What Would Get You in Trouble: Doctoral Students' Conceptions of Science and Its Norms

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Undergirding the academic enterprise is a web of assumptions about how the members of the academic community should conduct their professional lives. These assumptions are expressed in ways ranging from the most explicit directives (legal, institutional, contractual) to the implicit, taken-for-granted understandings that facilitate everyday interactions among members of the profession. They constitute the normative underpinnings of the academic profession.

Braxton and Bayer define norms as "shared beliefs within a particular social or professional group about behavior expected or desired in a given situation or circumstance" (1). In the academic context, the four norms that Robert Merton (2) identified in his 1942 analysis–universalism, communality [to use Barber's (3) term], disinterestedness, and organized skepticism–have framed much of the subsequent research. They figured prominently in Zuckerman's seminal analyses of the social system of science (4, 5). They are also reflected in Mitroff's (6) "counternorms", and they together capture most of the considerable literature that Braxton (7) compiled on the subject of norms.

Others, however, have argued for a more complex understanding of norms. Mulkay, for example, has claimed that norms are best understood as ideologies or "evaluative repertoires" (8). That is, norms constitute a kind of standardized narrative that academics use to describe and evaluate behavior and to prescribe responses to certain behaviors (8). Ajzen and Fishbein have described the significance of "subjective norms" that reflect what others, who are important to an individual, think he or she should do (9). From this perspective, neither an abstract normative system or an individual's own internalized norms are as important as the individual's understanding of others' expectations. Finally, Braxton and Bayer have demonstrated how a combination of inductive and survey-based strategies could uncover a complex set of norms in collegiate teaching (1).

The present study takes a different approach to the norms of the academic profession, with corresponding implications for the design of the study. First, it emphasizes the implicit over the explicit, on the assumption that implicit norms can be particularly powerful in shaping behavior. This study therefore relies on narrative descriptions of norms, instead of on a particular formulation of the normative structure of academia. It is rooted in the proposition that more attention needs to be paid to understanding science and its ethical aspects from the "inside out," that is through the experiences of scientists themselves (10-12). It therefore responds to Braxton's call for study of norms "expressed in the words of the respondents rather than in a priori definitions of possible norms" (7).

Second, it assumes that norms of a group are particularly salient to newcomers during a socialization period (13). The data for this study accordingly come from first-year doctoral students, who are encountering professional norms in intensive ways. Their experiences are likely to produce

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"contrast" in the gestalt sense through the process of "sense-making", which highlights the normative insights they acquire (14).

Third, the study assumes no necessary match among students' understanding of the broad norms of the academic profession, the norms that they have internalized and view as most salient, and the behavior of professional colleagues. This study therefore explores levels of consonance and dissonance that students perceive among these three phenomena.

Fourth, this study relies on Durkheim's useful proposition that norms are recognized when they are violated (15). The questions used in this study to elicit students' views of norms, therefore, ask students to contrast their views of general academic norms, as well as the norms to which they subscribe, against the behavior of their colleagues.

Methods

These parameters gave shape to the current study, which is part of a broader project on doctoral education, the Academic Life Project, funded by the National Science Foundation (Grant number 9408S08622). Participants for the current analysis were 30 first-year doctoral students in seven science and social science disciplines at a major research university. (The project will eventually involve over 100 interviewees and will be longitudinal.) Semi-structured interviews of approximately a half-hour yielded narrative data on norms and related topics.

A series of questions in the interviews asked students to consider and comment on relationships between academic norms and behavior (Do you see any conflicts between what people think or say you should do and the way work is actually done?), between their own perspectives and behavior (Do you see people around here acting contrary to your advice [to doctoral students on how to avoid serious mistakes]?), and between their own normative perspectives and academic norms (Are there any ideas or rules about how you should do your work that you don't agree with?). These questions highlighted students' understandings of academic research as a social enterprise whose membership they are entering. Those who articulated a more complex normative perspective showed greater awareness of the social aspects of the scientific enterprise and a more constructivist approach to knowledge development in the sciences. They were also less troubled by dissonance between behaviors and norms, recognizing the inevitable roles played by mistakes, errors of fact and of judgment, and mid-course corrections.

Results

Students' conceptions of norms that underlie their work are presented here in terms of the three contrasts identified above. First, students' conceptions of general academic norms are described in light of the behavior of their colleagues. Then the norms to which they subscribe are seen in contrast, again, to colleagues' behavior. Finally, what they understand to be academic norms are contrasted to their own normative orientations.

Correspondence between academic norms and behavior. The first comparison investigated is between students' conceptions of the norms of their fields and the behaviors of those around them. The interview question was, "Do you see any conflicts between what people think or say you should do and the way work is actually done?"

Approximately two-thirds of those interviewed saw no conflict between prescribed and actual behavior among their colleagues. Most saw no disjuncture; a few were more definite: "No, I mean, an emphatic no with the faculty," and, "They're pretty straightforward, and they'll pretty much hold true to their word." Two students noted that, while they were not aware of conflict between norms and action, they did not really know enough about what people were doing in the department to comment generally about people's behavior; as one put it, "I'm not privy to a lot of the goings on of the department."

Five students noted particular areas of disjuncture between norms and behavior. One mentioned safety rules:

> We all have to go to this safety training before we are allowed to go in the lab. It's just kind of a refresher course every year. And then ... they always say practically nothing is supposed to go down the drain. And sometimes stuff does. But we're not even supposed to put things like ... a simple rinsing agent down the drain ... but it happens all the time.

This student went on to affirm the importance of the safety rules for two reasons: first, that safety supports proper procedures ("if you don't do it right, it doesn't work"), and second, not following these rules is dangerous ("if you don't follow the rules in terms of safety, in terms of

correct procedure, usually that means that the chemist should not work in the lab").

A second point of conflict observed by a student is in admissions procedures for the graduate students in the department. From the vantage point of a place on the departmental graduate admissions committee, the student saw that, though the department touts a highly selective admissions policy, the process is influenced in political ways by influential individuals on the faculty. The result is that the department admits less-qualified people than its policy would suggest.

The third area of dissonance between prescribed and enacted behaviors is in research. One psychology student focused on experiments:

> We talk a lot about being a very experimental field and it's all about experiments, but it's so difficult to run experiments now with getting through the IRB [Institutional Review Board] and getting subjects.... [I]t's so much easier to pass out some sort of survey or some sort of questionnaire. And so we talk about the experiment and how wonderful it is, and then we don't do it.

Two other students also mentioned research, but in a different way. They clearly understood the faculty's focus on research, but they did not see faculty providing enough support to students to get them started on their own research. As one put it, "I think [it's] the absence of direction which is noticeable, which stands out. And I think some students have felt ... you know, they're sort of cast adrift, in some sense, and left to figure everything out for themselves." The other student described her frustration with the research imperative in light of the same kind of lack of direction:

> There almost seems like there's kind of pressure or an expected norm within the department itself that we get involved with research. Yet, in our specific discipline, in our area, there hasn't been very much guidance or, you know, pressure to do that.... I have met with my advisor twice on my own volition — and going to see her and saying, "Okay. Maybe it's time for me to get involved in research," and each time she has not had a specific project that really had any place for me to start.... And I just kind of walked away from it feeling like, just thinking that she had just so much going on already — and really, you know, like almost I kind of felt like I would be a burden to get involved at that point.

Correspondence between subscribed norms and behavior. The second comparison addressed in the interviews is between the norms to which students themselves subscribe and the behavior of their colleagues. Here the question is whether or not students see people around them acting contrary to the way the students think they should act. Employing Durkheim's view that norms are best recognized when violated, the interview protocol invited students to consider what they would advise incoming doctoral students to do to stay out of trouble in their work (15). Responses demonstrate students' personally held beliefs about how first year students should act, identified here as subscribed norms. Students were then asked, as follow-up questions, "Do you see people around here acting contrary to your own advice? What are they doing?"

Responses to these questions fall into three general categories: tasks, relationships, and ethics. Most of the responses addressed the work of graduate students. Several talked about the need for students to take responsibility for their own work and progress. As one put it, "I mean, in our department, it's a problem both with the students not taking the initiative to getting all of their requirements and prelims done and also, with our department, no one says anything if it takes you longer." Others disapproved of student colleagues' not getting their work done, taking too much time to get through their work, or abandoning the work altogether. All of these students clearly demonstrated a strong commitment to hard work and a sense that some others around them acted contrary to this subscribed norm.

Not only do students believe in getting the work done, but several mentioned the need to do independent work. One science student complained,

> I think one of the biggest mistakes that they could make is to do something that is not independent. I see a lot of people that are working with their advisors and really, ... I don't know the best way to describe this without sounding mean, but they just have no interest of their own. They are just a, like a little off-shoot of their advisor, like a little worker.... They're not independent at all.... You know, what they do is what their advisor says, and I think that's a really big mistake, because one day you can look back and be, like, "Oh. This isn't what I wanted to do at all, and if I had the choice I would have done it completely differently."

Taking the initiative for an independent stream of

inquiry is a step beyond responsibility for getting work done, a step that some, but not all, first-year graduate students take.

One student's story about a graduate-student peer illustrates her struggle with maintaining her independence in inquiry. The peer in question is someone she respects.

> But the problem is, he comes from a different undergraduate background, not an American system. He's from a different country, where being the best in the class was very much recognized and very much rewarded, and so he was the best in his class. And so he came here.... Everyone has been asking him for help, and so he would do all of his work way in advance — which was commendable — but then he would — instead of working and taking other people's suggestions and trying to integrate everything when we were working on problem sets — he would be, like, "This is right. I have the answer." And usually he did. Usually he was right. But it was annoying to work with him.... There were times where even though I knew I would probably get a better grade if I worked with him, because he would have the answers, I wouldn't want to do it. And also, you don't want the answers given to you.

Comments about relationships comprise the next category of responses about the contrast between subscribed norms and behavior. Students demonstrate clear ideas about how people should behave toward each other in the graduate school setting. Some mentioned the importance of having an advisor with whom the student can work. They described examples of advisors who were not supportive of their students. This behavior that ran contrary to their beliefs about how advisors are to act met with very strong negative reactions.

Other respondents showed a keen sense of the importance of making a good impression and expressed dismay that some of their peers did not appear to understand this point. A science student said,

> I know there's some people who, whenever there was an exam, they just didn't go into the lab all the time, and I don't think it left a good impression on some people who were working in the lab, working around them.... So if you don't seem very serious about your lab work, then they — someday when you have to go to them for advice or something — they're not necessarily drawn to give you as much time and make as much of a serious effort.

Another student described impression-management in blunt terms as a quid pro quo:

> I guess, just like, you have to do things for people so they'll do things for you later. I guess that doesn't even sound that bad. But more like — I can't think of a particular example — but just basically doing things that you don't want, because you know later it'll get you something you do want.

Not only are students aware of the work imperative, but they are also aware of the need for others to know that they subscribe to it. As the quotes illustrate, the norm bears both sanction and reward. This norm illustrates students' movement toward full acceptance into the academic social world.

The third contrast between behavior and students' own normative orientations was in the area of ethics. Those who mentioned ethics said that they had seen no instances of people acting contrary to what they themselves understood to be appropriate behavior. One said, "I've never seen anyone falsifying data, which is very, very good. And I believe that we don't have the second problem, fishing for data. At least in my group, we don't have that." Another noted, "I haven't seen, I haven't heard of anybody lying about stuff or trying to falsify results." This science student went on to describe how important it is for students to acknowledge mistakes, so that they are not interpreted as more serious offenses: "Everybody makes mistakes.... Everyone's pretty understanding of when your experiments don't work or when you did a stupid mistake or whatever."

The normative understandings that the doctoral students reveal through their comments on the contrast between what peers should do and what they are actually doing thus center largely on their work and their relationships with colleagues. That is, they appear attuned to both functional and social norms of academic life. The next step is to contrast their own normative orientations to what they perceive to be the general norms of their fields.

Contrast between academic norms and subscribed norms. Students' perceptions of prevalent academic norms may not match their own ideas about how they should conduct themselves in the academic world. As both academic norms and subscribed norms can be brought into focus by contrasting them against behavior, so they can be clarified by comparing them to each other. The relevant question on the interview protocol was, "Are there any ideas or rules about how you should do your work that you don't agree with?"

The task-related points of disjuncture fell generally in the category of competition and its attendant work pressures. A student in a social science department commented,

> Everyone's competing for jobs in academic environments primarily.... And I guess what that means for many students is they have to adapt to a competitive type of atmosphere and in some cases be more competitive than they would like to be in order to further their goals further on. And I think that might be disheartening for some students.... And I think all of the students ... try to be good-natured about the entire thing, but I think the pressure of continuing to get as many publications as you can is the reality that dawns on a lot of students — something they didn't anticipate, necessarily, early on.

Another student talked about competitive pressures to publish in terms of "the whole production thing" and the "assembly line production attitude."

Several students complained about the work loads they bear in terms of the mismatch between their professors' views on how much work they should do and their own. A science student talked about peers who never take time off and "work themselves to death" to live up to what they perceive as the standards of work in the field; the student said he would never do that. Another commented on prevalent norms for the quality of a dissertation. In this students' relatively new field in science, it was generally expected, 10 or 20 years ago, that each dissertation would open up a completely new field of inquiry; now, the expansion of the discipline and the far greater competition due to a more crowded field make it much harder to have such an impact through doctoral work. The student noted, though, that normative understandings in the field had not changed in response.

Another point of contrast related to competition is the matter of independent work. Several students mentioned that at least some of their professors require independent, as opposed to collaborative, work on assignments in graduate courses. Many of the students were previously socialized to collaborative norms, and they found the professors' insistence on individual work counterproductive. Here students' normative orientations run counter to the academy's norms of rewarding people on the basis of individual achievement and independent contributions.

Beyond students' attention to task-related disjunctures between academic and espoused norms, the most striking pattern in students' responses is their uncertainty about academic norms in general. Most of them are keenly aware that norms vary by discipline or even from one research group to another. For example, one noted, "Everyone has such different views about how to do things." Another put it this way: "Each professor sort of has their own research policy. And that's academia. They have the freedom to make up the rules of their group, within certain bigger boundaries that the school sets." Yet another respondent said, "I don't think there are very many rules about how we should conduct our research, other than the whole basic 'Be ethical and stuff.' I don't observe very many rules about how we should conduct the research." This student went on to mention that she might change her mind as she got further into her research, when she would have to remember all the rules about where to put commas — thereby illustrating just how far she had to stretch to think of general norms of the field.

Perhaps some of the uncertainty that students expressed about academic norms is related to the ways in which such norms are communicated. The student quoted above who mentioned each professor having his or her own research policy went on to say, "Ideally, it should be talked about as a research group as a whole, but it seems to me that a lot of stuff is just sort of telephone, where one person tells another person, and that person tells the next person." Another talked about his reluctance to ask people how things should be done in the lab:

> The approach towards how you learn your way around the lab is you just go in there and you do it. As far as being taught or having anyone specifically to show you around, you really don't, because everyone in there is really, really busy, because they are doing research. And they don't want to take time out of their research to show you how to work [a machine], because it's such a simple thing to them, and they get really frustrated and impatient with someone who is just learning how to use it. And so, generally you just have to go in there and learn on your own.... I almost felt afraid to go to other people in the group with my stuff, because I don't want to waste their time and I don't want to feel stupid either.

Of course, some students were unable to identify any dissonance between the norms to which they subscribe and the more general academic norms

as they see them. One person wryly commented on the thoroughness of his own socialization to the general normative structure of the field: "Maybe I've been just so well trained that I don't know anything anymore."

The results in this section show, as did the earlier results, that students' normative conceptions are dominated by functional or task-related norms. They also show a general awareness among students of social norms, though their conceptions of norms for interpersonal relations are not as fully developed as their views on functional norms.

Discussion

The findings presented here contribute to our understanding of doctoral students' initial normative orientations. Students' conceptions of normative imperatives are relevant to policy initiatives that are currently receiving a great deal of attention. The federal Office of Research Integrity recently announced a major new initiative that will focus on the promotion of the responsible conduct of research. The American Educational Research Association is currently preparing to publish a book that will direct attention to the AERA Code of Ethics and its use. Dozens of other academic associations are writing or revising their codes of ethics, and virtually every major research university has addressed its institutional policies on ethics and misconduct in the past five years. The federal government is seeking to expand its requirements for formal training in ethics beyond those for trainees covered by National Institutes of Health funding. Most of the attention to expanded training in ethics and related issues focuses on graduate students and other newcomers to the academic profession.

Continued self-regulation by the scientific community depends on the ongoing renewal of normative conceptualizations that, through their generational evolution, continue to reflect the expectations of society for science. Most of the emerging initiatives are driven, however, by a sense of urgency or by federal regulations and directives, without attention to doctoral students' understanding of science, academic life, and the norms of their disciplines. Neither do they reflect ways in which newcomers interact with and shape the normative bases of their fields (16).

This study serves as a window onto the normative assumptions of science, but it furthermore suggests ways in which those norms can be communicated within and beyond the scientific community (17, 18). The doctoral students interviewed reveal the norms of science as they understand them, during a period when they are intensely and reflectively face-to-face with the way science works. They are the future membership of the scientific community, but they are also current participants in the enterprise, struggling with their own ideas of how they should behave as scientists.

The results of the interviews demonstrate intriguing patterns of dissonance among the three phenomena examined. The interview responses show that students' normative conceptualizations are dominated by functional (task-related) norms, as we might expect from earlier work on anticipatory socialization that emphasizes survival in the graduate or professional-school setting (16). Augmenting the functionalist perspective, however, are emergent conceptualizations of social and ethical norms.

The inchoate nature of first-year students' personal normative orientations suggests that approaches to socialization of doctoral students to academic life, particularly in the areas of ethics and related issues, may overestimate the extent of students' understanding of the academic system, the nature of research, and the place of individual academics in the broader context of research. Students interviewed here showed very little awareness of their disciplines, beyond their own work, or of the higher education system, beyond their own departments. The imperatives they identified have to do generally with the work at hand and the people with whom they interact.

Socialization to the field and to the normative bases of research in a discipline should be grounded in the academic world with which these students are familiar, while at the same time introduce them to the broader academic environment. The theme of individual, independent work that runs through these interviews suggests that students might not be subject to as much osmotic group socialization as many faculty assume. It is also clear that the channels by which socialization to the normative aspects of academic life are communicated are primarily informal. Calls for more formal, more deliberate approaches to normative socialization find support in the vagueness with which students conceptualize the norms that underlie academic research.

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