Can we use an app on a smartphone or tablet to collect detailed expenditure data?
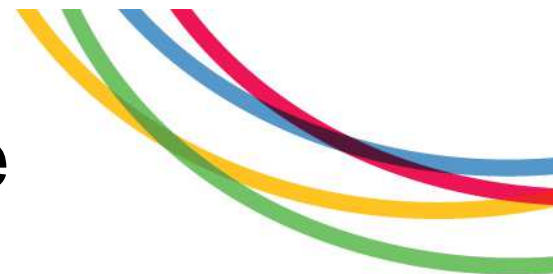
Carli Lessof, University of Southampton,
National Centre for Research Methods

NCRM RMF 5 July 2018

Understanding household finance through better measurement

Funding

Partners

Team		
Annette Jäckle (Essex)	*Brendan Read* (Essex)
Thomas Crossley (Essex)	**Mick Couper** (Michigan)
Jonathan Burton (Essex)	Joachim Winter (Munich)
Paul Fisher (Essex)	Carli Lessof (NCRM)
Mike Brewer (Essex)	Alexandra Gaia (City)
Alexander Wenz (Essex)	Cormac O'Dea (IFS)
Supervisors	**Patrick Sturgis** (NCRM)	**Dave Martin** (NCRM)

Background and literature

- Interest in new data collection methods

- Add value to questionnaire based surveys

- Willingness to use mobile devices

  Wenz et al (2017) "Willingness to use mobile technologies for data collection in a probability household panel", UKHLS WP 2017-10

- Participation given multiple stages for drop out

  Angrisani et al. 2017, Crawford et al. 2013, Lynch et al 2017, Wytinck & Caldwell 2017, Yan et al 2017

- Do these address problems with existing methods e.g. with paper diaries?

  Crossley, T.F. and J.K. Winter, "Asking Households about Expenditures: What Have We Learned?" in Carroll, C., T.F. Crossley and J. Sabelhaus, Eds., Improving the Measurement of Consumer Expenditures, Studies in Income and Wealth, Volume 74. Chicago: University of Chicago Press, 2015.
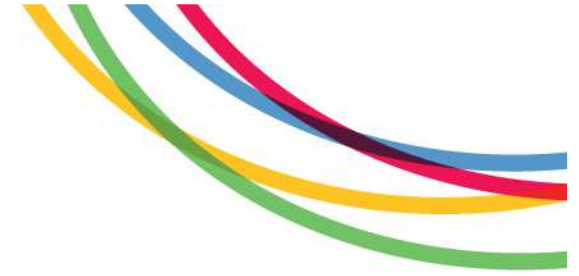
Spending Study 1: Aims

➢ Collect detailed information about monthly spending

    Purchase of goods & services

    In a probability household panel survey

➢ Scan shopping receipts

    Reduce measurement error?

    Lower burden?

➢ Examine total survey error

    Non-response rates and bias

    Quality of data: process and outcomes

Spending Study 1: Design

- Kantar Worldpanel app

    Scan shopping receipts

    Enter purchases without receipts

    Report no purchases that day

- Use for 1 month

    Own smartphone or tablet

    iOS or Android

- Invitation and 7 reminders by letter and email over 4 weeks

- Incentives

    £3/£6 to download and 50p daily

- Notifications at 5pm

- Surveys at registration, end of week (x5) and end of project
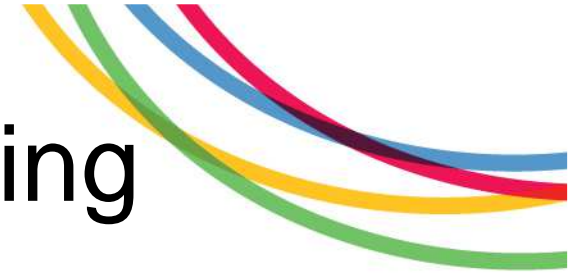
App design – tasks
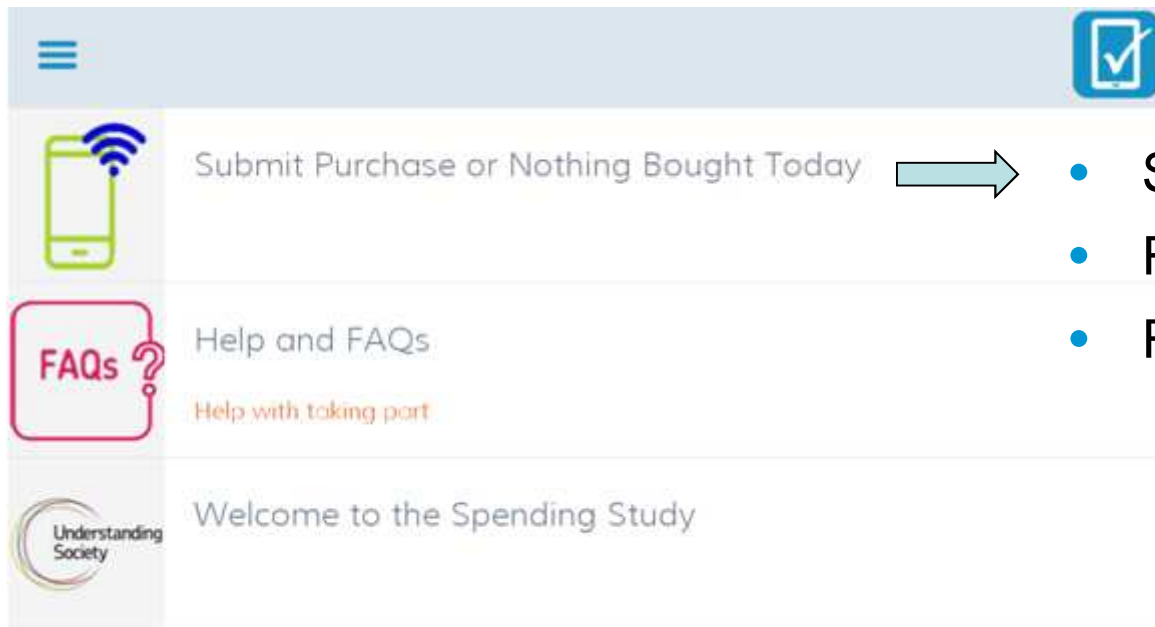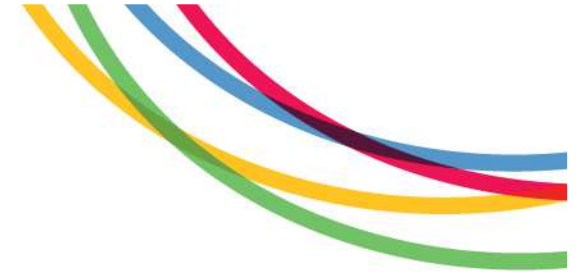
- Scan shopping receipt
- Report spending in app diary
- Report no purchases that day

App design – scan
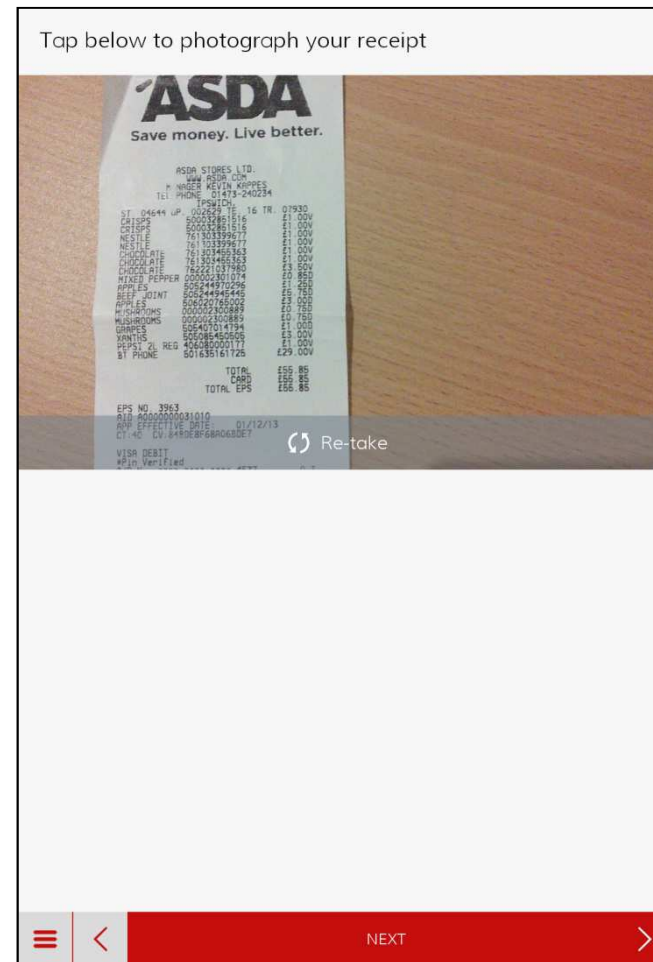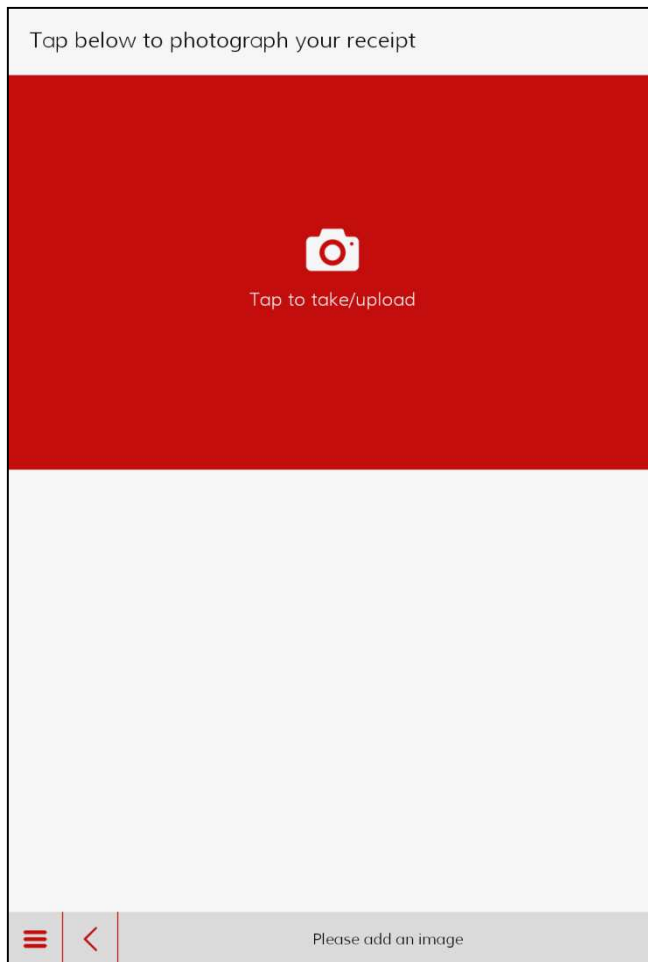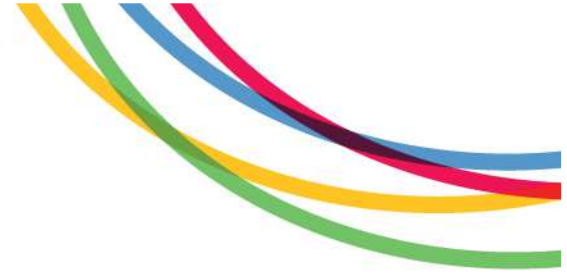
App design – report spending

How much money was the purchase for?

15.00

NEXT

-	+	,		1	2	3	⌫
*	/	.		4	5	6	✓
(	)	=		7	8	9	
	␣			*	0	#	

Which of the following categories best describe what the purchase was?

Please select all that apply

Food and groceries

Clothes and footwear

Transport costs, e.g. petrol, car maintenance, public transport costs

Child costs, e.g. childcare, school equipment and fees

Home improvements and household goods, e.g. DIY, gardening, furniture, white goods or electrical goods

Health expenses, e.g. glasses, dental care, prescriptions, social care

Socialising and hobbies, e.g. going out (restaurants, pub, cinema, theatre, concert), gym or club membership, arts and crafts, children's activities

Other goods and services, e.g. books, magazines, DVDs, CDs, games, toys, beauty products, haircuts, manicures, massages
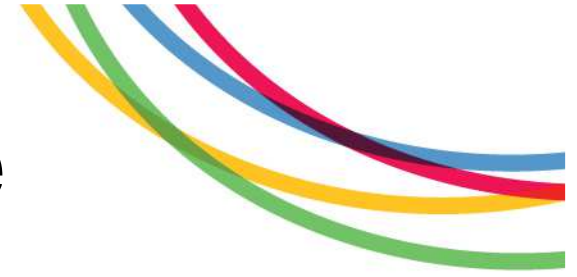
Holidays

Giving money or gifts to other people, e.g. money for children, gifts or money for relatives, donations to charity

Please select 1 or more options

Spending Study 1: Sample

- *Understanding Society* Innovation Panel

  Probability sample of 1,500 households in Great Britain

  Annual interviews with everyone aged 16+

  Wave 9: May-Sept 2016

  Collected additional covariates

  - Socio-demographics
  - Potential barriers to participation in app study
  - Financial position
  - Financial behaviours

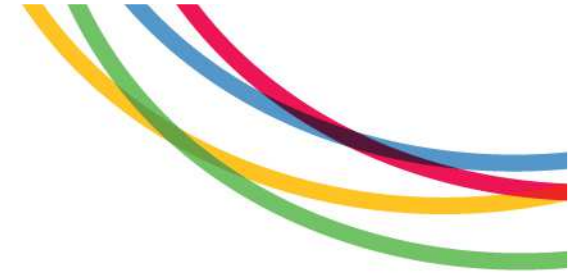- Invited all wave 9 respondents

  N=2,112

  Oct 2016

Key results

- Participation and non-participation bias

- Burden

- Quality of spending data compared to benchmark data

- Compliance with the process

Participation Jäckle et al (2017)

- Participation among general population low (12.8% used 1+)

  Similar participation rates in other emerging studies (e.g. Angrisani)

  Barriers high (14% had mobile and hypothetical willingness)

- Strong biases in who participates

  Personal use of PC and apps for finances

  General survey cooperativeness

  Women

- Some very encouraging results

  No bias in observed correlates of expenditure

  Small group of very cooperative people

  Little drop-out over the month

Source: Jäckle et al (2017) "Participation in a Mobile App survey to collect expenditure data as part of a large-scale probability household panel: response rates and response biases"

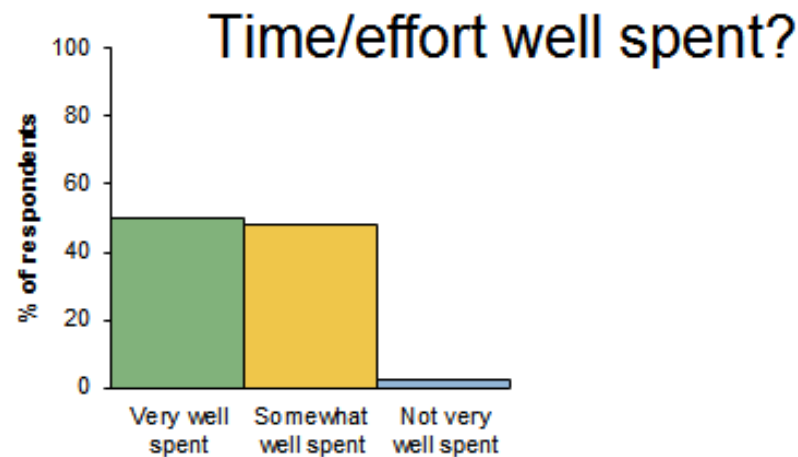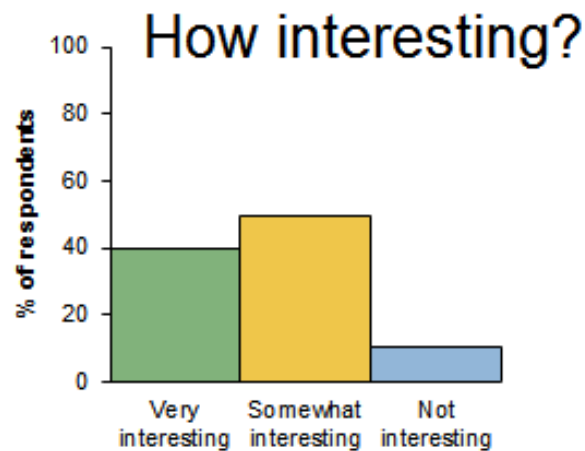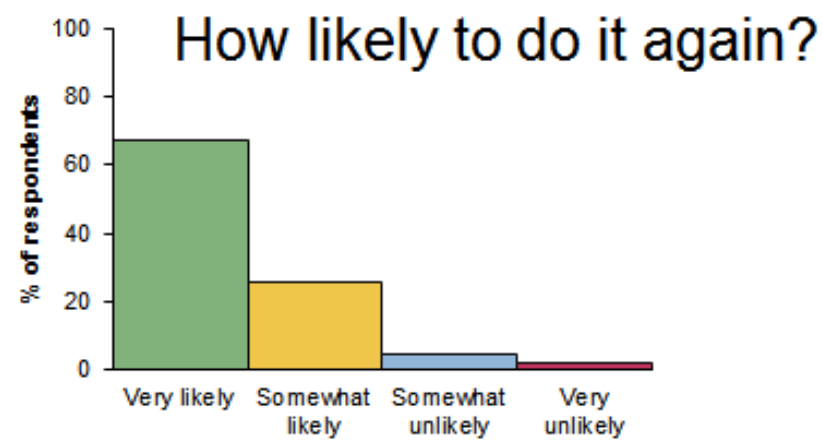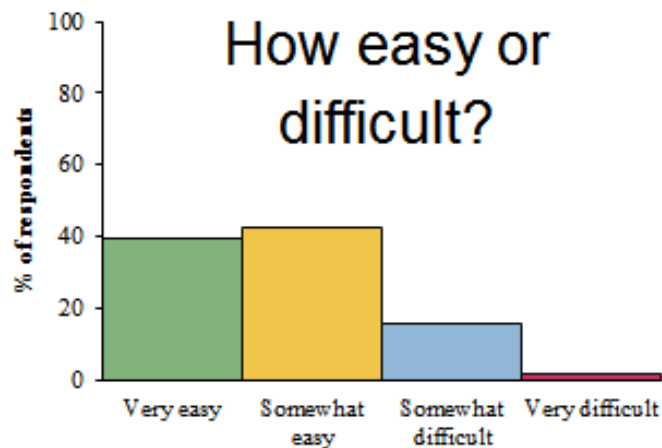# Participation sustains over time
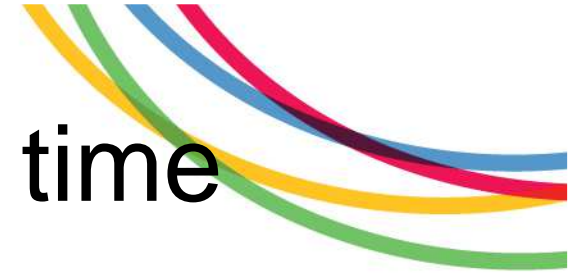
App users and drop-out per day:
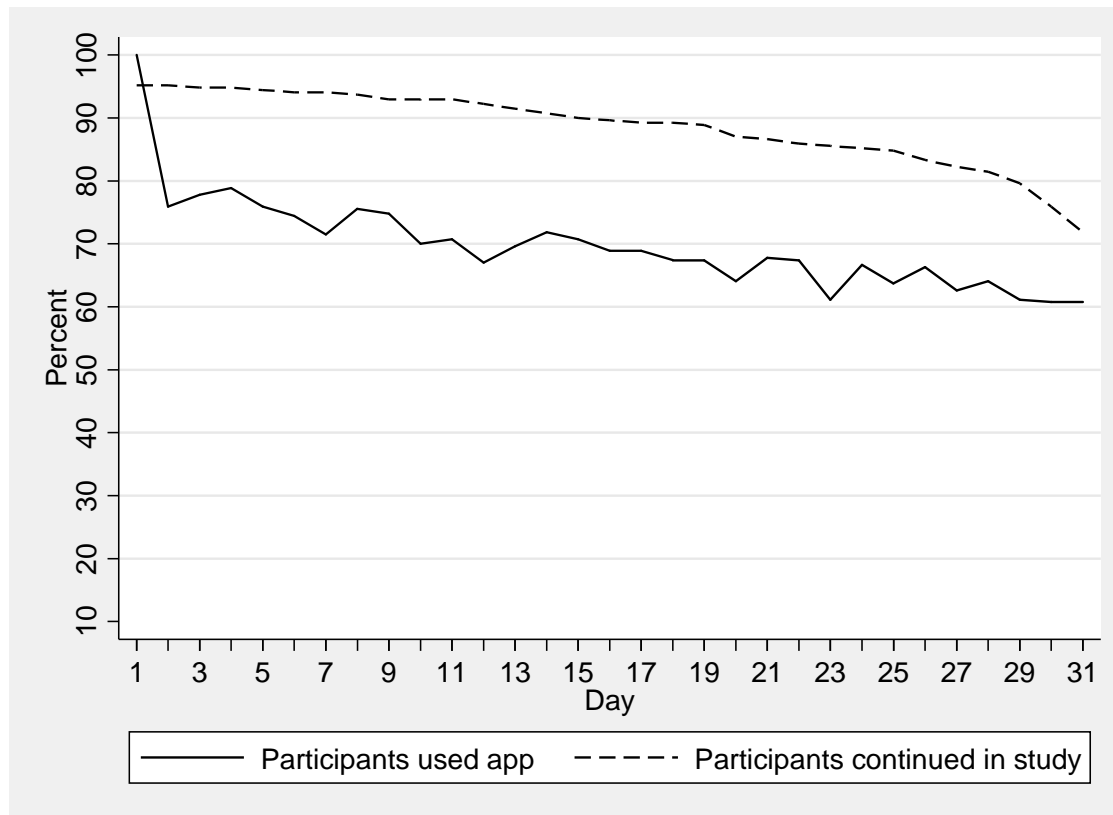
Source: Jäckle et al (2017) "Participation in a Mobile App survey to collect expenditure data as part of a large-scale probability household panel: response rates and response biases"

Burden: time taken & subjective perceptions of task (Read, 2018)

Quality of spending data (Wenz, 2018)

- Benchmark data:

  Living Costs and Food Survey (LCFS)

  Main survey on household spending in UK

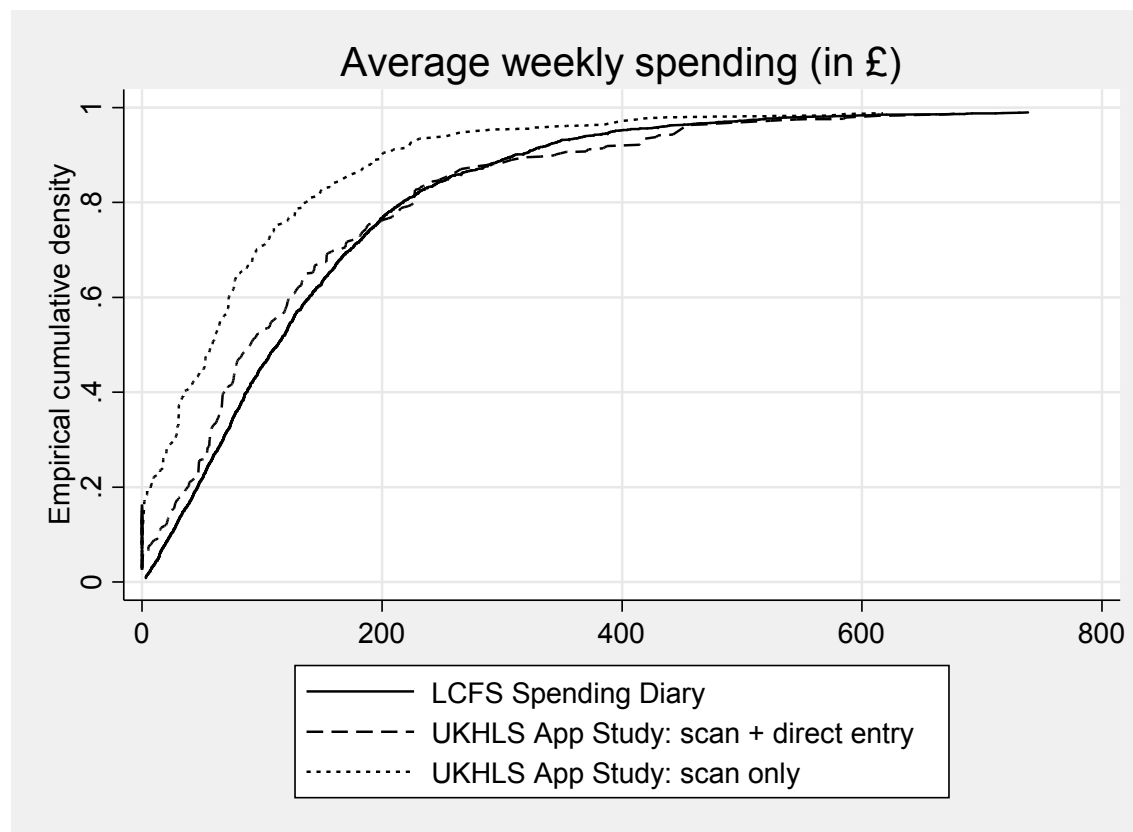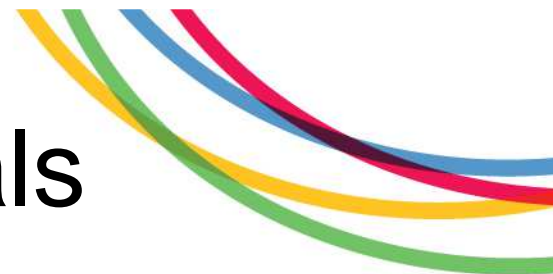 Random sample of HHs in UK (GB + NI)

  Adults aged 16+

  Paper spending diary (2 weeks)

- Comparison:

  Oct-Dec – APP: 2016, LCFS: 2015

  Inverse probability weighting to match sample composition to LCFS
  (Age, Gender, Employment status)

Source: Wenz et al (2018) "Quality of expenditure data collected with a receipt scanning app in a probability household panel"

Total spending of individuals

Average weekly spending (in £)

	LCFS	App	Scan
Mean	141.9	135.0	82.5
Median	113.0	89.5	58.4
SD	117.8	129.7	95.6
N	2,156	261	260

Legend:
— LCFS Spending Diary
– – – UKHLS App Study: scan + direct entry
········ UKHLS App Study: scan only

Source: Wenz et al (2018) "Quality of expenditure data collected with a receipt scanning app in a probability household panel"

Quality: compliance with task

1. To what extent do respondents comply, conditional on initial participation?
2. Who is more or less compliant?
3. Is the level of compliance sustained over time?

What do we mean by compliance?

A. Using the app every day (scan, direct entry, no spend v missing)
B. Number of purchases reported (scan or direct entry)
C. Scan receipts rather than entering purchases directly
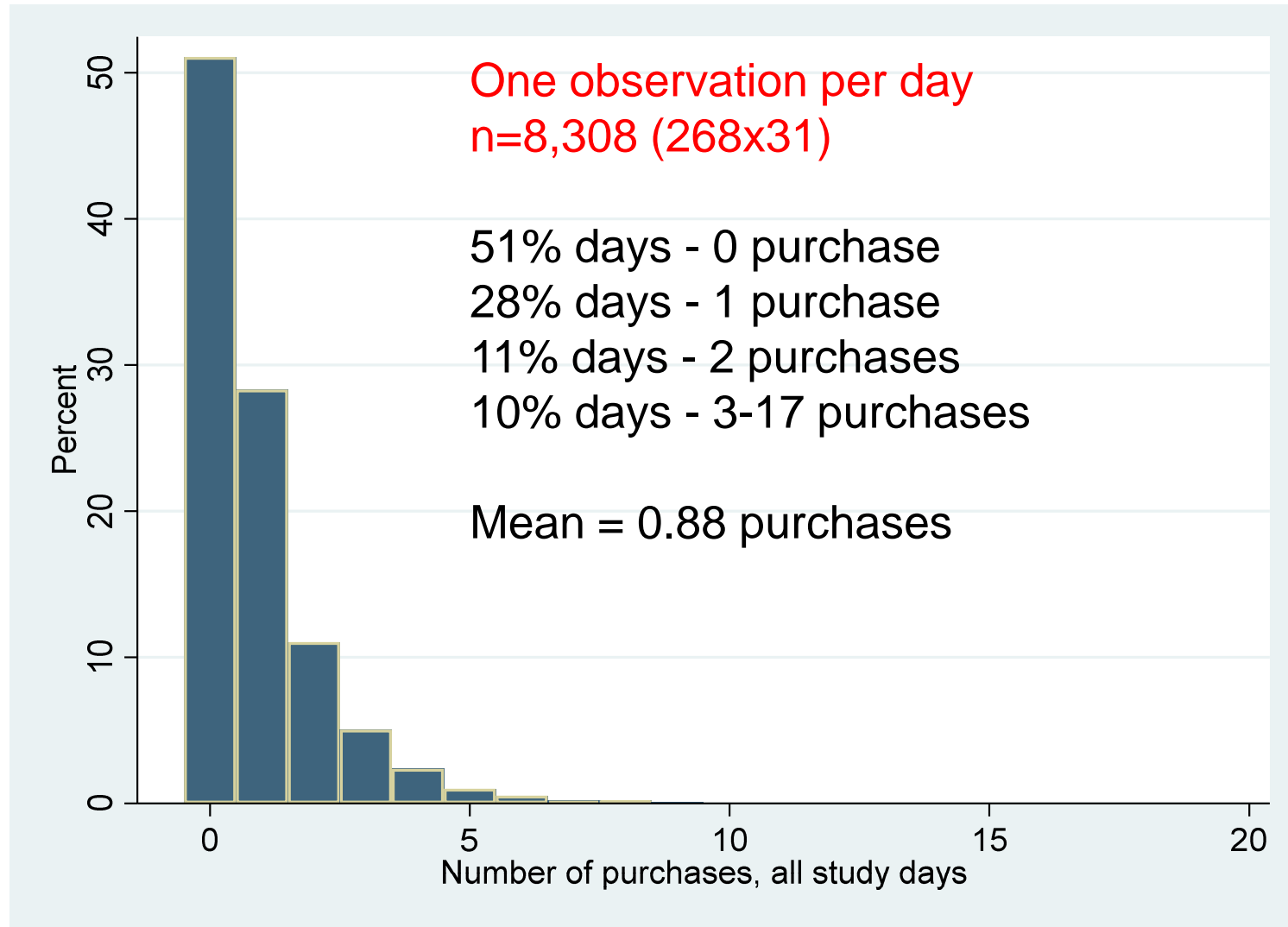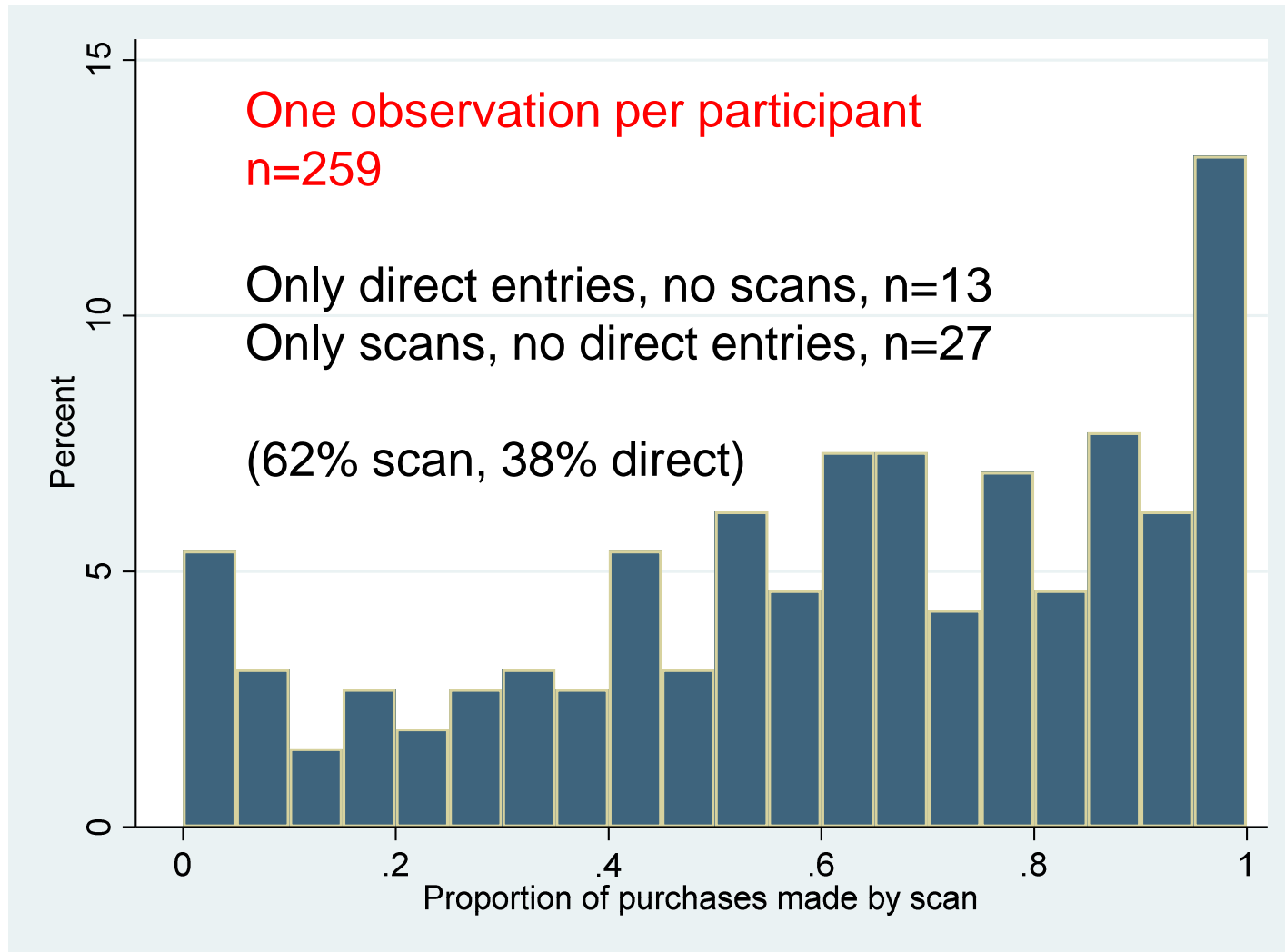D. Scanning soon after purchase

A. Overall app use (day 2-31)

One observation per participant n=268

4% (8) = 1 add. day
8% less than 7 add. days
80% over 14. add days
30% total 28-31 days

Median 24 days
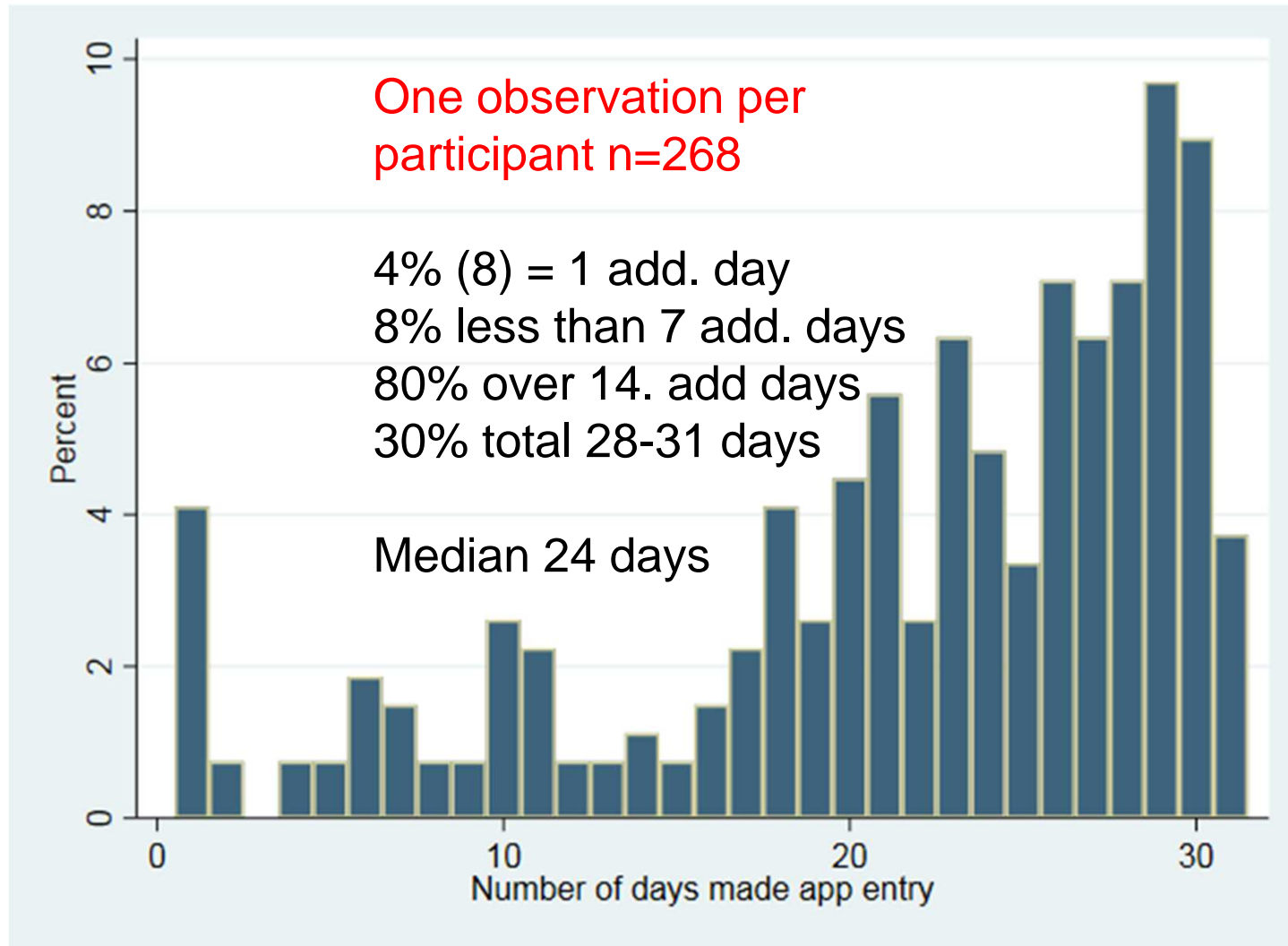
B. Total purchases per person

One observation per participant n=268

9 ind = 0 purchases

Median = 24.5 purchases

B. Total purposes by days

One observation per day
n=8,308 (268x31)

51% days - 0 purchase
28% days - 1 purchase
11% days - 2 purchases
10% days - 3-17 purchases

Mean = 0.88 purchases
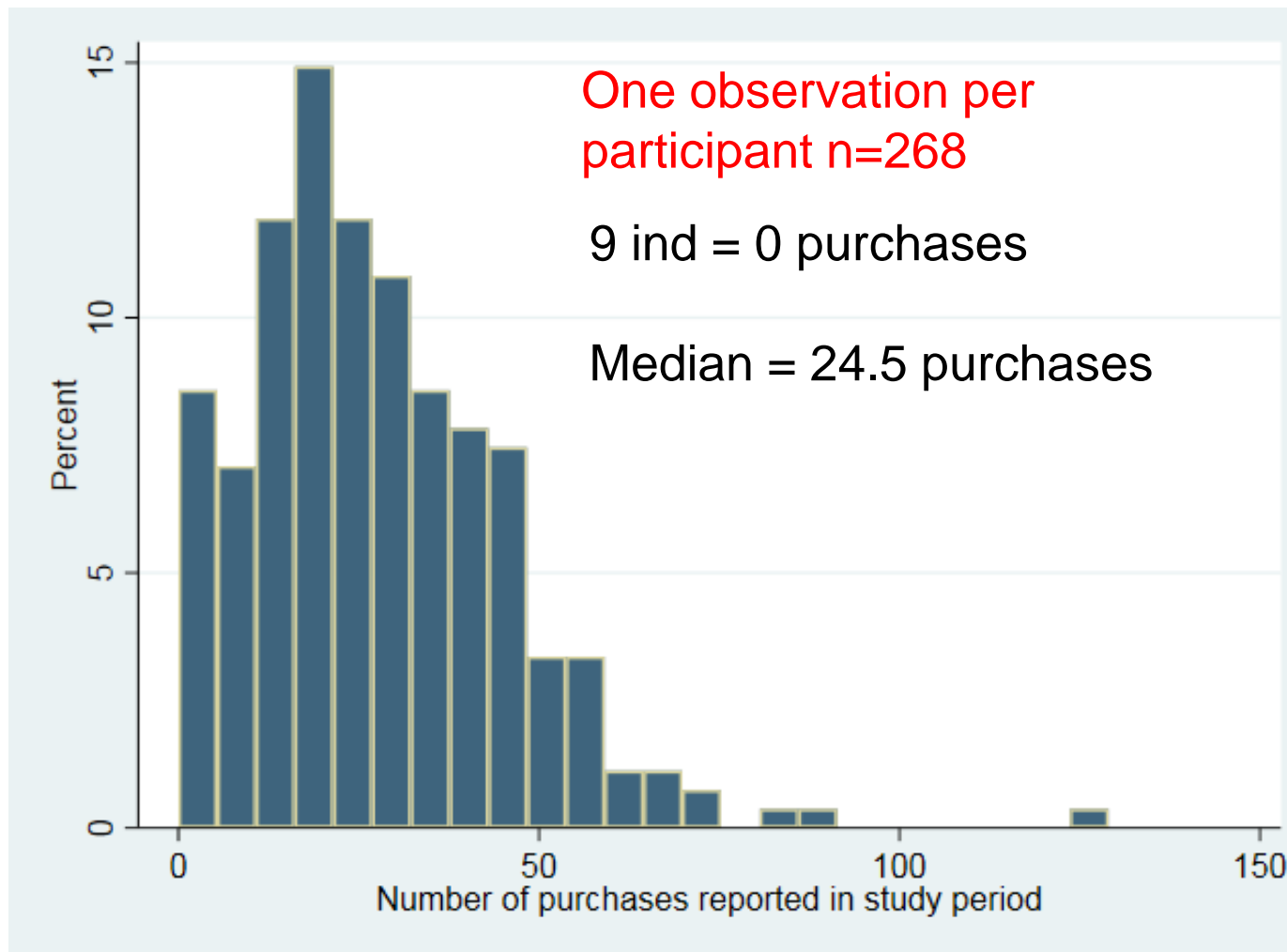
Number of purchases, all study days

C. Scanned v. direct entries

One observation per participant
n=259

Only direct entries, no scans, n=13
Only scans, no direct entries, n=27

(62% scan, 38% direct)

D. Time from shop to scan (24 hrs)

One observation per scanned purchase, total n=3,454

Based on 24 hrs (94% scans)
 - 90% of scans by 12pm

4% delay 1-2 days
2% delay 2-3 days
1% delay 3+ days (max 20)

Mean = 7.4hrs
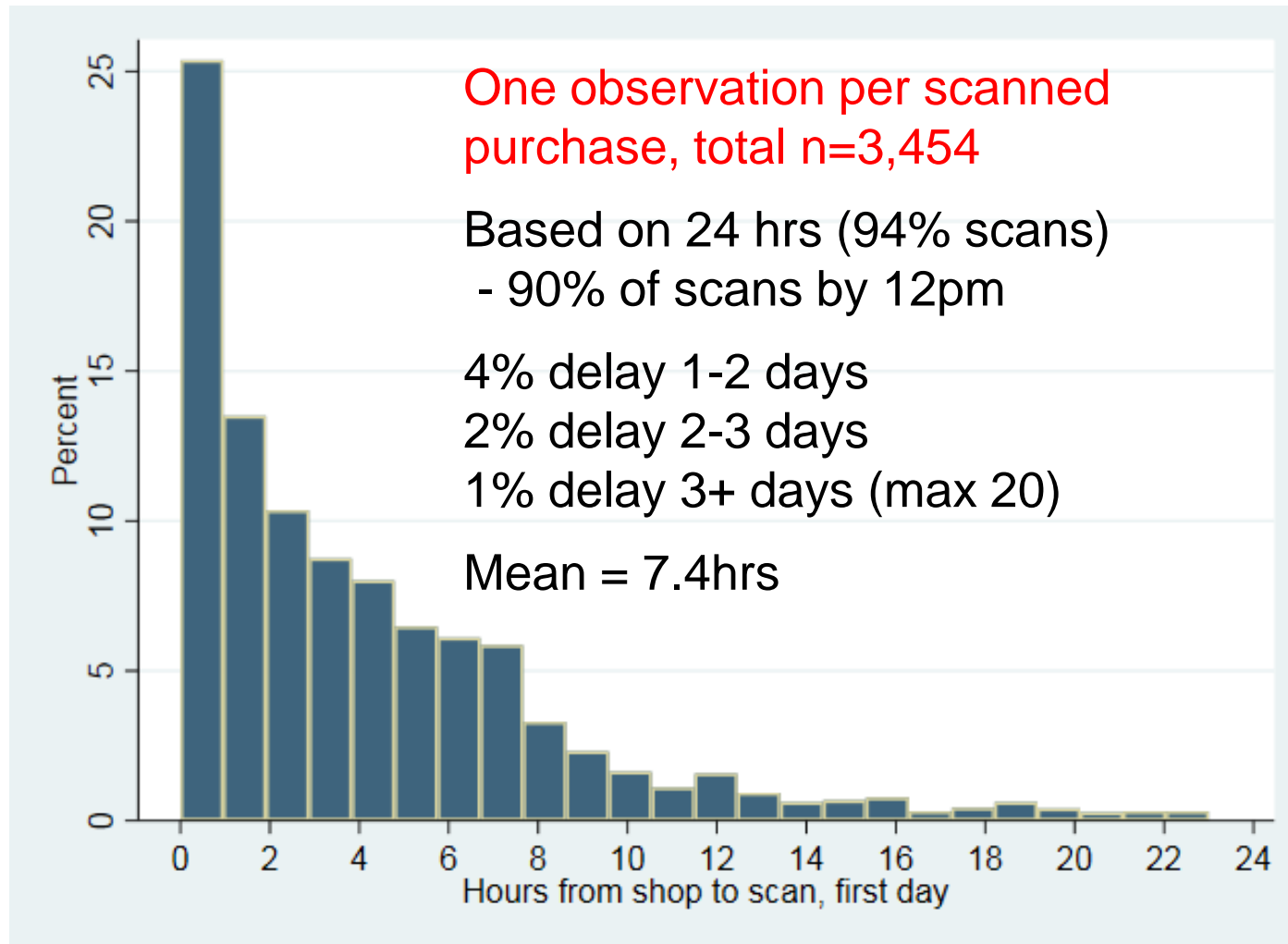
Q2 Who is more/less compliant?

Analysis based on day 2-31

	A Used app	B Number of purchases	C Scanned vs direct	D Time to scan
Female		+		
Age	+ 51-60 - 71 over	+ 41-70	+ 41-60	+ 61-70
Education				
Infrequent shoppers	+			
Time constrained	-			+
Keeps a budget				
High item non-response at IP9	-	-		
Intense mobile device use			-	
Frequent use of mobile device			+	
Worries using app for online survey	+	+		
Worries using camera for barcodes	-	-		

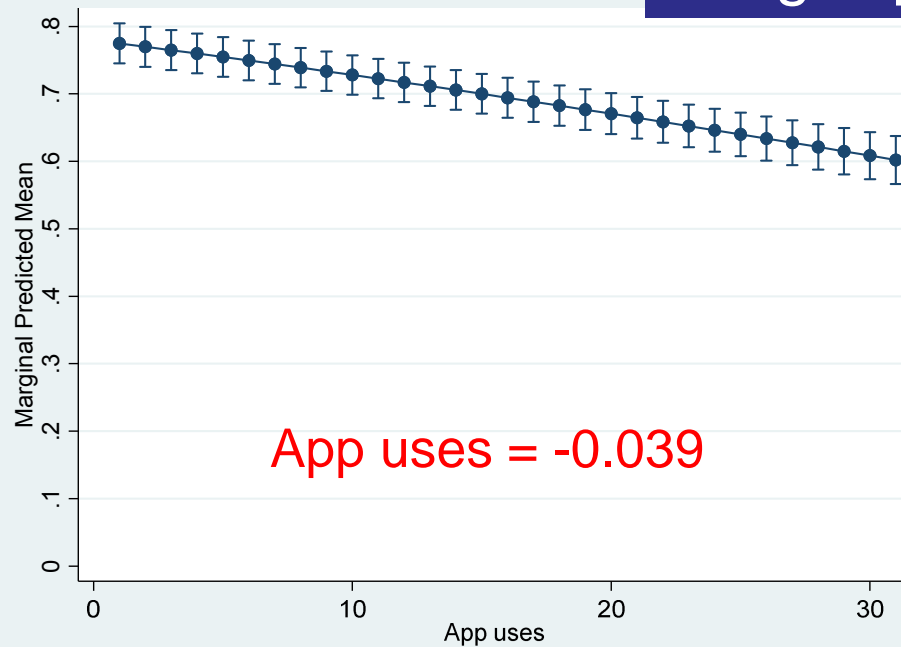| +	More app uses	More purchases	More scans	Longer time

Q3: Does compliance decline?
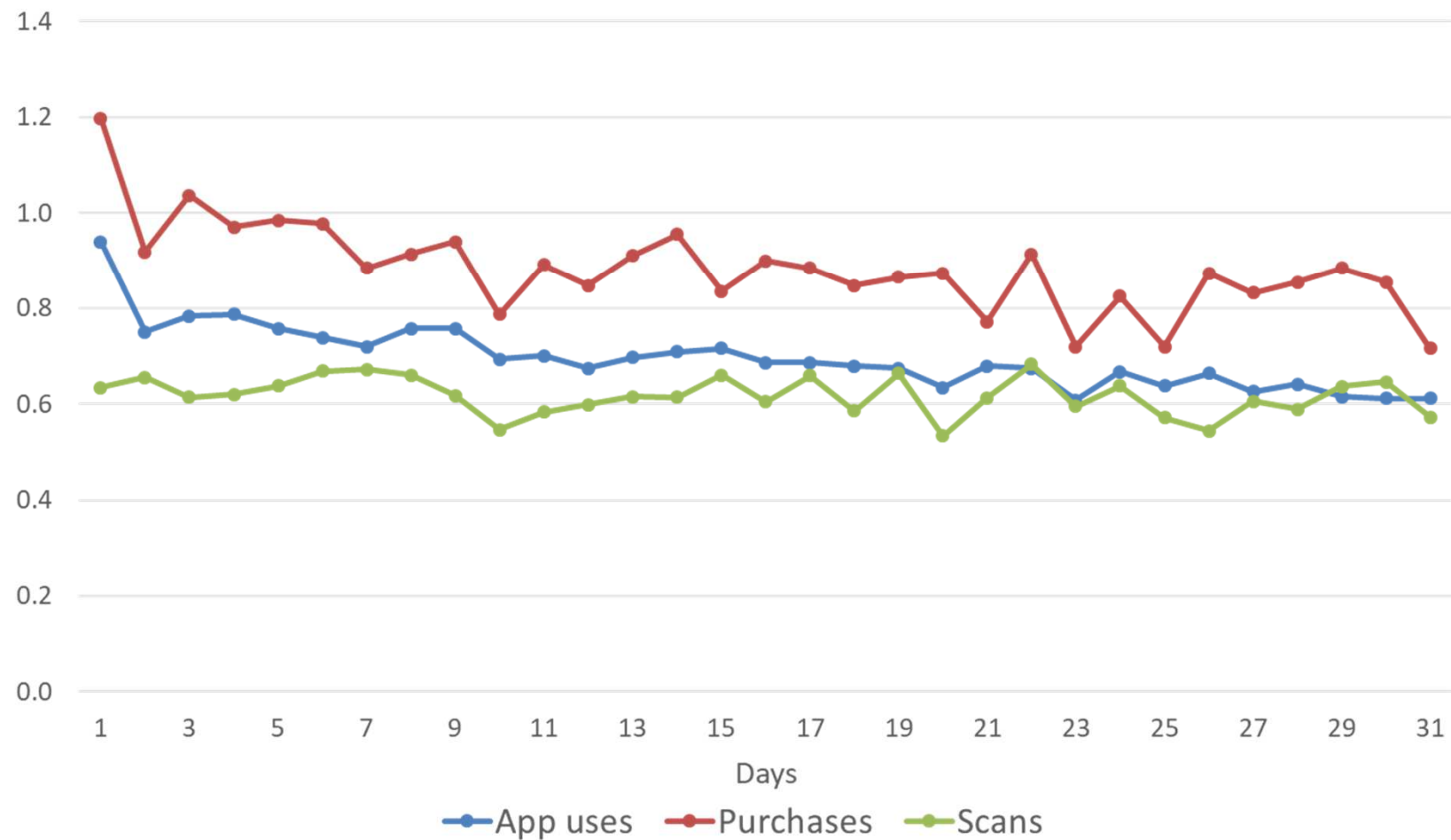
Marginsplot (days 2-31)
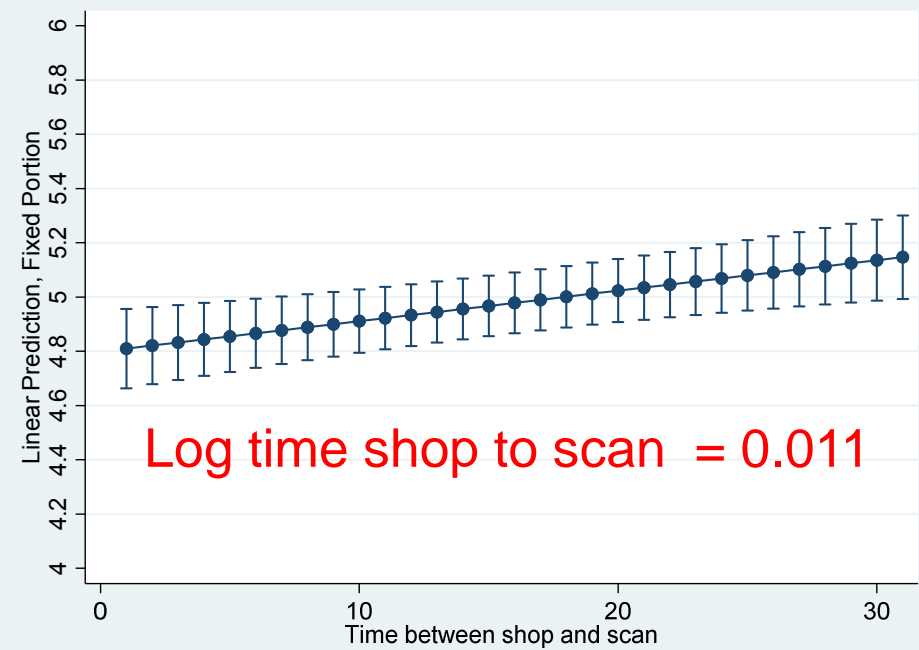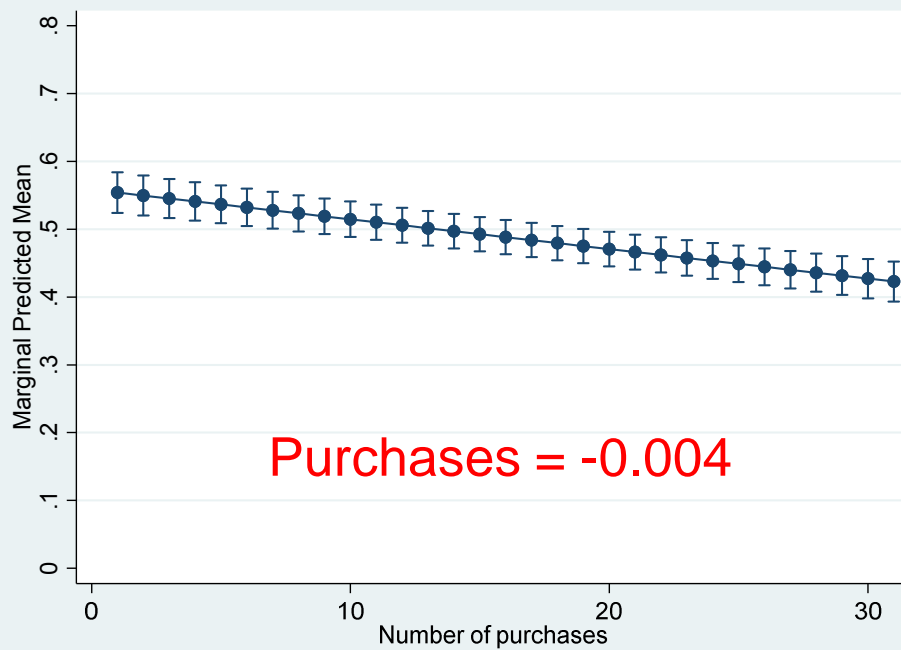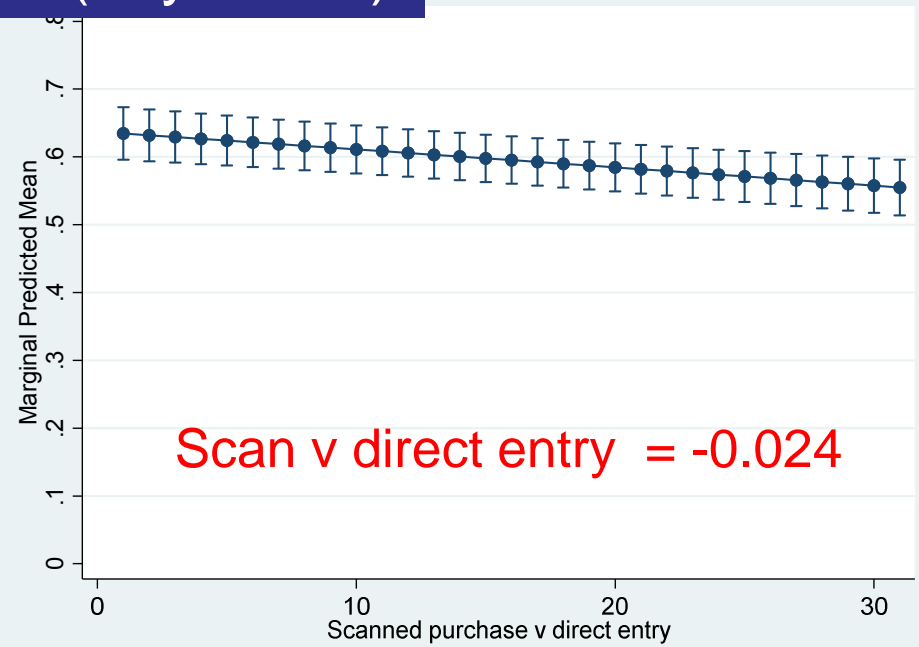
Summary Spending Study 1

- Small group of very cooperative respondents
  - Completed task for the month
  - Reported low burden
- Biases in who participates but not in correlates of spending
- Total spending maps onto LCFS
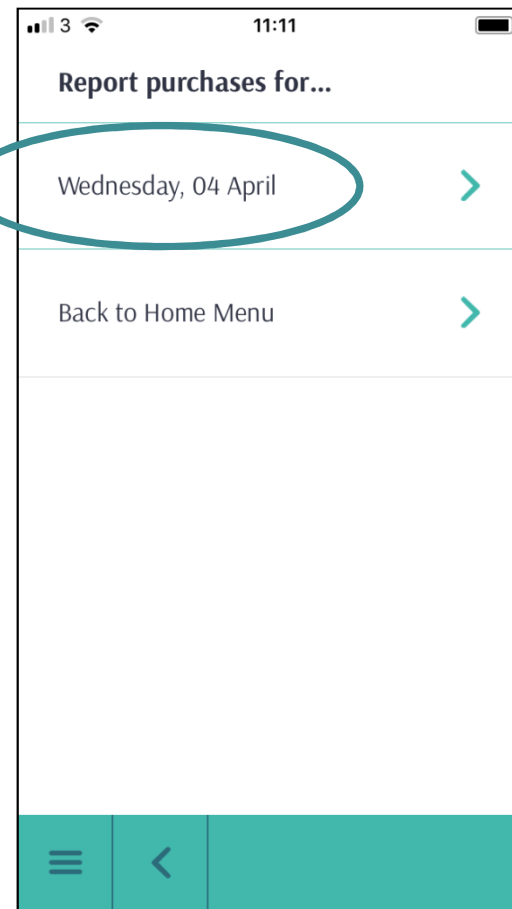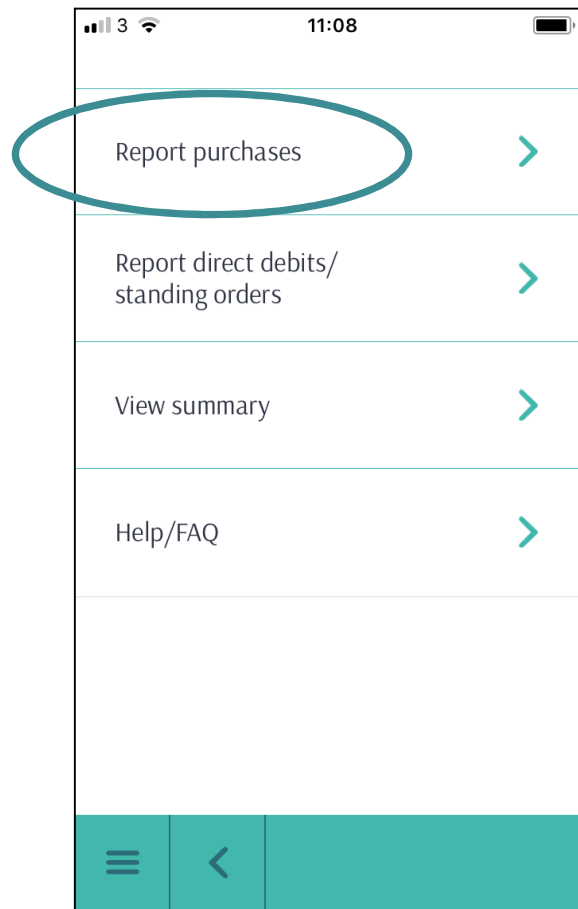- Continued compliance based on four measures, but evidence of decline

How can we increase participation?

- Spending Study 2
  - ✓ Reduce barriers to downloading app
  - ✓ Simple diary based on direct entry (Suffield et al 2018)
- Sequential 'modes' to report daily spending
  - ✓ Smartphone app
  - ✓ Online diary
- Experiments:
  - ✓ Invitation to app in interview vs by post
  - ✓ Promise feedback on reported spending
- Data collection:
  - ✓ Innovation Panel w11
  - ✓ Access panel

Spending Study 2
App design: report daily purchases

Spending Study 2
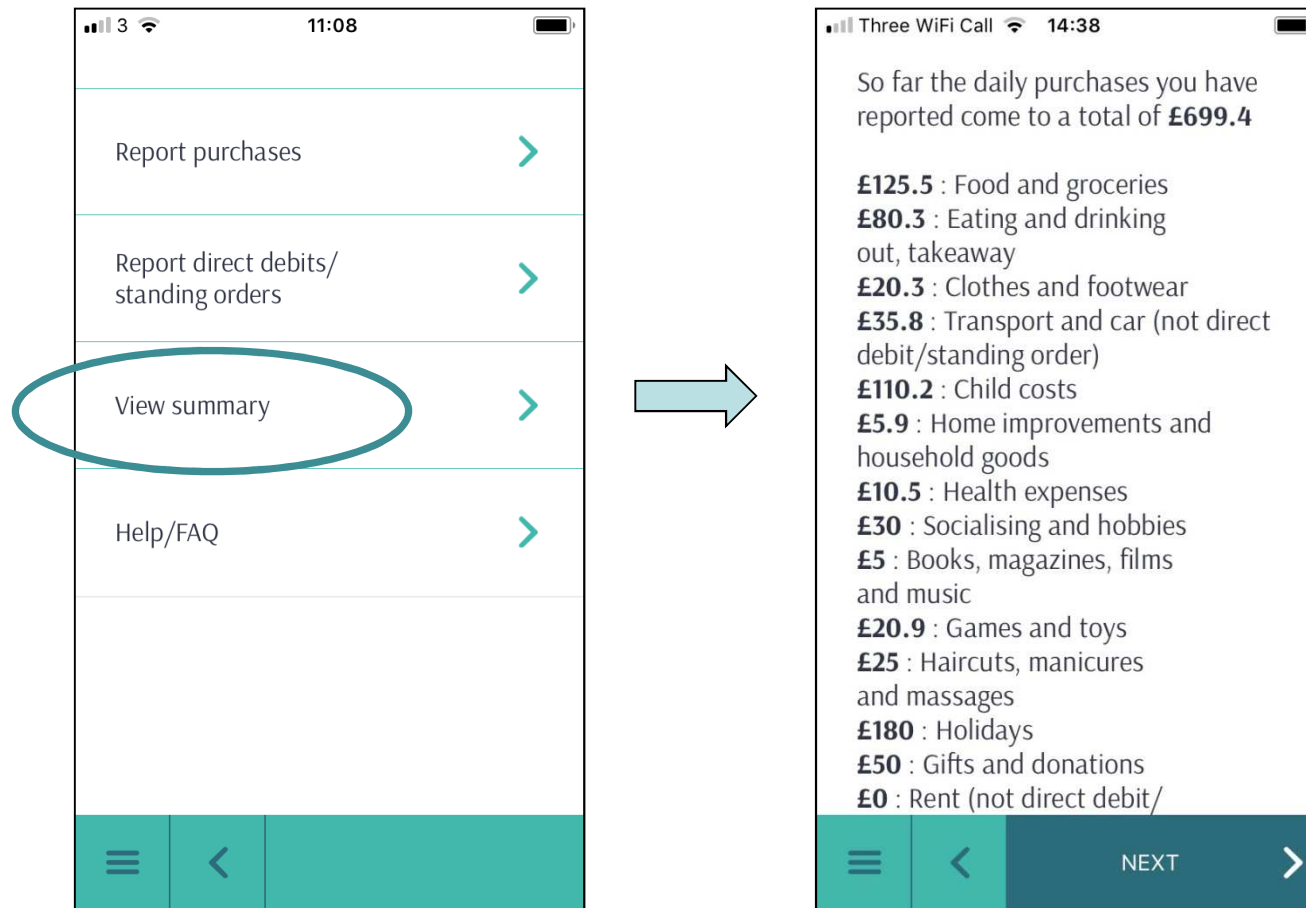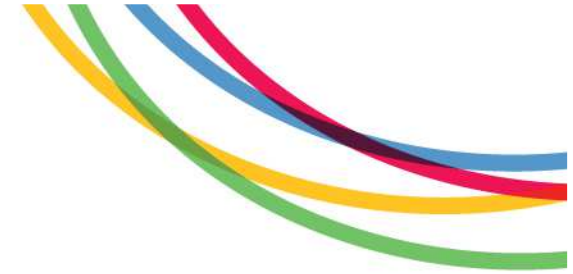App design: report daily purchases ctd.

Spending Study 2
App design: report direct debits & standing orders
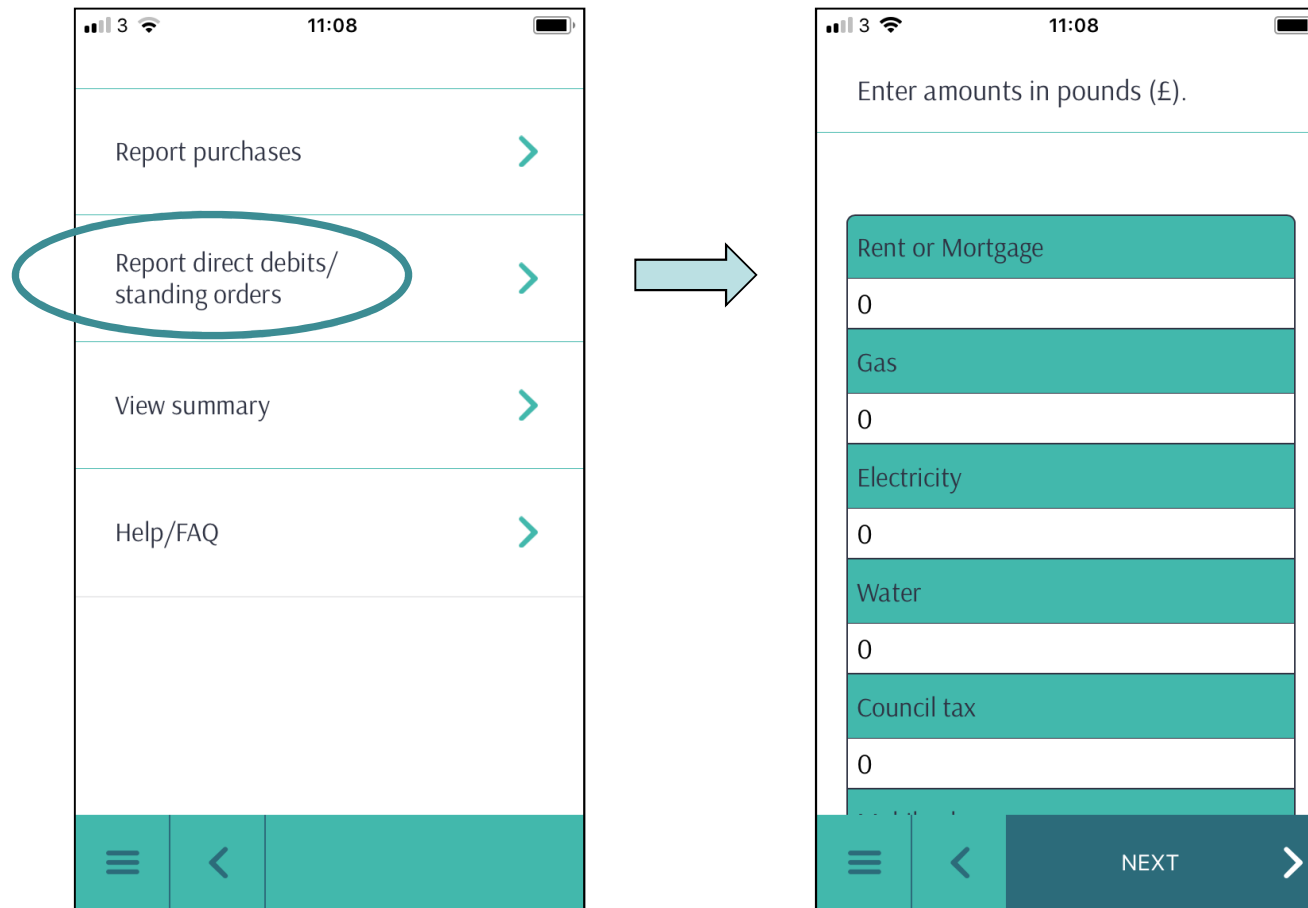
Spending Study 2
App design: feedback on reported daily purchases

More info on spending study

- Working Paper:

  Jäckle, Burton, Couper and Lessof (2017) *Understanding Society Working Paper* 2017-09.

- Project webpage:

  https://www.iser.essex.ac.uk/research/projects/understanding-household-finance-through-better-measurement