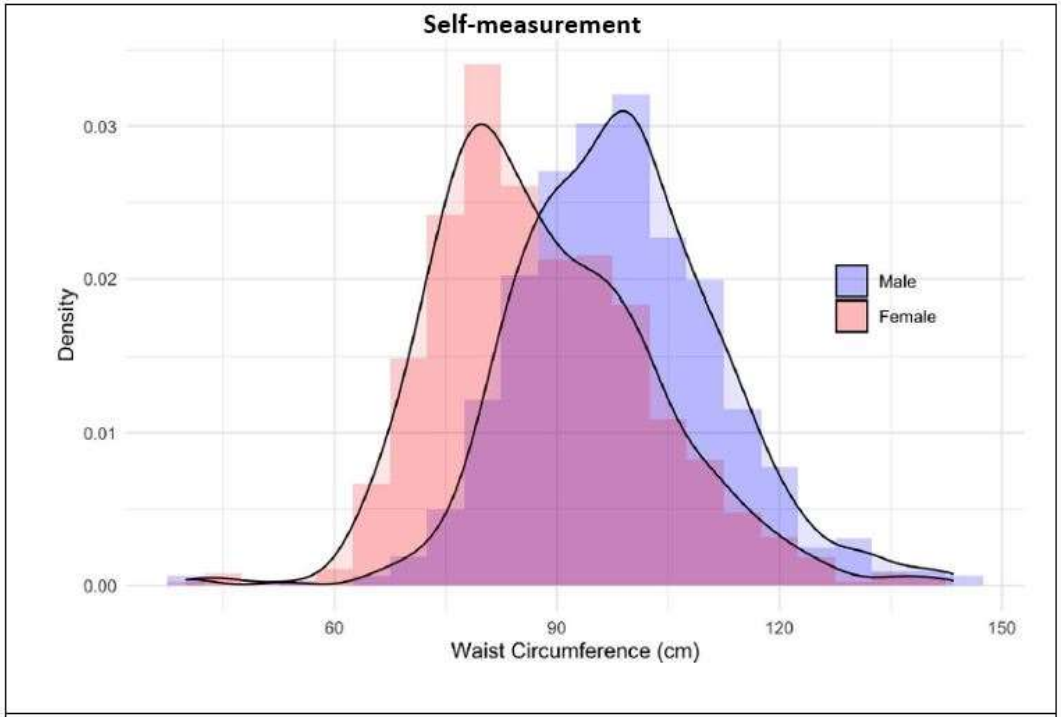
How did the app do with getting results?

- Poorly
- Participating sample slightly more biased than with other measures

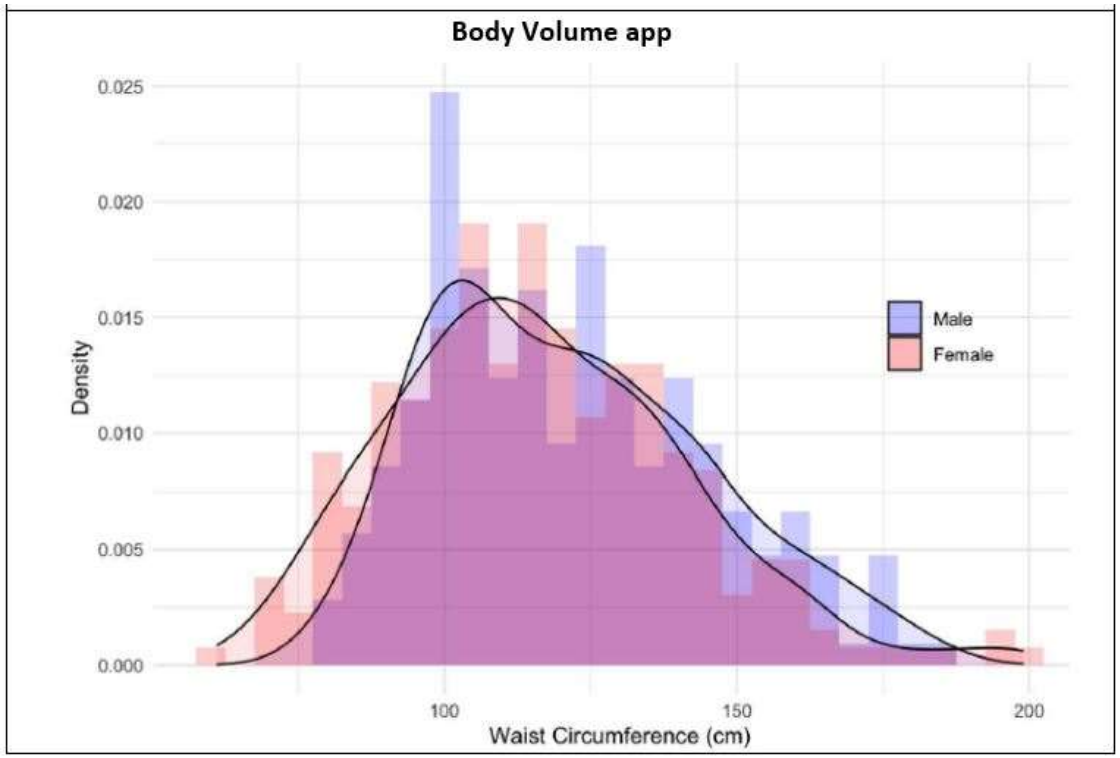


But did we get good data?

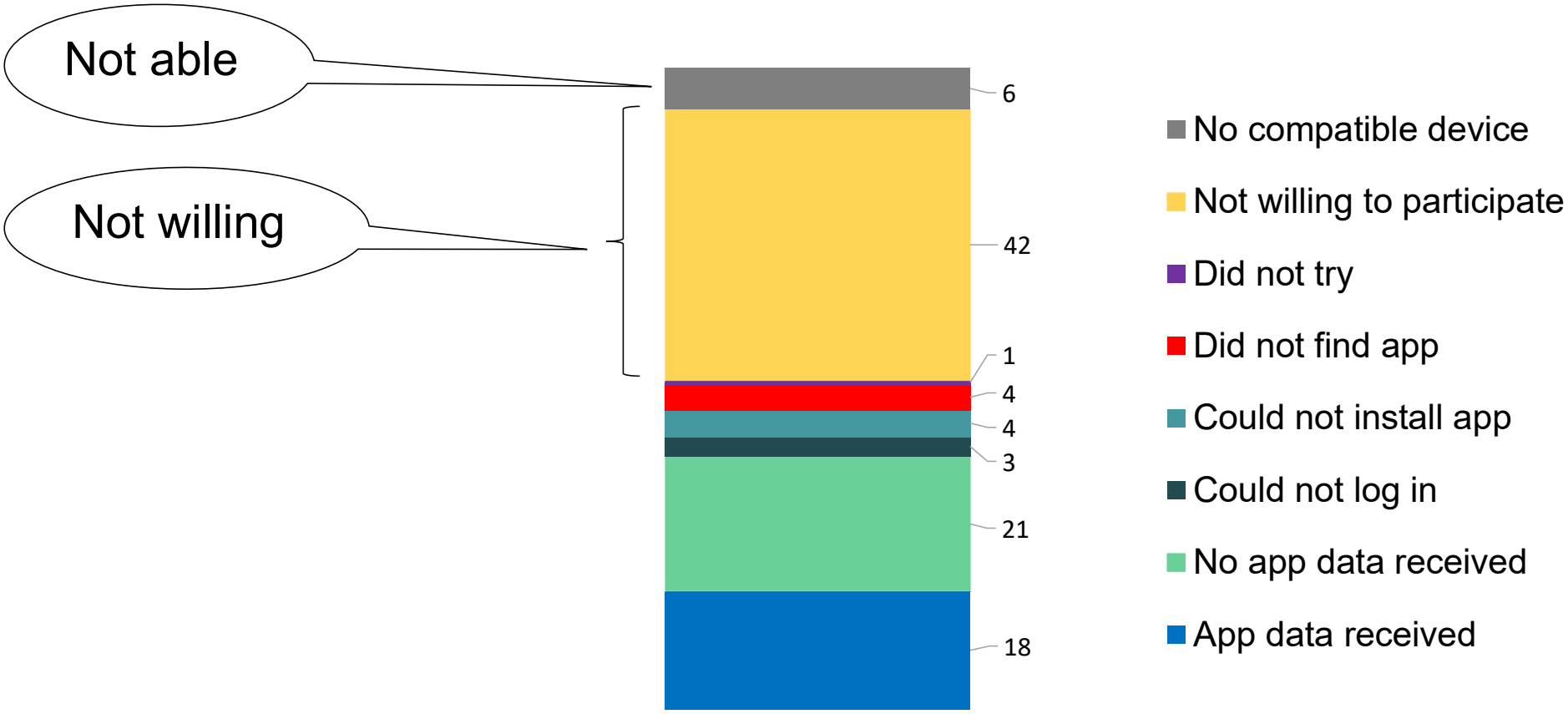




Not really


Body Volume app
0.025
0.020
0.015
0.010
0.005
0.000
Density
100
150
200
Waist Circumference (cm)
Male
Female

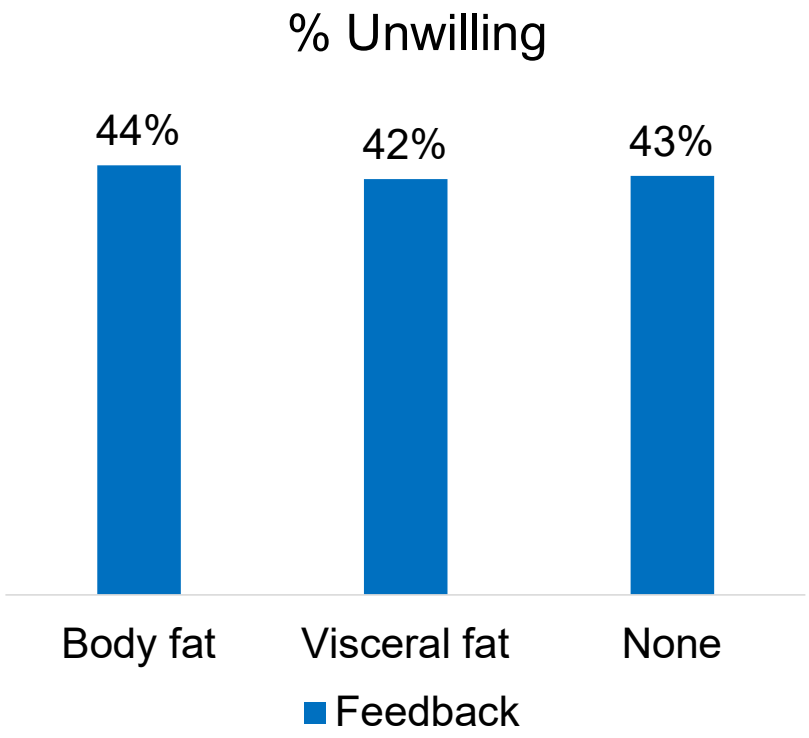
What went wrong?

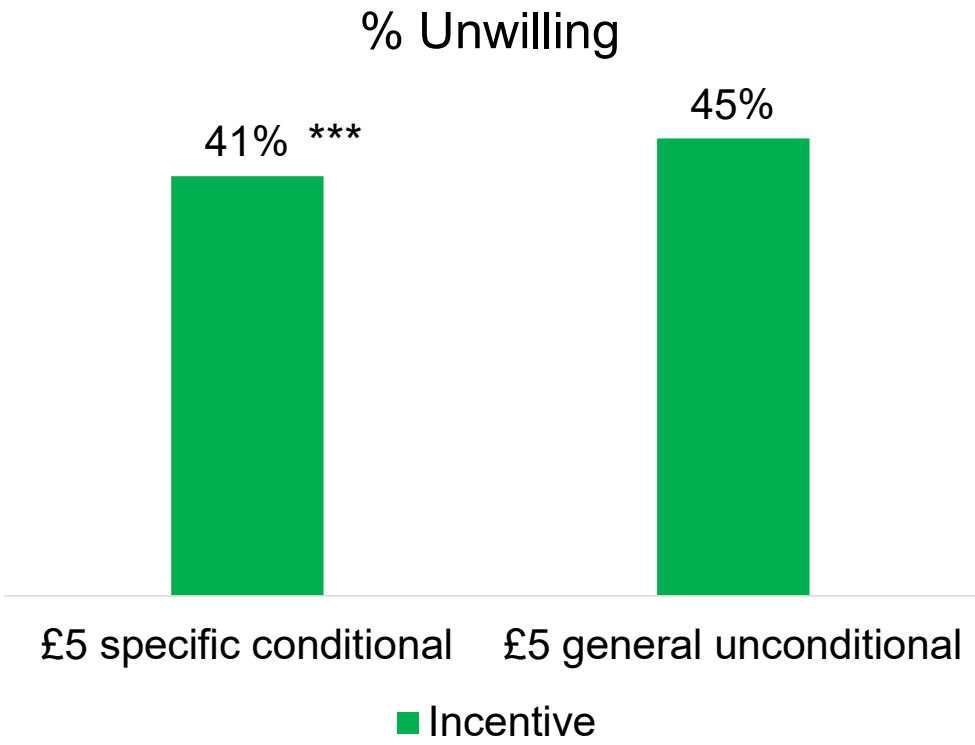


Why weren’t people willing?

- **Privacy?**
  - 36% “not willing to share this kind of information”
  - 5% “not confident information held securely”
- **Burden?**
  - 17% “don’t want to participate in additional tasks”
  - 15% “not interested in answering additional questions on this topic”
  - 9% “do not have time”
- **Technical concerns?**
  - 10% “not able/confident to download apps”
  - 7% “don’t want to take up storage space”

Our efforts to motivate people were mixed





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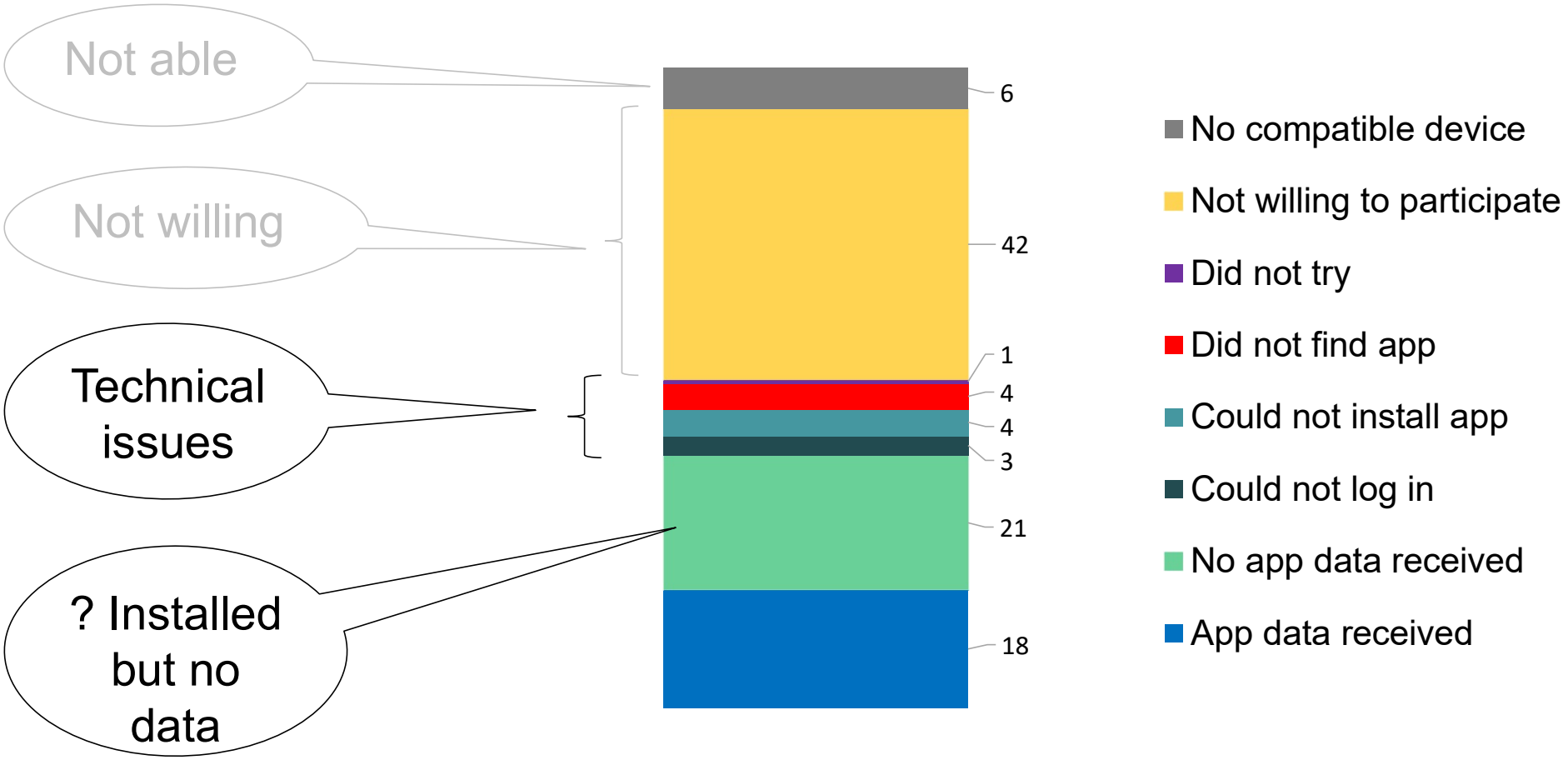
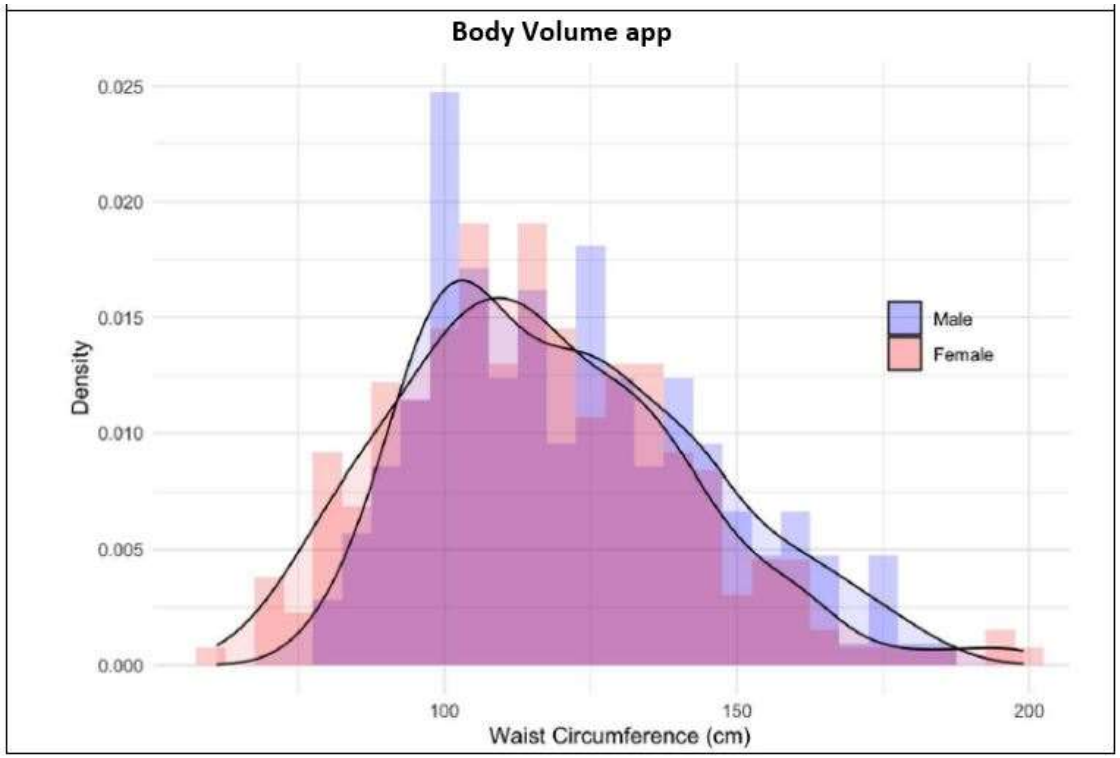


Installed but no data?

- No feedback from this group, speculation…
  - ? The app looked too complicated
  - ? Too much to read
  - ? Asked for too much personal information
  - ? Task was too difficult
  - ? The app just didn't work
  - ? Couldn't manage it by themselves
  - ? Had never intended to do so, but felt effects of social desirability
    (CAPI 36% vs Web 16%; "not willing" 20% vs 51%)

And what happened here?

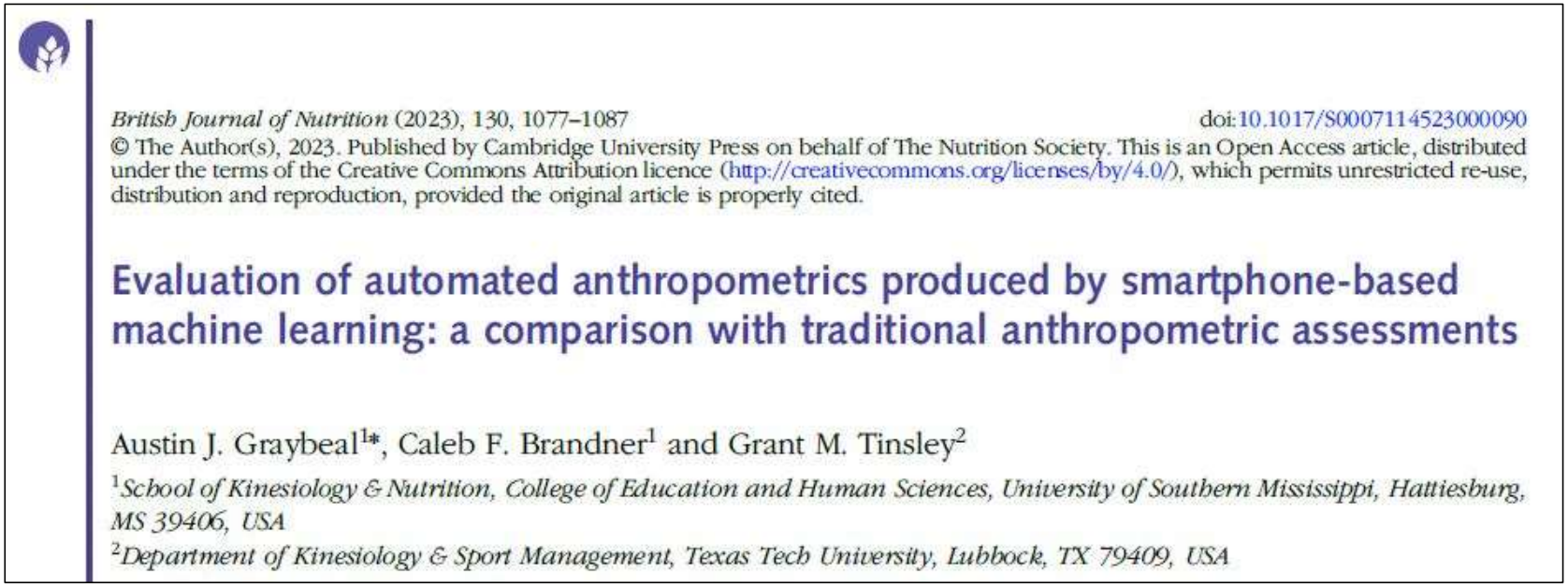


Context questions from the app

Differences between the BVI app and self-measurement

- Controlling for sex, age, education, frequency of smartphone use
- Bigger differences if…
  - Wearing baggy clothing
  - Two or more items in the background
  - Coloured walls (rather than white)

Some good results using BVI apps



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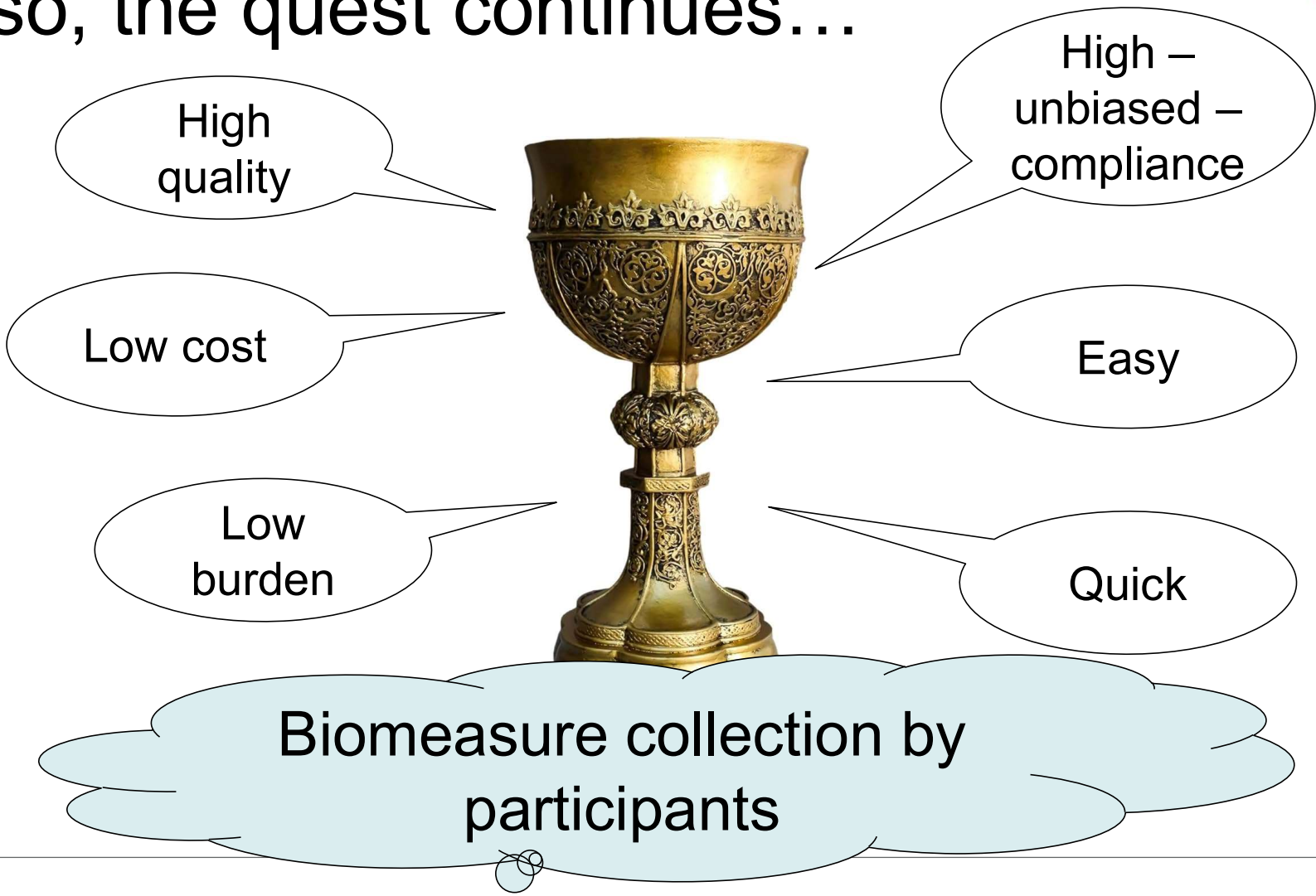
But under certain circumstances

- Participants reported to the laboratory…
- Upon arrival participants were asked to remove any external accessories … and/or loose clothing
- For scanning… participants were instructed to wear minimal form-fitting clothing. Higher waisted shorts that covered the participants bellybutton were altered to expose the participants entire abdominal region to the smartphone camera. Participants with long hair were instructed to tie their hair up so that no hair was present below the shoulder line.
- All images were taken in front of a grey vinyl wall in this designated area, and all external windows were covered so that no other background or external light source polluted the scanning region.
- The smartphone was positioned at a standardised distance …and a standardised height for all participants using a stationary tripod with adjustable angle settings…
- The smartphone was locked into place at an angle determined appropriate by the mobile application…
- All assessments were conducted in duplicate and subjectively inspected for quality to ensure that there were no errors during landmarking procedures.

The right app, but in the wrong context?

- An app designed to work with volunteers, in clinical surroundings, used by trained researchers
- Less effective with participants who are doing it as an additional task, doing it themselves, in their own homes, with no training
- Importance of field tests, trials, pilots

And so, the quest continues…



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Data

- University of Essex, Institute for Social and Economic Research. (2024). Understanding Society: Innovation Panel, Waves 1-16, 2008-2023. [data collection]. 13th Edition. UK Data Service. SN: 6849, http://doi.org/10.5255/UKDA-SN-6849-16.