

The Art and Science of Mentoring

Tammy D. Allen & Lillian T. Eby

University of South Florida, University of Georgia

Is mentoring art or is it science? The authors of this chapter define how art and science are relevant to mentoring theory. They suggest that it must be a balance of both art and science and note that, like all relationships, each mentor/protégé relationship will require a unique balance.

Keywords: mentor, mentee, mentoring, protégé

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*"Not art and science serve alone; Patience must
in the work be shown."*

- Johann Wolfgang von Goethe (1749 - 1832).

Is mentoring an art or a science? Or might it be both? At first glance, art and science may appear to be opposites. Art is often associated with emotion and subjectivity, while science is more often associated with data and objectivity (Maeda, 2013). However, there has long been a deep connection between art and science (Pomeroy, 2012). Both are involved in inquiry and in the process of learning through the feedback that occurs by thinking and doing. Indeed, the symbiosis between science and art is growing in recognition through efforts such as STEAM (science, technology, engineering, *the arts*, and mathematics) approaches to education that recognize creativity and innovation are essential elements of the scientific inquiry process (Pomeroy, 2012). A distinguishing feature of science is the development of accurate, useful, and evidence-based explanations of how and why phenomena occur (Grand et al., 2018). The scientific enterprise has the goals of understanding how the world operates and the application of that information to improve the lives of people. By identifying patterns of associations between phenomena, science allows us to predict human behavior, which in turn, can promote individual growth and well-being. For example, by identifying the factors that predict student success in college, we can develop interventions that facilitate success, as well as identify strategies to help remove obstacles to individual achievement. With these defining characteristics of scientific inquiry in mind, mentoring can indeed be considered a science. That is, mentoring processes can be and have been examined through the methods of science. For example, a wide variety of hypotheses

concerning mentoring relationship effectiveness have been developed and tested (Pfund, Byars-Winston, Branchaw, Hurtado, & Eagan, 2016). Moreover, a vast array of research methods have been used to understand mentoring from a scientific perspective, including qualitative approaches (e.g., Allen, Poteet, & Burroughs, 1997; Straus, Johnson, Marquez, & Feldman, 2013), field studies (e.g., Allen, Eby & Lentz, 2006; Baker, Hocevar, & Johnson, 2003), experimental research (e.g., Evertson & Smithey, 2000), and meta-analytic reviews of the literature (e.g., Eby, Allen, Evans, Ng, & DuBois, 2008; Raposa et al., 2019). This array of research methods highlights the fact that the science of mentoring comes in many different shapes and sizes. Notwithstanding the scientific basis of mentoring, we also recognize that the practice of mentoring is also an art. We elaborate on these ideas below.

The Evidence for Mentoring as a Science

In his review of the literature concerning faculty mentoring of graduate students, Forehand (2008) referred to mentoring at present as, "being an art rather than a science" (p. 752). This evaluation was based on limited research in existence and a few conceptual frameworks to guide the way. Has there been progress in the past decade that has followed Forehand's review? First, to answer that question, we underscore that Forehand was specifically referring to student-faculty mentoring. Researchers conduct mentoring scholarship across different disciplines, often divided into three categories: youth, student-faculty, and workplace (Allen & Eby, 2007). Each of these categories of mentoring relationships has their literature that has different strengths and weaknesses. Importantly, there are differences in the state of the evidence

which is based across these different categories of mentoring relationships. For example, in our view, youth literature is the most advanced concerning the evaluation of formal mentoring programs (see for example Dubois, Herrera, & Rivera, 2018). By contrast, although some conceptual frameworks (e.g., O'Neil & Wrightsman, 2001) and empirical research (e.g., Tennenbaum, Crosby, & Gliner, 2001) exist on student-faculty mentoring, this area of scholarship is more limited (Johnson, Rose, & Schlosser, 2007). Nonetheless, looking across these three types of mentoring there is an extensive body of research that provides useful knowledge concerning mentoring phenomena. Meta-analytic studies demonstrate that there are robust relationships that transcend the different types of mentoring (Eby et al., 2008; Eby, et al., 2013). For example, interaction frequency is positively associated with the perceived receipt of psychosocial and instrumental mentoring and with perceived relationship quality (Eby et al., 2013). Likewise, mentor-protégé similarity concerning "deep-level" characteristics such as personality, work styles, and life experiences is a strong and consistent predictor of protégé perceptions of mentoring received and relationship quality (Eby et al., 2013). Lending further credence to the notion that mentoring is a science, the study of mentoring is funded by federal scientific funding agencies such as the *National Institutes of Health* and the *National Science Foundation* (e.g., Sorkness, Pfund, Ofili, Okuyemi, Vishwanatha, 2017). In addition, in 2017 the *National Academy of Sciences* convened a committee charged with conducting a consensus study entitled *The Science of Effective Mentoring in Science, Technology, Engineering, and Mathematics* that includes identification of the successful elements of effective mentoring relationships in STEM education (<http://sites.nationalacademies.org/pga/bhew/mentoring/index.htm>). Similar efforts have been undertaken to collate evidence-based practices for youth mentoring programs focused on science, technology, engineering, or mathematics (Kupersmidt, Stelter, Garringer, & Bourgoin, 2018) as well as youth mentoring in organizational contexts (Kupersmidt, Stelter, & Garringer, 2019). Research-based evidence also exists to support the practice of mentoring. Those who design mentoring programs have a science base to help guide them in program design and implementation (Allen, Finkelstein, & Poteet, 2009; Clutterbuck, Poulsen, & Kochan, 2012; Lunsford, 2016). Similarly, research exists concerning the elements of effective mentoring that can be used to help steer mentors and protégés (Johnson & Ridley, 2008). Moreover, in so much that mentoring is an interpersonal relationship, the vast literature on relationships can also be used to help inform our understanding of mentoring (Campbell & Campbell, 2012). As an illustration, self-expansion theory (Aron &

Aron, 1986) proposes that people are inherently motivated to increase resources, perspectives, and identities that facilitate personal goal achievement. Developing relationships with others is a primary mechanism for self-expansion, and this widely supported theory may help explain the motivation to enter a mentoring relationship as well as the extent that individuals are likely to benefit from them. Likewise, the application of attachment theory (Ainsworth, 1979) to close adult relationships may offer insight into how mentors may serve as both a secure base for protégé personal and career exploration as well as a haven for protégés when they encounter stressful situations.

The Art of Mentoring

Although there is a strong scientific base, mentoring is a collaborative relationship that develops and evolves across time (Pfund et al., 2016). The contexts within which mentoring relationships develop and the people who participate in the relationship are diverse, resulting in no two mentoring relationships that are the same. Each relationship is based on a complex interplay of cognitive, affective, and interpersonal factors (Hawkey, 1997), which manifests in unique and idiosyncratic interaction patterns between mentors and protégés (Eby, Rhodes, & Allen, 2008). A mentoring relationship also reflects the personal and professional goals of a given protégé, which is unique to that individual. Mentors also have different skill sets, life experiences, and motivations that they bring to a mentorship. Moreover, the same mentor is likely to engage in different behaviors with different protégés, depending on the protégé's goals, motivations, and behavioral responses to the mentor's actions. The extent that a mentor can provide the "right type" of support at the "right time" to a protégé is at the heart of the art of mentoring. Because mentoring relationships are so varied and complex, a rigid template for what will make for the most effective relationship does not exist, and mentors and protégés often must adapt their behavior to fit the given situation. As noted by Pfund (2018), "Consider a faculty member with a decade of mentoring experience who has engaged in hours of mentor training. This mentor is likely to have a wealth of knowledge and deep skill set with approaches for addressing a wide range of mentoring challenges. Some would argue that there is an art to deciding when to use specific approaches for optimal impact. In many ways, this scenario parallels that of a well-trained artist, who possesses all of the supplies needed (e.g., paints, brushes, canvases) and all of the skills required to paint. Despite all of this preparation, the artist must still decide what, where, and when to paint." Therefore, effective mentoring of others requires the consideration of evidence-based practices, but

also often the use of new approaches and creativity. Drawing from scientific evidence while also integrating the sensibility of an artist can enable the mentor to adapt and respond to the unique needs of each protégé.

Future Research Needs

Over a decade ago, Ragins and Kram (2007) suggested that the field of mentoring could be likened to a garden, noting that some parts of the garden were highly matured while others have been relatively neglected. Although the science of mentoring has grown and evolved considerably over the past several decades (Allen, Eby, Chao, & Bauer, 2017), fallow fields that need tending remain across the vast mentoring landscape. Below we elaborate on several areas in which we believe future research is particularly needed.

Much of the research on mentoring is based on static, between-person approaches that provide a limited snapshot of a mentoring relationship. This research is useful for understanding phenomena such as who is more or less likely to be mentored or to mentor others and the associations between mentoring with cognitive, affective, and behavioral outcomes. What is lacking is an understanding of the “lived experience” of mentoring (Allen & Poteet, 2011). Such insights will come from person-centered approaches to mentoring and the collection of continuous forms of data. For example, within-person experience sampling studies could be employed that track student-faculty mentoring relationships at their start and through key milestones. This type of research could yield insights into episodes within mentoring relationships that were particularly important or especially salient to mentors and protégés. Observation is a hallmark of science, but such methodology is woefully lacking in the study of mentoring. At first blush, mentoring relationships do not seem to readily lend themselves to examination within the lab or under a microscope. However, the development of wearable devices permits a mechanical form of observation in that they enable the collection of granular data in real-world settings as behaviors and physiological reactions occur. As applied to mentoring research, wearable sensors could be used to investigate episodes of mentoring exchanges. For example, sociometric badges could be used to examine the fine-grained speech patterns of mentors and protégés during mentoring exchanges, clothing embedded sensors could be used to assess heart rate variability during those interactions, and electroencephalogram headbands could be used to observe the brain wave patterns of the participants (Izmailova, Wagner, & Perakslis, 2018; Kayhan et al., 2018). Another promising approach to better understand interaction patterns involves micro-behavioral coding of actual mentoring exchanges that have

been audio or video recorded. This coding could be accomplished by using observational software that allows for the identification of conversational speaking turns and adapting validated behavioral coding schemes that have developed to identify relational behaviors among romantic couples. Once coded, this approach would allow for the modeling of temporal interaction dynamics using techniques such as lag sequential analysis (Lehmann-Willenbrock & Allen, 2018). This method would allow for testing hypotheses about which types of relational behaviors by one partner trigger specific behaviors by the other partner. By focusing on the actual, observable behaviors that characterize mentor-protégé interactions we would be able to capture behavior as it happens and obtain data that is both conceptually and methodologically closer to the phenomenon of interest (Baumeister, Vohs, & Funder, 2007). Turning our attention to mentor, although a substantial body of research has demonstrated a connection between mentoring and a wide variety of positive outcomes, as alluded to above we have limited understanding of the specific behaviors enacted by mentors that are key to achieving positive outcomes for protégés (Allen, Shockley, & Poteat, 2010; Kraiger, Finkelstein, & Varghese, 2018). Much of the existing literature is based on broad categories of mentor behavior or functions that classify mentoring as instrumental or as psychosocial (Eby et al., 2013). This classification has inhibited our ability to truly understand what it is that mentors do that is beneficial. Recent research has taken one step toward remediating this gap. Kraiger et al. (2018) developed a new framework of mentoring that takes into account what mentors do (e.g., assign tasks), mentor objectives (e.g., improving protégé skill), and specific behaviors that link objective-action pairings in context (e.g., the mentor describes the assigned task to the protégé and the skills that will be developed to complete the task). This data can be used to provide further study into specific mentoring behaviors as well as used as a tool for mentors.

Conclusion

Embracing mentoring as an art and as a science can be beneficial to researchers and practitioners alike. Mentoring research needs to be informed by practice, while mentoring practice needs to be informed by research. It is through this blending of art and science that mentoring relationships are likely to flourish. The science of mentoring helps us understand foundational elements of effective mentoring. The art of mentoring reminds us that no two relationships are the same and that relational effectiveness reflects a complex (and not easily measurable or predictable) interplay between both mentor and protégé skills, motivations, and goals.

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About the Authors

Tammy D. Allen, Ph.D., is Distinguished University Professor of Psychology at the University of South Florida (USF), where she also serves as Director of the Occupational Health Psychology training concentration. Her work focuses on topics related to work-family issues, mentoring relationships and career development across the lifespan, and organizational practices such as remote work. She has been funded by the National Science Foundation and the National Institute for Occupational Safety and Health, among others. She has over 200 peer-reviewed journal articles, books, and book chapters and her work has been cited over 60,000 times (h-index = 102). Dr. Allen is a recipient of the Society for Industrial and Organizational Psychology (SIOP) *Distinguished Scientific Contributions Award* and the *Herbert Heneman Jr. Award for Career Achievement* from the Academy of Management (AOM). She served as President of SIOP (2013-2014) and as President of the Society for Occupational Health Psychology (2018-2019). She is Fellow of the American Association for the Advancement of Science, American Psychological Association, Association for Psychological Science, SIOP, and AOM.

Dr. Lillian Eby holds the title Distinguished Research Professor at the University of Georgia, where she is a faculty member in the Industrial-Organizational Psychology Program. She is a Fellow of the American Psychological Association, Association for Psychological Science, Society for Industrial and Organizational Psychology, and the Academy of Management. Her research focuses on mentoring relationships at work, career success, worker well-being, and the intersection of work and family life. She has published over 120 peer-reviewed journal

articles. Her scholarly work appears in publication outlets such as the *Journal of Applied Psychology*, *Personnel Psychology*, *Journal of Vocational Behavior*, *Organizational Behavior and Human Decision Processes*, *Journal of Management*, among others. Dr. Eby has also co-edited three books, one on mentoring in organizational, educational, and community settings (Allen & Eby, Blackwell Press), one on the effect of relationships on employee attitudes, behavior, and well-being (Eby & Allen, Taylor/Routledge Press), and one on work and family (Allen & Eby, Oxford University Press). She is former Associate Editor of *Personnel Psychology* as well as the *Journal of Applied Psychology*. Currently, she is the Editor-in-Chief of the *Journal of Applied Psychology*, the premier academic journal in Industrial-Organizational Psychology.