



Brian J. Scholl

Award for Distinguished Scientific Early Career Contributions to Psychology

Citation

“For his brilliantly creative and sweepingly broad research program that addresses the hard questions in cognitive science. Drawing on insights from psychophysics and developmental work, Brian J. Scholl has advanced psychologists’ understanding of what counts as a visual object and what rules are used to compute object persistence. To study the nature of visual consciousness and processing without awareness, he has developed ingenious visual tasks as freely as a painter mixing colors on a palette. His imaginative studies on causal perception have revived the elegant traditions of Gestalt psychology. He has set a breath-taking agenda that inspires junior and senior researchers alike.”

Biography

Brian J. Scholl is happy to have grown up in the heartland of the Midwest, in what used to be a rural part of northwestern Wisconsin, near the St. Croix River. His parents, Don and Jean Scholl, did their best to put up with what they might now politely refer to as his “independent streak.” His school years were fun, but not especially challenging—a fact for which he remains extremely grateful, as it left more time for making music, reading science fiction, and getting into trouble. He wisely chose to stay in the Midwest after high school, heading to Carleton College in Northfield, Minnesota. A sign at the edge of town captured life at Carleton: “Northfield, MN: Town of cows, colleges, and contentment”—sentiments

that he continues to enjoy today in New Haven, Connecticut, though now with fewer cows.

Scholl began his studies at Carleton as a computer science major focused on artificial intelligence, but this soon led to an even greater interest in nonartificial intelligence and to the Department of Psychology. He owes special thanks to Kathy Galotti for giving him the C in Introduction to Psychology that he needed to graduate, instead of the D that he is fairly certain he actually earned. He graduated from Carleton in 1994 with a double major, writing theses on genetic algorithms (for computer science) and theories of consciousness (for psychology). Along the way, he also studied philosophy and linguistics, including a course on syntax during his freshman year that he took along with a senior named Dan Simons—who would become a friend and collaborator many years later.

In pondering life after college, Scholl noticed that jobs in the real world involved people telling you what to do; recalling that this sort of thing was what tended to get him in trouble, he decided to avoid the real world for as long as possible. Graduate school seemed like a good next step, but he couldn’t decide whether to pursue computer science, psychology, or philosophy. This choice seemed too important to make while still in college, so he decided to find a mentor with established expertise in all three fields and to make up his mind later. This led him to Zenon Pylyshyn, who was the director of the Rutgers Center for Cognitive Science (RuCCS). Scholl’s decision to work with Pylyshyn was one of the best choices he ever made, and it led to many exciting collaborations and a lasting friendship. They began their joint work with discoveries about how the mind keeps track of objects as the same persisting individuals over time, motion, featural changes, and visual interruptions such as occlusion. Scholl drew three primary lessons from watching Pylyshyn work, which he has since tried to emulate: Keep the big picture firmly in mind, disregard disciplinary boundaries, and craft experimental paradigms to fit theoretical questions (rather than the reverse).

Early in his graduate school career, Scholl was also fortunate to learn about cognitive development from Alan Leslie, with whom he went on to publish several papers about the nature of infant cognition and theory of mind. During these studies, he began to notice that many of the salient themes, questions, answers, and even specific manipulations in research on midlevel vision were suspiciously similar to those at play in research on infant cognition. This led him to suspect that these fields had much to offer each other and that researchers in these two areas were actually studying the same underlying processes. This hunch continues to motivate many of his projects today, as he conducts studies in both areas in an attempt to connect these two strands of cognitive science.

Scholl was also fortunate to interact at RuCCS with a fantastic array of other colleagues, from new professors including Jacob Feldman to titans including Bela Julesz, Jerry Fodor, Randy Gallistel, Rochel Gelman, and Steve Stich. Stich, in particular, taught him by example how philosophy and psychology can interact to the betterment of both. Scholl was also schooled in this regard by his housemates, Jonathan Weinberg and Ron Mallon, who remain great friends. Scholl's most important link to philosophy in graduate school, though, was that he met one of Stich's undergraduate thesis students, Wendy Reilly. He and Reilly quickly became lifelong friends, and in recent years have single-handedly supported the MetroNorth train lines between New Haven and New York City (where she is a lawyer in Manhattan but is a nice person anyway).

Beyond RuCCS, one of Scholl's most valuable experiences during graduate school was participating in the sporadic Object Group meetings organized by Pylyshyn. This discussion group brought together like-minded researchers from the broader area and introduced Scholl to both Susan Carey (then at New York University) and Anne Treisman (from Princeton). Treisman eventually served on Scholl's dissertation committee, Carey became a collaborator later in his career, and both continue to inspire him in many ways.

Near the end of graduate school, Scholl went to the annual meeting of the Association for Research in Vision and Ophthalmology (ARVO). Being incurably nocturnal, he stayed up late during the first night of the conference, chatting with various colleagues on the veranda of a beachfront hotel. Eventually everyone else went to bed except for Scholl and an incredibly wise and interesting fellow whose name Scholl hadn't caught, but who he eventually learned was Ken Nakayama. That chat—plus the discovery that all of the most interesting research at ARVO seemed to have come from the group that Nakayama ran along with Patrick Cavanagh—led Scholl to do postdoctoral work the following year at the Harvard Vision Sciences Laboratory.

At Harvard, Scholl discovered how intellectually stimulating a large lab group can be—especially one that is active 24 hours per day and has a Ping-Pong table. Scholl and Nakayama branched out to the study of dynamic visual events, focusing on the perception of causality, and through these projects Scholl saw how important and useful it can be to construct phenomenologically compelling demonstrations of visual phenomena. One floor up in William James Hall, Scholl also had a chance to reconnect with his old Carleton classmate Dan Simons, with whom he began a long-term collaboration (led by Simons's graduate student Steve Most) focused on the relationships between attention and awareness—especially as they interact in exciting strange phenomena such as inattention blindness. During this time, Scholl also began to experience the joys and tri-

als of academic service, as he received an invitation from Jacques Mehler to help edit what was already Scholl's favorite academic journal, *Cognition*.

Scholl arrived at Harvard assuming that he would stay there for several years, but he soon applied for a single job that seemed too perfect to pass up, down the coast at Yale (where the kayaking was better anyway). After receiving the job offer just a few months after beginning his postdoc, he deferred the job for a semester and then moved in 2001 to build the Yale Perception and Cognition Laboratory.

The luckiest stroke in Scholl's career soon arrived as he was joined by an unparalleled group of graduate students (Hoon Choi, Jon Flombaum, Nic Noles, and Nick Turk-Browne), two postdoctoral fellows (Steve Mitroff and Josh New), and many talented undergraduate collaborators (including Dawn Chan, Phillip Isola, Alexandria Marino, Maya Shankar, Rachel Sussman, and Alex White). Yale also encouraged graduate students to work in more than one laboratory, and in this context Scholl was also able to work with Ohad Ben-Shahar, Erik Cheries, Justin Jungé, George Newman, and Kristy vanMarle. This group, aided by funding from the National Science Foundation and the National Institutes of Health, has led Scholl's research program in several new directions, with a focus on attention, awareness, and (more recently) learning.

What drew Scholl to Yale in the first place was the sense that the quality of his potential colleagues there was unmatched: Nobody at Yale seemed to be missing the forest for the trees, and everyone seemed to be studying Big Questions with theoretical sophistication. He continues to feel very fortunate to work among such a brilliant, warm, and interactive group of people, including Wooyoung Ahn, Paul Bloom, Jeremy Gray, Andrew Hollingworth (now at the University of Iowa), Marcia Johnson, Frank Keil, Teresa Treat, and Steve Zucker. Laurie Santos and Karen Wynn have been particularly close colleagues and friends, and have introduced Scholl to the joys of studying nonhuman primates and human infants. (This has helped him keep the trials of testing undergraduates in perspective, since only a modest number of them drool on computers or carry dangerous infectious diseases.) In several ways, however, Scholl's closest colleague at Yale has been Marvin Chun. In fact, Scholl was initially hired to replace Chun (who had left Yale for a tenured position elsewhere the year before Scholl arrived), and he felt honored to inherit Chun's old office. Since Chun was rehired at Yale a few years later, however, Scholl has greatly enjoyed their joint lab meetings, collaborations, and work co-advising students, and he remains honored to contribute to such a vibrant visual cognition group.

The results of working with such fabulous students and colleagues have paid off for Scholl with several honors, including the Robert L. Fantz Memorial Award from the

American Psychological Association and a fellowship invitation to the Center for Advanced Study in the Behavioral Sciences. His most cherished honors, however, have stemmed from the love of teaching and mentoring that he first acquired at Carleton. He is currently the only member of the Yale faculty to have won both the major prize for graduate education (the Graduate Mentor Award, in 2003) and one of the major undergraduate teaching prizes (the Lex Hixon Prize for Teaching Excellence in the Social Sciences, in 2005). Scholl continues to have great fun teaching Introduction to Cognitive Science—now among the largest courses in the university—and he is now serving as Director of Undergraduate Studies for the cognitive science major. Having received tenure earlier this year, he looks forward to many more years of collaborations with his Yale colleagues.

Selected Bibliography

- Alvarez, G. A., & Scholl, B. J. (2005). How does attention select and track spatially extended objects? New effects of attentional concentration and amplification. *Journal of Experimental Psychology: General*, *134*, 461–476.
- Choi, H., & Scholl, B. J. (2004). Effects of grouping and attention on the perception of causality. *Perception and Psychophysics*, *66*, 926–942.
- Flombaum, J. I., Kundey, S. M., Santos, L. R., & Scholl, B. J. (2004). Dynamic object individuation in rhesus macaques: A study of the tunnel effect. *Psychological Science*, *15*, 795–800.
- Flombaum, J. I., & Scholl, B. J. (2006). A temporal same-object advantage in the tunnel effect: Facilitated change detection for persisting objects. *Journal of Experimental Psychology: Human Perception and Performance*, *32*, 840–853.
- Mitroff, S. R., & Scholl, B. J. (2004). Perceiving the disappearance of unseen objects. *Perception*, *33*, 1267–1273.
- Mitroff, S. R., & Scholl, B. J. (2005). Forming and updating object representations without awareness: Evidence from motion-induced blindness. *Vision Research*, *45*, 961–967.
- Mitroff, S. R., Scholl, B. J., & Wynn, K. (2004). Divide and conquer: How object files adapt when a persisting object splits into two. *Psychological Science*, *15*, 420–425.
- Most, S. B., Scholl, B. J., Clifford, E., & Simons, D. J. (2005). What you see is what you set: Sustained inattentional blindness and the capture of awareness. *Psychological Review*, *112*, 217–242.
- Most, S. B., Simons, D. J., Scholl, B. J., Jiminez, R., Clifford, E., & Chabris, C. F. (2001). How not to be seen: The contribution of similarity and selective ignoring to sustained inattentional blindness. *Psychological Science*, *12*, 9–17.
- Scholl, B. J. (2001). Objects and attention: The state of the art. *Cognition*, *80*, 1–46.
- Scholl, B. J. (2004). Can infants' object concepts be trained? *Trends in Cognitive Sciences*, *8*, 49–51.
- Scholl, B. J. (2005). Innateness and (Bayesian) visual perception: Reconciling nativism and development. In P. Carruthers, S. Laurence, & S. Stich (Eds.), *The innate mind: Structure and contents* (pp. 34–52). London: Oxford University Press.
- Scholl, B. J., & Leslie, A. M. (1999a). Explaining the infant's object concept: Beyond the perception/cognition dichotomy. In E. Lepore & Z. Pylyshyn (Eds.), *What is cognitive science?* (pp. 26–73). Oxford, England: Blackwell.
- Scholl, B. J., & Leslie, A. M. (1999b). Modularity, development, and 'theory of mind'. *Mind and Language*, *14*, 131–153.
- Scholl, B. J., & Nakayama, K. (2002). Causal capture: Contextual effects on the perception of collision events. *Psychological Science*, *13*, 493–498.
- Scholl, B. J., & Nakayama, K. (2004). Illusory causal crescents: Misperceived spatial relations due to perceived causality. *Perception*, *33*, 455–469.
- Scholl, B. J., & Pylyshyn, Z. W. (1999). Tracking multiple items through occlusion: Clues to visual objecthood. *Cognitive Psychology*, *38*, 259–290.
- Scholl, B. J., Pylyshyn, Z. W., & Feldman, J. (2001). What is a visual object? Evidence from target merging in multiple-object tracking. *Cognition*, *80*, 159–177.
- Turk-Browne, N. B., Jungé, J. A., & Scholl, B. J. (2005). The automaticity of visual statistical learning. *Journal of Experimental Psychology: General*, *134*, 552–564.
- vanMarle, K., & Scholl, B. J. (2003). Attentive tracking of objects vs. substances. *Psychological Science*, *14*, 498–504.

