Siegfried Greif · Heidi Möller ·
Wolfgang Scholl · Jonathan Passmore ·
Felix Müller *Editors*

International Handbook of Evidence-Based Coaching

Theory, Research and Practice

Springer

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Preface

The original inspiration for this handbook came from discussions with academics and coaching practitioners at the European Association of Work and Organizational Psychology (EAWOP) Congress in Münster, Germany, in May 2013. A position paper on "Coaching – Practice or science based?" (Greif, 2013) traced the history of coaching and its relationship to science. An analysis of the 50 coach training programs in the USA, UK, and Germany most popular on the Internet at that time showed that references to scientific foundations or evidence-based coaching are very rare, in the USA and Germany only in 2% and 4% and in the UK at least 13% of the cases.

We developed a plan to publish a handbook with contributions from experts from both science and practice, which contribute to the further development of evidence-based coaching by providing current, scientifically founded, and practically applicable knowledge for coaches and coaching trainings. A first edition of the handbook has been published in German (Greif et al., 2018). From the beginning, however, we planned an expanded international edition in English and looked for distinguished authors from many countries. We are happy to have been able to inspire our coeditors, Jonathan Passmore and Felix Müller, to make our joint *International Handbook of Evidence Based Coaching* happen and to help us attract more international authors.

In our handbook, we have chosen to focus on basic scientific constructs, theories, and evidence for coaching rather than on the practical coaching methods or coaching schools. However, we have placed the maximum emphasis on ensuring that each individual contribution begins with a practical example from coaching and, in addition to the scientific foundations, always describes practical applications and demonstrates the importance of the scientific foundations for coaching practice. It was important that all relevant scientific disciplines are included. The presentations in our handbook show that scientific research deals with extremely diverse questions that are of high interest for coaching and are by no means as dry and distant from practice as some people might assume.

We would like to thank our authors who share with you, the reader, in more than 70 contributions their impressive knowledge. They come from many European countries, such as Germany, Austria, Switzerland, Great Britain, the Netherlands, and Denmark, as well as from the USA, Australia, South Africa, and Asia. As editors and reviewers, we were the first readers of their contributions and realized the great increase in knowledge made possible by reading them. Subsequently, we have tried out some of the suggestions ourselves in practice and have brought much of it into our own coaching training or university teaching.

We do not expect readers to read the manual from front to back. It can be used more as a reference work. We have taken great care to keep the articles short and readable. Those who wish to delve deeper into the individual themes and knowledge will find further literature in the bibliographies at the end of each contribution.

Given the large number of contributions, it makes no sense to acknowledge them individually in this preface. In order to be able to take a look at the field of knowledge at a glance, we list them here in keywords. However, the variety of topics is much greater than this, because numerous other constructs, concepts, and theories are discussed in each of the individual contributions. They are listed as keywords before each contribution.

The themes in brief

1. *General themes, coaching process, research, and profession:* definitions and concepts—science and practice—pseudoscience and charlatanry—gender and micropolitics—coaching relationship—diagnostics—success factors in the coaching process—interactions in the coaching process—ethics—professionalization—forms of contracts—quality of service—state of coaching research—team coaching research—health coaching research—supervision for coaches—system theories—behavior modification—brain-focused coaching—understanding and comprehension—e-coaching—future of AI in coaching—coaching and sustainability.
2. *Individual characteristics and changes:* Insights through coaching—defense mechanisms—mindfulness—affects and action regulation—burnout—embodiment—emotional intelligence—emotion regulation—feedback—motivational interviewing—gender theory—health—decision making—complex problem solving—culturality—career—crises—learning—mentalization—motivation and goal commitment—motivation, will, and implementation—side effects—personality development—mental disorders—resilience—self-development—self-reflection—meaning—language and meaning—stress and stress management—transformative learning—transference and countertransference—growth and security orientation—perception and judgment—values—goals
3. *Leadership and teams:* Failure in groups—leadership coaching—leadership theories—interaction dynamics in groups—team coaching—problems of teamwork—implicit leadership theories—interaction—communication—conflict management—bullying—roles—top management

4. *Organization and society:* change processes—dynamics in family businesses—power and micropolitics—organizational metaphors—organizational context—organizational culture—coaching and sustainability

No manual can be complete. Right up until the last minute, we included additional contributions. Anyone who misses concepts can let us know and we can decide whether to include them as an online contribution first. Our goal is to keep adding to and updating the handbook. For future additions, we would especially appreciate specific feedback on the individual chapters.

The two articles "Coaching definitions and concepts" and "(How) can coaching practitioners learn from science?" provide an introduction and overview to the different concepts and scientific views found in coaching. They are therefore placed at the beginning of the handbook. Overall, we have included different disciplines (psychology, education, business administration, sociology, philosophy, neuroscience, linguistics, and communication sciences) with a very wide range of scientific directions as well as qualitative and quantitative research methods, both in the overarching contributions and within the range of topics. However, we have not included concepts for which there is no scientific research or which would be classified as "pseudoscientific" because they merely give themselves the appearance of being scientific but on closer examination use scientific terms, findings, and theories in a misleading way and have not been subjected to supportive research.

Our handbook is aimed first and foremost at coaches and those who want to become coaches, at human resource developers who implement and organize coaching in their organizations, or at other clients of coaches. Coaching clients who want to know more about the basics of coaching would be a further interesting group of readers. Clients and coaches often emphasize the importance of working together as equals. As in our initial idea for this handbook, we would also like to see its use in coaching trainings.

The exchange with the authors and among us five editors was very intensive and discursive. We all took a lot of time for it, but we are convinced that it has brought us to new levels of understanding. We would like to thank the authors for this.

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Contents

Coaching Definitions and Concepts

Siegfried Greif, Heidi Möller, Wolfgang Scholl, Jonathan Passmore, and Felix Müller

Influence Through Coaching Definitions and Concepts

What is Coaching? Almost every coach knows the answer to this question. However, a comprehensive answer requires a description of coaching which differentiates it from other interventions. Defining coaching, and describing its unique characteristics, is a cornerstone of the profession (Passmore & Yi-Ling, 2019). With a definition in place, the coach can start to construct their claims that coaching is indeed a profession (Fietze, 2015).

Some see coaching as a form of person-oriented counselling, others as help for self-help rather than counselling. Raddatz (2006) sees coaching entirely as counselling without advice on the grounds that advice would not work. Differences of opinion in definitions are not merely disputes over words. These differences are related to different underpinning concepts, dispute over what counts as evidence and the future direction of development. Definitions are used to define areas of

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professional influence and those who assert them can hold a privileged position, influencing both professional practice and training (Beck et al., 1980).

For organizations, clients, and coaches, it is of fundamental importance to explore these different coaching definitions and concepts. However, in this short chapter, it is not possible to provide a complete review of all definitions, but we hope to provide a useful summary.

Coaching Definitions and Their References to Coaching Concepts

From today's relativist perspective definitions are not right or wrong (Gabriel, 2004). According to classical definition theory, a coaching definition should name the central characteristics that must be present in order for an interaction to be described as coaching and at the same time indicate characteristics that distinguish coaching from other interactions. Wahren defines coaching as "individual counselling of individuals or groups in professional and/or psychological-sociodynamic questions or problems related to the world of work by the coach" (1997, p. 9).

This early definition sees coaching as an activity (counselling) limited in scope, that of business. However, the development of coaching has seen the definition extended beyond work (Schmidt-Lellek & Buer, 2011). According to Rauen, coaching is a "person-centered counselling and support process that can include professional and private content and is limited in time" (2001, p. 64). Instead of the relatively unspecific definition offered by Wahren, other writers have tried to identify the unique features of coaching.

Passmore and Fillery-Travis (2011) have drawn on Gabriel's thinking to offer a definition which ascribed characters, processes, and outcomes to the activity of coaching: "Coaching is a Socratic based, future focused, dialogue, between a facilitator (coach) and a participant (client), the purpose is to stimulate the self-awareness and personal responsibility of the participant."

In contrast Kilburg, noted the organization's interests in coaching and offered an organizational definition: *"Executive coaching is defined as a helping relationship formed between a client who has managerial authority and responsibility in an organization and a consultant who uses a wide variety of behavioral techniques and methods to help the client achieve a mutually identified set of goals to improve his or her professional performance and personal satisfaction and, consequently, to improve the effectiveness of the client's organization within a formally defined coaching agreement"* (Kilburg, 1996).

Difficult Delimitation

The core characteristics listed in these definitions are not precisely defined. When writers suggest that coaching is "person-centered," does this mean that the coach will address the client's wishes as the sole focus of their work? What about the interests of the organizations that pay for the coaching? How are these interests balanced? Even if this characteristic is narrowly defined, it remains to be asked whether it is sufficient to distinguish it from other forms of 1-1 interventions, such as vocational counselling, mentoring, or personal development.

Are precise descriptions of the characteristics of coaching and differentiation from other interventions important or only necessary for scientific definitions? Coaching associations have not paid attention to quality criteria for definitions but like to use formulations that point to important characteristics, but which are short and snappy. One example is the definition of the world's largest international coaching association, the International Coaching Federation (ICF): "Coaching is partnering with clients in a thought-provoking and creative process that inspires them to maximize their personal and professional potential" (ICF, 2015). This definition is effective in advertising coaching and may best be regarded as an persuasive definition (Gabriel, 2004). However, it is limited in helping the reader differentiate between coaching and learning, or helping the reader understand the unique characteristics of coaching.

Coaching and Counselling

In some definitions, explanations are added in order to highlight the special features of coaching. In these explanations, references to the underlying coaching concepts can sometimes be identified. Thus, Rauen (2001, p. 63 f.) explains that "coaching does not involve 'advice' but focuses on 'self-help' and 'self-responsibility'". He notes it also excludes the treatment of mental disorders.

The formula "self-help" is used by many coaches and suggests that coaching aims to activate the existing resources of the clients. Some coaches see this as an important differentiation from counselling. However, there are definitions of counselling that see counselling as an aid to self-help. According to Häcker and Stapf counselling is a "problem-solving process designed by the counsellor according to methodical aspects, through which the efforts of the person seeking advice are supported and his competences are improved in order to cope with the task at hand independently" (Häcker & Stapf, 2009, p. 122). Constructivist counselling concepts, such as the systemic concept of Handler's integrated counselling (2007), also explicitly distinguish them from traditional specialist counselling. Whether coaching can be regarded as counselling, therefore, depends on what is understood by the term counselling. Deplazes et al. (2016) used micro-process analyses of expert videos to show that many coaches, contrary to their claims,

among other things, asked closed questions and combine instructive elements with a facilitative process. Passmore (2007) found that experienced coaches while espousing a specific model often used a diverse combination of models in their practice.

Coaching to Promote Solution and Result-Oriented Self-Reflection

Within the framework of coaching, which is protected by confidentiality, the client can openly reflect on their objectives, personal motives, and goals, but also on their fears, difficulties, and conflicts with others as well as on their individual situation and their possibilities, in a similar way to psychotherapy (see chapter: Self-Reflection in Coaching). The increasing complexity and uncertainties of post-traditional society require the individual to be more reflexive (Giddens, 1991). Against this background, Reinhard Stelter sees the function of coaching as opening a reflexive space to develop new possibilities for action (2013, p. 412). In contrast to other methods, an important key feature of coaching can therefore be seen as a "systematic and intensive promotion of result-oriented problem- and self-reflection" (Greif, 2008, p. 59). However, it may be argued that coaching shares this with psychotherapy. However, in contrast to psychotherapy, reflections in coaching focus more on the social and organizational context (see chapter: Mental Disorders in Coaching).

Problem- and self-reflections can slide into endless rumination. One of the approaches used by coaches to overcome this is to focus on solutions and results. This does not mean that they must lead to a definable goal, but also to a focus on new insights, actions, decisions, or resolutions.

Greif's definition includes further features:

"Coaching is an intensive and systematic promotion of result-oriented problem- and self-reflection as well as counselling of individuals or groups to improve the achievement of self-congruent goals or to conscious self-change and self-development. The counselling and psychotherapy of mental disorders are excluded". (Greif, 2008, p. 59). Thus, goals are regarded as self-congruent if they agree with the clients' mental representation of their ideal self-concept.

Coaching Concepts

In her book on the history of coaching, Leni Wildflower (2013) describes the many social and conceptual influences on the development of coaching since its beginnings in the 1960s and 1970s. Her social backgrounds include the Civil Rights and Self-Help Movement in the USA, the Human Potential Movement, and above all Humanistic Psychology. Wildflower sees the Esalen Institute, founded in 1962 in Big Sur, California (USA), as an innovative center for intellectual and spiritual

discussions and creative ideas. The names of the thought leaders who were invited to Esalen at the time and who conducted workshops or training sessions read like a complete Who's Who of the time. Many of their ideas are still the basis of coaching concepts today. Just to name a few: Abraham Maslow with his humanistic motivation theory and utopia of self-fulfillment in society, Will Schutz and group-dynamic encounter groups, Carl Rogers with his justification of humanistic psychology and client-centered therapy and counselling, Fritz Perls with his first ideas on Gestalt therapy, the family psychotherapist Virginia Satir, Timothy Leary with his plea for free access to psychedelic drugs, the anthropologist Gregory Bateson with his communication theory, the physicist Fritjov Capra with his holistic-systemic approach and bridging to Taoism and Eastern mysticism, Alexander Lowen with his bioenergetics, the Viennese neurologist and psychiatrist Viktor Frankl and existentially oriented psychotherapy as a search for the meaning of life, Albert Ellis with a cognitive turn in behavioral therapy and the analysis of irrational beliefs, the psychiatrist Eric Berne and his Transactional Analysis (TA), the computer scientist Richard Bandler and the linguist John Grinder, who both, influenced by workshops in Esalen and by therapists like Satir, developed together the concept of Neurolinguistic Programming (NLP) (see chapter: Pseudoscience and Charlatanry in Coaching) or the racing driver Sir John Whitmore, who in his second career and his studies of humanistic psychologists like Maslow and Rogers developed his GROW concept as a process model of coaching. In addition to scientists, spiritual teachers such as Alan Watts (Zen Buddhism as a new form of psychoanalysis) were also involved in Esalen.

Psychoanalytical or Psychodynamic Concepts

According to Wildflower (2013), many of today's coaching concepts have their roots in psychoanalytic therapeutic directions, which are often referred to as psychodynamic in more recent overarching approaches. Psychodynamic coaching applies an understanding of organizations and leadership as well as methods from psychoanalytic therapy to the coaching process (see Giernalczyk & Lohmer, 2012). In addition to the consciously perceived processes, unconscious processes such as defense mechanisms (see chapter: Defense Mechanisms), fears and resistances are analyzed that shape the behavior of the client or the entire organization and stand in the way of a realistic completion of tasks (see Haubl, 2008; West-Leuer & Sies, 2003). In addition to focusing on functional structures such as tasks, responsibilities, and roles as well as personality and leadership styles, unconscious conflict patterns and dominant character characteristics of the client are also included. The psychodynamic approach, therefore, sees the client in a force field that is determined by his personality on the one hand and the team and organizational dynamics of his/her organization on the other—the mediating instance is the concept of the roles he/she assumes. The psychodynamic approach assumes that the development orientation of people is supported within the framework of a coaching process. Through increasing

awareness of personal and organizational patterns and personal development wishes, growth, self-control, and self-efficacy as well as the possibilities of positive leadership are promoted.

The GROW Model and Goal-Oriented Coaching

Sir John Whitmore propagates an approach which he described as "Coaching for Performance" (Whitmore, 1992). At the heart of this approach was The GROW model. The model stands as an acronym for the initial letters of the words: Goal setting, Reality review (feasibility in the current situation), Options (choices and alternative strategies), and Way forward (what needs to be done, when, by whom, and with the will to do it. In order to motivate clients to define goals, Whitmore drew on SMART criteria. SMART is an acronym for Specific, Measurable, Accepted, Realistic, and Scheduled. Whitmore formulated his model in a way that caught popular attention while also underpinning the approach with psychological theories (Maslow's Motivation Theory, Goal setting theory, Objective Theories, and Emotional Intelligence) as well as his practical experience of coaching executives.

Anthony Grant has developed goal-oriented coaching based on cognitive theories and research on self-regulation (see chapter: Goals in Coaching). The approach can be considered a prototype of a scientifically based, or evidence-based concept (Stober & Grant, 2006), because the theoretical models and the effectiveness of coaching have been tested using scientific methods, such as RCT's (randomized control groups).

Different Systemic Coaching Concepts

A growing number of coaching approaches describe their approach as systemic. According to a review of coaching approaches, systemic approaches seem most popular in Germany with 55%. This compared with only 2% in the United Kingdom and none in North America (Greif, 2014).

What is understood by the term "systemic" varies between writers (see chapter: System Theories in Coaching). Many writers do not provide a definition. Others refer to Luhmann's operative constructivist theory of social systems (1984). König and Volmer (2002) orientate themselves in their cross-directional, moderately constructivist systemic coaching on further developments of Bateson's personal system theory. Oriented to Bateson, they assume that the behavior of social systems results from the interaction of the acting persons and their subjective interpretations, social rules, behavioral patterns and feedback loops, and the system environment. Furthermore, there are coaching concepts in which, for example, the consideration of interactions in the family or groups is regarded as systemic, based on Satir or other

concepts of family therapy and Gestalt theory (see chapter: System Theories in Coaching).

Neurolinguistic Programming

In the 1970s, Richard Bandler and John Grinder analyzed the linguistic interventions of successful psychotherapies; Virginia Satir, Fritz Perls, and Milton Erickson in an attempt to combine these methods on the basis of a constructivist communication model (Bandler & Grinder, 1975). Basic assumptions were that people can be classified as different types of learners according to their preferred sensory channels and that certain nonverbal reactions of individuals provide information about internal processes (e.g., looking up to the left means that the person remembers something visually). However, the vast majority of available studies on the assumptions and effects of NLP provide no consistent confirmation (Sharpley, 1987; Witkowski, 2010; Passmore & Rowson, 2019) and is considered a pseudoscience by some authors (see chapter: Pseudoscience and Charlatanry in Coaching). Notwithstanding this evidence, according to wider European research (Passmore et al., 2017) NLP remains a widely taught and used coaching approach.

Cognitive Behavioral Coaching Concepts

In contrast to classical behavior therapy, the focus of cognitive-behavioral concepts is on behavioral change, as well as changes to the cognitions and emotions involved. According to Ellis' ABC(DE) model (1993), which is also used in coaching, people often experience undesirable but activating events (A). About these events they develop rational, but also irrational beliefs (B). These beliefs lead to emotional, behavioral, and cognitive consequences (C), with the irrational beliefs leading to maladaptive or unhealthy consequences. Therefore, the clients are supported to dispute (D) and change of the irrational beliefs and encouraged to develop more efficient (E) rational beliefs and behavior.

In addition to Ellis, there are various alternative cognitive-behavioral coaching concepts. They draw on a wealth or evidence (see chapter: Behavior Modification in Coaching). Cognitive-behavioral coaching has emerged as one of the most popular and widely used methods in coaching practice, for example, in Europe (Passmore et al., 2017). Practitioners have added to the literature through developing coach-specific models (Palmer et al., 2008).

Solution-Focused Coaching

According to de Shazer (De Shazer & Dolan, 2012), the aim of this approach is for the practitioner to help the clients to focus on the future positive situation after their goal is accomplished and to develop a solution using their experience knowledge and strengths. If a coach strictly follows the concept of solution-focused theory the client avoids problem analysis and instead invests their energy in identifying solutions. One way of encouraging this shift in focus is the Miracle question:

"Imagine, in the middle of the night, a miracle happens and the problem that prompted you to talk to me today has been solved. (. . .) So, when you wake up tomorrow morning, what might be the small change, change that will make you say to yourself, 'Wow. Something must have happened—the problem is gone!" (simplified according to De Shazer & Dolan, 2012).

Scientific studies prove the effectiveness of the method as a brief approach (De Shazer & Dolan, 2012). These methods, like cognitive behavioral coaching, have also been widely transferred to coaching (Passmore et al., 2017).

Positive Psychological Coaching

Similar to solution-focused counselling, positive psychology assumes that interventions have a more positive effect if they are strengths-focused and directly aimed at positive consequences. Positive psychology sees itself as a comprehensive psychology, which can be applied to all areas of practice, and again has been adapted and developed as a coaching approach (Kauffman et al., 2010; Green & Palmer, 2019).

Result-Oriented Coaching

The result-oriented coaching approach (Greif, 2008) integrates empirically verified findings from application-oriented research, e.g., on self-concept theory as the basis for result-oriented self-reflection (see chapter: Self-Reflection in Coaching). It not only takes into account goal clarifications according to the SMART criteria, but also encourages the clients to reflect on goals, their identity and meaning of life. In contrast to positive psychological coaching, clients are given space to reflect on negative experiences and problems, but this reflection is combined with an activation of their positive resources. The result-oriented coaching was deliberately not formulated as a closed theory, but as a theoretical framework open to change and expansion.

Narrative Coaching

The basic assumption of Narrative Therapy, developed by White and Epston (1990), is that individuals' identity is formed by the stories individuals tell about themselves and their life. Stories and experiences of failure, which are told again and again with strong emotional participation, are particularly important. Drake and Stelter (2014) conceive narrative coaching as a values free, philosophical conversation (see chapter: Meaning as a Topic in Coaching). The reflexive conversations help clients to become aware of their own stories, to recognize that the meaning and their identity are constructed, to understand how they influence their identity and through this their behavior.

Clarifying and Discussing Differences and Similarities

The coaching definitions and concepts presented in this chapter differ widely. There appears little consensus between coaches about coaching concepts and what they understand by coaching. According to our observations, however, differences and issues are not even discussed openly at conferences or in research papers, but informally within groups who share similar orientations. However, coaching can only constitute itself as an overarching profession that is open to different directions, concepts, and methods if differences and similarities, as well as the self-image of the profession, are discussed and clarified together. Differences and conflicts within the profession can enrich coaching and stimulate interesting exploration of concepts. The prerequisite is that they are informed in terms of evidence and carried out cooperatively.

In conclusion, coaching still lacks a dedicated center like Esalen offered in the 1960s and 1970s. We believe what is needed is more space at conferences, in coaching journals and in cross-directional publications, to encourage and facilitate these discussions to develop a shared and deepened understanding across different coaching concepts. Our aim is to use this publication as a mechanism to draw together different institutions that offer both coach training and research, like the Coaching Psychology at the University of Sydney, the Institute of Coaching at the Harvard Medical School, Henley Business School, Case Western, and the Theory and Methodology of Counselling unit at the University of Kassel or the Division Social Psychology at the University of Salzburg.

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How Can Coaching Practitioners Learn from Science?

Wolfgang Scholl, Siegfried Greif, and Heidi Möller

Introduction

This handbook aims to convey scientific concepts and theories that can be useful for coaches in training and practice. Often, practitioners are interested to explore scientific findings and to consider how this research can inform their work.

However, many practitioners are also very skeptical about the benefits of scientific findings for practice. More precisely, according to our observations, the following quite different attitudes towards scientific results can be found:

(1) Enthusiastic acceptance of scientific findings (e.g., from current brain research), even if it remains unclear to what extent these findings change practical action.
(2) Great general skepticism about the validity of scientific findings. If fellow scientists themselves criticize research results, which findings are valid?
(3) General rejection of applied science because it has an unjustified claim to truth. Some practitioners say accordingly, they are not interested in whether their knowledge is "true" or "false," but only pragmatically, "whether it works."
(4) Staying out of the difficult dispute within science; this seems to be better because otherwise everything will be further complicated.
(5) Resignation about the sheer volume of knowledge. Even full-time scientists cannot keep up to date beyond their small area of research; so, why should a

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practitioner try to come to grips with the many possibly relevant scientific results beneath the demanding role of working with clients?

In this chapter, these different points will be analyzed in more detail and worked through with the aim of creating more clarity and showing possibilities for building bridges between science and practice. Since general skepticism towards science (2) and the dispute within science (3) precede the other points, we begin with a description of the relevant views on science that can be found with reference to their application in coaching. Subsequently, the relationship between science and practice is systematically presented with regard to the respective possibilities in order to clarify the problem points (1) and (4).

For point (5), the immense abundance and topicality of scientific knowledge, it is necessary to clearly compile the current scientific knowledge that applies to coaching. This is precisely the aim of our handbook. Numerous specialists and practitioners present coaching-relevant findings from their fields of work in a compact and understandable way and provide examples of their application. The handbook thus provides a model for building bridges between science and practice.

Science Views and Coaching Directions

Philosophy of science is a vast field within philosophy, basically much too large for a short chapter. In the following, therefore, only the scientific views that are frequently represented in the field of coaching, namely (1) the empirical–analytical and (2) the systemic–constructivist are addressed. The former are mainly to be found in psychology and other social sciences, the latter especially in sociology and pedagogy, and often also among coaching practitioners.

Empirical–Analytical Science Views

Scientists and inquisitive children both ask "why" questions to find out the causes of what is happening around them. More recent analytical science views analyze how such "why" questions can be answered by scientific explanations. Explanatory attempts can be motivated by unexpected events, explorative studies, critical examination of existing explanations, or new derivations from proven theories. With increasing scientific progress, more comprehensive general theories are formulated to integrate individual explanations, from which then further hypotheses can be derived and tested. Such explanations can be formulated as verbal assumptions or hypotheses or as mathematical models and computer simulations. These hypotheses or models can be tested in a variety of ways, from well-designed case studies or document analyses, to laboratory or field experiments, large field surveys, or secondary analyses of existing data.

It would be a naive view of science if one hoped to be able to find out what is clearly "true" or "false" or to fathom the "truth" through many studies. Since Popper's criticism of the positivism of the Viennese School (1934/2005), most science theorists have acknowledged that empirical research can never prove a theory or assumption as "true" or "right." Truth is not a possible result of research, but a regulative idea in the sense of a general striving for better predictions and a rejection of disconfirmed results, of "fake knowledge," and fraud. Scientists are committed to this guiding idea, even if they cannot see how far they have approached "truth" with a more valid explanation or research study. The "getting closer" only applies in comparison with other explanations, which do less well explain what is observed; for instance, different degrees of goal achievement with different coaching methods. According to this view of science, one must always face critical empirical tests as to whether the hypotheses (or models) derived from the theory have proved themselves provisionally in a study, in comparison with alternative hypotheses. Even if it is possible to predict the results of investigations with repeated critical tests and thereby to explain a high percentage of the variance found, then the theory has provisionally proved its worth and can become the starting point for investigations in other contexts as well as for deeper or more comprehensive explanations. Scientific progress is built up on empirical tests with which assumptions can be replaced by modified or new assumptions that are more accurate and/or explain more aspects. The accuracy of the prediction is a first comparison criterion, a second is the explanatory content, i.e. the set and scope of related hypotheses or intended applications derived from a theory.

Scientific explanations of concrete events or research hypotheses should be derived logically from theories. An example is the general goal theory (Locke & Latham, 1990), according to which set goals lead to better results the higher and more specific they are. As a result, more comprehensive and general goals should be broken down into manageable sub-goals and concrete implementation intentions. This has been confirmed in numerous research studies on different goals (Gollwitzer & Sheeran, 2006). During the development of goal theory, a condition was added that the goals must be accepted internally (goal commitment), and that feedback on steps towards goal achievement promotes effectiveness as a moderating condition. As further studies show, goal clarification is, as usual in coaching, an important starting point (see chapter: "Motivation, Volition, and Implementation in Coaching"). Thus, goal theory gained precision and concreteness over time. The scope of the theory was extended in that it has proved itself in externally set, in participatory negotiated, and in self-imposed objectives.

Theories and derived hypotheses intend general validity (applying always and everywhere) and a causal explanation (if–then). Only with intended general validity does it make sense to critically examine them in a wide variety of situations and to specifically improve them according to the test results. If one just describes what is going on in science without this claim, it would only be a kind of historiography or storytelling. Most scientists (and most practitioners as well) assume that their assumptions are generally valid when they refer to past studies or those from other countries (or quote practical experience). The same is also true for everyday

arguments in which the general assumption is often not explicitly mentioned, but is implicit as self-evident by speaker and listener: The call "Boy, put something on, it's freezing cold outside" implies that insufficient clothing causes colds, a common hypothesis already contained in the word "cold" (yet, which is probably wrong, according to Wikipedia). As in any conversation, many such general assumptions are implicitly used in coaching. Their explanation makes them accessible for reflection and critical review. The search for causal explanations of the if-then type is particularly important for the practical use of scientific findings, because it facilitates the targeted search for possible interventions ("if ...") for desired results ("then ...").

In empirical research, things are more complicated. If tests do not lead to confirmation, this does not have to be due to a false theory, but may also be traced back to errors in observation, measurement, or other investigation conditions (Gawronski, 2000); they, too, therefore require new critical reviews and improvements. An empirical non-confirmation can also be due to overlapping and opposing influences which could not be neutralized either by randomization in an experiment or by a large sample in a field study. For instance, smokers usually find it very difficult to give up smoking even though they want to stay healthy for a long time and have set themselves the goal of doing so. Often the achievement of the goal is prevented by conflicting habits, conformity in the circle of friends, or the strength of other immediate needs. In the vast majority of cases, it is necessary to combine several relevant hypotheses into more complex models and to incorporate possible conditional effects for certain applications. For an example of a more complex approach see the already cited chapter: "Motivation, Volition, and Implementation in Coaching.")

Since human behavior takes place in a very complex texture of effects, it is more difficult to check the theories and their investigation conditions than in the natural sciences. First, theoretical concepts or constructs must be operationalized with precise empirical descriptions of the facts in question. Here the development of measurement concepts plays a central role, possibly with the aid of technical instruments. It should be noted that definitions and their operationalization are theory-dependent in two ways, which will be explained using the example of emotion research: First, the constructs must fit the respective theory. In emotion research, for example, two approaches struggle with each other and authors even differ within each approach: Are there a small number of basic emotions that can be distinguished in facial expressions by biologically predetermined muscle contractions or even in neuronal patterns? (Ekman & Oster, 1979; Panksepp, 1998). Or is there a broad spectrum of scalable emotional qualities that can be classified into three dimensions by self- and other-assessment? (Fontaine et al., 2007; Plutchik, 1991). Secondly, the measurement process itself is based on theoretical assumptions, e.g. on the technical equipment for neural measurement or the connections between muscle contractions in the face and experienced feelings, which have to be empirically tested themselves. Finally, the entire examination must be designed in such a way that distorting influences of any kind can be avoided or clearly identified for the interpretation of the results. What could be distorting influences, however, again depends on the state of theoretical and practical knowledge (cf. the smoking example