

Impacts and Effects of Improved Wood Burning Stoves on Time Use and Quality: An Experimental Study in Rural Kenya

Madeleine Rossanese

Berkeley Air Monitoring Group

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Evaluation Partners



Presentation credit:
Kirstie Jagoe (content)
Danova Gardilcic (graphics)

Introduction

Study aims:

- Identify and understand any **changes in time use**, as well as **quality of time** after introduction of **an improved cookstove**.
- Explore the value, role, and feasibility of various data collection methods

Hypothesis:

- Cooking, collecting, and preparing firewood is arduous and demands significant amount of time.
- The use of a cleaner more efficient cooking technology can impact on time use patterns and potentially lead to changes in time poverty, time quality, and perceived drudgery.



Study design

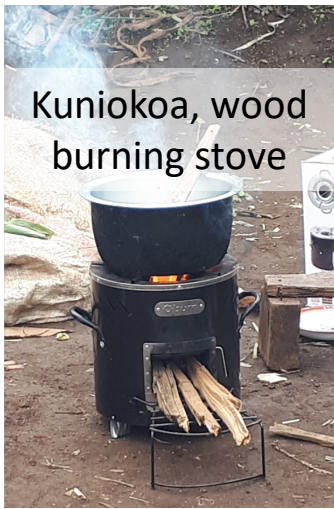
Study sample

Mixed methods before-and-after study in 55 households in rural Kenya.

Families predominately used wood fuel for cooking and collected at least half of their cooking fuel throughout the year.



Intervention stove



Kuniokoa, wood burning stove

Data collection methods

Survey: with both open and closed questions implemented at baseline and follow-up

Stove use monitors: monitored for **4 weeks before** and **14 weeks after** receiving the intervention stoves.

Focus group discussion (FGD): one at end of study

Photo elicitation supported FGD: two at end of study

What is Photo Elicitation?

Qualitative research method carried out to generate a **richer** understanding of the situation from the **participants' point of view** through the use of visual and narrative data.

Provides an opportunity for **triangulation with the other data** collection methods

Allows **the participants to tell a story** that is detailed and self-reflective.

Similar to Photovoice – though PV aims to work with participants to identify priorities and strategies for social action. PE is more of a research method than an intervention approach.

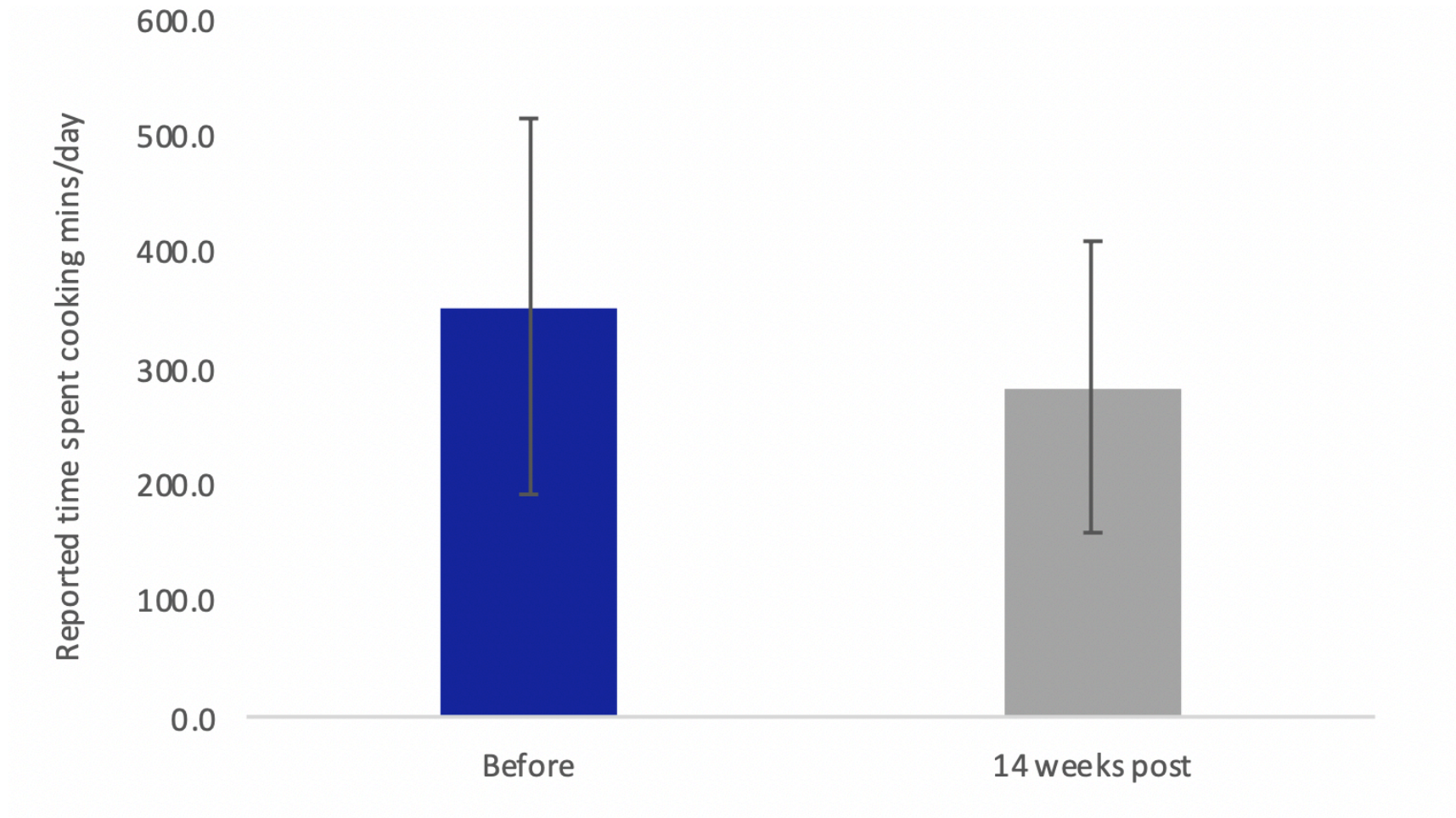


Our households

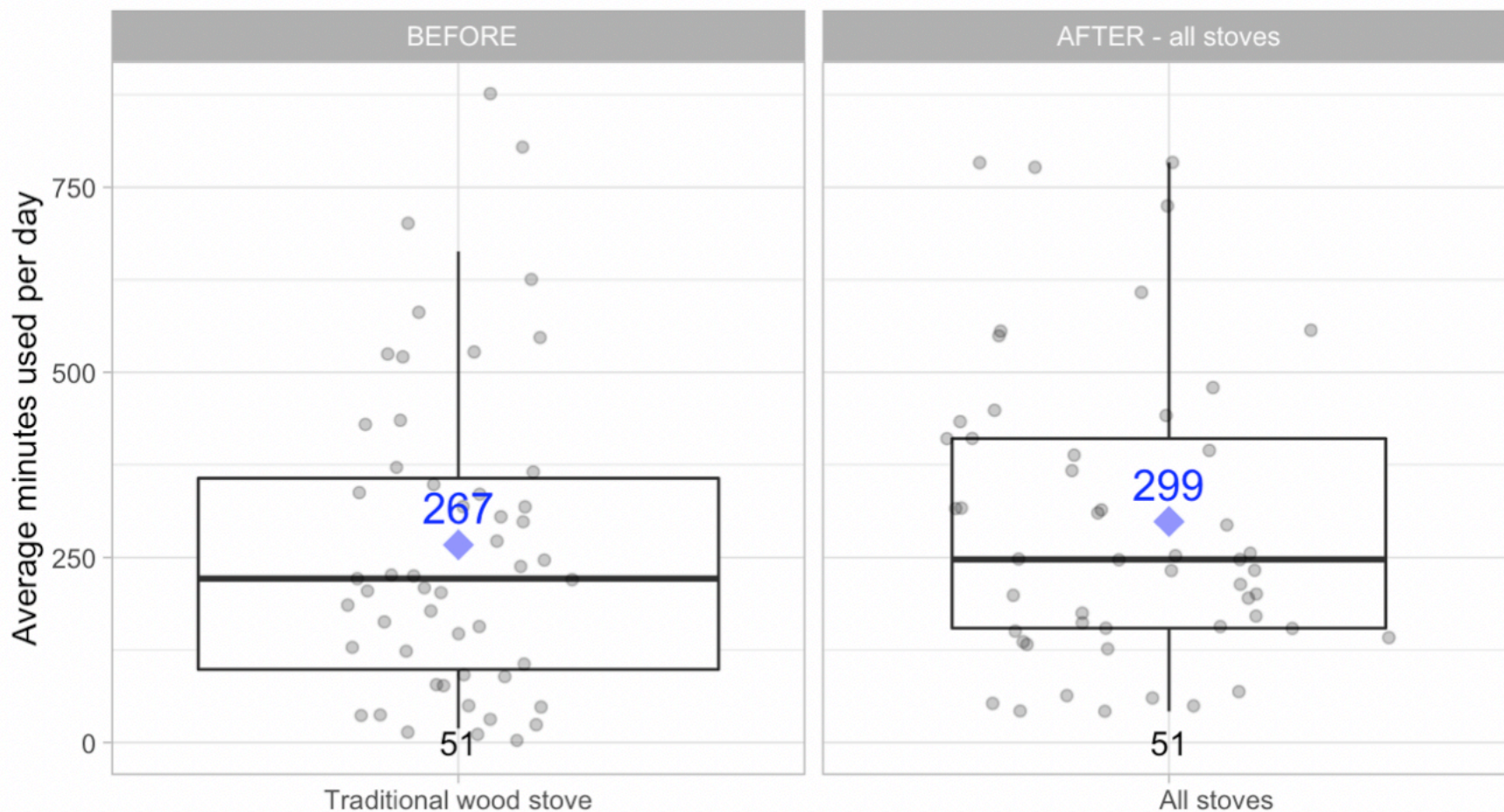
Characteristic	% (n)
Married	78% (43)
Completed elementary education or more	75% (41)
Paid work outside the home	22% (12)
Income generating activities from the home	82% (45)
Average age (mean)	40 (SD 10)
Average household size (mean)	6 (SD 2)

	Stove type	Baseline (n=55)	Post intervention (n=55)
Primary stove	Traditional wood	100% (55)	60% (33)
	Kuniokoa	-	40% (22)
	Other	-	-
Secondary stove	Traditional wood	-	18% (10)
	Kuniokoa	-	72% (39)
	Other	9% (n=5)	9% (5)
Tertiary stove	Traditional wood	-	9% (5)
	Kuniokoa	-	35% (19)
	Other	-	6% (3)

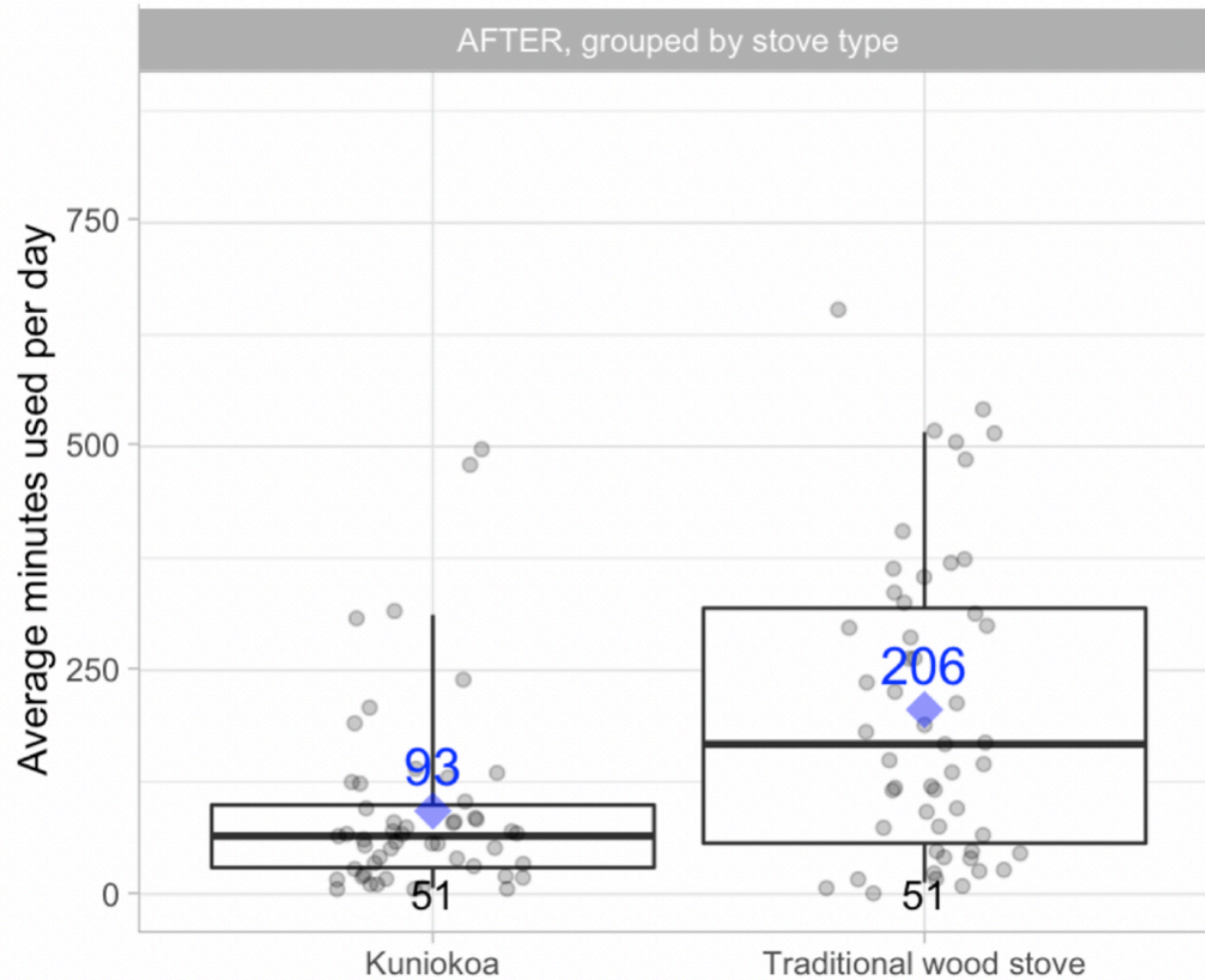
Reported time spent cooking



SUMS Results



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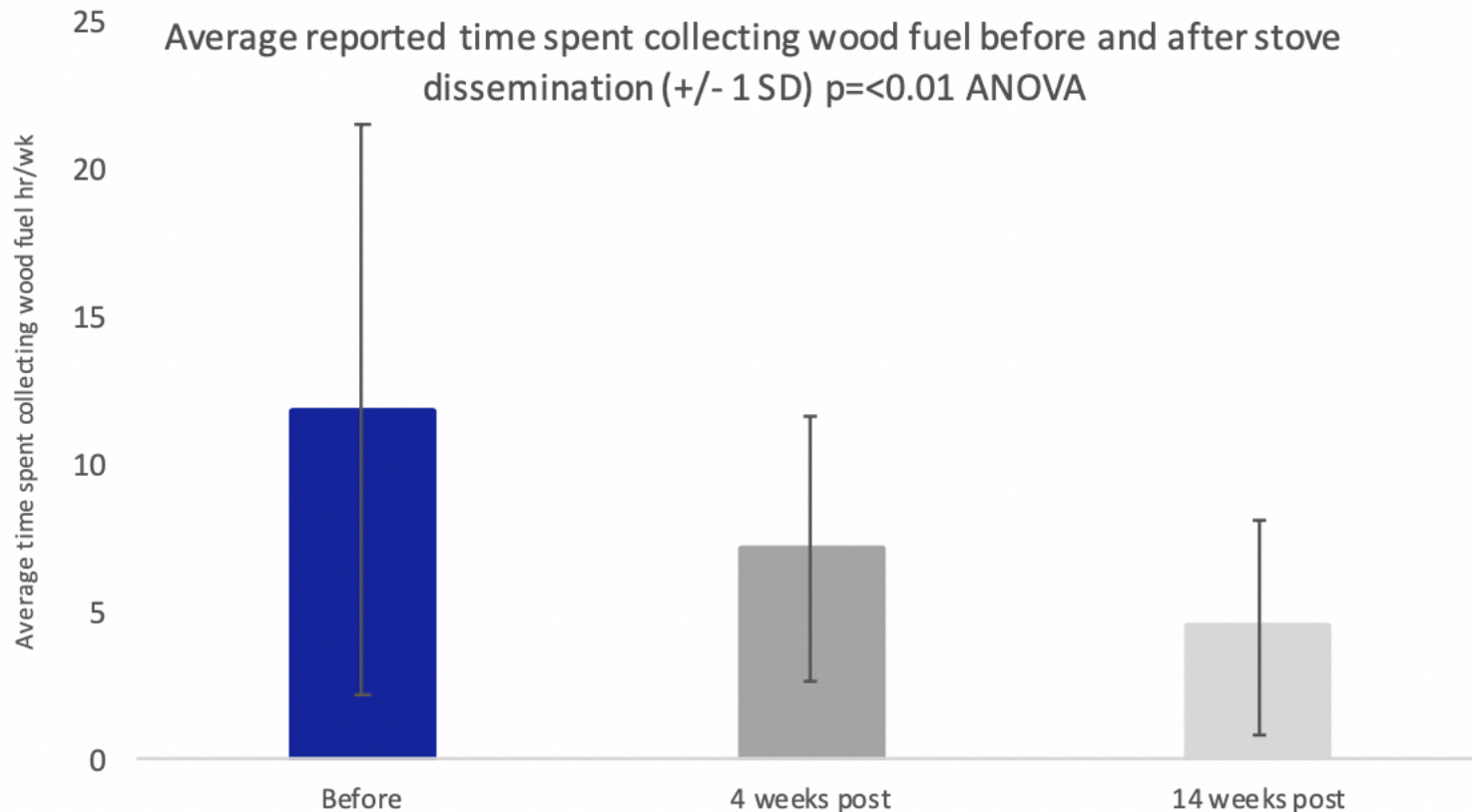
Qualitative data offers us context

Participants reported:

- Shifts in cooking responsibilities to other family members
"[My daughter] now cooks most of the time, and she is happy about that because before [she] had difficulties while using the other stove."
- The intervention stove fulfilled suppressed needs
"There might be someone who [has] some difficulties while milking because [that person may] milk the cow using cold water because of lack of firewood."
- The intervention stove allowed for simultaneous activities
"I used to stop washing clothes and go tend to the fire, but now I do my work from the same place, and I don't make a lot of movements."

Also consider: Social-desirability bias

Reported time spent collecting fuel



Qualitative data offers us context

Participants reported:

- Reduction in the frequency of fuel collection trips

“This kuniokoa makes it possible to go for fuel collection less often than while using three stove fire because if [this wood] was to be used on three stone fire they are for only two days but now it shows that this is the amount of firewood that I will use with kuniokoa for a week and some days.”
- Reduction in the distance-traveled during fuel collection trips

“We used to go to collect firewood for long distances that would take a lot of time, but now [...] even if you collect one bunch only, you know you will [have enough to] use.”

Confounding factor: Kenyan Government Policy Changes (02/2018)

Reported mechanisms for time savings

Participants reported:

- Simultaneous stove use reduced overall cooking time
- Faster ignition and flexible tending
- Reductions in cleaning time

“It has made my work easier. So where I would be doing much work from the other stove that I [used to] wake up and start sweeping a big space because of that dirt, am seeing that it has saved time for me, I get time for resting.”

- Portability and flexible tending facilitate multitasking
- Streamlined, safer operation allowed female children to share the burden
- Modern design incentivizes husbands and male children to share cooking tasks

“Even if I am outside washing clothes, [my husband] will not first call me to add more fuel. He will do it, and food will continue cooking.”

Reported uses of saved time

Participants reported:

- Engaging in paid work, often on other farms

“Since I got the Kuniokoa, it has saved me time that I now get time for doing paid work outside home.”
- Increasing time-spent on their own farms and businesses

“Before, I used to close my business [...] for me to go for fuel collection, but now I am at my business most of the time.”
- Accomplishing more household chores without stress and/or to a higher standard

“I am able to do tasks that I was unable before, homes are now clean, there are no dirty clothes, farms are looking good because we have time for working.”
- Rest and selfcare
- Social and leisure activities

Reported mechanisms for reduced drudgery/increased wellbeing

Participants reported:

- Reductions in the physical strain associated with heavy loads of fuel and tending three-stone fires
 - A decrease in perceived health and safety risks
 - “I don’t experience smoke or excess heat from the stove, so I can spend as much time cooking without the fear of headaches, burns, or a runny nose.”*
 - Improvement in cleanliness and ambiance
 - A heightened sense of pride or elevation of status
 - Alleviation of the stress of not being able to access woodfuel
 - Enhanced sense of freedom and flexibility
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- Overlap with benefits gained from freely using saved time

Study strengths and limitations

- Primary study limitations: lack of control group and relatively short timeline
- External factors beyond study control (fuel collection ban) caused confounding in fuel collection results
- Study strength: examined changes in time quantity and quality after intervention for all household members (not just cook)

Future research directions

- Better explore impacts and outcomes for the economic story we weren't necessarily expecting
- Collect data from teenage children and husbands directly
- Repeat fuel collection assessment, with better seasonal comparability and a stable collection situation
- Standardize and model methods to quantify and understand patterns of simultaneous stove use from stove-use monitoring data

Key take-aways

- Partial displacement of traditional technologies with improved biomass technologies can yield significant benefits with time and drudgery aligned goals
- A more complete picture of an entire family's daily contributions to household chores, income-generation, and other day-to-day household mechanics can offer additional insight into sustained adoption of technology
- Qualitative data offers invaluable context for quantitative and instrument-based findings, as well as new information that may otherwise be overlooked