

Obituary - Nachruf

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In memoriam Hermann Haken (1927 – 2024)



Hermann Haken (1927-2024)

As many readers probably know, the great physicist Hermann Haken, the father of synergetics, passed away on August 14 after 97 years of a fabulous scientific life that ranged from laser theory in the 1950s to the development of nonlinear models of complex systems. I will not list here the numerous academic titles he was awarded, the prizes and honors he received in a very long and industrious life almost to the end. The interested reader will find them summarized in the magnificent obituary that Jürgen Kriz dedicated to him for SystemAgazine and the DGSF website – including, and this is of interest to every psychologist, a focus on Haken's contribution to systemic psychotherapy. You will forgive me if I attempt here to fulfill the enormous debt of gratitude I owe Haken, if only in small part, by focusing on Haken's importance to recent developments in Gestalt theory. I will therefore not go into his *cursus honorum* (which lacks only the Nobel Prize, for which he was nominated several times) or his scientific career. The interested reader will be able to find all the information he wishes, in addition to the very well-documented article by Kriz quoted above, in the enormous number of memorial publications in the most important scientific journals and on the Internet.

I will therefore speak about what Haken's work meant for the development of Gestalt theory, and I will be forgiven if I speak about it from my point of view and that of the researchers of the research group on perception, in which I recognized myself, headed by Gaetano Kanizsa, at the Department of Psychology of the University of Trieste. I must also recognize that in Italy among psychologists Haken's ideas, but in general of non-linear dynamics in events of psychological interest, have not taken root very well, and in conclusion I would also like to discuss the reasons for this relative failure.

In fact, starting in the 1970s, Kanizsa and I had begun a program of revision of some of the founding concepts of Gestalt psychology. Our interest was directed towards the problems of the self-organization of the perceptual field, which we believed to be the greatest contribution that this school had offered to psychological research, with the related problems linked to Prägnanz, to the multistability of many configurations, to isomorphism. What engaged us was the need to overcome the qualitative, metaphorical way that the theorists of this school had too often had of presenting certain concepts. Thus Köhler's extraordinary intuition of defining the perceptual field as analogous to the electromagnetic field had never gone beyond the verbal level of nominalistic analogy, while it would have deserved much more attention, and a quantification in precise terms. But the same is also true for subsequent developments. Just to give an example, Brown and Voth's field theory, very successful in the 1930s, with the postulation of the presence in the perceptual field of cohesive forces and braking forces, also stopped at a purely qualitative stage – speaking of “forces”, we should then speak of vectors, specifying their point of application, direction and length, and trying to identify their laws of action and constraints, but all this has always been very far from the ideas of its proponents and of those who wanted to apply the model to research. The same can be said of isomorphism, a term with a very precise mathematical meaning, but applied to psychology only in analogical terms. The examples could go on and on, but what I want to underline here is that this imprecision has often led to imprecise and misleading definitions of concepts that are fundamental to Gestalt psychology – even if, as Kanizsa said, these imprecisions have also had a positive side, leaving an extraordinarily open field for the creativity of researchers, with results whose extraordinary nature is there for all to see.

The turning point for us was a seminar that we held in 1984 in Macerata at the invitation of Giuseppe Galli, and in which for the first time we discussed the problem of the ambiguity of the fundamental concept of Prägnanz. Also present was Michael Stadler, then a professor at the University of Bremen, a student of Wolfgang Metzger, a great friend from Italy, where he had lived as a boy, who had also conducted important research in collaboration with colleagues

from the University of Bologna. It was Stadler who spoke to us for the first time about synergetics, which he was approaching driven by the same needs as us: to clearly specify and quantify concepts that in Gestalt psychology had remained at a nominal and qualitative level. Stadler's speech convinced us. In 1988-89 I went on sabbatical to Bremen, where I conducted research in this perspective with Stadler and his students Peter Kruse and Sabine Pfaff on apparent movement and on the anisotropy of the perceptual field.

In 1989 we therefore participated in an event that, as Kriz notes, constituted a true milestone in the history of the relationship between Haken and experimental psychology: the Schloß Elmau conference, attended by psychologists of the most diverse origins and theoretical orientations. Just a few names: Karl Pribram, J. A. S. Kelso, A. C. Zimmer, W. Wildgrem, M. T. Turvey, and so on. Beyond the great scientific value of the contributions presented, which ranged from the study of perception to neuropsychology, from multistability to emotional states, from psycholinguistics to oscillatory brain processes, to neural networks, the fundamental aspect of the conference, which rightly remained impressed in the minds of all the participants, was the great enthusiasm, and the clear feeling that something new and great was being built. Incidentally, Haken's introductory chapter, 10 pages of exemplary clarity, is in my opinion the most beautiful and clear illustration of what synergetics is, and of the ways to apply it correctly in psychological research. The proceedings, edited by Haken and Stadler under the title *Synergetics of Cognition*, were published as volume 45 of the *Springer Series in Synergetics*.

That was the occasion of my first meeting with Haken, a meeting that deeply affected me and of which I have a vivid memory. Even though I was not young, in front of him I felt like a kid, it was my first real moment in which I tried to master synergetics, so I overwhelmed him with questions, which he listened to with attention and respect, even when he felt obliged to correct me. Attention and respect for others, beyond his absolute prestige, are the two attitudes of Haken that have always been confirmed to me also in subsequent meetings.

Two other conferences of extraordinary importance also took place during this period, which I consider it necessary to report on. The first took place in Bremen in 1993, and the proceedings edited by Kruse and Stadler were published under the title *Ambiguity in Mind and Nature* as No. 65 of the Springer Series in Synergetics. Unfortunately, the memory of this conference is painful for me; with Kanizsa we had prepared a paper on multistability as a tool for perceptual research, which was included in the proceedings, but a few months before the conference Kanizsa died – and I was touched that the participants wanted to dedicate the conference to his memory.

Haken participated in this conference not only with a talk on the most important aspects of synergetics for perception, phase transition and meaning, but also with an important specific talk on the synergetics of multistability, in collaboration with T. Ditzinger. The participants included van Leeuwen, Zimmer, Kelso, Vetter, Schöner, but I would also like to emphasise the importance of the contribution of the Italian physicist G. Caglioti, who introduced the problem of the relations between quantum mechanics and synergetics. The topics discussed mainly concerned the relationships between synergetics and multistability in perception, but also multistable neurophysiological processes, neural networks, cognition in animals, etc,

The third conference I would like to mention was organised in 1999 at the University of Rome “Tor Vergata” by an epistemologist, Arturo Carsetti, and its results were published in 2000 by Kluwer under the title *Functional models of cognition*. Only one session dealt with synergetics, with specific reports by Haken, Pessa and myself. In particular, I would like to remember Eliano Pessa, a physicist who switched to psychology and was for a long time a full professor of psychology in Pavia, author of numerous publications on neural networks, but also on nonlinear dynamical systems. Unfortunately, Pessa left us in 2020, the same year as Michael Stadler and five years after the death of Peter Kruse.

The conference in Rome was of course less important than the two previously mentioned, but I wanted to talk about it because, for one thing, it was the first official presentation to an Italian audience, which aroused great interest and stimulated the beginning of concrete research activities. Moreover, Haken’s report was extremely clear and I recommend it to all those who want to follow this path.

Of course, the research and comparative work of Haken and the “synergetic” researchers is far from complete. As mentioned earlier, Haken, although older, is continuing his work at least until 2021. The *Springer Series in Synergetics* continues its publications with volumes appearing again in 2023. More than 3000 publications worldwide have been inspired by Synergetics.

As for our research group, unfortunately the news was not so glowing. When I retired in 2010, the group practically disbanded. Young researchers soon had to realize that – at least in Italy – mathematical skills are only valued by psychologists working in research if they have an ancillary function: that is, data analysis and psychometrics – otherwise a psychologist who talks about math is considered an alien. So my younger colleagues have had to look for a place outside Italy and have found it (K. Klokocovnik in the United States, G. Leonardi in Poland, A. Solfo in the Netherlands) or they have actually moved on to data analysis or psychometrics. If these lines have helped to arouse, if not enthusiasm, then at least interest, then I have achieved my goal. Because I assure you that there are

few things as beautiful for those who do research in this field as identifying the order parameters that determine the movement of a complex non-linear system in a space that is not homogeneous but characterized by the presence of attractors.

We can only thank Hermann Haken for these exciting research trips, for the attention and respect with which he listened to us, and for the insightful answers he gave us to our problems.