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"In memory of Michael Turvey"

One more time with feeling: A personal tribute to Michael Turvey the scientist[1]

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ABBREVIATIONS
HKB model Haken-Kelso-Bunz model

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ABSTRACT

Early influences of Michael Turvey's work on the author's thinking and Turvey's long lasting impact on the field of motor behavior and related scientific disciplines are briefly described.

KEYWORDS: Perception | Action | Functional Synergies | Coordination Dynamics

INTRODUCTION

When Claudia texted me that Michael was gone, I immediately said I'd come up. Knowing that others would have the same reaction to the terrible news, she said "Michael will be sorry to miss the gathering". Isn't that the truth! Looking around at this room and seeing you all, I think you will agree, he's here. Can't you hear him? As he used to say in his famous lectures when he wanted to emphasize a point "*One more time with feeling!*" Everyone here who knows Michael Turvey will agree he'd want us to celebrate his life. One more time with feeling. And this time, Mikey, yours truly gets to call the shots. But I know he's listening. I can hear him, his deeply resonant Shakespearean voice: "I'm listening Kelso". He could be so intimidating sometimes, couldn't he? Why? Because, in fact, *as everyone knows he was a genius*.

I can't remember when I first met Michael Turvey. Maybe as early as 1973 at one of the NASPSPA meetings, for sure by 1977 at Ithaca College. But before that, there was this paper he wrote which was different than any paper I had ever read before. He'd written it during a Guggenheim Fellowship at the University of Sussex in England, circa 1973 or 74. It was called "Preliminaries to a Theory of Action with Reference to Vision" (Turvey, 1977; see also Fowler & Turvey, 1978). Although it wasn't published until 1977 somehow a draft was in circulation—just regular photocopier stuff. My students and I struggled over it, partly because of the content—Turvey had unearthed a whole host of papers few had ever heard of before, and partly because of the sheer *elegance and style* of the writing. How is it that you can perceive the letter A in such a staggering variety of contexts? And how is it that you can produce the letter A using an infinite variety of coordinated movements? How is the constancy of perception linked to the constancy of action? The concepts of action he introduced, invariants, equivalence classes and the like were revolutionary at the time. So were the concepts of vision, of how we see. The minimal unit of understanding lay in their relation. A coalition. A togetherness. Not a dominance of the senses over the poor old motor system, the servant of the mind. Rather, Turvey was saying the action concept of writing A and the perception concept for identifying A share common ground. This was not armchair stuff. All of it was substantiated by mechanistic details of modeling, mathematics and neurophysiology. I had never read anything like it. And the *obvious level of scholarship* from the Jesuitly trained Turvey was unparalleled.

Why did this early Turvey paper have such an effect? Well, it was far closer to what I thought the whole field of movement *should* be all about! It struck a chord. From an early age, I was interested in sports and singing and drama, as well as science. When I entered graduate school in Madison, Wisconsin I wondered if there might be a scientific entry point into how you become skilled at those things. The zeitgeist of cognitive psychology in those days was all about "programs", "representations" and "information processing." In order to claim any legitimacy for the study of movement, the task was to see whether movement "cues" (feelings of where your limbs are and how they move) follow the same rules as other sensory systems. Does memory for movement deteriorate over time the same way as memory for visual and auditory information? What was measured were very simple responses—positioning a lever or tapping a key.

[1] Based on a eulogy delivered at Michael Turvey's funeral on August 19, 2023.

Had this anything to do with understanding real skill in real environments? As they say sometimes about the field of Quantum Mechanics, the attitude was don't worry about what it means. Just get on and do it. Which, of course, we did (Kelso, 1977).

However, Turvey's paper and his ideas of *coordinative structures* aka *functional synergies* changed the furniture in the room, as they say. For me, it was a completely new way to do science. I asked him to come out to the University of Iowa and give a series of lectures, which were recorded and transcribed and later published as three chapters with his students, Hollis Fitch and Betty Tuller—with beautiful graphics by someone called *Claudia Carello* (Turvey, Fitch & Tuller, 1982; Tuller, Turvey & Fitch, 1982; Fitch, Tuller & Turvey, 1982; see also Turvey & Carello, 1995). So, the plot as you can see, is thickening…

The Turvey lectures were in the spring of 1978 but did not appear in book form until 1982. By the Fall of 1978, I had moved to Haskins Labs at Yale University and was working directly with Michael and Carol Fowler and Betty Tuller and many other wonderful scientists and brilliant students. Practically speaking, by the way, Michael didn't have anything to do with my going to Haskins (my students and I at Iowa had a paper on voluntary two-handed movements about to appear in *Science* (Kelso, Southard & Goodman, 1979) and tenured Associate Professorships were on offer at Oregon and USC) but in my mind as well as my heart, of course he did. *Big time*. Haskins offered the opportunity to do full-time research, which I loved. There we went after Michael's coordinative structures in studies of both speech and limb movements. For the latter, I brought my own apparatus for studying bimanual coordination and perturbations thereof (Kelso & Holt, 1980). For speech, the technical expertise at Haskins was unsurpassed. Anywhere in the world. So we pursued, as Michael would say "how the bits and pieces gang together" when a person speaks or moves their body. That simple phrase of Michael's—*how you can take a lot of things and have them gang together to form an organization*—a process now understood as self-organization--turned out to have even greater ramifications. Unforeseen at the time. That's another story (Kelso, 1995; 2022; Turvey, 1990). But none of it—finding coordinative structures in speech production, discoveries of phase transitions in human hand movements (and indeed eventually in the human brain), the HKB model and all its symmetry breaking extensions that spawned the field of Coordination Dynamics—from Matter to Movement to Mind, Social interactions and Beyond…*Entire fields and scientific approaches, call them what you may*--Task Dynamics, Gestural Dynamics, Articulatory Phonetics, Behavioral Dynamics, Ecological Dynamics, DST, The Dynamical Hypothesis in Cognitive Science, 4E Cognition, Dynamic Touch, etcetera, etcetera, etcetera as the King of Siam used to say…None of it would have happened without Michael Turvey's insights, understandings and writings. *None of it*. Simple as that. That's really all I came here to say. Except, as an Irishman, for a parting glass. In his Essay or Epistle on Man, Alexander Pope said of Newton: "Could he, whose rules the rapid comet bind, Describe or fix one movement of his mind?" The great scientist, Michael Turvey took us much closer to answering Pope's question.

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