

Productivity and Health: Physical Activity as a Measure of Effort

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Household Surveys in a Changing Data Landscape

Session 2: Innovations in Household Surveys

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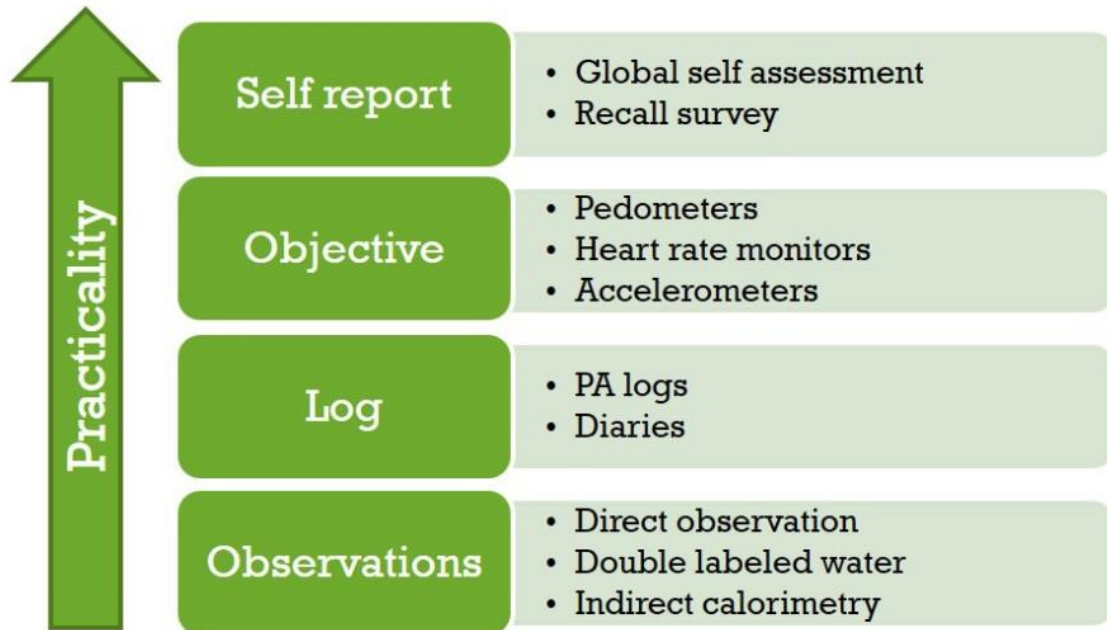
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Motivation

- Individual measures of labor productivity assess worker production (output) per unit of time (input), but direct measures of worker output outside of piece rate wages settings is challenging.
 - Attributing output to workers is difficult when multiple workers provide labor to produce an output.
 - Issues with self-reported time use
- Worker effort is an alternative input into productivity, but is difficult to measure (Becker 1977, 1985, Gibbons 1987, Lazear 2000).
 - Measuring physical activity as a direct measure of effort is increasingly possible with wearable tech (accelerometers) in physical occupations.

Measurement of Physical Activity



(Bull, 2009)

Validation of Physical Activity Measures

- We implemented a phased-in randomized control trial of a malaria testing and treatment program on a large sugarcane plantation in rural Nigeria.
- Workers are paid a piece rate based on their daily output (sugarcane cut). A subsample of workers were allocated an accelerometer to measure their physical activity.
- Data collected included a household survey, accelerometer data, and the firm's administrative data on worker output and payroll.
- Physical activity measures are highly correlated with daily earnings

Malaria Intervention Effects on Physical Activity

Panel: Work-Day Observations where Labor Supply==1

	<i>Labor Outcomes</i>		<i>Physical Activity</i>				<i>Distribution of Activity</i>		
	Daily Earnings (Naira) (1)	Daily Rods Cut (2)	Sedentary Hours (3)	Light Work Hours (4)	Fairly Active Hours (5)	Very Active Hours (6)	Light/ Active Hours (7)	Fair/ Active Hours (8)	Very/ Active Hours (9)
Malaria Program Offer (1=Yes)	456* (234)	204* (105)	-0.946** (0.365)	-0.120 (0.155)	0.848*** (0.236)	0.217*** (0.071)	-0.094*** (0.022)	0.069*** (0.017)	0.025*** (0.008)
Constant	1,386*** (239)	619*** (107)	18.187*** (0.579)	3.614*** (0.390)	1.842*** (0.270)	0.356*** (0.122)	0.645*** (0.049)	0.306*** (0.035)	0.049*** (0.018)
Number of Worker-Day Observations	559		503				503		

Standard errors are clustered at the worker-level with workgroup-week fixed effects. All outcomes are for one-week reference periods.

Labor outcomes and physical activity outcomes are complementary to understand the effect of a malaria intervention on worker productivity and effort

Integrating Physical Activity Monitors with Household Surveys

- Integration is feasible with subsamples in national surveys.
 - Benchmarks could provide correction factors for self-reported time use for all types of occupations and labor productivity for physical occupations for the full sample.
- Compliance protocols require more intensive field supervision and field costs.
- The future is now: A recent review of accelerometer studies with sample sizes greater than 400 identified accelerometry data for more than 275,000 individuals, from 76 studies and 36 countries (Wijndaele et al, 2015).

Akogun, O., A. Dillon, J. Friedman, A. Prasann, P. Serneels. (2020)
“Productivity and Health: Physical Activity as a Measure of Effort,”
World Bank Economic Review, forthcoming.

Working paper version linked [here](#)