

AWARD

Award for Distinguished Scientific Early Career Contributions to Psychology: Marc G. Berman



Citation

“For innovative research delving into environmental influences on cognition and affect. Marc G. Berman’s research has engaged behavioral, neuroscientific, and computational techniques to expose how natural and artificial scenes can alter cognitive processes and induce affective reactions. In addition, his research seeks to understand the underlying visual computational mechanisms that underlie these effects. This work spans the study of healthy individuals and individuals with various cognitive dysfunctions due to underlying disease states. In addition, Marc G. Berman’s research has contributed new analytic methods to the study of psychological processes, including methods for the treatment of neuroimaging data.”

Biography

Marc is the son of Sharon (Swann) and Sidney Berman. Marc was born in East Grand Rapids, Michigan, but spent most of his childhood growing up in Huntington Woods, Michigan, a northwestern suburb of Detroit, with his parents

and younger sister, Sandra. Marc became interested in the field of psychology in part because of his grandparents’ lives and experiences. His paternal grandparents are Holocaust survivors, and listening to their stories at a young age had Marc grappling with how people can do so much harm to other people. It was also amazing to Marc how his grandparents, who survived such horrific experiences, could continue to be loving and open-minded people despite their constant nightmares. You would never know what they went through on meeting them, except for seeing *A-4655* tattooed in green ink on his grandfather’s left arm—a chilling reminder of all that they had gone through. The fact that Marc’s grandparents could live such loving and open-minded lives speaks to their resilience and, again, how incredibly complex the human mind is. Marc’s maternal grandmother was an inspiration to him as well through her quiet morality, strength, and resilience in raising four children on her own after the much too early passing of Marc’s maternal grandfather.

In addition to these experiences, Marc also became aware, at a young age, of how people’s social and physical environment can impact their behavior, beliefs, and personality. Marc’s relatives on his mother’s side are predominately Christian, with many living in more rural areas, whereas his relatives on his father’s side are predominately Jewish and live in more urban or suburban areas. It was always interesting to Marc to see these differences and how they might influence political beliefs, interests, preferences, and behavior. This was a reminder to Marc that people tend to grow into who they are; they are not necessarily born into who they are.

An anxious kid, Marc did not enjoy school very much even though he did well academically. Often thinking that he was going to fail his next test, he would spend hours worrying—more time worrying than actually studying. His father once prodded him to fail a test to see that it is not the end of the world. Marc couldn’t bring himself to do it. The best part of school was definitely recess and the chance to play basketball or touch football; it was a chance to break free from his worrying mind.

You might think that given these experiences, Marc would enter college to study psychology. You’d be wrong. Marc entered the University of Michigan to study computer

engineering, due to his affinity for math and science and with the idea that computer engineering would be a growing field. By his junior year, Marc became disinterested in computer engineering and thought of dropping out of school. Two experiences prevented that from happening. The first was a biomedical engineering seminar that Marc attended, where he saw Doug Noll talk about a technology called functional magnetic resonance imaging (fMRI), where one could monitor the brain in action. Marc was inspired by this presentation and e-mailed Noll to see whether he could work or volunteer in his lab, which studied fMRI from the physics side. Two of Noll's lab members, Luis Hernandez-Garcia and Scott Peltier, got back to Marc, and Marc began to work in that lab. The second experience involved Marc's introduction to industrial and operations engineering (IOE), which was a field that combined elements of engineering and psychology. Marc took a course called Cognitive Ergonomics, taught by Yili Liu. Liu took an interest in Marc and encouraged him to pursue a PhD in IOE, seeing that Marc would likely not be satisfied in an industry job. Before that time, Marc had never considered pursuing a PhD, and the idea was a complete mystery. These experiences inspired Marc and got him closer to pursuing his passion—studying human behavior and the human mind.

These experiences also led Marc to meet two additional mentors who would have a huge impact on Marc's career and interests. While working at the fMRI lab, he noticed some psychologists running experiments on people in the MRI scanner. The ability to quantifiably study brain processes, which could help one to understand behavior, fascinated Marc. The codirector of the fMRI center, John Jonides, met with him and offered him a position as his lab manager. As lab manager, Marc learned, as John would say, "soup to nuts" for what it is like to be a cognitive neuroscientist. After a year as lab manager, Marc was accepted at the University of Michigan as an interdepartmental doctoral-level student in psychology (under the guidance of John Jonides) and IOE (under the guidance of Yili Liu). In addition, Marc was also introduced to Stephen Kaplan, who taught a course titled Neural Models of Learning. Marc began to meet with Steve regularly to discuss research ideas. It was in these meetings that Marc and Steve designed a study to test attention restoration theory (ART). The idea behind ART is that if one can find environments that do not tax directed attention, while simultaneously having stimulation that can capture involuntary attention, one might be able to restore or replenish this vital cognitive resource (i.e., directed attention; Berman, Jonides, & Kaplan, 2008; Kaplan, 1995; Kaplan & Berman, 2010). They designed a study to test this theory in a well-controlled experiment and found that interactions with nature lead to a ~20% improvement in working memory span but that no significant improvements were found after interactions with the more

urban environment (Berman et al., 2008). These effects on cognitive performance were also not driven by mood or season (i.e., one attains the same cognitive effects in January as in June). Graduate school was the first time that Marc ever loved school. Part of that love stemmed from his incredibly supportive colleagues and friends, such as Ethan Kross, Rich Gonzalez, Bernadine Cimprich, Patty Deldin, Alex Atkins, Derek Evan Nee, Michael Franklin, Lee Newman, Katie Askren, Jamaal Matthews, Susanne Jaeggi, and Martin Buschkuhl. Yili showed Marc how to apply complex quantitative models to the study of the brain and behavior. John showed Marc everything there is to know about running an empirically based cognitive neuroscience lab and all the tools that go along with that. John was also willing to devote lab resources to cultivate Marc's interests even if they were a bit outside of what John's lab typically did. He also provided Marc more free meals than anyone else did, outside of Marc's parents and grandparents. Steve helped Marc find his intellectual passions, and both he and John provided Marc with the confidence to pursue those passions. John would also provide the environment where Marc would meet his wife, Katie Krpan, because Katie was a postdoc in John's lab when Marc was finishing up his PhD.

After his PhD, Marc did his postdoc with Randy McIntosh at the Rotman Research Institute at the University of Toronto. There Marc learned many cutting-edge tools of computational neuroscience that he still applies to his work, and he met great collaborators and friends in Tomas Paus, Grigori Yourganov, Stephen Strother, Nathan Churchill, and Bratislav Misic. Marc was able to apply these newly learned computational techniques to Walter Mischel's original delay of gratification (i.e., Marshmallow study) participants so that one could predict who ate the marshmallow and who resisted eating the marshmallow from the person's brain network activity 40 years later (Berman et al., 2013). Marc's first faculty job was at the University of South Carolina, where he had great collaborators and colleagues. Marc is now at the University of Chicago and has been surrounded by incredibly supportive colleagues and mentors in the Department of Psychology and across the entire university.

Currently, Marc directs the Environmental Neuroscience Lab at the University of Chicago, where his lab attempts to understand how different physical and social environments affect brain and behavior. He and his students have examined how exposure to visual disorder can cause cheating (Kotabe, Kardan, & Berman, 2016), how perceiving curved edges can alter thought content (Schertz et al., 2018), how exposure to greenspace can affect health (Kardan et al., 2015), and how environmental preferences change over development (Meidenbauer et al., 2019). Marc would like to thank all of his current and former students for their hard work and intellect. Thank you, Omid, Kate, Kim, Elliot,

Hiro, Ivo, Carlos, Gaby, Steve, Andrew, Kyoung, Francisco, Tanvi, Cecilia, Jason, Jenny, Jaime, Muxuan, Frank, Jillian, and Olivia. Marc is grateful to be able to work on these problems while also spending time with Katie and their three children, Ellie, Kara, and Sasha, and is so grateful to his parents, sister, wife, family, and friends for all of their love and support. Although progress has been made, Marc looks forward to the future of psychology with the hope that future psychological research will lead to a better understanding of the human mind and its relation to the social and physical environment (Berman, Kardan, Kotabe, Nusbaum, & London, 2019; Schertz & Berman, 2019) so that people can avoid the atrocities of the past and reach new heights of human psychological well-being. Marc believes that this will come from people's ability to model and quantify the complex interplay between their brains and the social and physical environment.

Selected Bibliography

- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*, 169–182. [http://dx.doi.org/10.1016/0272-4944\(95\)90001-2](http://dx.doi.org/10.1016/0272-4944(95)90001-2)
- Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science, 19*, 1207–1212. <http://dx.doi.org/10.1111/j.1467-9280.2008.02225.x>
- Kaplan, S., & Berman, M. G. (2010). Directed attention as a common resource for executive functioning and self-regulation. *Perspectives on Psychological Science, 5*, 43–57. <http://dx.doi.org/10.1177/1745691609356784>
- Berman, M. G., Yourganov, G., Askren, M. K., Ayduk, O., Casey, B. J., Gotlib, I. H., . . . Jonides, J. (2013). Dimensionality of brain networks linked to life-long individual differences in self-control. *Nature Communications, 4*, 1373. <http://dx.doi.org/10.1038/ncomms2374>
- Kardan, O., Gozdyra, P., Masic, B., Moola, F., Palmer, L. J., Paus, T., & Berman, M. G. (2015). Neighborhood green-space and health in a large urban center. *Scientific Reports, 5*, 11610. <http://dx.doi.org/10.1038/srep11610>
- Kotabe, H. P., Kardan, O., & Berman, M. G. (2016). The order of disorder: Deconstructing visual disorder and its effect on rule-breaking. *Journal of Experimental Psychology: General, 145*, 1713–1727. <http://dx.doi.org/10.1037/xge0000240>
- Schertz, K. E., Sachdeva, S., Kardan, O., Kotabe, H. P., Wolf, K. L., & Berman, M. G. (2018). A thought in the park: The influence of naturalness and low-level visual features on expressed thoughts. *Cognition, 174*, 82–93. <http://dx.doi.org/10.1016/j.cognition.2018.01.011>
- Berman, M. G., Kardan, O., Kotabe, H. P., Nusbaum, H. C., & London, S. E. (2019). The promise of environmental neuroscience. *Nature Human Behaviour, 3*, 414–417. <http://dx.doi.org/10.1038/s41562-019-0577-7>
- Meidenbauer, K. L., Stenfors, C. U. D., Young, J., Layden, E. A., Schertz, K. E., Kardan, O., . Berman, M. G. (2019). The gradual development of the preference for natural environments. *Journal of Environmental Psychology, 65*, 101328. <http://dx.doi.org/10.1016/j.jenvp.2019.101328>
- Schertz, K. E., & Berman, M. G. (2019). Understanding nature and its cognitive benefits. *Current Directions in Psychological Science*. Advance online publication. <http://dx.doi.org/10.1177/0963721419854100>