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A Tribute to Guy Groen

Guy Groen, a distinguished contributor to cognitive science, died August 24, 1992, in Toronto, at the age of 57.

Guy was born in Belgium, moved to England at the age of 5, and then to Canada at 15. He received his Bachelor's degree in psychology in 1956 from the University of Toronto, and his Master's degree in mathematical statistics in 1961. He moved to Stanford University in 1962, where he obtained a Ph. D. in education, under the direction of Pat Suppes.

After graduating from Stanford, Guy was an assistant professor at Carnegie Melon University from 1967 to 1973, and was an NIE Associate at the National Institute of Education before returning to Canada in 1975. From 1975 to 1992, he was an associate professor at McGill University where he had a joint appointment in the Department of Educational Psychology and Counselling, Faculty of Education, and in the Centre for Medical Education, Faculty of Medicine. His major research interest was in the area of problem solving. Over the years, his research evolved up the ladder of complexity, devoting work to reaction times in simple arithmetic and moving on to working on diagnostic reasoning by physicians and medical students.

During the course of a 30-year-career, Guy made significant contributions in several areas of applied cognitive science. As a graduate student in Stanford, he became involved in seminal research in the development of computer-assisted instruction (Suppes & Groen, 1968). His doctoral research on chronometric studies of children's arithmetic was very influential in the development of the field of cognitive research in mathematics (Groen & Parkman, 1972; Groen & Resnick, 1977). He was to make several

outstanding contributions to this field over the course of ten years. Guy had a keen interest in the philosophy of science and published a paper with Nobel Laureate, H. A. Simon. He was also interested in Piagetian thought and its relevance to educational practice, and, consequently, produced several distinguished articles that challenged many of the prevailing views on this matter (Groen, 1978). Guy was also actively involved in research pertaining to computer-based learning environments and, in particular, Logo environments. In his writings on this subject, he attempted to formalize the notion of a microworld in order to provide a relatively precise measure of what could be learned (Groen, 1984).

It may be said that Guy Groen was a true intellectual. His major research interest during the past decade was in the domain of medical cognition, which offered him a set of unique, complex, and difficult problems, but, because of the nature of his intellect, he was able to take on these challenges. He helped bring creative solutions to complex problems, drawing on a varied and vast intellectual knowledge-base.

Guy was quick to recognize and acknowledge new and promising ideas, and was even quicker at dismissing poor and ill-formed ones. This was reflected not only in our joint collaborative efforts, but also in his interactions with students. He attracted intelligent, creative, and ambitious students, whom he took great pride in fostering in their intellectual development while still providing the maximum freedom to pursue their intellectual goals. Being a person who thrived in an environment that provided maximum freedom of expression of ideas, the Centre for Medical Education provided the kind of environment where interactions with him could be in a nonrestrictive manner and where we did discuss ideas at any hour of the day or night, weekdays, weekends, and holidays. This provided an ideal setting to foster his creative ideas, consequently it was not unusual for Guy to call his close colleagues late at night to talk about some brilliant idea he had.

Medical cognition was an area of study to which Guy devoted considerable effort and I shared this study with him. At the time he began working in this area, medical education and its view on cognition was based on dated theoretical constructs and flawed assumptions. With his modern understanding of the philosophy of science, Guy drew on a varied knowledge-base, and the unique expertise he developed at Stanford and Carnegie Melon universities provided new perspectives and motivated him to challenge the flawed assumptions.

The year of 1985 marked the publication of the first paper in medical education that challenged some of these old ideas (Groen & Patel, 1985). He also had the final word on this issue (assumptions about medical education)

since the last paper that addressed the on-going debate that was generated will appear as an editorial in the *Journal of Medical Decision Making* (Patel & Groen, in press). Guy had a knack for challenging conventional wisdom and old assumptions, thus, frequently, his ideas were controversial and generated a great deal of heated debate, but in the end, Guy usually won. He was very seldom wrong.

The following year marked a publication in the journal, *Cognitive Science* (Patel & Groen, 1986) which used notions from Artificial Intelligence (AI) to address issues of medical reasoning. This was a significant paper, in that it generated a program of research that looked at the variation in the nature of expertise at a time when expertise was considered a monolithic entity. As things go in circles, Guy's last contribution on this issue, which we jointly wrote about two months ago, is also going to appear in *Cognitive Science* (Patel & Groen, in press). It is somewhat of a coincidence that this last paper was written during the International Meeting of Psychology, in Belgium, the country where he was born.

In 1988, Guy co-organized with me, in Montreal, The Tenth Annual Meeting of the Cognitive Science Society, which was a great success and brought further recognition to the cognitive science community at McGill. This year was also highlighted by a publication (Groen & Patel, 1988) that theoretically and empirically related the studies on comprehension and problem solving in medicine.

The year of 1990 was marked by a significant paper for the journal, *Cognition and Instruction* (Patel & Groen, in press), inspired by our joint trip to Indonesia and India to the International Meeting on Problem-Based Learning. This was Guy's first visit to the East, and our discussions in "back alleys" and cafes during this trip led to the conceptualization of studies related to learning and explanation in practical contexts.

In the following two years (1991-92), Guy began drawing on his expertise from Carnegie Melon University, where he first observed the integration of models of cognition and AI, and this influenced our thinking about how work in medical cognition could have implications for the design of tutoring systems and medical informatics. This resulted in our invitation to give two plenary sessions, one at the Meeting of European AI in Medicine (Patel & Groen, 1991), held at Maastricht in the Netherlands, and the other at the World Congress of Medical Informatics, in Geneva (Patel & Groen, 1992).

Guy had friends in many corners of the world — people who genuinely respected him. Following his death, many messages were received expressing the significance of Guy's personal and professional contribu-

tions. This is reflected in the following two messages. The first is from Harry Stanton, publisher, MIT Press, which is perhaps the leading publishing house for cognition and neuroscience:

It was really Guy who started me thinking about the idea of 'cognitive science' as it came to be called, one day when, catalog in hand and not much in my head, I knocked on his door and talked or rather listened for about an hour and a half while he explained to me why this non-existent (almost) field was about to grow wings and fly across the then landscape. So I owe a lot to Guy and his kindness and insight. . . . (Harry Stanton, personal communication)

The other was from Joseph Young, program director of Cognition and Memory, National Science Foundation:

Guy Groen was my officemate at Stanford from 1962-1966, and afterwards we remained good friends. We learned mathematical psychology together, talked about everything under the sun, and even were traded like ballplayers after our first quarter, 'Groen for Young and a player to be named later.' Guy went to work for Pat Suppes and I for Bill Estes. Though distance kept us from frequent contact, it was a highlight of nearly every scientific meeting we both attended for us to get together over Mexican food and go over everything from our personal and professional lives to the political scenes in the U. S. and Canada. All his old Stanford buddies, and I in particular, will miss him terribly. . . . (Joe Young, personal communication)

On a more personal note, I knew Guy personally for about 15 years, five years in a student-professor relationship, and almost a decade as a professional colleague and friend. Our professional collaboration began in the fall of 1983. During this time, we jointly co-authored 26 articles and made numerous presentations at professional meetings. We also co-edited a volume for the Tenth Annual Meeting of the Cognitive Science Society.

Our close working relationship also developed into a strong bond of friendship. We shared many things, including his flare for good food and good wine, his appreciation of music, and, most importantly, his deep desire to understand Eastern culture and philosophy. In between the scientific sessions at the professional meetings, which we invariably attended together, we had time to discuss and share some of our common interests. I will miss him.

To those who knew Guy well, his legacy will be long lasting. To those academic communities that he contributed to in most significant ways, his legacy will continue to live and thrive.

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