Evidence of the Hawthorne effect â?? worth knowing about and watching out for

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Quantifying the Hawthorne Effect

Submitted by Jed Friedman on 2014/10/16 This post is co-authored with Brinda Gokul

Many who work on impact evaluation are familiar with the concept of the Hawthorne effect and its potential risk to the accurate inference of causal impact. But if this is a new concept, letâ??s quickly review the definition and history of the Hawthorne effect:

- The Hawthorne effect refers to study participantsâ?? alteration of behavior solely as a result of being observed (rather than as a result of the intervention). Hence for the effect to exist it is necessary for the subjects to realize they are under observation. The term originates from the Western Electric Companyâ??s Hawthorne Works Plant in Chicago where, in the late 1920s and early 1930s, researchers tried to study the effects of altered workplace lighting on worker productivity. It turned out that worker productivity improved when the lighting was increased, but also improved when the lighting was dimmed. Indeed it became apparent that whenever a change was implemented, such as a change in work hours, productivity improved for a period of time. The conclusion: productivity was not being affected by the changes in workplace conditions but instead by the self-knowledge of workers that they were under observation.

So the Hawthorne effect may present a challenge to the validity of causal inference (when agents respond to the knowledge they are being studied rather than respond to the changed environment as a result of the intervention) or may present a challenge to the accuracy of measurement (when the fact of observation alters the behavior measured). Clearly any effect magnitude, and indeed whether the effect arises at all, depends on the study context including the type of behavior observed. Yet only a handful of studies have attempted to identify and measure the Hawthorne effect.

My colleague Brinda Gokul and I recently reviewed the health economics and public health literature that explicitly study the effect in the general field of health. This is a hard question to get at, but some inventive studies, at times utilizing new technology, have given us some fascinating results. (Itâ??s a fairly nascent literature, and at the bottom of this post we list the papers that we have found.)

With respect to behavior of health providers in developing countries, one of the more extensive studies in understanding the Hawthorne effect was conducted in the Arusha region of Tanzania and resulted in a series of papers by Kenneth Leonard and Melkiory Masatu. The challenge in measuring the Hawthorne effect is that we need to also have â??stealthâ?• data on subject behaviors when they are not aware of observation. The Tanzaniaâ??s study trick was to use patient recall interviews, conducted soon after the clinic visit, to reconstruct the actions of the clinicians and specifically their adherence to proper medical protocols. This stealth data is then compared with what is recorded by trained

enumerators when they observe the clinician treating patients.

Of course the first step is to validate the accuracy of the â??stealthâ?• patient recall data, which the investigators do by comparing the enumerator observation record with patient recall data for the patient visits that were explicitly observed. It turns out there is a high degree of concurrence, with agreement between observer and patient on approximately 70% of the items measured.

Prior to the arrival of the research team, patient recall measured an average 53% baseline adherence to medical protocol by health providers, after the arrival of the research team, this adherence increased by almost 10 percentage points (or 20%). And it appears that the adherence to protocol actually matters, as cases that have higher adherence also have higher rates of accurate diagnosis and higher patient satisfaction. Of note is that the Hawthorne effect was rather short lived â?? providers returned to baseline level of adherence after 10-15 observed patient visits. Iâ??ve been told of this same effect by education researchers who say that teachers habituate quite rapidly to video observation and return to â??normalâ?• levels of practice in within a day or so after the introduction of the camera.

Another example is from the Indian state of Orissa where investigators evaluating sanitation efforts to increase latrine use and reduce open defecation took a technological approach to the collection of stealth data: they developed a small hidden device to monitor latrine activity that recorded the times when the latrine door was opened. They called this device a PLUM â?? passive latrine use monitor. Amongst households with a latrine, the PLUM recorded members of the household using the latrine on average 2.11 times in the morning and 0.53 times in the afternoon.

Once this baseline data was collected, the study induced the Hawthorne effect by sending an observer to stand outside selected latrines for a five hour period in order to validate the passive monitor. It turned out that when a known observer was in place, household latrine compliance increased in the morning from 2.11 times to 2.71 and in the afternoon from 0.53 to 1.03 times. (Clasen, 2012).

For several healthcare studies in Europe, Canada and the United States, results also identified the Hawthorne effect. Here is a selection of findings:

- By contrasting hand sanitation practices recorded discretely through a real-time location system (RLTS) â?? which recorded all dispensations from hand sanitizer stations as well as the movement of explicit hygiene auditors in an acute care hospital â?? researchers identified the Hawthorne effect in an acute care research hospital. The researchers recorded a rate of 3.75 dispensations per hour when the sanitizer station was visible to the auditor compared to 1.48 dispensations from a station not currently under observation. In contrast, there were only 1.07 dispensations in the week before observer arrival.
- Another study of hand sanitation practices contrasted antiseptic hand rub (AHR) use among medical personal in five intensive care units both in the presence and absence of an announced observer of sanitary practice. When the official observer was absent, a trained covert observer â?? a research nurse part of the medical team â?? also recorded AHR use. The Hawthorne effect had a marked impact on AHR compliance: 29% baseline compliance and 45% compliance in the overt period. (Ruden)

- An observational study of physician inappropriate prescribing behavior found the rate of anti-biotic prescriptions for diagnosed viral respiratory infections to be 17%, but a record review of unobserved cases for the same physicians and over the same study period found the anti-biotic

prescription rate for viral cases to be 46%.

- The Hawthorne effect was induced in paramedic reporting practices solely by written notification of an upcoming quality-improvement audit, thus indicating that the effect does not always require direct observation or feedback. In this case, post audit announcement, the rate of incomplete paramedic reports declined by 20%. This finding also suggests, of course, a behavioral mechanism behind many Hawthorne effects â?? the perceived demand for performance. (Campbell)

Many of these reviewed studies look at small samples and are relatively short-term. So persistence of the observed effect is an important open question as well as the interaction between observation and the complexity of the behavior studied.

Here is the list of work attempting to quantify the Hawthorne effect that we have found for the health related field â?? please add to it if you know of others (in any field) â?? weâ??d be very grateful.

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