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Research Agenda: The Effects of Responsible-Conduct-of-Research Training on Attitudes

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Abstract

Requirements for training in responsible conduct of research have significantly increased over the past 25 years, despite the absence of evidence for a substantial impact. One of the challenges has been to choose among the many possible goals that might define outcomes. Although much of the focus of research has been on changes in knowledge or skills, a case can be made that attitudes and perceptions are at least as important. Based on a recently completed pilot study, the authors propose several areas for research to clarify not only what but also how attitudes and perceptions would be usefully assessed.

Keywords

research ethics; responsible conduct of research; education; attitudes; perceptions

After 25 years, despite increasing requirements and programs for responsible conduct of research (RCR) education (National Institutes of Health [NIH], 1989, 1992, 2009), there is little systematic evidence that such teaching has a meaningful impact (Kalichman, 2009, 2013a). Merely having requirements to provide RCR education begs the question of what we hope to accomplish. Unfortunately, there is little evidence of coherence in goals for teaching RCR (Kalichman, 2013b; Kalichman & Plemmons, 2007; Plemmons & Kalichman, 2007, 2013).

Education theorists have proposed a wide variety of taxonomies or frameworks for thinking about what outcomes might be considered. One of the most influential taxonomies is that of Bloom, Engelhart, Furst, Hill, and Krathwohl (1956), who proposed dividing educational objectives into three domains: cognitive, affective, and psychomotor. The cognitive domain includes what we know (knowledge) and know how to do (skills), while the psychomotor domain references motor skills. Both of these domains define objectives that are readily a subject for testing, but only the former is relevant to the teaching of RCR. The third domain, affective, is summarized as including much more diffuse characteristics such as “interests, attitudes, appreciations, values, and emotional sets or biases” (Krathwohl, Bloom, & Masia,

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1964). This domain is particularly intriguing from the perspective of RCR education because it is presumably a prerequisite for someone to consider applying their learned knowledge or skills. It should also be noted that the cognitive and affective domains have been framed broadly as “abilities” (Institute of Medicine, 2002; Mentkowski & Associates, 2000): “Abilities are complex combinations of motivations, dispositions, attitudes, values, knowledge of concepts and procedures, skills, strategies, and behaviors” (Mentkowski & Associates, 2000, p. 10). That said, despite the likely importance of affective components, separating them out from one another, and being clear about the dynamic relationship between all the elements of “abilities,” is likely to be challenging, if not impossible. For example, does one have an interest in something because of a positive attitude or appreciation for that thing? Or do they have a positive attitude or appreciation because of a preexisting interest? And how does a positive attitude influence the acquisition and practice of knowledge?

Although RCR requirements were presumably driven by concerns about research misconduct (Kalichman, 2013a), attempts to assess the impact of RCR education have emphasized outcomes best characterized as knowledge or skills. Statistically significant outcomes have been demonstrated in both cases, but these tend to be modest (e.g., Antes et al., 2010; Powell, Allison, & Kalichman, 2007). However, at least two studies (McGee, Almquist, Keller, & Jacobsen, 2008; Plemmons, Brody, & Kalichman, 2006), based on self-reports, and using relatively open-ended qualitative and some quantitative measures, suggest that RCR education can have a profound impact on most students, but that what is important for one is not necessarily the same for another. For example, Plemmons et al. (2006) found that when respondents were asked about what they had gained from their courses, many cited specific topics (e.g., authorship, conflicts of interest), a substantial number noted that they had learned how to “avoid potential misconduct or recognize misconduct,” and others reported an increased appreciation of ethics in general (e.g., “reminder that ethics is important/relevant”). More importantly, embedded in these self-reports is the possibility that what is often most important are changes that would best be placed in the affective domain: attitudes, perceptions, beliefs, and so forth.

To test the hypothesis that educational programs positively influence attitudes and perceptions, graduate students, postdoctoral researchers, and medical students were polled before and after taking research ethics courses and workshops taught by faculty at University of California, San Diego (UCSD; this study is reported in the supplementary online document, available at jre.sagepub.com/supplemental). Although the magnitude of specific changes was small, many group outcome measures were significantly improved by the courses and workshops. It is perhaps noteworthy that overall changes may have been small, in part, because the programs had a significant impact on many individuals, but the nature of the impact varied among individuals (i.e., as described in McGee et al., 2008; Plemmons et al., 2006). These findings are consistent with the proposal that more attention should be paid to attitudes as an important outcome measure for research ethics education. This initial study suggests several lines for further exploration:

1. It would be worthwhile to begin with some open-ended studies, perhaps with focus groups, to better assess the range of changes students and RCR

teachers each perceive to be important outcomes for RCR education programs. While those changes can be expected to be numerous and diverse, it is likely that some themes will be identified both as recurrent and important. It might be useful to attempt separating those themes into distinct categories (e.g., attitudes, perceptions, beliefs, etc.), but, perhaps at least as important, will be to be clear about particular outcomes (e.g., an increased percentage of students report that continued learning about RCR is an important part of a well-grounded career in research).

2. Because previous studies, as well as this study, suggest that what is important for one student may be less important for another, it is essential that studies be designed to assess individual changes. The present study ran into logistic challenges, so more thought is needed about how to better match student pre- and post-course changes in responses, while still protecting individual confidentiality. For example, rather than assigning numbers to individual students, as was done in this study, it might be better for students to generate their own identifiers from information that will be known to them, but not others. This should more reliably allow pairing of their matched "I.D." in pre- and post-course surveys, but with little or no risk that their confidentiality would be breached.
3. Another direction for further study is to examine those statements that elicited the strongest evidence for positive changes in attitudes and perceptions. For example, a particularly strong and positive impact was found for two statements involving pre-paredness to address research misconduct by whistle-blowing.
4. It may be worth examining further those cases in which student attitudes were worrisome. For example, and ironically, despite self-reports of a better understanding of how to address research misconduct, this study identified a small but statistically significant increased agreement with the statement that it is "a bad idea to report research misconduct." This raises several questions. Did the teaching approach favor this conclusion? Did students misinterpret the intended meaning of this statement? Did those individuals who felt better prepared to address research misconduct differ from those who maintained that it is a bad idea to report research misconduct? Although the long-term goal may be to create an instrument useful for assessing the impact of an individual course, getting good answers to questions such as how a particular statement was interpreted will require focus groups or interviews to be sure that questions are sufficiently clear.
5. If research better clarifies topics worth assessing, then it may be of interest to develop measures that would be generalizable. At that point, it may be appropriate to give more attention to questions of validity (i.e., To what extent do the questions or statements address issues that are of interest?)

and reliability (i.e., To what extent do the questions or statements result in consistent answers from similar samples of trainees?).

Taken together, these preliminary studies of attitudes and perceptions are not intended as evidence that such measures are preferable to assessments of knowledge or skills, but hopefully they will help prompt further consideration of that possibility, as well as an acknowledgment of the complicated relationship between attitudes, beliefs, and practice.

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Biographies

Michael W. Kalichman is the founding director of the University of California, San Diego (UCSD) Research Ethics Program and has worked in the research ethics field for more than 20 years. In 1999, he created the first version of a web-based resource to help institutions develop programs of instruction in the responsible conduct of research (<http://research-ethics.net>). He leads National Institutes of Health (NIH)–funded and National Science Foundation (NSF)–funded research on the goals, content, and methods for teaching research ethics. He was responsible for the design and oversight of this research, supervised data collection, conducted the data analyses, and wrote the first draft of the article.

Dena K. Plemmons has been teaching and conducting research in research ethics for the past decade, having made a mid-career shift from anthropology. She co-directed with Kalichman the Resources for Research Ethics Education website (<http://research-ethics.net>) for several years, and now works both with the Research Ethics Program at UCSD and as Director of the Division of Research Affairs at San Diego State University. She also leads a National Science Foundation (NSF)–funded research project on standards of authorship in international collaborations. She collaborated with Kalichman on the design and conduct of these studies as well as review of the data analysis and writing of the article.

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