2015 ELEANOR CLARKE SLAGLE LECTURE

A Career in Inquiry

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MeSH TERMS

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This article, based on the 52nd Eleanor Clarke Slagle lecture given at the 95th American Occupational Therapy Association Annual Conference & Expo, explores the concept of inquiry as the basis for a career and as an activity of daily living. Using the heliocentric theory and the space program at NASA as examples, the broad concept of inquiry is discussed, because it has led to important changes in society over the course of history. The article describes how a career as a clinician–scientist can be grounded in the concept of inquiry and explains how all occupational therapists and occupational therapy assistants can base their own careers in inquiry, using examples from the early history of the profession of occupational therapy and from work by current investigators. Practical suggestions applicable to every clinician are provided.

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Thank you for this extraordinary honor. In particular, I would like to thank the 2014 Awards Committee and my nominator, Kathlyn L. Reed, the 1986 Eleanor Clarke Slagle lecturer. And my thanks to Leonard Sobel for such a nice introduction.

At the 2014 Slagle lecture, I sat in the audience next to an occupational therapist with many years of experience, who told me that at these lectures, she likes to hear big ideas that inspire her. So I hope this lecture inspires her, because her great attitude inspired me. I was also inspired by Jenny Hersh, who is among the next generation of occupational therapists. I hope this lecture inspires Jenny and other students and gives them some ideas to use during their long and productive careers. Jenny will give me some feedback in a few years.

I dedicate this lecture to the memory of my friend and colleague Sheila Mun-Bryce. She was a pediatric occupational therapist whose concern for children and inclination toward inquiry drove her to become a neurobiologist. With her fascination and joy in life, Sheila never stopped questioning and looking for answers. She would have enjoyed the topic of this talk.

A Career in Inquiry

Inquiry is the act of asking for information, the seeking of truth, the asking of questions, both small and large, simple and complex, practical and impractical. Some aspects of inquiry are the types of questions we ask, the ways in which we ask those questions, and the ways in which we use the information we obtain. Inquiry includes research of all kinds, but it is also broader than that. Participating in inquiry has implications for our day-to-day work habits, our careers, and our lives.

The process of engaging in inquiry is as important as the result of the inquiry. A process that is as important as the product—where have we heard that description

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before? It sounds like occupational therapy, doesn't it? Inquiry is a process in which many of us *do* participate, and all of us *can* participate, every day. In other words, inquiry is one of our activities of daily living (ADLs). When we listen to the morning news, when we read the newspaper or our professional publications, when we go to work and ask questions of our coworkers, we engage in inquiry. Inquiry has allowed us to move forward from the reconstruction aides in starched aprons and caps working to help shell-shocked soldiers from World War I (Low, 1992) to professionals who serve in a range of capacities, specialties, and work environments.

Inquiry is a powerful ADL. The ability to engage in inquiry is one of the skills of the human mind that defines us as a species and unites us as people. Over the course of history, people in all parts of the world, in all cultures, speaking all languages, have engaged in inquiry. Inquiry has led to improvements in the comfort of our homes, the speed of our transportation systems, and the ways we access information. We use inquiry when we look for information online, when we use our GPS mapping programs or ask directions when we are lost, when we teach children new skills, or when we take classes to learn something new ourselves. The ADL of inquiry can save lives, scare politicians, shake a church to the core of its beliefs, and change the course of history. By questioning the status quo, engaging in the act of inquiry is essentially subversive. Therefore, engaging in inquiry is an act of courage.

Let us consider an example. Have you ever looked up at the sky on a clear evening and wondered about the twinkling lights in the heavens? People have been doing that for millennia. Early observers looked at the lights, wondered what and where they were, gave them names, and in the absence of real information made up myths to explain them. Most early observers believed that the universe revolved around the earth. Twenty-five hundred years ago, however, one visionary man, Aristarchus of Samos, looked at the lights in the night sky, wondered what and where they were, and dared to suggest a new idea: that the planets revolved around the sun. We now call that idea the *heliocentric theory*.

Five hundred years ago, in the small city of Krakow, Poland, near the northern edge of Europe, Nicolaus Copernicus looked at the objects in the night sky, wondered what and where they were, collected data by making careful observations with his telescope, and, like Aristarchus before him, concluded that the earth and the other planets rotated around the sun. Perhaps he foresaw the furor when the word got out because he waited to publish his book *On the Revolutions of Heavenly Spheres* until 1543, shortly before

his death. Other investigators followed, including the mathematician Johannes Kepler and the astronomer Galileo Galilei. Their work supported and extended Copernicus's observations and upset a lot of people at the time, who believed that the universe revolved around the earth. Galileo even risked excommunication because the hierarchy of the Catholic Church thought his subversive opinions were heresy, so he was sentenced to house arrest for putting forth his new ideas. Imagine that! That's crazy! Eventually, however, knowledge won out over ignorance. As evidence accumulated, the heliocentric theory became accepted.

Those men lived in an age before the germ theory of disease, before indoor plumbing, central heating, wrist-watches, and comfortable shoes; before electricity and the Internet and smartphones—an age when a letter could take weeks to be delivered, an age when few men and even fewer women could read. They wrote with quill pens by candlelight. They traveled by foot, by horseback, and by oxcart. They lived in an age when monarchs and popes had absolute power and when daring to disagree with someone in power could end one's career, if not one's life—an age when engaging in the act of inquiry was subversive and courageous. Nevertheless, they persisted and by daring to question the dogma of the day, by collecting evidence and developing coherent theories based on that evidence, the new ideas put forth by those early astronomers and their colleagues eventually changed the world.

You are probably wondering what astronomy has to do with occupational therapy. Let's make a little wrinkle in time (L'Engle, 1962). Have you all read that children's book, *A Wrinkle in Time*? If not, I recommend it. In other words, let's skip ahead a few centuries. The results of the heliocentric theory eventually led to physicists making calculations about the relative locations of the earth, the moon, and other planets in the universe; to scientists figuring out how to launch a man into space to begin to explore the universe; and to the astronaut Alan Shepherd practicing his favorite recreational occupation, golf, on the moon during Apollo 14. That theory also led to astronauts living aboard the International Space Station (ISS)—some of you may remember Leroy Chiao telling us about his occupational performance aboard the ISS during the American Occupational Therapy Association (AOTA) Annual Conference & Expo in Houston in 2009. There are astronauts aboard the ISS right now.

The heliocentric theory also led to incredible technological feats: to the landing of the Philae lander on a comet, and to robots collecting samples on the surface of Mars. That theory also led to ongoing, serious discussions

about how and when a manned mission will be sent to Mars and then will return safely—hopefully in our lifetimes. That idea led to a White Paper written by occupational therapists on behalf of AOTA and submitted to the National Academy of Sciences that discusses the value of the human space program from an occupational therapy perspective (Cohen, Harvison, & Baxter, 2013).

From a young man in a small town on the northern edge of Renaissance Poland inquiring about the planets and the stars with a primitive telescope and writing his observations with a quill pen by candlelight, we arrive at the possibility of sending a round-trip manned mission to Mars and the contribution of our profession to the effort. Wow! Inquiry can take us everywhere.

Occupational Therapy and Inquiry

For the rest of this lecture, I will discuss occupational therapy directly. When I use the phrase *occupational therapist*, I am referring to everyone—occupational therapists and occupational therapy assistants alike.

Inquiry, into the nature and usefulness of occupation as a work cure, was important at the very beginning of our profession. Herbert Hall received the first grants to study occupation from the Proctor Foundation in 1905 and 1906. The resulting paper reported the first evidence that people with mental health disorders can improve through the use of specific therapeutic occupations (Hall, 1910). Those ideas are still valid today. Thus, inquiry has always been an integral part of our profession.

Many modern-day leaders of our profession have discussed the important relationship between practice and research as inquiry. For example, in her eloquent Slagle lecture of 2005 discussing the ethos of occupational therapy, Suzanne M. Peloquin told us that one of our guiding beliefs is that effective therapy melds artistry and science. In her 1983 Slagle lecture, Joan C. Rogers discussed the relationship between clinical reasoning and research findings. In her 1986 Slagle lecture, Kathlyn L. Reed discussed the factors, including research, that influence decisions about adopting or discarding various media and methods in treatment. In her 2000 Slagle lecture, Margo B. Holm told us how to move toward evidence-based practice. In her 2008 Slagle lecture, Wendy J. Coster reminded us to select our research measures with care.

In her inaugural Presidential Address of 2004, M. Carolyn Baum described the tapestry of our profession (Baum, 2005). She told us that practice, education, and science must be related to make our profession stronger. She generously invited some members of AOTA to contribute their thoughts on the future of occupational

therapy; Joan Rogers commented on her hope for an evidence-based approach to become an ADL for every clinician, and Kristine Haertl hoped for evidence-based practice to become common in community health prevention and promotion.

Empirical Research

The occupational therapy literature includes the body of evidence published in journals that specifically say “occupational therapy” in the title, but the literature that is relevant to our profession is broader than that. We have access to the vast body of other biological and psychological studies that are germane to our work, from genetics and cell biology to epidemiology and health systems research. We can use all of that literature. We can ask questions about all of those topics.

For example, we can ask questions in basic research about the nature of things on the cellular level, the systems level, and the level of the whole preparation—that is, people and animals. Sheila Mun-Bryce once explained the nature of her research on cortical damage in swine in the context of her background in pediatric occupational therapy (Mun-Bryce, Roberts, Bartolo, & Okada, 2006; Mun-Bryce et al., 2004). Sharon Juliano studied occupational therapy as an undergraduate; she is now a neurophysiologist who does research on development of the cerebral cortex and plasticity of the cortex in response to injury.

The elegant studies by these investigators are not directly related to the practice of occupational therapy, but this work gives us important information about how the brain works and repairs itself. Clinicians who work in developmental disabilities and in neurorehabilitation can use that information to help them understand the phenomena they confront in their clinics. See, for example, Juliano’s extraordinary research on the movements of developing neurons (Abbah & Juliano, 2014). If you want a treat, find the paper online and watch the videos of migrating neurons. They are amazing!

All occupational therapists deal with problems in motor learning. Therefore, doing research in motor learning is logical for us. The 1995 and 2013 Slagle lecturers, Catherine A. Trombly and Glen Gillen, both discussed the literature in motor learning (Gillen, 2013; Trombly, 1995). Experiments in motor learning by many investigators, including occupational therapists (Giuffrida, Shea, & Fairbrother, 2002; Ma & Trombly, 2001; Mani et al., 2013; Poole, 1991; Sabari, 1991), are important for understanding sensorimotor adaptation in people with certain kinds of disabilities and the best approaches to treat them, to teach

specific splinter skills, and to help these clients develop generalized motor programs for use when task demands are novel. For that reason, my doctoral degree is in motor learning, and I have performed some motor learning studies, too (Mulavara, Cohen, & Bloomberg, 2009; Roller, Cohen, Bloomberg, & Mulavara, 2009). Every occupational therapist ought to be familiar with the principles developed through this vast body of work. Therefore, occupational therapy educational programs should incorporate those principles into their curricula.

Occupational therapy investigators have a history of developing and testing clinical treatment paradigms, and those studies have expanded our scope of practice. For example, the pioneering research on pressure ulcer prevention and treatment by Susan L. Garber (Garber, 2014; Garber, Krouskop, & Carter, 1978), who will be the 2016 Slagle lecturer, paved the way for occupational therapy involvement in that aspect of care. Nowadays, occupational therapists are routinely part of the pressure ulcer treatment team, thanks largely to her work.

Occupational therapy practice has expanded to so many different specialties that listing them all is impossible. As therapists develop their practice specialties, I hope that clinician–scientists will pursue research to ask questions about the efficacy of treatment, patient satisfaction, and best practices. I was inspired by the research posters I saw at the 2015 AOTA Annual Conference & Expo. Many young investigators are doing terrific work, and I applaud them all.

Some occupational therapists also ask epidemiologic questions about health care systems and large populations. That kind of research may help health systems planners, hospital directors, and insurance managers plan for services, including occupational therapy. See, for example, the studies of large data sets by Kenneth Ottenbacher and Timothy Reistetter (A. J. Ottenbacher et al., 2014; K. J. Ottenbacher et al., 2014).

All of these kinds of research are valid for occupational therapists because they provide new knowledge we can use to improve our clinical practices and to inform our clients, referral sources, payment sources, politicians, and policy experts. Thus, inquiry facilitates our work so that we can continue to improve the lives of the patients and clients we serve.

Having a Research Career

To be successful, to develop a body of research, the individual investigator's work should focus on a theme that drives the investigator throughout his or her career. The specific studies or experiments may use a variety of re-

search questions, testing modalities, and research designs to explore various aspects of the problem of interest. Over many years, the investigator develops a web of research with overlapping and related themes that are all associated with the central issue.

I would like to discuss the example of one such research career to help you understand these ideas. Many other paths can be taken depending on the individual's interests, resources, and needs. The career of this clinician–scientist has been based on a lifelong interest in the problem of sensorimotor adaptation: how people adapt to changes in their sensorimotor or perceptual–motor relationships, how to measure those changes, and how to facilitate those changes. This investigator began learning about the body of basic research on the vestibular system and then about the paucity of research on vestibular rehabilitation.

For some investigators, doing a postdoctoral fellowship after graduate school can be useful to develop more research skills. This experience is similar to a residency for physicians or advanced specialty training for therapists. Early on, shortly after doing a postdoctoral fellowship, our young investigator collaborated with some physical therapists to develop the first norms for a new screening tool, the Clinical Test of Sensory Interaction on Balance (CTSIB; Cohen, Blatchly, & Gombash, 1993; Shumway-Cook & Horak, 1986). This little screening test is a great example of a clinical observation that took on a life of its own, in part because of great publicity by the two physical therapists who published the original paper, both of whom went on to have distinguished research careers studying balance. The CTSIB is now used all over the world and has been cited in at least 5,300 papers.

A few years later, our investigator still had an interest in balance. So, with the assistance of an occupational therapy student, Lori G. Heaton, the investigator studied age-related changes on the state-of-the-art balance test using computerized dynamic posturography (Cohen, Heaton, Congdon, & Jenkins, 1996). Several years later, because of the work on the CTSIB, our investigator was invited by a program officer at the National Institutes of Health (NIH) to consult on the use of the CTSIB for data collection during the 2001–2002 and 2003–2004 years of the ongoing, nationwide epidemiologic study known as the National Health and Nutrition Education Study (National Center for Health Statistics, 2006). Several years after that, the CTSIB was used in a study of the effects of HIV/AIDS on vestibular function and balance (Cohen et al., 2012). Also, in collaboration with colleagues at NASA's Johnson Space Center, the team developed new norms for the CTSIB and tested the

CTSIB against computerized dynamic posturography (Cohen, Mulavara, Peters, Sangi-Haghepeykar, & Bloomberg, 2014; Mulavara, Cohen, Peters, Sangi-Haghepeykar, & Bloomberg, 2013). In this way, you can see that ideas tend to circle around a theme and can appear intermittently throughout a research career as the investigator develops new perspectives on them.

Another early study by this investigator was a survey of people who had had vestibular rehabilitation with a local physical therapist. At that time, no reports in the literature described the level of impairment in ADL performance among people who had vestibular disorders, and no reports about vestibular rehabilitation discussed any functional changes after therapy. Obviously, none of those authors were occupational therapists! So our investigator began work on what eventually became a series of questions about that problem (Cohen, 1992).

The initial survey study used a simple list of ADLs that every occupational therapist would consider important. The study was inexpensive; it cost \$25, mostly for postage. That little study is still being cited because it asked an important question that would have been obvious to every occupational therapist but was not obvious to anyone else: How well did people function before and after treatment? If you work with clients who have well-defined diagnoses and their functional limitations or ADL deficits are not well described in the literature, then you might want to consider doing that kind of study.

That initial work also led to a survey of patients with Ménière's disease, with the assistance of an occupational therapy student, Lana R. Ewell (Cohen, Ewell, & Jenkins, 1995), and to a study that examined people in the acute phase of recovery from acoustic neuroma resection. An *acoustic neuroma* is a tumor of the Schwann cells that provide the myelin sheath for the vestibular nerve (Cohen, 2007). I had to include some neuroscience in this talk, so here it is: You all remember Schwann cells from your neuroscience classes, right? You all remember that a *Schwann cell* is the nonneural cell that provides the myelin sheath that wraps around the axon of a peripheral nerve to increase conduction velocity, right? An acoustic neuroma is a *schwannoma*, or tumor of the Schwann cells of the vestibular nerve.

Then, with the assistance of an occupational therapy student and certified driving rehabilitation specialist, Jennifer Wells, our investigator did a study of driving problems in people with vestibular disorders (Cohen, Wells, Kimball, & Owsley, 2003). That initial work also led to the development and norming of a better ADL scale, the Vestibular Disorders Activities of Daily Living Scale (VADL), with assistance from an occupational

therapy student, Angela S. Adams (Cohen & Kimball, 2000; Cohen, Kimball, & Adams, 2000), and a paper refining that scale with a Brazilian physical therapist, Natalia A. Ricci, as part of her doctoral research (Ricci, Aratani, Caovilla, Cohen, & Ganança, 2014). The VADL has become widely used and has contributed to acceptance of the idea that patients with vestibular impairments have functional limitations.

So this work on ADLs in people with vestibular disorders is another theme that has run through our investigator's work over many years. That topic has not been exhausted, however. Perhaps other investigators will follow up on this problem and will learn more about the effects of vestibular disorders on performance of functional skills.

Translational Research

Have you ever thought about running a clinical trial of some type of treatment? Be careful. Our naive investigator first planned a clinical trial with no idea of how challenging it would be. That first clinical trial, funded by the American Occupational Therapy Foundation (AOTF), was performed in collaboration with two terrific occupational therapists, Laura V. Miller and Maureen Wineland. The study was based on the problem that one of the first papers about vestibular rehabilitation had referred to the value of occupational therapy (Cooksey, 1945), but no one had ever studied occupational therapy in vestibular rehabilitation. The team provided evidence showing the value of structured occupation for the treatment of people with vertigo (Cohen, Kane-Wineland, Miller, & Hatfield, 1995; Cohen, Miller, Kane-Wineland, & Hatfield, 1995). That study helped establish vestibular rehabilitation as within the scope of practice for occupational therapy.

The AOTF-funded study formed the basis for two NIH grants to study vestibular rehabilitation. In a study of people with chronic vertigo, our investigator learned two things: (1) The exact frequency of head movement was unimportant as long as the movement was within the frequency range of normal head movements and (2) as vertigo decreases and balance improves, ADL independence improves (Cohen & Kimball, 2003, 2004).

A debate among surgeons and therapists is whether therapy is needed in the acute postoperative period after acoustic neuroma resection. So another study tested the value of therapy for people shortly after surgery to resect an acoustic neuroma. Interestingly, contrary to the prediction, therapy given at bedside during the first postoperative week did not lead to significant improvements

compared with a sham treatment in which the participants were given an equivalent amount of attention (Cohen, Kimball, & Jenkins, 2002). The reason probably involves the very rapid changes that the brain undergoes in that acute period. So if you get a referral to see such a patient in the acute phase of recovery, focus your care on patient education and safety, not on vertigo habituation. Wait a few weeks for the patient to recover before you decide whether vertigo habituation exercises and activities are needed (Cohen et al., 2002). This problem, too, has not yet been explored completely. If you have access to this population of patients, it might be a fruitful area for research.

Clinical studies sometimes require years to collect enough subjects. For example, two of our investigator's studies on treatments for benign paroxysmal positional vertigo took more than 4 years each for data collection (Cohen & Kimball, 2005; Cohen & Sangi-Haghepeykar, 2010). Four years is a long time, but because data were collected on several measures to investigate several questions simultaneously, several publications resulted from the study.

This model of focused clinical research can be used to ask many questions. Before beginning such a study the investigator should plan the resources, such as the investigator's time; a clinical caseload with cooperative referring physicians; laboratory or clinic space; and a collaboration with a statistician. Because data collection takes so long, you must also have *patience* as well as *patients*. Funds to run the study are also useful. So program directors and department chiefs who want their faculty members and staff to do research must consider how to provide, or assist investigators in obtaining, the resources needed.

Answers to any particular question inevitably lead to more questions. Our clinician–scientist's clinical practice allowed our investigator to ask some questions about treatments for several kinds of vestibular disorders, about some aspects of motor learning that affect how therapists should plan treatment, about some basic mechanisms of the vestibular system, and about screening people for vestibular disorders—circling back to that early interest in balance screening with the CTSIB. In this way, a career focused on inquiry via research can be grounded in some basic problems that lead to a complex web of research questions of several types.

In case you have not already figured out my little game, I am the investigator whose career path I was describing. That means I know the problems and pitfalls as well as the results. In my life and career, inquiry is an ADL. By sharing my story with you, I hope to have given you

some insights into how it can work over the span of a career so you might get some ideas about how it might work for you.

Other Kinds of Inquiry

A career based on inquiry may include research as an instrumental ADL for some occupational therapists, but such a career also includes other aspects of inquiry for all therapists as a basic ADL. Having a career in inquiry means that you don't get intellectual time off. You are always learning and questioning. Here are some ways that you can do it.

Be a little bit nosy. Find out what other people are doing and why. Every person you meet, no matter the nature of that person's job or educational background, has something to teach you because every person you meet knows something that you do not know. If you embrace that idea, then you will learn a lot simply by asking, Why do you do that [whatever *that* is]? Why do you do it in that way? What happens if you do that in another way?

Ask questions of your colleagues in occupational therapy and your coworkers who are audiologists, nurses, physical therapists, physicians, psychologists and counselors, speech–language pathologists, social workers, and teachers. Ask questions of the housekeeping staff, the esthetician, the recreation staff, the plumber, the light bulb expert at the lighting store, and the small plant expert at the nursery. Ask questions, especially, of people you consider to be authority figures, including the physician who is the medical director, the psychologist in the mental health section, or the master teacher at a school. Be prepared to respond to their answers with more well-considered questions. That kind of dialogue can be informative, will make your work more interesting, and will show your colleagues that you are a thoughtful professional, deserving of their respect.

Asking those questions, however, requires having courage. For example, Judith J. Joseph, an occupational therapist in Houston, was a little bit courageous when she asked a physical therapist in her hospital why the physical therapist used a particular treatment technique for vestibular rehabilitation. When the answer didn't make sense, Judi was a little bit courageous again when she asked me to explain the answer. In that particular instance, the answer didn't make sense to me, either, so we both got a chuckle out of it.

Here's a good idea: Join your state occupational therapy association and attend the district and state meetings. (And, no, the state association presidents didn't ask me to say that.) You can get some of your continuing education that way and also have the opportunity to meet

some other therapists who, like you, are having careers in inquiry. Because everyone knows something that you don't know, encourage the other members to share their ideas and information. In Texas, the districts are so large that our district meetings include members who cannot travel the distance to attend meetings on site; thanks to current technology—and the technological savvy of Eileen Garza—we have virtual meetings using video communication technology so that members who live in the far-flung corners of each district can participate. If you live in a state with very large districts, you might want to inquire about that technology. As the technology improves, distance participation should become easier.

Here's another idea: Start a study group, sometimes known as a "journal club." Meet with some other therapists every few months to discuss three or four research papers to try to figure out what they mean and how to use that information in practice. You might consider emailing the authors to ask questions. Authors like to hear from readers because it means that someone is paying attention to their work. (Imagine the author on the receiving end of your email thinking, "Somebody read my paper. Yeah!") You might even ask whether you can get the author of a paper to explain it to you or answer questions via telecommunication or video communication. That inquiry might lead to something interesting; you never know.

If all journal club members have similar interests, you can read in depth on a particular topic. If members have diverse interests, you can read more broadly with less depth per topic. No matter what you read and discuss together, you will surely have an interesting discussion, and you might find some common ground. For example, perhaps a hand therapist and a driving specialist in the same journal club as a geriatric therapist might end up learning about the driving problems of elderly people with arthritis and their difficulty manipulating the steering wheel, door handles, and small dials and buttons of the car. Maybe you will come up with an idea to do a study together or to advise some automobile manufacturers about changing their car designs. Don't worry about running out of reading material; that won't happen!

Participating in a study group as an act of inquiry can be very professionally subversive because you might develop new ideas about practice and you might change the status quo at your institution or within your practice specialty. Participating in a journal club is also an act of courage. Admitting to your peers that you do not understand something can be intimidating because you might assume that everyone else understands. You might also assume that the experts who wrote the papers know more than you do. Maybe they do, but maybe they don't.

In her 1983 Slagle lecture, Joan Rogers cautioned us to remember that research papers leave us with probabilities and not certainties about each patient. That means we should be careful about extrapolating when we try to apply specific research findings to our own clinical practices. In her 2000 Slagle lecture, Margo Holm advised us about moving toward evidence-based practice. She instructed us to ask specific clinical questions, take time to track down the best evidence to guide practice, appraise the evidence and not just take it at face value, use the evidence to do the right thing, and evaluate the impact of evidence-based practice to determine whether you followed the appropriate guidelines, used the material as intended, and had outcomes—including therapist satisfaction—consistent with the desired results (Holm, 2000). As you learn about research findings, try to keep these ideas in mind.

Try not to be frustrated when you see journals filled with research papers rather than papers on treatment techniques. Elaine Viseltair, who was the editor of the *American Journal of Occupational Therapy* for many years, mentored many young authors, including me. The work of such an editor is invaluable in guiding the field and teaching young investigators how to communicate their ideas. In 1988 Viseltair wrote a thoughtful editorial in which she described the inherent tension for the editor of an association-owned journal between selecting research papers that provide new information to move a field forward and selecting papers that discuss how to give clinical care. Both kinds of papers are necessary (Viseltair, 1988).

If your interests are health related, start by doing a literature search on PubMed. PubMed is the free index of biomedical literature run by the National Library of Medicine, which is part of NIH and which you support with your taxes. I'll repeat that statement just to make sure everyone knows: You get this extraordinary resource for free. Wow! The U.S. government has generously made access to PubMed free to everyone with Internet access, all over the world. Therefore, our guests from countries with well-established health care systems that include occupational therapy and individual health care providers in small villages in remote parts of the world with less organized health systems all have access.

The abstracts are all available for free. If a study was performed using federal funds, such as a grant from NIH, then the version of the manuscript that was accepted for publication is also available for free, even if the formatted, published version is not free. To download a paper, look on the top right corner of the PubMed web page for the abstract and see where it says "Full text links." Click on one of those links. Otherwise, click on the link to the author information and email the author to request a copy.

If your interests are in special education or psychology, look in the indexes for these fields. For example, you might want to search PsycINFO or CINAHL. If you are looking for review papers, try searching the Cochrane Library, which provides very detailed expert reviews. Many databases are available, so you ought to be able to find one to meet your needs.

If you are not sure where to search, stop by the local library and meet with the reference librarian. Even your public library might have an occupational therapy collection. For example, the New York Public Library established an occupational therapy collection at the mid-Manhattan branch in the 1980s with a donation from the New York State Occupational Therapy Association after a request by Mary V. Donohue and some other local therapists. If you cannot obtain a journal article or book locally, ask your librarian to look for it through interlibrary loan. No matter where you live in the United States, the holdings of the National Library of Medicine are available to you.

Role of the Research Consumer

All of us—investigators, educators, clinicians, health care administrators, and laypeople—are consumers of research. Consumers and investigators have different roles. For the investigator, doing science is often an intensely private endeavor: when the investigator is working in the lab or at the office computer in relative isolation to design a study and to collect data, when the investigator has discreet conversations with colleagues, and when the investigator writes grant applications for funds to support that research, access to which is privileged. Science becomes a public and social endeavor when the investigator presents preliminary data at professional meetings and presents the final data as papers published in peer-reviewed journals that the entire world can read (Piel, 1986). Therefore, as consumers—as readers, conference attendees, and clinicians—we all participate in an essential part of the public process of science.

Because of this public aspect of research, the process of doing science is complete only when consumers participate. When we listen to talks at a professional meeting, when we attend poster sessions, or when we discuss new ideas with colleagues over dinner, we participate in an integral part of the process of inquiry. Readers of journals participate by considering individual papers and sometimes by writing letters to the editor or other commentary. Investigators need us to read their work, think about it, criticize it, comment on it, and decide whether to accept the ideas they have presented.

Offering a critique of someone else's research is important. Criticizing the ideas, the methodology, the re-

sults, and the interpretation help to improve the science. In the long run, that criticism helps improve care. For that reason, at professional meetings and in-service seminars, please *do* ask questions and request clarification when presentations are unclear to you.

Questions are valuable, especially tough questions that make investigators think, that help them clarify their ideas and learn to communicate those ideas and research findings effectively. Being asked such questions may be uncomfortable for the investigator, but because the investigator will grow from the experience, your questions will be therapeutic. Think of yourself as helping the investigator clarify the research question and learn how to present the ideas in writing later. A thoughtful question is really a compliment to the speaker because it indicates that you are paying attention and that you are interested in that person's work.

So, please participate in the process. If someone else asks questions, follow up with your own question. If no one else has a question—we all know that awkward silence at the end of a talk—perhaps other people are shy and are waiting for someone else, like you, to ask the first question. So be courageous. In the spirit of inquiry, stand up and offer your question.

Science moves forward in fits and starts, with ideas presented by investigators and accepted, partially accepted, or rejected by consumers. Enjoy your essential role in the process of inquiry.

Inquiry involves getting information from a variety of sources. Newspapers and other media are sometimes useful as sources of general information or at least as starting points. For example, the *New York Times*, *Washington Post*, National Public Radio, and BBC News all have excellent health and science sections that cover a broad range of topics and explain them in a way that is intelligible to people who are not experts in those fields. Their articles are short enough to read online at lunchtime. Many other publications and news outlets have professional health and science writers. Be selective, but consult some of them regularly. You just never know where you will get your next great idea! If your local newspaper or news-oriented radio or television station does not have a good health and science section, get in touch with the editor and advocate for one. You, and everyone else in your community, will benefit.

Meaning of a Career in Inquiry

So what does having a career in inquiry mean? Having a career based on inquiry means having courage: to ask questions, to seek new information, to not accept the status quo, to be willing to challenge authorities in the

Figure 1. This F/A-18 Hornet (fighter jet) is pushing its performance envelope, generating a cloud of water vapor as it breaks the sound barrier and generates a sonic boom.

Note. U.S. Navy photo 1106-N-TU221-408, June 6, 2011. Used with permission. Use of released U.S. Navy imagery does not constitute product or organizational endorsement of any kind by the U.S. Navy.

quest for truth. Having a career in inquiry means being forthright and even brave—brave enough to stand up in public and ask a “silly” question at the risk of disapproval or embarrassment in front of colleagues, supervisors, and other authority figures. Having a career in inquiry means being willing to point out contradictions and flaws in reasoning. It means being honest. It means, for example, being the one to say, in a completely professional way, of course, that the evidence suggests that the emperor might not be wearing any clothes (Andersen, 1837/2004)!

As I said earlier, basing your career on inquiry may be subversive because it challenges the status quo. Challenging current ideas is one of the ways that professionals move their field forward. Occupational therapists have always done that. The World War I reconstruction aides were out there on the cutting edge of acceptable behavior for proper young ladies of their era, using new ideas to help valiant young men to whom they were not married and had not been formally introduced, and they were certainly courageous. We have taken the foundational ideas from the reconstruction aides and workshops teaching handicrafts for the work cure, and we have moved beyond them into the 21st century by not accepting the way things were, by not resting on what we learned in occupational therapy school, by not doing just what our great-grandmothers did.

We have moved our profession and our careers forward by pushing the envelope. By using inquiry, Dr. Hall, Ms. Slagle, the other founders of our profession, and their intellectual descendants were quietly, wildly subversive in their own wonderful, kind, caring, well-mannered, therapeutic, questioning, challenging ways. They pushed the envelope by asking questions that no one before them had ever asked and refusing to be held

back just because no one before them had ever done what they chose to do. Figure 1 shows a fighter jet surrounded by a vapor trail, literally pushing its performance envelope to its design limits and beyond, generating a cloud of water vapor as it punches through the sound barrier. So when you think of pushing the envelope, think of a sonic boom. Let everybody know you’re there!

All of us should have careers based on inquiry. With inquiry as one of our ADLs, we should push the envelope, bring our occupational therapy sensibilities to places where they have never been before, and improve the world a little bit by asking questions, using the answers to improve our ideas, and then doing things better than they have been done before. If the work of Copernicus, Kepler, and Galileo could change the world without their having had any of our modern advantages, surely the 54,000 occupational therapists who are members of AOTA can use our inquiring minds and new ideas to make progress!

Figure 2. Reconstruction aides, Châteauroux, France (left to right): Louise Green, Hope Gray, Susan Hills, Elizabeth Melcer, Lena Hitchcock, Daphne Dunbar.

Note. Photo RG4119966b, 1919, from the archive of the American Occupational Therapy Association, Inc., Bethesda, MD. Used with permission.

Homework Activity

So here is your homework assignment. This is for all of you, not just the students. On a clear night, go outdoors. Look up at the lights in the sky; think about what and where they are. Think of the early astronomers. They changed the world.

When you return to work, stop for a moment and think of the intrepid reconstruction aides, some of whom appear in Figure 2. Think of Louise and Hope and Susan, Elizabeth, Lena, and Daphne. They changed the world, too.

Ask questions and follow up on the answers. Be courageous. Be a little bit subversive. If you do those things, if you honor the twin legacies of the early astronomers and the reconstruction aides by having careers in inquiry, *you* will change the world. ▲

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