# A Clinical Perspective on Tacit Knowledge and Its Varieties

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ABSTRACT Key Words: tacit knowing, tacit knowledge, explicit knowledge, Michael Polanyi, Harry Collins *Harry Collins' book* Tacit and Explicit Knowledge *seeks to clarify the concept of tacit knowledge made famous by Michael Polanyi. Collins' tripartite taxonomy of tacit knowledge is explained using illustrative examples from clinical medicine. Collins focuses on distinguishing the kinds of tacit knowledge that can (in principle) be made wholly explicit from the kinds of tacit knowledge that are inescapably tacit. Polanyi's writings, on the other hand, emphasize the process of tacit knowing. Collins' investigation of tacit knowledge makes an important scholarly contribution that is distinct from and complementary to investigations that focus on tacit knowing.*

The term *tacit knowledge* has been used in many scholarly disciplines, but its definition varies widely between (and sometimes within) disciplines.[1] The term *tacit knowledge* itself contributes to this confusion. Polanyi rarely used the phrase *tacit knowledge* in his own writings. He wrote instead about tacit awareness, the tacit dimension, and tacit knowing.[2] So discussion of Polanyi's central intellectual contribution – the tacit dimension – is typically conducted using a term – tacit knowledge – that does not emphasize his focus on the process of knowing. In particular, the term *tacit knowledge*, though it is grammatically less awkward than *tacit knowing*, tends to reinforce the misconception that Polanyi was endorsing some kind of mystical, special knowledge in opposition to explicit knowledge.

This often-ignored distinction between tacit knowing and tacit knowledge is important for understanding Harry Collins' excellent new book, *Tacit and Explicit Knowledge*, in which he tries to clarify confusion about Polanyi's thought and modern debates about tacit knowledge and tacit knowing. Collins (who uses the term *tacit knowledge* throughout his book) has produced an original and important contribution to scholarship on the tacit dimension that should be of great interest to all readers of *Tradition and Discovery*. This book provides a fresh perspective in part because it tackles the subject of tacit knowledge without using Polanyi's own writings as the starting point for discussion. In this review, I shall frequently rely on illustrative examples of tacit knowing and tacit knowledge taken from my own discipline, clinical medicine.

Collins' book is built around three provocative claims. First, he declares that Polanyi himself is partially to blame for the confusion around tacit knowledge. Polanyi's discussion of the tacit dimension in *Personal Knowledge* is not always clear or consistent, and often seems to suggest that the tacit dimension is a mystical or special concept, rather than an unremarkable aspect of everyday human knowing and doing. Second, he argues that tacit knowledge seems problematic or unusual only because of our modern focus on explicit knowledge. Humans know and do countless things every day without worrying about exactly how they know or do them. This fact seems odd only because our society takes for granted that true, scientific knowledge must be wholly explicit. As a result, scholars often misinterpret the existence of tacit knowledge as a residual nuisance rather than an indispensible component of human knowledge. Finally, Collins claims that scholarship on tacit knowledge has been hindered by the mistaken assumption that "understanding human experience is the route to understanding knowledge" (6). The resulting focus on human perception and embodiment obscures important features of tacit knowledge. In other words, Collins argues that we should focus more on tacit *knowledge* and less on tacit *knowing*.

Collins devotes the first half of his book to the concept of strings. A string is any physical object with some kind of pattern inscribed on it, such as a photograph (patterns of ink on paper) or spoken words (patterns of compressed air). Strings transmit information through physical contact, through which patterns are transformed from one medium to another (e.g, transformation of electrical currents into patterns of pixels on a computer screen). Collins takes pains to distinguish string transformation from language translation, which always requires human interpretation (and so by extension access to tacit knowledge). Collins also distinguishes digital strings from analog strings. The information in digital strings can (at least theoretically) be broken down into a set of explicit steps or patterns without any loss of information. In contrast, transmission and interpretation of analog strings depends partly on their physical properties. The patterns in analog strings always require some social knowledge or understanding that "affords" their interpretation in one way rather than another. Knowledge can be made wholly explicit only if it can be transmitted as a digital string.

Collins' detailed, painstaking definitions (e.g., eight different meanings of *cannot*) pay off in the second part of the book, where he proposes a taxonomy of tacit knowledge. He divides tacit knowledge into three distinct categories.

(1) Relational tacit knowledge comprises knowledge that is tacit only because of contingent features relating to interpersonal interaction or attention. A doctor seeing a patient for a rash may not explicitly recognize that his patient is annoyed, because he is behind schedule and is focused on getting to his next patient. This knowledge could have been made explicit if the doctor had merely more paid attention to the patient's emotional state or if the patient had voiced her annoyance at being kept waiting past her scheduled appointment time.

(2) Somatic tacit knowledge comprises knowledge that is tacit because of the human body's physical properties or limitations. Suppose that the presence or absence of this patient's rash depends on two factors: subtle changes in body temperature and small fluctuations in serum antibody concentrations. The patient will be unable to tell the doctor exactly when her rash started or how it has changed over time. This is because a) human memory is fallible, b) humans have a limited ability to perceive subtle changes in their peripheral body temperature, and c) humans have no ability to perceive changes in their serum antibody concentrations. Doctors might, however, construct a sophisticated machine to continuously measure antibody concentrations, body temperature, and the presence or absence of skin rashes. Such a machine could make explicit the knowledge of how the patient's rash changes over time and perhaps even lead to a mathematical equation that predicts her rash based on body temperature and antibody concentrations. Somatic tacit knowledge, like relational tacit knowledge, is not mystical and can be made explicit in principle (e.g., through the construction of a temperature-and-antibody-measuring machine).

(3) Finally, collective tacit knowledge comprises knowledge that is tacit because it depends on social and cultural judgments that depend on context and so cannot be generalized in explicit terms (i.e., transformed into digital strings). A decision algorithm for diagnosing a rash, for example, always presupposes a wealth of collective tacit knowledge that cannot be made explicit. The diagnostic algorithm takes for granted that the rash is troublesome enough for the patient to seek formal medical advice (a threshold that varies across cultures), that the doctor is able to distinguish among rashes, bruises, and burns and so consult the proper diagnostic algorithm, that the doctor has training that allows him to interpret the algorithm, and so on. Collins convincingly argues that collective tacit knowledge can never be made wholly explicit, even with the help of massive supercomputers or armies of researchers. Collective tacit knowledge is typically required for processes (such as bicycles or temperature-and-antibody-measuring machines) to operate successfully within

human society. For example, our hypothetical temperature-and-antibody-measuring machine could only work reliably for a rash that always had the same color and appeared at the same anatomical location. Few rashes are so predictable in the real world. Even with sophisticated optical technology, it is probably not possible to construct a machine that could reliably identify a rash that appeared and disappeared in different shapes and on different parts of the body. Nor could a machine reliably identify the rash when the patient was sunburned, or if the rash periodically changed colors. A human with access to collective tacit knowledge would probably need to tell the machine when the rash appeared and disappeared in order for it to work properly. Collective tacit knowledge, however, is just another kind of everyday human knowledge. Humans can typically identify a rash on their skin without a second thought. Rash identification only seems difficult when one tries to build a machine that can do the job as well as humans can.

I know of only one other published attempt to develop a taxonomy of tacit knowledge,[3] so Collins' tripartite classification of tacit knowledge is an important and welcome contribution to Polanyi scholarship. I agree with Collins that Polanyi's own descriptions of tacit knowing are not always entirely clear. For example, in *Personal Knowledge* Polanyi contrasts tacit vs. explicit awareness, focal vs. subsidiary attention, and articulable vs. inarticulable knowledge, but he never explains exactly how these different pairings relate to one another. Polanyi's later writings did clarify some of the ambiguities in *Personal Knowledge,* and his thinking did evolve over the course of his career. Nevertheless, ambiguity remained, as evidenced by important disagreements about Polanyi's philosophy among many of his closest collaborators.[4, 5]

A major goal of the tripartite taxonomy of tacit knowledge set out in *Tacit and Explicit Knowledge* is to distinguish the kinds of knowledge that can (at least theoretically) be made explicit from the kinds of knowledge that cannot. Most of Collins' arguments are oriented to the artificial intelligence community and to debates about the degree to which computers can approximate human cognitive processes and expertise. He draws a line between relational and somatic tacit knowledge on one side, which can always be made explicit (at least theoretically), and collective tacit knowledge on the other, which cannot.

One practical test of Collins' taxonomy is whether scholars in different fields find it a useful framework for working out the implications of tacit knowledge to their own disciplines. For example, doctors and patients typically reach decisions about diagnosis and treatment during face-to-face interactions. When reaching these decisions, both parties depend on explicit and tacit knowledge to reach optimal decisions. Identifying circumstances during which reliance on tacit knowledge leads to better or worse medical decisions might eventually be used to improve medical care.[6] As a modest first step, I recently attempted to make explicit some aspects of tacit knowing in clinical medicine. In this study, doctors and patients were video-recorded during routine office visits and were subsequently interviewed about their thoughts and actions using the video-recording as an elicitation device. My colleagues and I analyzed these interviews for evidence that study participants relied on tacit knowing when reaching medical decisions.[7]

I found that Collins' taxonomy was a useful way to think about the study's findings, though the study was mostly finished before I read his book. The majority of patients' and doctors' comments involved relational tacit knowledge; that is, knowledge that patients and doctors merely failed to notice during the visit. Several patients, for example, explicitly recognized aspects of their own communication styles for the first time. Other comments might relate to somatic tacit knowledge. A few doctors mentioned that they adjusted their tone of voice to fit the topic of discussion and patients' needs. Although ratings of doctors' tone of voice have been associated with patient satisfaction in other studies, patients in our study rarely mentioned the doctor's

tone of voice. Collins might consider tone of voice an example of somatic tacit knowledge. Humans have difficulty focusing on multiple cognitive tasks at once, so during clinic visits, patients may not be able to notice changes in voice tone at the same time that they are talking to the doctor and remembering details of their physical symptoms. Finally, some comments from the study participants seemed to indicate collective tacit knowledge. One patient related that she was satisfied with her doctor because he was much kinder than her previous doctor. This kind of judgment requires sophisticated collective tacit knowledge about what counts as kind behavior for doctors. Study participants did, therefore, seem able to recognize explicitly some judgments that required access to collective tacit knowledge. Collins' taxonomy does make it clear, however, that it would be impossible to derive a universal, explicit rule for judgments that require collective tacit knowledge (e.g., a formula for predicting patients' satisfaction with their doctors). Readers of *Tradition and Discovery* will not need Collins' book to convince them of this conclusion. Many otherwise intelligent people who work in health care, however, still seem to act as if medical technology could (and should) one day replace (rather than merely complement) the human practice of clinical judgment. For these people, Collins' book provides an argument that is helpful for distinguishing realistic applications of technology from science fiction.

I have few complaints about *Tacit and Explicit Knowledge*. I do wish that Collins had given the reader more context for his argument in the first half of the book. In particular, his discussion about strings and string transformation relies almost entirely on his own previous work and gives the impression that he developed the concept single-handedly. His discussion of strings would have been stronger if he had discussed how his definition related to or built upon the concept of strings used in computer science. In addition, I was curious as to whether Collins' definition of strings has been taken up by other scholars in the fields of artificial intelligence and information science.

Finally, while Collins does show the importance of distinguishing between the content of knowledge and the process of knowing, he seems to dismiss the focus on knowing as misguided or unhelpful. However, these two perspectives are complementary and both are important for answering different questions. Whether knowledge is tacit or explicit ultimately depends not on its content, but on how it functions for the people who interpret and rely on it.[8] Polanyi's central motivation was to explain the processes of problem solving and scientific discovery, which is why he typically wrote about *tacit knowing* and the *tacit dimension* rather than *tacit knowledge*. In contrast, Collins is tackling a question that was secondary to Polanyi's intellectual program: which aspects of the tacit dimension can be made explicit under the right circumstances, and which cannot? This question requires a focus on knowledge rather than knowing and is central to problems about artificial intelligence. It is a much less important question, however, when trying to understand how doctors and patients make use of knowledge to reach medical decisions. Collins himself notes that the doctor evaluating the rash cannot distinguish between relational, somatic, and collective tacit knowledge, because he experiences all three categories of tacit knowledge in the same way.

Overall, however, these are minor criticisms of an important book. Collins has provided a fresh and practical perspective on tacit knowledge that has the potential to help scholars in other disciplines (such as clinical medicine) think more carefully and clearly about the nature of human knowledge. Collins leaves the door open for others to build on or even improve his taxonomy. He notes that many problems relating to tacit knowing and knowledge remain unsolved, and that the boundaries between relational, somatic, and collective tacit knowledge are not always clear or fixed. These categories can still, however, do much to clear away the thicket of misunderstanding that has grown up around tacit knowledge and tacit knowing. Polanyi was

undisputedly a brilliant and original thinker, but his own writings do not always provide clear or definitive answers to the many questions and problems he tackled during his life. Collins' book builds on and extends aspects of Polanyi's intellectual program by focusing on questions about knowledge to which Polanyi gave relatively less attention. As a result, I expect that *Tacit and Explicit Knowledge* will have a significant impact on future debates about the tacit dimension for years to come.

## Endnotes

[1]Véronique Ambrosini and Cliff Bowman, "Tacit Knowledge: Some Suggestions for Operationalization," *Journal of Management Studies* 38:6 (2001): 811-829.

[2]Stephen Gourlay, "Knowing as Semiosis: Steps towards a Reconceptualization of 'Tacit Knowledge'" in Tsoukas H. and N. Mylonopoulos, editors, *Organizations as Knowledge Systems: Knowledge, Learning and Dynamic Capabilities* (New York: Palgrave MacMillan, 2004), 86-105.

[3]Carl Bereiter and Marlene Scardamalia, *Surpassing Ourselves: An Inquiry into the Nature and Implications of Expertise* (Chicago: Open Court, 1993).

[4]Marjorie Grene, "Tacit Knowing: Grounds for a Revolution in Philosophy," *Journal of the British Society for Phenomenology* 8 (1977):164-71.

[5]Phil Mullins and Marty Moleski, "Harry Prosch: A Memorial Re-appraisal of the *Meaning* Controversy," *Tradition and Discovery* 32:2 (2005-2006): 8-23.

[6]Stephen G. Henry, "Polanyi's Tacit Knowing and the Relevance of Epistemology to Clinical Medicine," *Journal of Evaluation in Clinical Practice*, 16:1 (2010): 292-7.

[7]Stephen G. Henry, Jane H. Forman, and Michael D. Fetters, "'How Do You Know What Aunt Martha Looks Like?' A Video Elicitation Study Exploring Tacit Clues in Doctor-Patient Interactions," *Journal of Evaluation in Clinical Practice*, 2011 [in press].

[8]Grene, *op. cit.*