

# Beyond a Good Story: From Hawthorne Effect to Reactivity in Health Professions Education Research

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## **AUTHORS**

Elise Paradis, PhD.\* Assistant Professor, Leslie Dan Faculty of Pharmacy and Department of Anesthesia, Faculty of Medicine, University of Toronto; Scientist, The Wilson Centre, University of Toronto and University Health Network. 144 College St, Toronto, ON M5S 3M2 CANADA. [elise.paradis@utoronto.ca](mailto:elise.paradis@utoronto.ca)

Gary Sutkin, MD. Associate Professor, Department of Obstetrics, Gynecology, and Reproductive Sciences, University of Pittsburgh Medical Centre, Magee-Womens Hospital, 300 Halket Street, Pittsburgh, PA 15213 USA. [gsutkin@magee.edu](mailto:gsutkin@magee.edu)

\*Corresponding author.

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Leslie Dan Faculty of Pharmacy, University of Toronto;  
Department of Obstetrics, Gynecology, and Reproductive Sciences, University of Pittsburgh Medical Centre.

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Qualitative research methods; clinical education; qualities/skills/values/attitudes

## **ABSTRACT**

### *Context*

Observational research is increasingly being used in Health Professions Education (HPE) research, yet it is often criticized for being prone to observer effects (also known as the Hawthorne Effect), defined as a research participant's behavioral alteration in response to being observed. This article explores this concern.

### *Methods*

First, this article briefly reviews the initial Hawthorne studies and the original formulation of the Hawthorne Effect, before turning to contemporary studies of the Hawthorne Effect in HPE and beyond. Second, using data from two observational studies (in the OR and in the ICU), this article investigates the Hawthorne Effect in HPE.

### *Findings*

Evidence of a Hawthorne Effect is scant, and amounts to little more than a good story. This is surprising given the foundational nature of the Hawthorne Studies in the social sciences and the prevalence of our concern with observer effects in HPE research. Moreover, the multiple and inconsistent uses of the Hawthorne Effect have left researchers without a coherent and helpful understanding of research participants' responses to observation. The authors' HPE research illustrates the complexity of observer effects in HPE, suggests that significant behavioral alteration is unlikely in many research contexts, and shows how sustained contact with participants over time improves the quality of data collection.

### *Conclusion*

This article thus concludes with three recommendations: that researchers, editors and reviewers in the HPE community use the phrase "participant reactivity" when considering the participant/observer/research question triad; that researchers invest in interpersonal relationships in their study site to mitigate the effects of behavioral alteration; and that researchers use theory to make sense of participants' behavioral alteration and use it as a window into the social world. The term "participant reactivity" better reflects current scientific understandings of the research process and highlights the cognitive work required of participants to alter their behavior when observed.

*Perhaps the most important lesson to be learned from the original Hawthorne experiments is the power of a good story (Levitt and List, 2011: p. 237).*

## **Introduction**

Qualitative research has grown in both importance and quality over the past decades in the field of health professions education (HPE). Observational methods in particular are increasingly being used, yet a common critique persists and may prevent their full appreciation: that they are prone to the “Hawthorne Effect,” defined as research participants’ alteration of behavior when observed. HPE researchers should be concerned about observer effects on behavior, for if they exist and they are strong, then observational research – whether experimental or ethnographic – merely reports what research participants *want us* to see, rather than exposes *what really goes on* when no one is watching.

In this article, we argue that this is an over-simplistic understanding of observer effects in research based on three main sources of data. First, we review the Hawthorne Studies, their critiques, and the original formulation of the Hawthorne Effect. Second, we provide an account of contemporary research on the Hawthorne Effect, efforts to make this methodological artifact visible, and recent examples of its application in the HPE literature. Third, we use examples from our own observational research to illustrate the complexity of observer effects on participant behavior in two settings: the operating theater and the intensive care unit (ICU).

In light of this evidence, we suggest that it is time for the HPE community to reconsider how observers’ presence impacts research findings, and suggest some fertile avenues for future research that consider research participants’ reactivity to the goals of research. We hope this paper will help us as a community move beyond perpetuating the good but inflated story of the Hawthorne Studies and engage in higher-quality observational research.

## **The Hawthorne Studies and the Hawthorne Effect**

The Hawthorne experiments were conducted in Cicero, Illinois, between 1924 and 1933.<sup>1,2</sup> They have taken on a “mythical power” in the social and behavioral sciences mostly because, according to Gillespie (1991), of the overarching “narrative of scientific defeat transformed into victory by a leap of insight.”<sup>1</sup> The Hawthorne story is generally told as follows. Scientists, after failing to establish a causal link between working conditions and productivity, ultimately discovered that “special attention by supervisors led to improved productivity.”<sup>3</sup> It is this special attention that is generally thought to constitute the Hawthorne Effect. Yet this story misrepresents what actually happened: two of the initial operators were forcibly removed for insubordination and replaced by much faster operators.<sup>1,4,5</sup> Furthermore, the Hawthorne experiments have been subsequently criticized for study design and execution, and it has been noted that the results were mixed at best.<sup>6</sup>

Reanalyses of the Hawthorne Studies further undercut the traditional account. Franke and Kaul (1978) found that two variables, combined with the aforementioned replacement of two

operators, explained about 90% of the variance in the productivity: the economic adversity introduced by the Great Depression and the quality of the raw materials provided to operators.<sup>7</sup> Similarly, a reanalysis of the original data by Jones (1992)<sup>8</sup> suggest that when local and university researchers failed to establish a causal link between productivity and one of the dozens of experimental changes they had introduced, they basically turned to their own, pre-existing presuppositions about social behavior. Finally, Levitt and List (2011) summarized their reanalysis of Hawthorne data by noting that “[p]erhaps the most important lesson to be learned ... is the power of a good story.”<sup>6</sup>

--- INSERT BOX 1 ABOUT HERE ---

**Box 1: French’s Canonical Description of the Hawthorne Effect**

“From a methodological point of view, the most interesting finding was what we might call the “Hawthorne Effect.” In order to manipulate more precisely the physical factors affecting production, the experimenters had set up a special experimental room for a small group of girls (sic!) who were wiring relays. This wiring room was separated from the rest of the factory, and the girls working in it received special attention from both outside experimenters and the management plant. Careful studies of this wiring group showed marked increases in production which were related only to the special social position and social treatment they received. Thus, it was the “artificial” social aspects of the experimental conditions set up for measurement which produced the increases in group productivity.”<sup>9</sup>

The phrase “Hawthorne Effect” has been attributed to John R.P. French, author of a chapter on field experiments published in a key research methods textbook of the era.<sup>10</sup> We reproduced what can be said to be its canonical definition in Box 1. Most authors since French have truncated the excerpt and used only this sentence to define the Effect: “Careful studies of this wiring group showed marked increases in production which were related only to the *special social position and social treatment* [the women] received” (our emphasis).

Yet a closer reading of French’s chapter clarifies that he used the term “Hawthorne Effect” as a critique of the “artificial” conditions created by the Hawthorne experimenters, conditions “so different from the usual factory conditions that this experiment stands midway between a field experiment and a laboratory experiment.”<sup>9</sup> French’s “Hawthorne Effect” was not intended as a challenge to naturalistic, *in situ* approaches typically used by ethnographers. Rather, it highlighted the lack of generalizability of research obtained in an artificial environment.

## Contemporary Studies on the Hawthorne Effect

Given the mythical status of the Hawthorne Effect, one would assume that contemporary researchers must have proved its existence, overshadowing its absence from the original studies. Our review of contemporary studies suggests that evidence of a Hawthorne Effect is limited, however. Adair (1984) reviewed 40 educational and psychological studies claiming to control for a Hawthorne Effect. Authors generally posited three mechanisms (special treatment or attention accorded subjects, awareness of being in an experiment, and change in routine or novelty) yet reported no influence of these variables on behavior. Adair concluded that the Hawthorne Effect “anecdotally fits situations we recall, yet on closer examination it is meaningless,”<sup>3</sup> and suggested that researchers focus on participants’ understanding of the research and related behavioral adaptation.

----INSERT BOX 2 ABOUT HERE ----

### **Box 2: The Case Against the Hawthorne Effect**

- Data from the original Hawthorne studies are not compatible with a Hawthorne Effect.<sup>6-8</sup>
- The original conception of the Hawthorne Effect<sup>9</sup> is generally discussed out of context; a contextual reading suggests broader methodological concerns about generalizability of experimental findings.
- The impact on behavior of the three main mechanisms identified by researchers as constitutive of the Hawthorne effect (special attention; awareness of being in an experiment; novelty) is not supported by research.<sup>3, 11, 12</sup>
- Contemporary uses are so broad and inconsistent as to make the phrase meaningless.<sup>11</sup>

A more recent review by social psychologists Chiesa and Hobbs (2008) has shown that authors of 227 introductory social science textbooks, encyclopedias and dictionaries have used the phrase to bring attention to contextual factors impacting the research process, intervening variables in the observer/behavior alteration chain, and resulting changes in behavior among study subjects.<sup>11</sup> Such broad and inconsistent use of the Hawthorne Effect led them to suggest that we should stop using the phrase.

Finally, a 2014 systematic review by McCambridge et al. used a broad definition of the Hawthorne Effect as one that “concerns research participation, the consequent awareness of being studied, and possible impact on behavior”<sup>12</sup> to evaluate whether it exists, under what conditions it operates, and the size of the effect if it exists. They found that randomized controlled trials provided evidence of small, statistically significant effects; that

quasiexperimental studies were inconclusive; and that observational studies suggested that “the size of any effects of health-care practitioners being observed or being aware of being studied probably very much depends on what exactly they are doing.”<sup>12</sup> Echoing Adair,<sup>3</sup> they point to “conformity to perceived norms or researcher expectations”<sup>12</sup> as the core mechanism behind behavioral alteration.

Integrating the literature covered so far (see Box 2), we find very little empirical support for a Hawthorne or Observer Effect<sup>3, 6-8, 11, 12</sup> except in situations where participants know about the research aims and adapt their behavior to meet what they perceive to be the observer’s expectations.<sup>3, 12</sup> Moreover, confusion over its meaning arguably hinders rather than helps understand the limitations of observational research.<sup>11</sup>

### ***The Hawthorne Effect in HPE Research***

Several scholars in the field of HPE have discussed the Hawthorne Effect. In contrast with the literature in other subfields, which has investigated its existence across research methods, the Hawthorne Effect is generally discussed in the context of qualitative research. Boet et al. (2012) describe the Hawthorne Effect as a methodological concern to ponder alongside several others, and define it as “positively changed behaviour or performance resulting from awareness of being a part of a study.”<sup>13</sup> Ng, Lingard and Kennedy (2014) define it more broadly as “when observed participants act differently from how they would act if the observer were not present.”<sup>14</sup> They identify two mechanisms whereby it can be minimized: prolonged engagement in the field, time taken to establish trust or rapport, and observer comportment (including dress); the establishment of a process for recording and reflecting on the Hawthorne effect during observations.

In empirical articles, authors have tried to mediate the Hawthorne Effect using three main strategies. They have (1) placed multiple observers strategically in different operating rooms,<sup>15-17</sup> (2) collected data over prolonged periods of time and during long surgeries to encourage subjects to act naturally,<sup>15, 17-20</sup> and (3) encouraged observers to record examples of the Hawthorne Effect in their field notes.<sup>17</sup> Strangely, we were unable to locate examples of observer effects in published HPE articles, despite how it is an accepted methodological challenge for observational research. The many occurrences of overt conflict between participants reported in the above-cited research, however, suggest that research participants did not importantly alter their behavior when observed, and thus that participants are either not conscious of observer effects on their own behaviors, or did not report them to researchers.

The absence of cases of observer effects in the literature, combined with the presence of apparently undesirable behavior in published studies led us to consider observer effects in our own research, which is what we turn to next.

### **Considering the Hawthorne Effect in Our Research**

In this section we use some of our own observations in the operating theater and in the ICU to question the effect of observers on participants’ behavior. To select vignettes, we performed a secondary analysis of the observation notes taken during our latest study. We read through these notes and excerpted recorded moments of interaction between the observer and research

participants. We then discussed these excerpts and jointly evaluated their evocativeness, representativeness, and usefulness in illustrating the effect of observers on participants' behavior. We chose vignettes that best made visible the complexity of this relationship, which had become clear early during our analysis. Presentation of our data is severely limited by space concerns, and thus our vignettes were edited for concision. Ethics approval was obtained for both studies and at all study sites.

### ***Observational Research in Surgery***

In the collaborative surgical education research that I (GS) have led<sup>21, 22</sup> we typically place a videographer in the operating room and give her a handheld video camera, which makes her easily identifiable since the camera must be placed close to the surgeons to capture voice and subtle movements. We routinely interview the surgeons following the case and ask not only about their teaching, but also the question “were you aware of the videographer or the camera during the surgery?” Without exception, everyone answered they were not aware. Over the course of our project we encountered only one example in which the surgical team began a discussion with the videographer about her presence:

#### **Vignette 1: If I had an invisibility cloak**

Attending and Fellow are operating together intently. The observer is directly across from the attending and has the camera focused on her. She looks into the camera, pauses and asks: “Are you *not* allowed to talk to us?”

Observer: “Well, I prefer not to.” [Laughs.] “I’m just trying to be as inconspicuous as possible.”

Attending: “You’re not inconspicuous.”

Observer: “If I had an invisibility cloak, I’d be better off.”

Attending: “That’s right you need an invisibility cloak.”

The Attending immediately refocuses on the operative field. Only twice over 115 minutes of filming did any member of the surgical team look at the camera, despite the observer standing within 3 feet of the surgical field.

*Despite generally noting that the surgical team ignores the researcher, we were concerned that the presence of an observer recording the surgery would decrease the incidence of use of humor, especially off-color humor, and more animated, pointed teaching, yet we saw numerous instances of both. We were also concerned that attending physicians would hide their typical hierarchical, demanding behaviors, and thus that we would not capture their usual behavior. Yet in one example, during an audiorecorded postoperative interview, the attending reflected on her behavior in front of the camera:*

#### **Vignette 2: I’m going to kill you**

There’s one point where I say “If you goof up, I’m going to kill you.” (I say that) all the time. They know it’s a joke. If there’s a very serious step, I’ll stop and tell them how to go through the motions. ... I don’t think anyone really worries I’m going to kill them. (It communicates:) “This is an important step. This is something really, really important to remember.”

It is not clear whether she was aware that she made the threatening comment during the surgery, or whether it struck her later that this language was captured and that it thus needed to be defended.

In summary, on the basis of generally absent interaction in our data between observer and participants, and on the frequent occurrence of suboptimal or potentially embarrassing behavior, we believe that observers are unlikely to have a significant impact on surgical teaching. The operating room is a high-tech, fast-paced environment filled with many participants and distractions. Surgeons are intently focused on the operative field, and the ease with which they block out distractors and stimulants – such as the nurses chatting or the music playing – suggests that they are not likely to be influenced by another quiet presence. The operating room is sometimes referred to as the surgical “theater,” and anyone who has observed surgery knows that it is a performance and has an audience. Surgeons are thus used to surveillance: their activities are public and actively watched by many, including students, other healthcare professionals, sales representatives, etc. In such an engrossing context, we believe that observer effects might be dampened.

### ***Ethnographic Research in the ICU***

Here I (EP) draw on data collected during a year-long comparative ethnographic study of team interactions in four American intensive care units (ICUs).<sup>23,24</sup> There are many ethnographic approaches, but ours is best described as critical ethnography, which aims to challenge the status quo by describing how local culture and practices interact and intersect with broad social dynamics and individual histories.

Entry into a new social environment is difficult for all newcomers, ethnographers or not, and my first visits to the study ICUs were difficult as well. The initial work of introducing yourself, the study and its goals is always taxing, as there is much to learn. Once social connections with participants are made, however, the ethnographer has access to a fantastic source of “emic” data: data originating from insiders in the study site that can reflect how they see the world and why they act as they do. This emic perspective can then be combined with the ethnographer’s “etic” perspective, which reflects more closely their own social origins, training, values and beliefs.

Clearly, one of the key strengths of ethnography arises from “deep embeddedness”: knowing the clinicians at my field sites enabled me to witness situations that should arguably be hidden if the Hawthorne Effect was really strong, as in the following vignette:

#### **Vignette 3: A feisty little lady**

Lynn (RN), Emily (RN) and Jessie (Certified Nursing Assistant) are working together to re-install Ms. Lee onto her bed. Her twisting and turning landed her at the foot of her ICU bed. Joking, Lynn says: “Time not to torture old people!” Ms. Lee resists as they try to lift her up on the bed, and Lynn asks for restraints to help them do their work. Emily motions “They’re over there” with her head before lunging towards a chest of drawers. Ms. Lee kicks as the nurses struggle to put on the restraints.

Emily: “She’s a feisty little one.”



She then notices that Ms. Lee's gown is lifted up to her belly, pulls it down and squeezes the blanket tightly under the mattress on both sides. "I don't think it's illegal" to restrain her movement like that, she ventures, before concluding: "Torture was approved!"

Lynn, Emily and Jessie were undoubtedly aware of the social norms that they broke during my observations, including a respect for all patients (and especially elders), and the adherence to hospital protocols and state legislation. Three main reasons seem to dampen research participants' response to the observer's presence over time. First, we are more likely to act according to shared cultural norms in front of strangers than in front of people we know.<sup>25</sup> Second, the goal of the study is typically explained upon first encounter, and might fade from participants' memory. Third, trust develops as the ethnographic outsider becomes more of an insider.

Let us now turn to another vignette that illustrates the complexity of observer effects and the potential of ethnography.

#### **Vignette 4: Curtain's up!**

Eric (an ICU Fellow) and Lauren (an ICU Resident) are working together to put a trialysis port on Mr. White, a homeless man with a beard. Eric admits that he is "totally paranoid" about cleaning skin surfaces: "People are gross," he says, "especially homeless people."

Eric, who wants to leave by 6pm, tells Lauren: "You've got three minutes left, so you should be good." He then looks in my direction, and adds: "I was going to say something really sarcastic, but I know you're listening." I ask him to ignore me.

Lauren shares that another ICU fellow teaches her differently: "*He* says: 'it's not going to be perfect, move on,' while *you* say: 'it is perfect, move on.' It's confusing." Eric looks up at me: "I get written up [for bad behavior] all the time." I laugh, and he reiterates: "I'm not joking."

When Lauren finds the artery on the monitor, Eric cheers: "You found it right away, good job!" He then turns towards me: "Did you note that? Positive reinforcement."

Lauren struggles a bit, poking at Mr. White's skin. Blood squirts as she pushes the wire in, and the patient makes a big jerking motion. She apologizes: "It was an idiotic move." Eric (to Lauren): "It was a learner move, not idiotic." (To me): "Did you get this?"

As I walk out of Room 6, Pamela (RN) tells Russell (Respiratory Therapist) that she sent me to watch Eric and Lauren. "Does it happen often?" I ask. "That blatant attitude? No," responds Pamela, "it is just confirming that he is a capital D." Russell concurs.

This vignette once again shows the importance of relationships. Pamela, a trusted informant, encouraged me to observe Eric and Lauren. Interpreting Eric's behavior in this vignette is quite complex, however, and sheds new light on observer effects. Eric knows that he is observed, and partly adapts his behavior by instructing me to write down the positive reinforcement he gave Lauren and flagging moments where he self-censored. In doing this, he

shows his interpretation of meaningful clinical teaching, and of appropriate behavior. Yet Eric also admits that he gets scolded for bad behavior “all the time,” and his derogatory beliefs and impatience are visible on many occasions, as he calls homeless people “gross,” sets unrealistic expectations with Lauren, and seems unable to absorb the feedback he receives on the incongruence of his instructions with those of another fellow.

One could imagine a scenario where Eric convinces me of his clinical teaching skills and exemplary behavior through skillful deception. If he had not, for example, ruined his performance of “positive reinforcement” by both flagging it to me and pressuring Lauren for time, I might have seen him as a good teacher. In such a scenario, my initial (etic) assessment would have been challenged by the emic information given by Pamela and Russell, who clearly dislike him. Ethnographic relationships thus partially work as guarantors against deception, as skilled ethnographers are able to refine their emerging understandings of situations with others in the field.

## Discussion

In this paper, we have shown that data from the original Hawthorne Studies are not compatible with a Hawthorne Effect, that the original framing of the Hawthorne Effect has been distorted by decontextualization, and that despite the very limited evidence of a Hawthorne Effect, contemporary researchers use the phrase indiscriminately. The Hawthorne Studies told a good story, but data do not support the Hawthorne Effect.

Moreover, in the sociological literature with which the first author is familiar, discussions of observer effects are rare. The most elaborate we could find is by Adler and Adler (1994):

Relatedly, observational methods embody the least potential for generating *observer effects*. There are many ways researchers can affect their subjects, from the self-fulfilling to the self-negating prophecy (Kidder, 1981). Many people believe that entirely avoiding researcher influence on subjects is an idealistic improbability (Adler & Adler, 1987; Jarvie, 1969; Johnson, 1975), yet there are ways that such effects can be diminished. The naturalness of the observer role, coupled with its non-direction, makes it the least noticeably intrusive of all research techniques.<sup>26</sup>

This paragraph aligns uncannily well with French’s original formulation, and it is the only mention of observer or Hawthorne effects in the 1994 edition of Denzin and Lincoln’s *Handbook of Qualitative Research*.<sup>27</sup> In the most recent edition of this same text, the Adler and Adler text has been replaced, and there are thus no mentions of such effects in the 2011 edition of the volume.<sup>28</sup>

While several HPE scholars have grappled with the Hawthorne Effect over the years – in their writing and teaching –, we were unable to locate actual examples of observer effects in this literature. We have thus tried to enrich our methodological understanding using data from our own observational research. On this basis, we argue that rigorous, reflexive research in HPE is unlikely to be distorted by strong observer effects, for three main reasons. First, the demands of care are often too great for providers to access normative information. When the work is routine,

automatic responses are likely; when it is not, focus is likely to be on the task rather than on normative information. Second, health professionals are always observed. In teaching hospitals in particular, senior healthcare providers are consistently watched by trainees and by other healthcare professionals on their teams. Meanwhile, trainees are monitored regularly by peers, superiors, and other healthcare professionals. How and why the researcher's gaze would lead to further transformations of behavior is unclear, especially if the research question does not dictate the appropriate behavior. Third, researchers working within ethnographic traditions come to know their participants over time. Personal connections provide researchers with access to a broad range of situations, including those that display less-than-ideal behavior, and with information that protects against deception and manipulation.

We cannot, as a community, uncritically repeat “academic folklore”<sup>29</sup> that distorts our understanding of iconic studies and impedes science. To capitalize on what this paper has unearthed, we suggest that our community starts referring to research participants' behavior modification as “participant reactivity” rather than the Hawthorne Effect or observer effects. We define participant reactivity as a form of researcher/participant effect that comes from participants' active engagement with the research and its aims, a process that leads to behavioral adaptation that aligns with perceived social norms. We name this effect “participant reactivity” in recognition that the main mechanism for behavioral change lies in participants' cognitive work, not merely in the presence of researchers. Such an effect should be small, however, since social psychological research shows that “one's actions are relatively unaffected by normative information—even one's own—unless the information is highlighted prominently in consciousness,”<sup>30</sup> and that this type of information loses its salience over time.<sup>30</sup> Consequently, some contexts and tasks are more likely to be influenced by the presence of an observer, including social evaluative tasks<sup>31</sup> that include a clear right answer (e.g. hand washing<sup>32, 33</sup>), especially if they are bounded in time.

Instead of asking about the Hawthorne Effect, researchers who use observations and reviewers of such research should try to articulate their methodological approach and concerns more specifically. We have laid out some specific suggestions for researchers and reviewers in Box 3. Ethnographers in particular need to describe more fully their relationships to participants and be more reflexive about their practice, something that they haven't done in the past.<sup>30</sup>

-- INSERT TEXT BOX ABOUT HERE --

### **Box 3: Observational Research: Advice for Researchers and Reviewers**

#### **Researchers**

In order to minimize your participants' reactivity to being studied:

- Embed yourself within the environment and conduct sustained observations.
- Cross-check your own (etic) understanding of situations with the emic view of participants. Establishing rapport with your participants will help.
- Record and evaluate interactions between subjects and researchers.
- Consider limiting your participants' awareness of your specific research question.
- Pay particular attention to tasks where the "right" behavior is known and easily enacted (e.g. hand washing, feedback, etc.).

#### **Reviewers**

Consider whether the participants' behaviors could have been impacted by reactivity to research, particularly if they were aware of the research question and could have easily conformed to researchers' expectations.

Finally, using theory will help researchers who use observational methods make sense of behavioral adaptation. As social beings who respond to their environment and those around them, research participants will sometimes alter their behavior or at least *perform* what they believe is expected of them, as we have seen in the case of Eric. We know, for example, that students applying to medical school adapt their behavior to match known expectations,<sup>34,35</sup> and that trainees enact what they believe is the right way to doctor.<sup>36</sup> Here the theoretical insights generated by social psychology<sup>30</sup> (including Erving Goffman's work<sup>37-39</sup>) are a good place to start.

Instead of seeing behavioral adaptation as a failure of observational research, we should embrace it for what it can teach us about the social world. Humans are not atoms, and observer effects in social science research are not equivalent to Heisenberg's Uncertainty Principle. Health professions education researchers must recognize that research with human beings is not likely to deal in certainty, but rather that it is delicate and multifaceted. This fundamental, constructionist view of behavior is the first step in recognizing and honoring the complexity of the social world, and thus a critical step to take if we are to transform health professions education.

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