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Herbert Simon. Artificial intelligence as a framework for understanding intuition

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Abstract

Herbert Simon made overlapping substantive contributions to the fields of economics, psychology, cognitive science, artificial intelligence, decision theory, and organization theory. Simon's work was motivated by the belief that neither the human mind, human thinking and decision making, nor human creativity need be mysterious. It was after he helped create "thinking" machines that Simon came to understand human intuition as subconscious pattern recognition. In doing so he showed that intuition need not be associated with magic and mysticism, and that it is complementary with analytical thinking. This paper will show how the overlaps in his work and especially his work on AI affected his view towards intuition.

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1. Introduction

Herbert Simon made overlapping substantive contributions to the fields of economics, psychology, cognitive science, decision theory, and organization theory. Simon's work was motivated by the belief that neither the human mind, human thinking and decision making, nor human creativity need be mysterious. His life work was devoted to proving this point. His motto was "Wonderful, but not

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incomprehensible” (Simon, 1969, p. 4). Where he carried this out was at the intersection of economics, psychology, cognitive science, and organization theory. A major part of this intersection was creating computer programs which allow machines to “think” and make choices.

It was after he helped create “thinking” machines that Simon came to understand human intuition as subconscious pattern recognition. In doing so he showed that intuition need not be associated with magic and mysticism.¹ He also showed that “intuition is not a process that operates independently of analysis; rather the two processes are essential complementary components of effective decision-making systems” (Simon & Gilmartin, 1973, p. 33).

Intuition is often described by what it is *not*: intuition is a residual concept. Intuition is not a conscious analytical – logical, sequential, step-by-step, and reasoned – process of thinking. The most common terms used for intuition reveal intuition’s residual nature: gut feeling, educated hunch, sixth sense. Bunge (1962), in his book *Intuition and Science* states that intuition is what we call “all the intellectual mechanisms which we do not know how to analyze or even name with precision, or which we are not interested in analyzing or naming” (p. 68). The intellectual mechanisms Bunge cites include rapid reasoning, synthesizing disparate elements into a grand vision, and sound judgment. Simon’s preference was to refer to intuition as subconscious pattern recognition.

Although the logical and analytical nature of economic thinking has kept intuition in the background of the profession, Simon is not the first economist to discuss intuition. Adam Smith (Frantz, 2000), John Stuart Mill (Frantz, 2001), Alfred Marshall (Frantz, 2002b), John Maynard Keynes (Moggridge, 1995), Schumpeter (1954), and Frank Knight (Frantz, 2002a) are other famous names who wrote about intuition. For the past 25 years it has become almost commonplace for an economist to state during a presentation that, “The intuition behind the model (and/or result) is ...” In, *The Making of an Economist*, Klamer and Colander (1990) interviewed graduate students from various departments throughout the US. Students consider both mathematics and intuition to be important, and they express an appreciation for the intuitive elements in the work of their professors.

This paper will show some of the overlaps among Simon’s work on economics, psychology, cognitive science, and organization theory, and how these overlaps affected his view towards intuition.

¹ Simon had his own intuitive experiences. His preliminary exam in statistics for the University of Chicago in 1940 required that he produce a derivation of the chi-square statistic: he provided two derivations. He says, “While taking my shower on the morning of that exam, it came to me with blinding and unaccountable certainty that there would be a question on chi-square, and I boned up on it before setting out for the exam room. On no other occasion have I had such loving attention from my guardian angel” (Simon, 1996, p. 84). Simon had been contemplating programming computers to simulate chess playing since the early 1950’s. In 1955 during a walk on the campus of Columbia University he says, “Suddenly, I had a clear conviction that we could program a machine to solve such problems” (p. 203). Speaking about government employees specializing in security he said, “Intuitively, they know that intellectuals seek to be loyal to abstractions like ‘truth,’ ‘virtue,’ or ‘freedom,’ rather than to a national state or its flag” (Simon, 1989a, p. 133).

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