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Handwashing and Habit Formation: A Theory of Behavioral Change

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Global Handwashing Partnership Webinar

Handwashing with soap

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- High rates of child stunting and mortality worldwide due to bacterial and viral transmission
 - Diarrhea, ARI
 - 2 million child deaths yearly (WHO 2013)
- Handwashing with soap
 - “the most effective vaccine against childhood infections” (World Bank 2005)
- But handwashing rates abysmally low (3-35%) worldwide, especially during critical times. Why? [▶ worldwide rates](#)

Why don't people wash their hands?

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① Scarcity of information

- Information interventions have not worked. (WSP 2015, Galiani et al. 2015)
- People believe washing is important. [▶ study context](#)

② Scarcity of resources

- Resource interventions, including our own, have not worked. (WSP 2013, Ejemot et al. 2015, SHDS 2015)
- People have soap and water. [▶ study context](#)

③ No health returns in high-disease environments

- Not true in our setting: handwashing reduces acute respiratory infection and loose stool incidence [▶ results](#)
- translates into significant improvements in weight and height [▶ results](#)

People still don't wash. [▶ study context](#)

Key features of handwashing with soap

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- ① Preventive activity.
 - Returns are not salient.
- ② Not a social norm.
 - No persistent social costs to shirking.
- ③ Repetitive activity.
 - Repeated engagement is costly...unless it becomes a habit.

► study context

These features apply to many important health activities:
water treatment, latrine use, clean cookstove use, etc.

Conceptual framework: habits and rational addiction

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Becker and Murphy (1988): A Theory of Rational Addiction

- ① Habit formation: intertemporal complementarities in the utility from consumption
- ② **Rational** habit formation: Agents are aware of complementarities, so changes in future consumption affect current consumption

► the model

What we do in practice

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We implement an RCT among 2900 rural households with young children in West Bengal.

① Our experimental design randomizes:

- whether agents *receive* monetary incentives, social incentives, only a soap dispenser, or no intervention for daily handwashing
⇒ habit formation
- whether agents *anticipate* monetary incentives, social incentives, or neither
⇒ rational habit formation

② We observe:

- precise measure of handwashing behavior before, during, and after withdrawal of the interventions
- willingness-to-pay for soap
- child health: diarrhea, ARI, weight, height

Measurement technology: from the Media Lab

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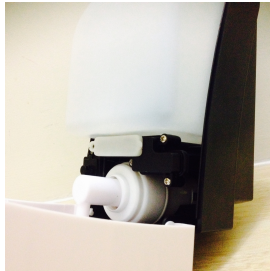
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Measurement technology: to the field

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Handwashing outcome measure

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Primary outcome: binary measure of dispenser use during the family's self-reported evening mealtime.

Maximize σ by making handwashing amenable to habituation:

⇒ **habit loop:** trigger, routine, feedback (Neal et al. 2015)

Experimental design

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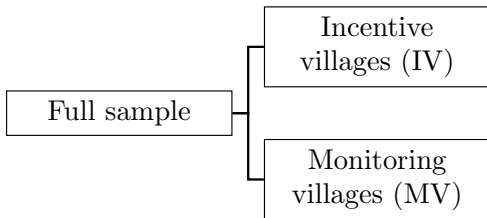
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Households are visited once every two weeks.

Incentives intervention

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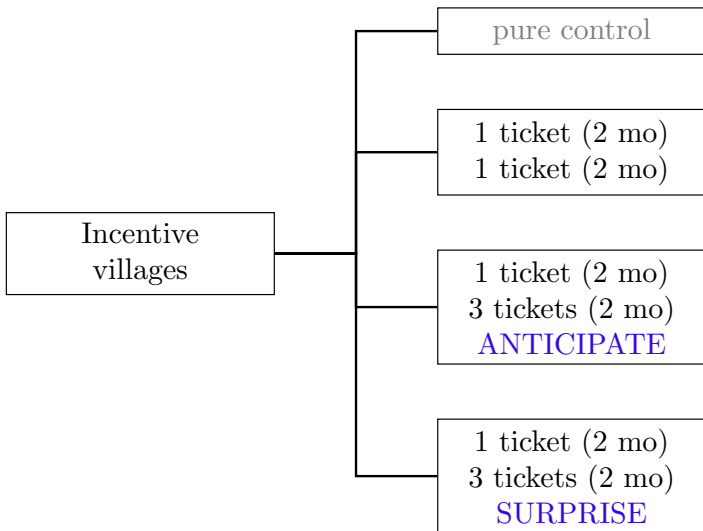
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Incentivized households receive:

- ① calendar
- ② dispenser to keep
- ③ soap for one year
- ④ tracking of behavior on calendar
- ⑤ tickets (one or three) per night dispenser active
 - redeemed for child and household prizes (on day of receipt or later)
 - 1 ticket = Rs. 3 = USD 0.05

Note: tracking measured and incentives earned daily, but recorded and received every two weeks

Incentives



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Parallel monitoring experiment

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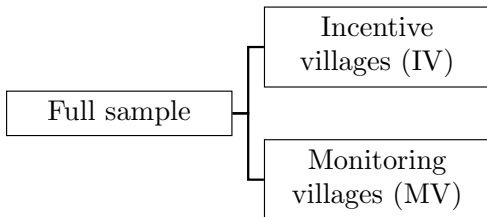
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Disentangling incentives from feedback alone:



Monitoring intervention

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Household Receives	Incentive	Monitoring
calendar	×	×
dispenser to keep	×	×
soap for one year	×	×
feedback on calendar	×	×
tickets	×	

Monitoring

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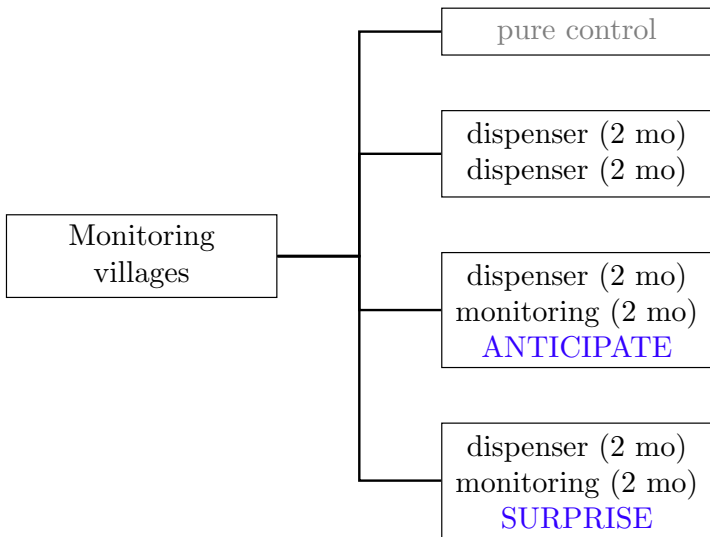
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- ④ Habit formation results
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 - Persistence effects
 - Anticipatory effects
- ⑤ Child health results
- ⑥ Conclusion

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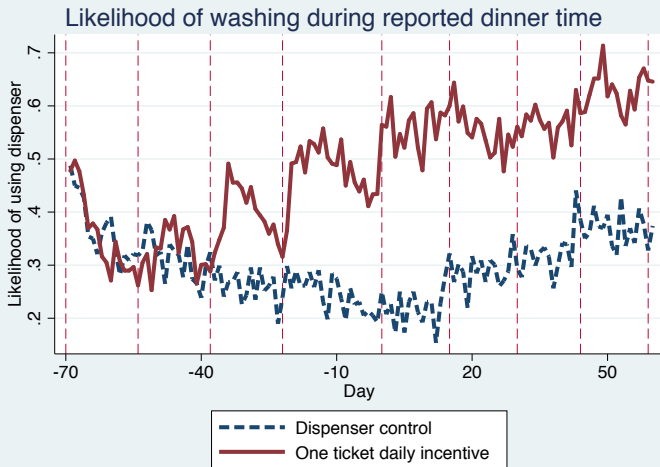
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Contemporaneous effects

Contemporaneous effects: receiving any tickets increases handwashing at dinnertime



Contemporaneous effects: tripling tickets has little effect on handwashing

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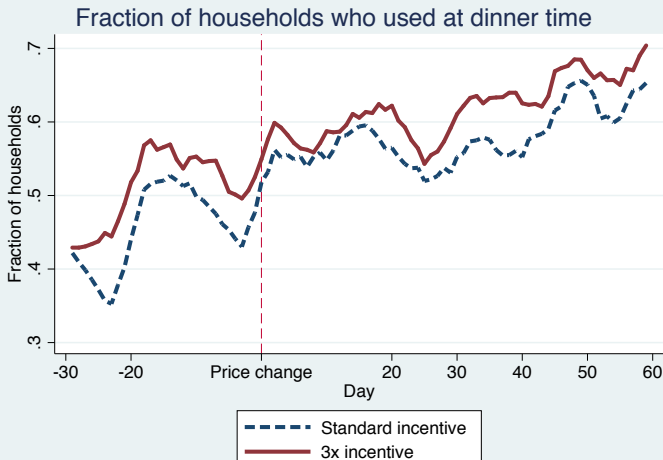
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Contemporaneous effects: monitoring increases handwashing

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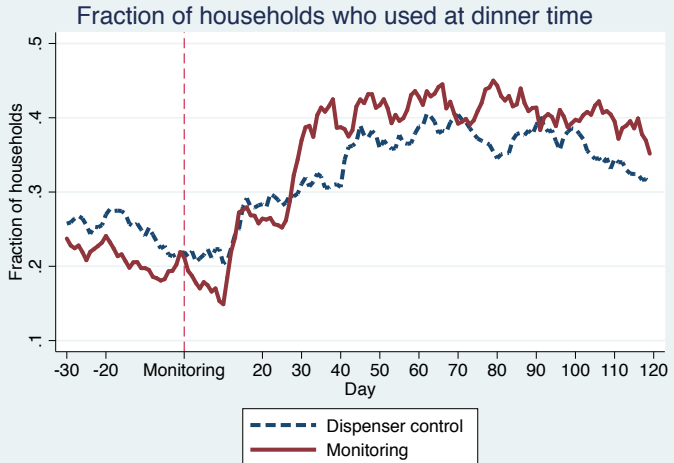
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Persistence effects

Habit formation: previously receiving incentives makes you wash more on extensive margin

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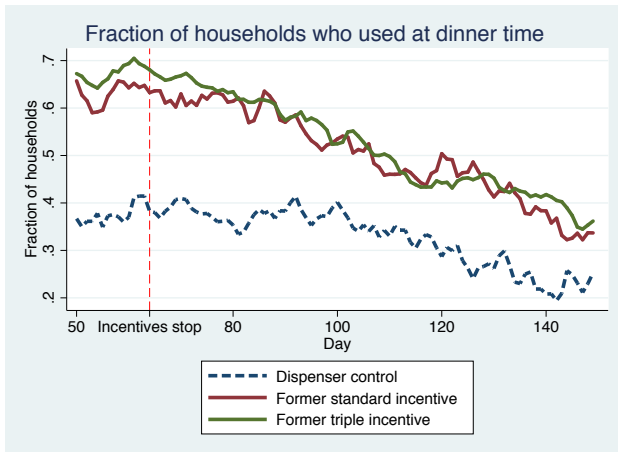
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Habit formation: previously receiving triple vs. single tickets does not persist

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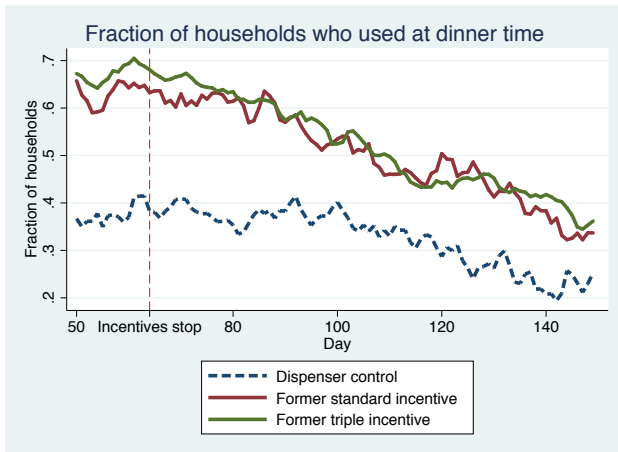
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Habit formation: previously being monitored makes you wash more

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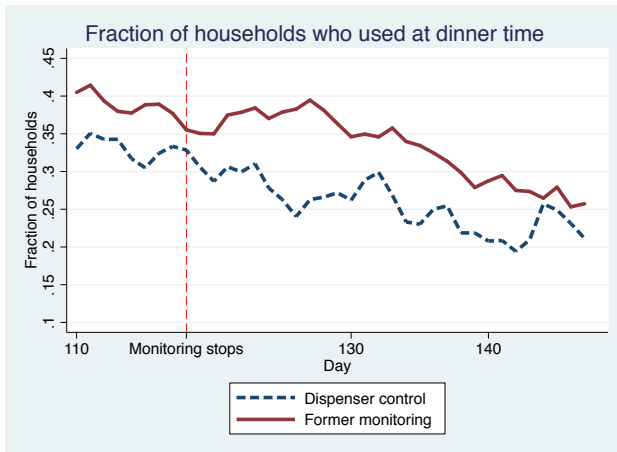
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Rational habit formation effects

Rational habit formation: no evidence in households anticipating triple tickets

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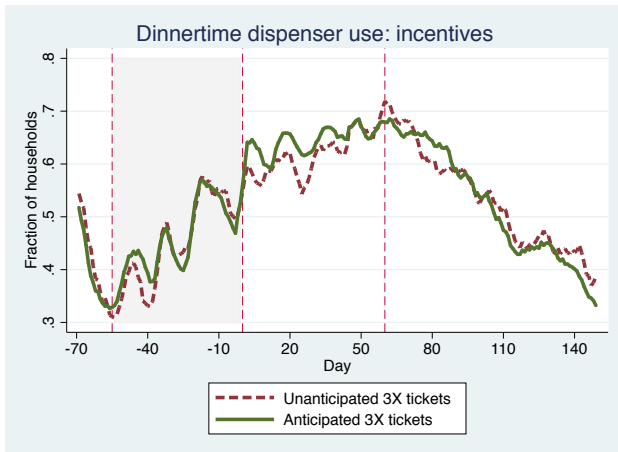
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Rational habit formation: strong evidence in households anticipating being monitored

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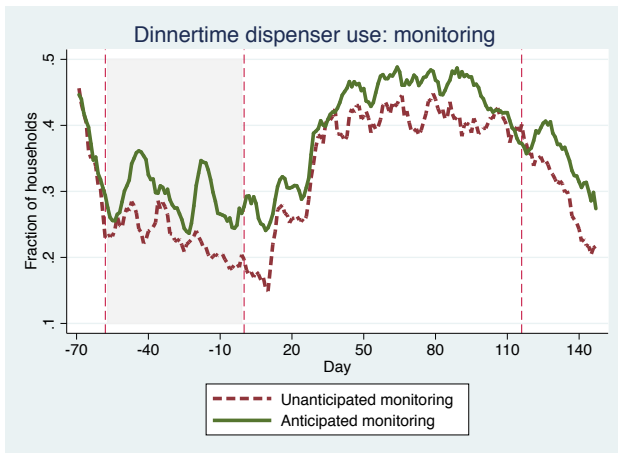
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Child health effects

Handwashing decreases loose stool and ARI incidence

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	(1)	(2)	(3)	(4)
	Any loose stool	Total days of loose stool	Any ARI symptoms	Total days of ARI
Received dispenser	-0.0315*** [0.00975]	-0.0817*** [0.0236]	-0.0393** [0.0154]	-0.204** [0.0884]
Mean of pure control	0.100 [0.00572]	0.209 [0.0151]	0.270 [0.00886]	1.247 [0.0504]
Observations	3,820	3,830	3,830	3,830

Notes: Observations are at the child level. "Received dispenser" is any household that received a dispenser, pooled over treatment arms. p-values adjusted for multiple hypothesis testing using Anderson (2008). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

► disaggregated by age

► disaggregated by treatment arm

► Back

Handwashing improves child anthropometric outcomes

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	(1)	(2)	(3)
	Weight for age z-score	Height for age z-score	Mid-arm circ. for age z- score
VARIABLES			
Received dispenser	0.135* [0.0640]	0.227* [0.0902]	0.0752* [0.0518]
Mean of pure control	-2.167 [0.0459]	-1.866 [0.0666]	-1.365 [0.0432]
Observations	863	862	858

Notes: Observations are at the child level. "Received dispenser" is any household that received a dispenser, pooled over treatment arms. p-values adjusted for multiple hypothesis testing using Anderson (2008).
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To summarize:

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- ① Handwashing alone has **substantial impacts on child health**
- ② Financial incentives and monitoring without incentives increases handwashing
- ③ **Handwashing is habitual**: effects persist after incentives or monitoring are removed
⇒ optimal scheme: frontload incentives
- ④ **Agents are rational habit formers**: anticipation of a rise in the future likelihood of handwashing increases current handwashing
⇒ optimal scheme: delay and announce incentives