APS European Society for Paediatric Research SPR Society for Pediatric Research

EDITORIAL

Unexpected lifeskills for physician-scientists: advice to early career investigators

Pediatric Research (2023) 93:1108–1109; https://doi.org/10.1038/s41390-022-02168-8

What contributes to a successful career as a physician-scientist? There are *skills* like identifying important and well-crafted research questions, choosing the right study design, implementing a rigorous methodology, attending to high quality data generation, ensuring the proper statistical analytic plan, and disseminating findings efficiently and accurately. There is the *context* of professional development that relies on committed mentors and colleagues who apply wisdom to the elements of research that aren't typically taught, like building effective teams and problem-solving when unexpected obstacles arise. And then there are the *personal traits* that tend to be most predictive of a successful career as a physician-scientist like tenacity, intense curiosity, an unwavering commitment to finding a way to do the work well with a deep sense of purpose. To all these personal traits, I propose adding gratitude.

Why gratitude? In today's world, gratitude has become somewhat of a bumper sticker concept- "practice gratitude" "attitude of gratitude" "# grateful!" And yet gratitude is not a superficial task to check off each day. It is a foundational part of our life's curriculum and serves to elevate the work we do, regardless of whether it is at the bench, bedside, or beyond. Research shows that gratitude is associated with optimism, autonomy, environmental mastery, and personal growth. It also seems to mitigate anxiety and depression[1,2]. All of these effects could benefit the physician-scientist.

Gratitude is inextricably linked to our own humility and vulnerability. It allows us to reach out to others for help and acknowledge the importance of what we don't know, rather than only leaning on what we know or think we know. There is power in gratitude, as it fuels the ability to learn from everything. Nothing wasted. I'd like to share three common scenarios where gratitude could be used to re-energize our focus and scientific contributions.

Scenario 1: Your grant was scored but not funded. Then revised and not scored. You are fairly certain your idea is really good. Do you move to another idea or try again?

Many of us have experienced this scenario, or some version of it. We begin with taking a deep breath and giving ourselves a day or two to provide space between our reaction and our strategic next step. Then we take a fresh look at our research question to ensure it is still relevant and meaningful. We conduct a literature search to make sure the idea is still innovative. We look again at our study design to find opportunities for improvement. Rather than allow the mindset of disappointment and denial to guide our next steps, we can bring a sense of appreciation for continuous quality improvement. This allows ourselves to rise above our perspective and learn from others. What did the reviewers note that we didn't? What could make the proposal even stronger? Also, we can be honest with ourselves to examine our passion and commitment to the scientific question posed. Sometimes, we might even learn that our thinking has evolved or other science has emerged to influence a revised research question. While other times, we re-double our efforts, renewed in our commitment to the work. *Gratitude, as well as tenacity, helps us to move forward productively, grateful that we work in an environment that allows us to continually learn and improve in our scientific contributions*.

Scenario 2: Recruitment is going much slower than expected and you are worried you won't be able to meet the necessary sample size to test your hypotheses. How do you alter your plans to achieve your goals?

This is highly likely if you conduct clinical or community trials. In fact, during the pandemic many original study designs could not proceed as envisioned. Rather than focusing on the *number* of participants enrolled, focusing on our processes and participants allows fresh strategies to emerge. A sense of gratitude for our teams who are in the field recruiting, our partners at our recruitment sites, and, most importantly, our participants, allows us to focus on *why* recruitment is challenging and solicit ideas that are grounded and value-added. It allows us to pause and gain different perspectives. For example, in one of our past studies, our original recruitment plan included participating in health fairs as part of the community. We quickly learned that we had very limited return on our efforts. The questions we raised to our staff, community partners, and potential participants were, "What do you think is contributing to this?" and "How could we make this better for you?" By asking questions, rather than assuming we had the answers, we learned that in our community, health fairs were about information sharing not about study recruitment. Due to the insights of our partners, we pivoted our approach using health fairs for information delivery only and then co-locating ourselves within community organizations for ease of recruitment after trusted community members provided information about the study opportunity[3]. *Taking time to express our gratitude to our research staff and partners and emphasizing that research is a team sport, leads to higher functioning teams with better outcomes*[4,5].

Scenario 3: You are completing your research study and are unclear what comes next. How do you identify your next research question?

We often choose our next scientific questions based on what we know. In this time of rapid explosion of information and new research tools, we have an opportunity to expand our collaborations to integrate novel expertise and augment innovation. For example, while my research predominantly focuses on behavioral interventions and the reduction of health disparities in pediatric obesity, I turned to genetics due to emerging scientific findings from the GIANT consortium[6,7]. At the time, this shed light on the potential genetic contributions to obesity. Around the same time, an article about epigenetics emerged[8]. While I am not a geneticist, I reached out to colleagues who were and started to learn about the potential and promise of how this component might contribute more insight into why some children emerge

Received: 19 April 2022 Revised: 25 May 2022 Accepted: 4 June 2022
Published online: 17 June 2022

into early obesity while others don't. This changed the lens in which I asked and answered research questions around pediatric obesity, opening up new avenues for scientific understanding[9,10]. *Gratitude for new discoveries created a fertile environment to consider new questions and explanations for why obesity interventions seem to work for some populations and not for others*. And we are not done. How many unexplored contributions exist? What about their interaction? What about the timing and duration of their exposure?

All these scenarios are bound by the glue of gratitude for the people around you. As physician-scientists that includes our teams, our collaborators, and our research participants. Gratitude looks like listening deeply. Gratitude sounds like acknowledging the contributions and ideas of everyone in the room with genuineness. Gratitude feels like an expansion of possibilities and the gift of learning each day, from each person.

Yes, you will face all manner of obstacles and opportunities as a physician-scientist. Be grateful for them, all of them, for they allow you to rethink your work to lead to your greatest impact.

Shari L. Barkin[1] ✉
[1]*Department of Pediatrics, Vanderbilt University Medical Center, Nashville, TN, USA.* ✉*email: shari.barkin@vumc.org*

DATA AVAILABILITY

Data sharing not applicable to this article as no datasets were generated or analysed for this commentary.

REFERENCES

1. Davis, D. E. et al. Thankful for the little things: a meta-analysis of gratitude interventions. *J. Couns. Psychol.* **63**, 20–31 (2016).
2. Wood, A. M., Froh, J. J. & Geraghty, A. W. A. Gratitude and well-being: a review and theoretical integration. *Clin. Psychol. Rev.* **30**, 890–905 (2010).
3. Cui, Z. et al. Recruitment strategies for predominantly low-income, multi-racial/ethnic children and parents to 3-year community-based intervention trials: Childhood Obesity Prevention and Treatment Research (COPTR) Consortium. *Trials* **20**, 296 (2019).
4. Stegen, A. & Wankier, J. Generating gratitude in the workplace to improve faculty job satisfaction. *J. Nurs. Educ.* **57**, 375–378 (2018).
5. Sawyer, K. B. et al. Being present and thankful: a multi-study investigation of mindfulness, gratitude, and employee helping behavior. *J. Appl Psychol.* **107**, 240–262 (2022).
6. GIANT Consortium. Accessed April 18, 2022. https://portals.broadinstitute.org/collaboration/giant/index.php/GIANT_consortium
7. Lindgren, C. M. et al. Genome-wide association scan meta-analysis identifies three loci influencing adiposity and fat distribution. *PLOS Genet.* **5**, e1000508 (2009).
8. Manco, M. & Dallapiccola, B. Genetics of pediatric obesity. *Pediatrics* **130**, 123–133 (2012).
9. Oelsner, K. T., Guo, Y., To, S. B. C., Non, A. L. & Barkin, S. L. Maternal BMI as a predictor of methylation of obesity-related genes in saliva samples from preschool-age Hispanic children at-risk for obesity. *BMC Genomics.* **18**, 1–10 (2017).
10. Rushing, A., Sommer, E. C., Zhao, S., Po'e, E. K. & Barkin, S. L. Salivary epigenetic biomarkers as predictors of emerging childhood obesity. *BMC Med Genet.* **21**, 1–9 (2020).

ACKNOWLEDGEMENTS

None

COMPETING INTERESTS

The author declares no competing interests.

ADDITIONAL INFORMATION

Correspondence and requests for materials should be addressed to Shari L. Barkin.

Reprints and permission information is available at http://www.nature.com/reprints

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.