Mentoring: Learned, Not Taught

Identifying Challenges

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Becoming a good mentor takes practice and reflection. Each of us tends to focus on certain aspects of mentoring, which we choose for many different reasons. Sometimes we focus on issues that were important to us as mentees, those we think are hard or uncomfortable to deal with (making us worry) or easy to handle (consequently making us feel good about our mentoring), or areas in which a mentee needs help. But few of us think about the diversity of issues that comprise the full mentoring experience, at least not when we are just starting out as mentors. By broadening our approach, and looking at mentoring in a systematic way, we can become more effective mentors more quickly than if we just confront the challenges as we stumble upon them. Some of us take decades to recognize all these facets of mentoring; others of us would never discover them on our own.

This chapter focuses largely on mentors of undergraduates and graduate students in a research lab, but many of the same issues arise in mentoring colleagues and others outside the lab. Each of us is likely to engage in numerous relationships as mentors and mentees throughout our careers and each relationship will be enhanced by what we learned in the last one. Reflecting on the following areas as your mentoring relationships evolve may help you avoid some common mistakes and hasten your arrival at a mentoring style and philosophy that is your own.

Mentoring principles, not practices, are universal

Although no one can provide formulas, practices, or behaviors that will work in every mentoring situation, there are some principles that should always guide mentoring relationships. It's a good idea to ask yourself periodically whether you are adhering to the basic principles you believe in. The values that most scientists would agree are inviolate in any mentoring relationship are: honesty, kindness, caring, and maintenance of high ethical and scientific standards. As you consider the differences among students, and design your mentoring strategies to serve them best, examine your values.

Mentees are different…from each other and from us

The diversity that our students bring us sustains the vibrancy of the scientific community and of science itself. Although most of us believe this in the abstract, dealing with people who are different from us or from our mental image of the ideal student can be frustrating and baffling. Those of us who are very organized, punctual, polite, tidy, diligent, smart, socially adept, witty, verbal, creative, confident, and tenacious probably value those characteristics in ourselves. When confronted with a mentee lacking any of them,

we may wonder if they are cut out to be a scientist. Moreover, cognitive styles (the ways that we learn or think about problems) are often what scientists value most highly in themselves, but cognitive styles are idiosyncratic; thus, being a good mentor necessitates accommodating a style that differs from our own.

After we have worked with a student for a few weeks or months, we may begin to see performance issues that didn't emerge immediately. Some issues are small, some global. We may find that it drives us nuts that a student likes to work from noon until midnight, whereas we prefer working in the early morning. Or a student may seem unable to articulate the objectives of a research project even after substantial discussion and reading. Or the student may seem unable to get a product from PCR. Or come up with an idea of their own. There are no simple prescriptions for what to do. The following sections offer some questions for reflection and sample situations to provoke thought about dealing with these very complex, very human mentoring challenges.

Building confidence

Probably the most important element of mentoring is learning that performance is the product of a complex interaction among innate ability, experience, confidence, education, and the nature of the performance environment. We have all had the experience of saying something eloquently and smoothly in one setting and then stuttering our way through the same words in a stressful setting. We have the ability to formulate the idea and express it well, but the stressful situation affects our performance. This happens to people in so many ways. If we are told as children that we are very smart, we develop confidence in our intelligence. In contrast, if we are told that we can't do science because we are female or a member of the wrong ethnic group, we may have lingering doubts even when we reach the highest levels of achievement. If we come from a family in which we are the first to go to college, we may feel that we just don't quite fit in when we are in the academic environment. All of these insecurities will surface at the most stressful times—when things aren't going well in the lab, when we are getting ready for exams, when we receive a poor grade, when our grants aren't funded and our papers are rejected. Those are the times when a mentor can make a difference. People with stores of confidence fall back on internal reinforcement during the rough times. The voice of a parent or teacher from the past saying "you can do it" may get them through. But people who haven't received those messages may need to hear them from a trusted mentor or colleague in order to keep going.

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The challenge for many of us is not to fall into the habit of measuring every student against our own strengths. Most of us have the impulse to think, "I never needed so much support or coddling, why should I have to give it to my students?" or "Can they really make it in science with such a need for reinforcement and coaching?" But the job of a mentor is to set high standards for mentees and then help them meet those standards. One of the most satisfying parts of mentoring is the frequency with which students surprise us. So often we hear a colleague say that, although they pushed a student to be great, it was a surprise when the student actually became great. A mentor may help a student develop the skills to be an outstanding scientist, but the most important message a mentor can ever send is that they have faith that the mentee will succeed. That faith, followed by the mentee producing high-quality science, will generate confidence.

Judging aptitude—can we?

Assessing aptitude has its own suite of challenges. Because of the intersection of social, psychological, experiential, and innate factors that affect our intellects and our ability to perform, it can be difficult to judge a student's ability to be a scientist. As mentors, it is our responsibility to examine the factors affecting a student's performance. A few questions we should ask include:

- Are my expectations reasonable for a scientist at this stage?
- Has this student had the training necessary to succeed at this task or in this environment (and could additional formal training improve their performance)?
- Does the student understand what is expected?
- Is this student disadvantaged in some way that makes the situation more difficult than it is for others?
- Is the student experiencing a stress—inside or outside the lab—that is affecting their performance?
- Might the student perform better in another environment?

Determining whether your expectations are clear and appropriate and whether a student has the necessary preparation can be accomplished through a dialogue with the student. The solutions to these issues should be agreed upon and implemented jointly. If the remedies do not result in satisfactory performance, then other actions may need to be taken.

Judging aptitude—impact of stress

People under stress cannot work at their highest potential; it may be impossible, therefore, to judge a stressed student's aptitude for science. Stress derives from many sources, some of which are obvious, some not so apparent The tension that we experi-

ence around deadlines is perceived by and understandable to most of us. But some students experience difficulties that may be invisible to us, and maybe even to the students themselves. Chronic illness and pain, financial problems, family responsibilities such as taking care of children or aging parents, or simply being different from the people around us can cause debilitating stress.

Some stress may come from past experience with prejudice. A student may worry that others will treat him differently if they find out that his parents are migrant farm workers, that he has epilepsy, or that he considered becoming a priest before choosing science. The student may have confronted bigotry in other situations that generated these fears and made him ultrasensitive to perceived or real intolerance. The student may be encountering prejudice in the lab that you may or may not perceive. There may be cliques from which he is excluded, jokes about his "difference" that may be intended to hurt him or are inadvertently hurtful. Discrimination experienced outside the lab or even off-campus might affect the student's ability to work. A person subjected to prejudice undergoes physiological changes in many different organ systems that translate into cognitive changes that influence the ability to focus, concentrate, and be creative. Even the fear or anticipation of such attitudes (known as "stereotype threat") can have crippling effects.

If you suspect that your student is suffering from stress that is affecting their ability to do science, consider discussing it with them. If the student has not discussed it with you, don't make assumptions or plunge in with aggressive questioning unless you know them very well and have established a trusting relationship. Instead, you can just provide an opening for the student to seize.

QUESTIONABLE QUESTIONS (unless you have already developed a trusting relationship)	PROBABLY SAFE OPENERS
"Are you having marital problems?" "Did you break up with your girlfriend?"	"You seem a little down these days. Is everything OK?" "You're looking tired. I hope you're feeling OK."
"Are you spending too much time at the nursing home with your mother when you should be in lab?"	"Is your mother recovering from the stroke? (assuming the student had confided in you about the stroke)"
"What's it like to be a black man in this town, anyway?"	"I can imagine that being black in this very white environment might be difficult at times. If you ever want to talk about it, I'm here."
"It must be hard to explain what you do to your family with no college graduates!"	"I was at a dinner with a bunch of lawyers the other night and, wow, did I struggle to explain what our lab does. Have you found any good analogies that lay people can relate to?"
"You're so attractive, you must get a lot of attention from the guys in the lab. Is it OK being the only woman on the 12th floor?"	"Are you comfortable in the lab? If there are ever conflicts, problems, or issues that get in the way of your work, will you please let me know what I can do to help?"
"Do you want to use my office during the day to pump milk while you're breastfeeding?"	"I can imagine that there are lots of logistical and practical issues that will arise when you have the baby. Please let me know if there is anything I can do to make things easier for you."
"Getting here for your graduation must be hard for your parents on a trash collector's salary, so do you want to use some of my frequent flyer miles to get them plane tickets?"	"I know you are counting on your parents being here for graduation. If there is anything I can do to help with their visit, let me know."

The inappropriate questions in the table are all intended to be kind and helpful, but may call attention to something that a student doesn't want singled out, causing embarrassment or awkwardness. If your students don't want to discuss their family, race, or nursing habits with you, respect that. The more appropriate questions attempt to provide an opening that the student can take or decline. These questions express caring and show that you notice them as human beings, without intruding into private places where you might not be welcome.

Judging aptitude—innate ability

Many of us are frustrated that our students don't seem as smart as we think they should be. People mature intellectually at different rates and all of the factors discussed in the previous sections can affect apparent intelligence. It is also important to look around at people who have advanced in science and notice the characteristics that got them there. Some are simply brilliant, and the sheer power of their intellects has driven their success. But most have many other attributes that contributed to their success. Most highly successful scientists are extremely hard working, terrific managers and motivators of other people, colorful writers, and charismatic people. The fortunate (and often most successful) scientists have large doses of all of these traits, but many scientists have a mixture of strengths and weaknesses. Some are poor managers, others are unimpressive writers, and,

Case 1.

"I had an undergraduate student in my lab who didn't seem very bright and I doubted that he would make it as a scientist. I encouraged him to move on. The next time I saw him, he was receiving an award for outstanding undergraduate research that he did in another lab. I was surprised. The next time I encountered him was when I opened a top-notch journal and saw a paper with him as first author. I was impressed. Next I heard, he had received his PhD and was considered to be a hot prospect on the job market.

A couple of years later, I had a graduate student who was incredible bright and a wonderful person, but wasn't getting anything done. I had tried all of my mentoring tricks, and then borrowed some methods from others. In a fit of frustration, I encouraged the student to take a break from the lab and think about what to do next. While she was taking her break, she received an offer to complete her PhD in another lab. She did, published a number of highly regarded papers, landed a great postdoc, and is now a well-funded faculty member at a major research university.

These experiences have made me realize the power of the "match." The student, the lab, and the advisor have to be well matched, and all fit has to come together at the right time in the student's life. I can't be a good advisor to all students, and where I fail, someone else may succeed. It reminds me to be humble about mentoring, not to judge students, and never predict what they can't do. Happily, they will surprise you!"

amazingly, some don't seem all that smart or creative, yet their labs turn out great work because of their ability to create a highly effective research group.

There is room for lots of different kinds of people and intellects in science. A student who frustrates you with an excruciatingly linear or earthbound style of thinking may develop into a reliable and indispensable member of a research team. A student who can't seem to keep track of details in the lab may turn out to be a terrific professor who generates big ideas and relies on lab members to deal with the details. Before you judge a student, consider the diversity of people who make up the scientific community and ask yourself whether you can see your student being a contributor to that community. And ask yourself what each of those members of the community was like when they were at your student's stage of development.

Fairness: monitor prejudices and assumptions

Most of us harbor unconscious biases about other people that we apply to our evaluation of them. Few of us intend to be prejudiced, but culture and history shape us in ways that we don't recognize. Experiments show that people evaluate the quality of work differently if they are told that a man or a woman, a black or a white person performed the work (see "Benefits and Challenges of Diversity" in the next section for a detailed discussion of this research). We can't escape our culture and history, but we can try to hold ourselves to high standards of fairness and to challenge our own decisions. Regularly ask yourself if you would have reacted the same way to a behavior, a seminar, a piece of writing, or an idea if it was presented by someone of a different gender or race. When you evaluate people, make sure you are holding them all to the same standards. When you write letters of recommendation, check your language and content and make sure that you are not introducing subtle bias with the words you use or topics you discuss (see the next section for research on letters of recommendation for men and women).

Changing behavior

When we discover that a student is disorganized, introverted, or chronically late, what should we do? How much do we accommodate these differences to encourage diversity in our research community and when does accommodation become bad mentoring, hypocrisy, or a violation of the principles that we have agreed form our mentoring foundation? When is a behavior something that other students should tolerate and when does it violate the rights of others in the lab? These distinctions are tough to make, and we are likely to arrive at conclusions that differ from those of other mentors or even from our own judgments at other stages in our careers. Considering a few key questions may help clarify our mentoring decisions.

- Is the behavior creating an unsafe environment for the mentee or others in the lab?

- Is the behavior negatively affecting the productivity or comfort of others in the lab?
- Will the mentee be more effective, productive, or appreciated in the lab if the behavior or characteristic is modified?
- Is the behavior or characteristic sufficiently annoying to you that it interferes with your ability to work with the mentee?

Choose your battles carefully. If your answers to the questions are all "no," you may want to let the situation go. Sloppiness that creates a fire hazard or leads to poor data record-keeping must be corrected, but perhaps a desk strewn with papers, however irritating, can be ignored. A student who is introverted might be accommodated, but a student who is excessively talkative or boisterous and interfering with others' work needs to modify the behavior.

So, if a behavior needs to be changed, what's a mentor to do? If you are lucky, simply making the mentee aware of it may solve the problem. It will help to be directive about the type of change needed and why it is necessary. It is useful to lay out the problem that you are trying to solve and then ask the mentee to participate in developing the solution. If this doesn't work, you may need to use stronger language and eventually use sanctions to achieve the needed change.

LESS EFFECTIVE	MORE EFFECTIVE
"Clean up your bench!"	"I'm concerned that the condition of your bench is creating a fire hazard. I'm sure you don't want to put the safety of the lab at risk, so what can we do to fix the situation?"
"Be on time to lab meetings from now on."	"You know, when you come into lab meeting fifteen minutes late, it's disruptive to the group and makes the person talking feel that their work isn't important to you. Is there some conflict in your schedule that I don't know about or do you think you can be on time in the future?"
"You'll never get anywhere in science if you don't dig in and stick with problems until you solve them."	"You seem to be giving up on solving this problem. I want to help you learn how to see problems through to their solutions, so what can I do to help? I want to work on this because problem-solving is going to be important throughout your career."

Case 2.

"Some issues are stickier than others. I once had a student who would come into the lab every Monday and loudly discuss his sexual exploits of the weekend. People in the lab—men and women—dreaded coming in on Mondays and were intensely uncomfortable during his discourse. No one in the group wanted to deal with it, and most of them were too embarrassed to even mention it to me. Finally, my trusted technician shared with me her intention to quit if this student didn't graduate very soon. I was faced with the challenge of telling the student that we all need to be sensitive to others in the lab and there might be people who didn't want to hear about his sex life.

I was uncomfortable with the conversation for a lot of reasons. First, I'm not used to talking to my students about their sex lives. Second, I was concerned that the student would be hurt and embarrassed that others in the lab had talked to me about his behavior and I didn't want to create a new problem in the process of solving the original one. Third, the student was gay and I didn't want him to think that his behavior was offensive because of this. I wanted him to appreciate that any discussion of sexual experience—straight or gay—was simply inappropriate for the open lab environment. But the student had never told me that he was gay, so I felt it was a further violation of his relationship with other lab members to indicate that I knew he was gay. The discussion did not go well because we were both so uncomfortable with the subject and I had trouble being as blunt as I should have been.

The behavior didn't change. The student finished his thesis and defended it. At the defense, one of the committee members suggested that the student do more experiments, and I detected the beginnings of a groundswell of support for his point of view. I blurted out that if this student stayed one more day in my lab, my wonderful technician would quit, so if he had to do more experiments, could he do them in one of their labs? In the end, everyone signed off on the thesis, the student graduated, and I never published the last chapter of the student's thesis because more experiments were needed to finish the story. I felt that I had weighed lab harmony against academic and scientific standards and have never been happy with how I handled the whole situation."

Some behavior issues raise the questions of personal rights. Is it OK to rule that your students aren't allowed to wear headphones in the lab? That they dress a certain way? That they not put up posters or sayings that are offensive to others? That they aren't allowed to discuss politics or religion in the lab in ways that make some members uncomfortable? That they not make sexist or racist jokes? And whose definition of sexist and racist do we use? How do we balance overall lab happiness with the rights and needs of individuals?

Deciding what to do about problematic behavior may be one of the most annoying parts of being a mentor or lab leader. Many of us just wish everyone would know how to behave, get along, and get on with the science that we are here to do. Unfortunately, behavioral issues can prevent the science from getting done, and they just don't go away. Not dealing with some problems is unfair to the mentee, who deserves to know how he or she affects others, but the behavior must be addressed in a sensitive way to prevent embarrassment and animosity. Another question is, who should handle it? If you are a graduate student responsible for an undergraduate researcher, should you take care of the problem or ask your advisor to deal with it? If you are a lab leader, should you always deal with problems directly or is it sometimes appropriate to ask a member of the lab to tackle the problem diplomatically? These questions have to be answered in context and usually based on discussion with the other person who shares responsibility for the mentee.

Every mentoring relationship is different

Each person we mentor has their own unique set of needs and areas for growth. Use the beginning of the mentoring relationship to get to know your mentee and begin to experiment with ways of interacting. Does your mentee ask a lot of questions or do they need to be encouraged to ask more? Does your mentee respond well to direct criticism or do they need to be gently led to alternative answers or ways of doing things? In what areas do you think you can help your mentee the most—developing confidence, independence, and communication skills? Learning lab techniques and rigorous thinking? Improving interpersonal interactions? Does your mentee demand more time than you can or want to give, or do they need encouragement to seek you out more often? Mentoring relationships are as diverse as people, and they change over time. Monitor the relationship and make sure your mentoring style and habits are keeping up with the development of your mentee and the mentoring relationship.

As you assess progress in your mentoring relationship:

- Find your style—mentoring is personal and idiosyncratic.
- Communicate directly.

- Emphasize in your mentoring the aspects of science that are the most important—ethics, rigorous analytical thinking, risk-taking, creativity, and people.
- Be positive. Remember that people learn what quality is by having both the positive and the negative pointed out.
- Celebrate the differences among students.
- You are shaping the next generation—what do you want that generation to be?

Case 3.

"I am a graduate student in a very crowded lab. One summer, we hosted two students from Spain. The students were great—they worked hard, got interesting results, were fun to be around, and fit into the group really well. The problem was that they spoke Spanish to each other all day long. And I mean ALL DAY. For eight or nine hours every day, I listened to this loud rapid talking that I couldn't understand. Finally, one day I blew. I said in a not very friendly tone of voice that I'd really appreciate it if they would stop talking because I couldn't get any work done. Afterwards, I felt really bad and apologized to them. I brought the issue to my mentoring class and was surprised by the length of the discussion that resulted. People were really torn about whether it is OK to require everyone to speak in English and whether asking people not to talk in the lab is a violation of their rights. Our class happened to be visited that day by a Norwegian professor and we asked her what her lab policy is. She said everyone in her lab is required to speak in Norwegian. That made us all quiet because we could imagine how hard it would be for us to speak Norwegian all day long."

An Important Mentor

"One of my most important mentors was Howard Temin. He had received the Nobel Prize a few years before I met him, but I didn't discover that until I had known him for a while and I never would have guessed, because he was so modest. Many aspects of science were far more important to Howard than his fame and recognition. One of those was young people. When he believed in a young scientist, he let them know it. As a graduate student, I served with Howard on a panel about the impact of industrial research on the university. It was the first time I had addressed a roomful of hundreds of people, including the press. My heart was pounding and my voice quavered throughout my opening remarks. I felt flustered and out of place. When I finished, Howard leaned over and whispered, "Nice job!" and flashed me the famous Temin smile. I have no idea whether I did a nice job or not, but his support made me feel that I had contributed something worthy and that I belonged in the discussion. I participated in the rest of the discussion with a steady voice.

When I was an assistant professor, I only saw Howard occasionally, but every time was memorable. One of the critical things he did for me—and for many other scientists—was to support risky research when no one else would. Grant panels sneered at my ideas (one called them "outlandish") and shook my faith in my abilities. Howard always reminded young scientists that virologists had resisted his ideas too, and reviews of his seminal paper describing the discovery of reverse transcriptase criticized the quality of the experiments and recommended that the paper be rejected! Howard was steadfast in his insistence that good scientists follow their instincts. When my outlandish idea turned out to be right, I paid a silent tribute to Howard Temin.

Howard showed support in many ways, some of them small but enormously meaningful. He was always interested in my work and often attended my seminars. When he was dying of cancer, his wife Rayla, a genetics professor, went home each day to make lunch for him. During that time, I gave a noon seminar on teaching that Rayla mentioned to Howard. When he heard who was giving the seminar, he told Rayla to attend it and that he would manage

by himself that day. That was the last gift Howard gave me as a mentor before he died, and it will always live with me as the most important because it embodied everything I loved about Howard: he was selfless, generous, caring, and supportive.

At Howard's memorial service, students and colleagues spoke about how they benefited, as I had, from his enormous heart and the support that gave them the fortitude to take risks and fight difficult battles. Each of us who was touched by Howard knows that he left the world a magnificent body of science, but to us, his greatest legacy is held closely by the people who were lucky enough to have been changed by his great spirit. ”