
A Brief Introduction to Philosophy of Science as it Applies to Clinical Psychology

Sean Hughes

Ghent University

Authors Note

SH, Department of Experimental Clinical and Health Psychology, Ghent University.

The preparation of this chapter was made possible by Ghent University Grant BOF16/MET_V/002 to Jan De Houwer. Correspondence concerning this chapter should be addressed to sean.hughes@ugent.be.
A Brief Introduction to Philosophy of Science as it Applies to Clinical Psychology

Although it may seem like a strange way to begin a chapter on the philosophy of science, stop for a moment and imagine three intrepid explorers. Each has set out to expand the limits of human understanding in some respect. The first is an astronaut busy analyzing soil samples on the cold, dark surface of the moon. The second is a marine biologist, trying to find ways to get penguins more active and engaged at a large public aquarium. The third is a primatologist deeply interested in the courting behavior of silverback gorillas, who finds herself wading through a tropical forest in Central Africa. Although all three use the scientific method to understand a specific phenomenon, they approach their goals in very different ways. The fundamental questions they are interested in (e.g., what is the lunar soil comprised of; how can the behavior of captive penguins be changed; how do primates behave socially in the wild) will guide the procedures they use, the theories they generate, the types of data they collect, and the answers they ultimately find satisfactory.

In many ways clinical psychological science faces a similar situation. Although clinicians and researchers are united by a shared goal (to understand how human suffering can be alleviated and well-being promoted) they often tackle that goal in fundamentally different ways. Some argue that this goal can be “best” achieved by detecting and correcting the dysfunctional beliefs, pathological cognitive schemas, or faulty information-processing styles that underpin psychological suffering (e.g., Beck, 1993; Ellis & Dryden, 2007). Others counter that the “best” solution requires that we contact and alter the functions of internal events rather their particular form or frequency (e.g., Hayes, Strosahl, & Wilson, 1999; Linehan, 1993; Segal, Williams, & Teasdale, 2001). In this rich, dense jungle of clinical research and theorizing different traditions often find themselves in fierce competition, with proponents of one perspective arguing for the logical supremacy of their own procedures, findings, theories and therapies, while others respond with equally and strongly held
convictions (see Reyna, 1995 for an example). In such an environment you might ask yourself: is there really a “best” solution to the problem of psychological suffering? How do clinicians and researchers define what qualifies as “best” and is this a subjective or objective choice? How do they actually determine whether a given procedure, finding, theory, or therapy is satisfactory or even better than others?

Although clinical researchers do not (typically) operate in the cold vacuum of outer space, the water tanks of an aquarium, or the humid interiors of tropical forests, their activities are nevertheless carried out within a larger context that guides their scientific values and goals. One of the more important aspects of this context is their philosophical “worldview”. Worldviews specify the nature and purpose of science, causality, data, and explanation. They define what we consider the proper subject matter of our field, what our units of analysis will be, the types of theories and therapies we build and evaluate, the methodologies we construct, and how findings should be generated and interpreted.

Questions about ontology, epistemology, and axiology can seem highly abstract and far removed from the daily trials and tribulations that comprise clinical research or therapeutic practice. In what follows I aim to demonstrate how philosophical assumptions are similar to the air we breathe: typically invisible, integral to our daily functioning, and yet often taken for granted. There is no privileged place that allows you to avoid these issues: your worldview silently shapes how you think and act, influencing the theories, therapies, techniques, and data you consider convincing or valid (e.g., Babbage & Ronan, 2000; Forsyth, 2016). It dictates some of your moment-to-moment behavior when interacting with a client. By properly articulating and organizing these assumptions you gain access to a powerful method of determining the internal consistency of your own scientific views, and ensure that your efforts at knowledge development are progressive (when measured against your (clinical) scientific goals).
Scientific endeavors must have criteria to evaluate competing theoretical and methodological accounts if progress is to be achieved. Yet scholars often engage in debates of a different kind: ones that center on the legitimacy, primacy, and value of one intellectual tradition relative to another. Such debates have been labeled “pseudo-conflicts” given that they involve applying the philosophical assumptions (and thus scientific goals and values) of one’s own approach to the assumptions, goals, and values of others (Pepper, 1942; Hayes, Hayes, & Reese, 1988). For instance, behaviorally-orientated therapists may dismiss the value of mental mediating representations and processes such as cognitive schemas or biases given that such explanatory constructs are counter (or even irrelevant) to their own focus on manipulable contextual variables that can facilitate the prediction-and-influence of psychological events. Similarly, cognitively orientated researchers might view any analysis that omits reference to the mental machinery of the mind as merely descriptive and non-explanatory. As Dougher (1995) notes, these respective scholars might wonder why their counterparts “persist in taking such outdated or plainly wrong-headed positions, why they persist in misrepresenting my position, and why they can’t see that both logic and data render their position clearly inferior” (p. 215). The failure to recognize the philosophical origins of these debates often leads to “frustration, sarcasm, and even ad hominem attacks on the intellectual or academic competence of those holding alternative positions” (p. 215). Psychological scientists who are capable of articulating their philosophical assumptions are better able to identify genuine and productive conflicts within traditions that drive theory and research forward, and can avoid wasting time on ‘pseudo-conflicts’ between traditions that tend to be degenerative in nature. In other words, appreciating the philosophical underpinnings of your work allows you to communicate without dogmatism or arrogance to those who hold different assumptions. Such flexibility is central to the theme of this book in helping different wings of evidence-based therapy learn to communicate across philosophical
divides. It is also part of why training in philosophy of science was recently added to the training standards for empirical clinicians by a consortium of cognitive and behavioral organizations (Klepac & Ronan, 2012).

Finally, the clinical literature is home to an overwhelming number of perspectives that may tempt students into adopting a vapid form of eclecticism, hoping that by mixing together all plausible theories and concepts, even better therapeutic outcomes are likely. Disciplined combinations of approaches are possible and helpful, but confusion results if theories and therapies are mixed in ways that are inconsistent (because underlying philosophical assumptions are misunderstood or ignored).

This chapter is divided into three sections. Part I will provide a brief introduction to the core topics of philosophy of science as they apply to those undergoing clinical training (for more extensive treatments see Gawronski & Bodenhausen, 2015; Morris, 1988; Overton, 2006; Guba, Lincoln, & others, 1994 among many others). In Part II, I will introduce a number of worldviews that were originally forwarded by Stephen Pepper in the 1940’s with a focus on two in particular (mechanism and contextualism). I will demonstrate how these latter worldviews have arguably shaped and continue to drive progress in clinical psychology. Finally, in Part III I consider the topics of worldview selection, evaluation, communication, and collaboration. If the reader then decides to adopt a particular philosophical perspective they will do so with awareness of the alternatives, how this decision shapes their own thinking and actions, and how they can interact with colleagues who see (or construct) the world in ways that differ from their own.

**Part I: A Brief Introduction to Philosophy of Science**

*Science* is broadly concerned with the development of a systematic body of knowledge that is tied to empirically derived evidence (e.g., Lakatos, 1978; Laudan, 1978). This system of knowledge is built with the intention of understanding and influencing “patterns of
relations among phenomena and processes of the experienced world” (Lerner & Damon, 2006, p. 70). Philosophy of science refers to the conceptual foundation upon which this systematic body of knowledge is built. Rather than focusing on the particular theories, methods, and observations that define a scientific domain, philosophy of science is concerned with the scientific enterprise itself. The goal is to uncover the assumptions that are often implicit (or taken for granted) in scientific practice and that dictate its course (e.g., how science should proceed, what methods of inquiry should be used, how much confidence should we place in the findings generated, and the limits of the knowledge obtained). In this way philosophy of science provides a perspective from which we can examine and potentially evaluate clinical psychological science.

Philosophical World-Views

A philosophical worldview can be defined as the coherent set of interrelated assumptions that provide the pre-analytic framework that sets the stage for scientific or therapeutic activity (see Hayes et al., 1988; closely related terms are ‘paradigm,’ Kuhn, 1962 and ‘research programme,’ Lakatos, 1978). One’s worldview is a belief system that both describes and prescribes what data, tools, theories, therapies, participants, and findings are acceptable or unacceptable. The basic beliefs that make up a worldview typically revolve around the following set of interrelated questions, with the answers to one question constraining responses to the others.

The ontological question. Ontology is broadly concerned with the nature, origin, and structure of reality and “being”. In other words, what does it mean to say that something is real, and is it possible to study reality in an objective manner? Many ontological stances can and have been taken. For illustrative purposes I’ll briefly discuss positivism, post-positivism, and constructivism given their prominence within psychological science, although other perspectives than these are possible.
**Positivism** is a reductionistic and deterministic perspective that often involves a belief in “naïve realism” – the idea that a discoverable reality exists that is governed by a system of natural laws and mechanisms. Scientific models and theories are considered useful or valid insofar as they increase our ability to make claims that refer to entities or relations in a mind-independent reality (i.e., truth as correspondence). This type of “knowledge is conventionally summarized in the form of time- and context-free generalizations, some of which take the form of cause-effect laws” (Guba et al., 1994, p.109). Scientific progress itself involves the development of theories whose representational nature gradually converges upon a single reality.

**Post-positivism** agrees that a mind-independent reality is assumed to exist but can only be imperfectly and probabilistically understood by humans due to their biased intellectual abilities and the fundamentally intractable nature of phenomena. Post-positivists believe that there is a reality independent of perception and theories about it but are critical that humans can know that reality with absolute certainty (e.g., see Lincoln, Lynham, & Guba, 2011). Thus all scientific claims about reality must be submitted to close scrutiny if we are to converge on an understanding of reality that is acceptable (if never perfect).

**Constructivism**, unlike positivism and post-positivism, takes a relativistic ontological stance. A mind-independent reality is substituted for a constructed one: reality does not exist independently from our perception or theories about it. Instead it is interpreted and constructed based on our experiences and interactions with the social, experiential, historical, and cultural environments in which we are embedded. Constructed realities are malleable, differ in their content and sophistication, and are not ‘true’ in any absolute sense of the word. Although Constructivists tend to acknowledge that phenomena exist they challenge the extent to which we can rationally know reality outside of our personal perspectives (e.g., see Blaikie, 2007; Lincoln et al., 2011; von Glasersfeld, 2001). In some forms of this approach, there is a
simple refusal on pragmatic grounds to view ontological questions as answerable, useful, or necessary (see Hayes, 1997).

**The epistemological question.** Epistemology, the theory of knowledge, is concerned with the acquisition and justification of knowledge (i.e., whether we do or can know anything as well as the validity of that knowledge and how we come to know it). It involves asking questions such as “how certain are we that we have accumulated knowledge” and “how can we distinguish this knowledge from belief”. When applied to science, ‘knowledge’ refers to scientific theories, explanations, and laws, while epistemology involves answering questions such as “in what way does evidence support a theory?” or “What does it mean to say that a theory is true or false” and “Is the revision and change of theory a rational or irrational process?”. Once again different stances can be taken. *Positivism* adopts a dualistic and objectivist position. Provided that she has access to the proper methodologies, the knower (scientist) can objectively view and record events as they “really are” and as they “really work”. This process does not influence the phenomenon of interest nor does the phenomenon influence the knower. Situations where the knower influences the known (or vice versa) represent threats to validity and strategies are implemented to reduce or eliminate potential sources of contamination. *Post-positivism is qualified dualist/objectivist*. Given the imperfect manner in which the world is viewed and recorded dualism is de-emphasized: observations are accepted as being prone to error and always open to critique. Theory is ultimately revisable and open to replacement by a different set of categories and relationships. However, objectivism is still the ‘regulatory ideal’ to which the scientist strives (Lincoln et al., 2011). Scientific analyses are considered to be ‘true’ or ‘valid’ insofar as they allow us to converge on an accurate (if imperfect) understanding of reality (i.e., truth is correspondence). Such analyses are based on the idea that (a) knowledge can be ‘best’ obtained through the identification of regularities and causal relationships between the component mechanisms that
constitute reality; (b) that these regularities and relationships will be easier to identify when the scientist and phenomenon do not contaminate one another; and that (c) the scientific method is the best tool we have to minimize such contamination. Thus the purpose of models and theories is to provide general explanations that are logically organized and that have clearly established links with the observable world. These explanations extend beyond the observation of individual events and have a heuristic and predictive function.

Finally, Constructivism is transactional and subjective. It argues that findings are obtained through the interaction of the knower and the known, and as such, are literally created as the scientific enterprise unfolds. In this way knowledge is subjective insofar as there is no objective location to view or obtain knowledge (and even if there was we have no way of accessing it). Thus the knower is an active participant rather than a passive observer in the knowledge acquisition and justification process. Truth is not correspondence with some underlying reality but rather the extent to which a particular analysis occasions ‘successful working’ or is considered ‘viable’. “To the constructivist, concepts, models, theories…are viable if they prove adequate in the contexts in which they were created” (von Glasersfeld, 1995, p.4). From this perspective, science can be viewed as “a corpus of rules for effective action, and there is a special sense in which it could be ‘true’ if it yields the most effective action possible” (Skinner, 1974, p.235; also see Barnes-Holmes, 2000).

The axiology question. Axiology refers to the relationship between knowledge and human values. When applied to science it involves questions such as: “how do values relate to (scientific) facts? What role, if any, do the researcher’s values play in the scientific process?” According to positivism the scientist views reality through a ‘one-sided mirror’: objectively and impartially. Values and biases have no place in this process and should be prevented from influencing one’s activity at all costs. Implementing appropriate methodologies and conceptual controls ensures that scientific products are ‘value-free’. Post-positivism takes a
similar if qualified stance: all observations are assumed to be theory-laden. The search for ‘absolute truth’ is abandoned and analyses are accepted as being guided by the cultural, social, historical, and personal expectancies the research brings with them to the enterprise (i.e., science is ‘value-laded’). Nevertheless, progress can be best achieved if the scientist does their upmost to minimize the impact of such contaminating factors on their theoretical arguments and empirical findings. Finally, Constructivism is dialectical: given the variable and personal nature of the constructed world there is no objective location from which reality can be independently observed or recorded. The scientist cannot be separated from their subject matter nor can theory be separated from practice. Thus values are considered to be an integral element of the interactions between and among scientist and the phenomenon they study.

The methodology question. Once the knower (scientist) has determined what can be known they must then identify a set of tools that are appropriate for generating that knowledge. Not just any methodology will suffice. For positivists methodology should be experimental and manipulative. A mind-independent reality that can be objectively known requires methodologies that can tap into such a reality free from the control of confounding factors. It also requires that “questions and/or hypotheses be stated in propositional form and subjected to empirical tests to verify them; possible confounding conditions must be carefully controlled (manipulated) to prevent outcomes from being improperly influenced” (Guba et al., 1994, p.110). Post-positivists share a similar view. However, given that all measurement is subject to error, the researcher must engage in a process of “critical multiplism” where they take multiple observations and measurements (that are each subject to different types of error) in order to identify potential sources of error, control for them, and thus better approximate reality. Through independent replication the scientist learns more about the ontological validity of their model. This in turn enables them to engage in the falsification (rather than
verification) of hypotheses and theories. **Constructivism** challenges the idea that knowledge exists freely in the world and that objective measurement procedures can be designed to capture such a world. All information is subject to interpretation by the researcher, and as such, the relationship between the researcher and their subject matter is a central focus of methodology.

**Philosophical assumptions are interactive.** Note that questions about epistemology, ontology, axiology, and methodology are deeply connected with one another. “Views of the nature of knowledge interact with views of the nature of reality: what there is affects what can be known, and what we think can be known often affects what we think exists” (Thagard, 2007, p.11). For instance, if one subscribes to the belief that there is a reality independent of the researcher then scientific inquiry should be conducted in a way that is objectively detached. This will enable them to discover “how things really are” and “how things really work”. This in turn requires that they identify a set of methodologies that are capable of reflecting objective reality in a pure or relatively uncontaminated manner. From this perspective questions that concern axiology (values) fall outside the realm of legitimate scientific inquiry.

**Conclusion.** When we clarify our philosophical assumptions we are articulating the set of decisions we have made prior to engaging in scientific or therapeutic practice. These decisions involve asking and answering questions that are not empirical but rather “pre-analytic” in nature (e.g., “what type of knowledge do we want to accumulate and why”, “how will we organize and construct that system of knowledge”, “what qualifies as ‘real’ or ‘genuine’ ‘evidence’ and how it should be interpreted”). The answers to these questions are the foundation upon which empirical work is carried out. Just as we need to lay a foundation before we can build a stable house so too do we need to lay down our philosophical assumptions before we can engage in scientific activity that is consistent and coherent.
Part II: Pepper’s Four Worldviews and Their Relation to Clinical Psychology

Although worldviews can and have been categorized in many different ways Pepper’s (1942) classification scheme is useful in reflecting upon the components, assumptions, and concerns that drive theory and research in different areas of clinical and applied psychology.

Pepper’s Worldviews

The core of Pepper’s thesis was that humans are not prone to engaging in complex, abstract thought and that they tend to rely on commonsense guides or “root metaphors” in order to maintain their intellectual bearings. He argued that the major (relatively adequate) philosophical positions can be clustered into one of four core models or ‘world hypotheses’: formism, organicism, mechanism, and contextualism. Each relies on a different root metaphor as a kind of thumbnail guide which suggests how knowledge ought to be justified or represented, how new knowledge should be obtained, and how truth can be evaluated (for more see Berry, 1984; Hayes et al., 1988; Hayes, 1993).

These worldviews are autonomous (because their basic assumptions are incommensurable) and allow content in different domains of knowledge to be described with precision (i.e., applying a restricted set of principles to specific events) and scope (i.e., analyses that explain a comprehensive range of events across a variety of situations). Their truth criteria provide a way of evaluating the validity of scientific analyses that emerge from a particular worldview. In the following section I will consider each of these worldviews and then discuss how they set the stage for particular kinds of clinical research and practice.

Formism

Pepper’s first worldview is formism. The root metaphor of formism is the recurrence of recognizable forms. An easy way to think of formism is that it is a form of philosophy based on the action of naming: knowing how to characterize a particular event. For instance,
“smart phones” constitute a class or category in which many particulars are said to participate. The ‘truth’ or ‘validity’ of an analysis is based on simple correspondence: individual member possesses characteristics that correspond to the characteristics of the class. A brick is not a smart phone because it is not electronic and you cannot make calls with it; a desktop computer is electronic and you can make calls with it, but it is not a smart phone in part because it is not portable and so on. The scientist’s task is to create a comprehensive set of categories or names and the ‘truth’ or ‘value’ of their actions can be determined from the exhaustive nature of the categorical system created. “If the system has a category for all kinds of things, and things for all categories, then the system is deemed to correspond with the a priori assumed world of things and events” (Wilson, Whiteman, & Bordieri, 2013, p. 29).

When applied to psychology, formism suggests that phenomena can be understood by assigning them to specific classes or types, and for that reason some nosologists or personality theories provide good examples of this worldview.

**Mechanism**

Mechanism is a more sophisticated variant of formism and is arguably the position that underpins most empirical work in contemporary psychology. The root metaphor of mechanism is the commonsense ‘machine.’ This approach “assumes the a priori status of parts, but goes on to build models involving parts, relations, and forces animating such a system” (Wilson et al., 2013, p.29). When applied to psychology the purpose of science is to identify the parts and their relationships that mediate between input (environment) and output (behavior) and to identify the operating conditions or forces that are necessary and sufficient for mechanisms to successfully function. Mechanisms can come in many different forms, from mental (e.g., associations or propositions), and physical (e.g., neural connections or chains of behavior) to environmental (e.g., a lever). So too can their operating conditions (e.g., ‘automaticity’ in the mental domain; presence or absence of environmental stressors on
neural activity; impact of gravity on a lever). Note that terms such as ‘mechanism’ and
‘mechanistic’ have sometimes been used within applied psychology as an epithet
meaning 'robot-like' or 'unfeeling'. This is not its meaning in philosophy of science and when I
refer to 'mechanism' I'm doing so without any such negative connotations.

From a mechanistic perspective causation is contiguous: “each step in the mechanism
can take place only if there is an immediately preceding step that puts in motion the next step”
(De Houwer, Barnes-Holmes, & Barnes-Holmes, Chapter 6 of this volume, manuscript p. 5).
Within psychological science, (mental) mechanisms are argued to operate under a restricted
set of conditions and these are often separate from, but co-vary with, the environmental
context under which behavior is observed. Thus the unit of analysis is the component element
of the machine. Although some of these elements are directly observable in principle (e.g.,
neurons), in psychology they often are inferred from changes in behavior due to organismic
interactions with the environment (see Bechtel, 2008).

Note that the root metaphor of a machine applies both to the knower and what is
known. “The knower relates to the world by producing an internal copy of it through
mechanical transformation. This epistemological stance preserves both the knower and the
known intact and basically unchanged by their relation” (Hayes et al., 1988, p.99). Analyses
are considered to be “true” or “valid” when the internal copy of reality (the hypothesized
model or theory) maps onto the world as it is. This is a more elaborated version of the
correspondence based truth criterion of formism. How well a particular system reflects reality
is evaluated by the extent to which it is corroborated by other independent knowers through
predictive verification or falsification.

Because complexity is viewed as being built up from parts, mechanists tend to be
reductionistic. The goal of science is to identify the most basic units that fill the temporal gaps
between one event and another (e.g., mental representations, past behaviors, neural activity,
emotions). This is achieved by building facsimiles of reality (internal copies) whose ‘truth’ or ‘validity’ is determined from their objective correspondence with that reality (e.g., mental models). Description and theoretical prediction constitute satisfactory forms of scientific explanation given that they allow one to evaluate correspondence between theory and reality. The result (at least in psychology) is a largely hypothetico-deductive and theory-driven research agenda and one that downplays distal factors (histories of learning) and emphasizes behavior as the product of an internal, independent causal agents or systems.

**Clinical implications.** The most common extension of this type of thinking in clinical psychology is the formulation of theories and models that detail the component elements and operating conditions of the mental machine that mediate between environment and dysfunctional behavior. In either case, the source and solution to clinical problems can be found in the elements that comprise the system: through the addition, revision, and elimination of mechanisms and/or operating conditions one can impact the probability of clinical outcomes. Given a truth criteria based on the elaborated correspondence between the proposed system and reality, predictive verification of theories and therapies is considered essential.

These philosophical assumptions are inherent in many cognitive and behavioral therapies. For example, the impact of stimulus pairings or operant contingencies in early behavior therapy might be explained by the formation and revision of stimulus-response or stimulus-stimulus associations (e.g., see Foa, Steketee, & Rothbaum, 1989). Similarly, the impact of cognitive therapy (CT; Beck, 1993; Mahoney, 1974) might be explained by the cognitive schemas, faulty information-processing styles, irrational cognitions, or automatic thoughts that are thought to mediate the relationship between environmental input and behavioral/emotional output. As a result of these explanations, the target of intervention
would be a change in the occurrence of these events, though restructuring, reappraisal, the modification of core beliefs, and so on (e.g., Hofmann, 2011; see Chapter 21-22).

**Organicism**

Organicism is a third worldview forwarded by Pepper. The root metaphor adopted is that of the ‘growing organism’. Organic development is viewed as beginning in one form, growing and transitioning in an expected pattern, and then ultimately culminating in another form that was inherent in what came before. Consider, for example, the organic process through which a seed turns into a tree. There are rules of transition between states or phases, and stability between periods of change, but once they are identified and explained, all are seen as part of a single coherent process. In order to explain the present and predict the future we must understand the basic rules that govern development and how these rules operate across both time and context (Reese & Overton, 1970; Super & Harkness, 2003).

Organicism is teleological. Just as a seed is “meant to be” a tree, stages of development make sense only by knowing where they are headed. The truth criterion of organicism is coherence. “When a network of interrelated facts converges on a conclusion the coherence of this network renders this conclusion “true”. All contradictions of understanding originate in incomplete knowledge of the whole organic process. When the whole is known, the contradictions are removed and the organic whole…is found to have been implicit in the fragments” (Hayes et al., 1988, p.100).

Organicists reject the idea of simple linear ‘cause-effect’ explanations, preferring a more synthetic (interactional) approach. They argue that a system cannot be understood by breaking it down into its component elements. The whole is not a combination of individual parts: rather the whole is basic with parts having meaning only with regard to the whole. The identification of parts or stages is to some degree an arbitrary exercise for the purpose of investigation, but the order of those stages are not. For instance, “where the line is drawn to
mark the difference between an infant and a toddler may be arbitrary, but that infancy precedes toddlerhood is non-arbitrary and is assumed to reflect the *a priori* organization of development” (Wilson et al., 2013, p.30).

**Contextualism**

Pepper’s fourth worldview is contextualism. The root metaphor of contextualism is the ongoing “act-in-context”. Acts can be anything done in and with a current and historical context and are defined by their purpose and meaning. Contexts can “project outward spatially to include the entire universe….backward in time infinitely to include the remotest antecedent, or forward in time to include the most delayed consequence” (Hayes & Brownstein, 1986, p.178). The ‘act-in-context’ is not a description of some static event that occurred in the past. Instead it is a purposeful activity that takes place here and now within physical, social, and temporal contexts. Thus in contextualism (as in mechanism and organicism) relations and forces may be described. However, the described organization of those forces and relations is not assumed to reflect some *a priori* organization of the world (as is the case with formism or mechanism) nor some progression towards an ‘ideal form’ (as is the case with organicism). Rather speaking of parts and relations are themselves the actions of scientists that operate in and with their own contexts and for their own purposes (Hayes, 1993). Consequently, scientific activity based on contextualistic thinking (within psychology) is not concerned with descriptions of the “real world” but rather “verbal analyses that permit both basic and applied researchers and practitioners to change the behavior of individuals and groups” (De Houwer et al., 2016b, p. 8).

Note that an “act-in-context” can vary from the most proximal behavioral instance (e.g., social anxiety as one interacts with colleagues here and now) to temporally distal and remote behavioral sequences (e.g., the impact of a particular experience two years ago on choosing whether to attend a social gathering in several days’ time). What brings order to this
spread of possibility is the pragmatic goal of an analyst (see Barnes-Holmes, 2000; Morris, 1988; Wilson et al., 2013). The metric of truth is neither correspondence nor coherence with a mind-independent reality but simply anything that facilitates ‘successful working’ (this is the same truth criterion previously mentioned in the section on constructivism and indeed constructivists are often contextualists).

There are varieties of scientific contextualism, however. In order to know what successfully works one must know what one is working toward: there must be a clear a priori statement of the scientists or practitioner’s goal or intent (Hayes, 1993). Descriptive contextualists (e.g., dramaturgists, narrative psychologists, post-modernists, social constructionists) are focused on analyses that help them appreciate the participation of history and circumstance in the whole. In contrast, functional contextualists set out to predict-and-influence behavior with precision, scope, and depth (Hayes, 1993). Because of this, contextualism is relativistic – what is considered true differs from one scientist to another based on their respective goals.

**Clinical implications.** Contextualism focuses the clinical researcher and practitioner on the meaning and purpose of a person’s thoughts, feelings, and actions in a given context. Humanistic psychology tends toward a descriptive contextualistic position in which therapists seek to appreciate the wholeness of a psychological event (Schneider, 2011). Many forms of modern cognitive and behavioral therapies, such as Acceptance and Commitment Therapy (ACT; Hayes et al., 1999), Functional-Analytic Psychotherapy (FAP; Kanter, Tsai, & Kohlenberg, 2010), Integrative Behavioral Couples Therapy (IBCT; Christensen & Jacobson, 1998), and Behavioral Activation (Jacobson, Martell, & Dimidjian, 2001), consciously adopt the core of a functional contextual position. Others such as Dialectical Behavior Therapy (DBT; Linehan, 1993; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006), Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2001), and Rational-Emotive Behavior
Therapy (Ellis & Dryden, 2007) mix the contextual perspective with elements of mechanistic thinking.

ACT can be used as a brief example to help show how contextualistic thinking leads the scientist/practitioner down a different pathway than mechanistic perspectives. Broadly speaking, ACT does not focus on the content of a thought, attempt to manipulate its form or frequency, nor does it concern itself with the extent to which a thought is “real”. Instead it pays close attention to what function the thought, feeling, or behavior has for the client in a given context. Take the example of a public speaker who encounters the thought “I’m going to have a panic attack” as she walks towards a podium. An ACT therapist might not assume that this thought is necessarily harmful or that it has to be eradicated or revised. Rather they might ask “How can you relate to this thought in a way that will foster what you want?”

This approach is adopted because cognitions, emotions, beliefs, and dispositions are viewed as dependent variables (actions) and not as contiguous causes of other dependent variables such as overt behavior (except in a context). In order to predict-and-influence the relationship of, say, thoughts and overt behavior, clinicians and researchers need to identify the “independent variables” that can be directly manipulated in order to alter that relationship and - and from their perspective - only contextual variables are open to direct manipulation (Hayes & Brownstein, 1986). Mental mechanisms (e.g., associations in memory, schemas, semantic networks, or propositions) and the hypothesized forces that bind them are (at best) more dependent variables – they are certainly not viewed as functional causes. That same truth criterion also applies to the client who is “encouraged to abandon any interest in the literal truth of their own thoughts or evaluations; and instead…embrace a passionate and ongoing interest in how to live according to their values” (Hayes, 2004, p. 647).

**Part III: Selection, Evaluation, and Communication between Worldviews**
Now that we’ve encountered a number of worldviews and discussed how they inform clinical thinking and practice you may be asking yourself a new set of questions about selection, evaluation, and communication. For instance, exactly how, when, and why did you decide to subscribe to a particular worldview and is your belief system any better or more useful than that of your peers? Given their fundamental differences can proponents of one worldview ever communicate and interact with those who adopt another perspective? It is to these questions that we now turn.

**Worldview Selection**

People may find themselves adhering to a particular worldview for several reasons. First, their philosophical orientation (and thus theoretical predilections) may be partially determined by individual differences such as temperament and personality attributes (e.g., Babbage & Ronan, 2000; Johnson, Germer, Efran, & Overton, 1988). Second, worldviews may not be consciously selected but rather ‘implicitly’ thrust upon us by the prevailing scientific, cultural, historical, and social contexts within which we find ourselves embedded. In other words, scientists may assimilate or inherit the philosophical framework that underpins the dominant Zeitgeist of their field during their training. Thus worldview selection may be to some extent irrational (Pepper, 1942; Feyrabend, 2010; Kuhn, 1962; although see Lakatos, 1978 for arguments centered on rational research program selection). For instance, once prediction is implicitly adopted as a scientific aim, then (mental) mechanistic explanations may be simpler and viewed as ‘common sense’. If your goal is to predict-and-influence behavior, a contextual position may seem more valuable. Third, people can evaluate the scientific outcomes that are produced when different worldviews are adopted and effectively “vote with their feet” (Hayes, 1993, p.18). The popularity of worldviews seems to shift across time, both within and between scientific communities (Kuhn, 1962).
Psychological science is no exception, with a variety of meta-theoretical paradigms, theories, and empirical issues gaining prominence at one time or another.

**Worldview Evaluation**

Although the selection of any particular worldview may be guided by popular convention, personality disposition, or matters of taste, the standards of evaluation applied to that worldview are specified. When we evaluate a particular product of scientific activity (e.g., a finding, theory, or therapy) as being either “good” or “satisfactory”, we are basically asking whether that activity is consistent or coherent with the internal requirements of a worldview, and with the consumers of new knowledge.

*Evaluating one’s own worldview.* One reason to clarify your own philosophical assumptions is that it allows you to evaluate your own scientific activity. For instance, if one adopts a positivist (realist) position, theories are “mirrors” that vary in the extent to which they reflect the world “as it really is”. Evaluation and progress therefore requires that standards be applied that lead to the development of “mirrors” that best reflect reality. For post-positivist (critical realists) a similar (if qualified) position is taken wherein researchers develop theories that are akin to “dirty mirrors” contaminated by error and bias. Standards of evaluation and progress involve polishing one’s theoretical mirrors so as to remove as much distortion in order to represent reality as closely as possible. A knowledge claim of this kind can best be tested by a hypothetico-deductive model of theory development in which highly precise predictions are extended to relatively unexplored domains (see Bechtel, 2008; Gawronski & Bodenhausen, 2015).

Theory testing looks quite different if one takes a contextualistic or constructivist stance. In this case theories are merely tools with which to achieve some end. Consider how a commonsense tool, say a hammer, could be evaluated. “A hammer is a good ‘hammer’ if it allows the carpenter to drive a nail. It would not make sense to say that the hammer does so
because it accurately refers to the nail or reflects the nail” (Wilson et al., 2013, p.30).

Similarly, a theory is considered a ‘good’ theory because it allows the scientist to achieve some desired outcome. In this case, theory evaluation involves determining the consistency with which models or theories can be shown to led to useful interventions across a range of situations (e.g., see Hayes, Barnes-Holmes, & Wilson, 2012; Long, 2013).

**Evaluating the worldview of others.** When evaluating research programs based on a worldview other than your own it is inherently dogmatic to apply criteria that emerge from your own worldview. A great deal of useless and counterproductive energy has been spent doing so in both basic and applied psychological science. For instance, researchers and therapists adhering to a functional contextual perspective might question why their colleagues are so preoccupied with pieces of the mental machinery and their operating conditions when doing so may depreciate the role that histories of learning and contextual variables play in how thoughts lead to other actions. Mechanists may counter that contextualists are not interested in scientific understanding - they are mere ‘technicians’ or ‘problem solvers’ who manipulate the environment in order to produce changes in behavior without any appreciation of the mechanisms that mediate those changes.

What should be clear, however, is that these arguments are ‘pseudo-conflicts’ – an attempt by proponents of one worldview to position their own philosophical assumptions (and thus scientific goals and values) as ultimately right and that of others as wrong. Yet philosophical assumptions cannot be proven to be right or wrong because they are not the result of evidence – they define what is to be considered as “evidence”. The standards developed within a given worldview can therefore only be applied to the products that emerge from that approach (in much the same way that the rules that make sense within one sport (soccer) cannot be used to govern the activity of others (basketball)). Furthermore no worldview is strengthened by showing the weaknesses of other positions.
There seem to be four legitimate forms of evaluation. One is to improve your own scientific products as measured against the criteria appropriate to your approach. A second is less obvious, but is professionally helpful and collegial: enter into the assumptions of colleagues that differ from your own and then help them improve the scientific products as measured against the criteria that are appropriate to those assumptions. A third is to clearly articulate the assumptions and purposes that underpin your scientific activity and note (non-evaluatively) how this differs from others. For instance, you can describe the root metaphor and truth criterion that you’ve adopted and how your analyses are carried out from this perspective, without insisting that others with different assumptions do the same. A final approach is to note the goals and uses of science by consumers (e.g., government funders; patients) and to objectively assess whether research programs serve those ends.

**Communication and Collaboration between Proponents of Different Worldviews**

In light of the above, you might wonder if it’s possible for adherents of one worldview to communicate and collaborate with those from another without sacrificing their respective goals and values in the process. The received wisdom in psychology is that communication across worldviews is *not* possible. A concrete example is the way researchers use the same words but are referring to different concepts (e.g., “cognition” means very different things for mental mechanistic and functional-contextual researchers; see De Houwer et al., 2016b) or use different words to refer to a similar idea (e.g., ‘attentional allocation’ or ‘stimulus discrimination’). The most common result of these difficulties appears to be either a fight over perceived scientific legitimacy or a tendency to ignore the fruits of their respective labors.

There is a radically different way to approach this situation, however, and it helps explain some of why training in philosophy of science has been added to the expected knowledge base of practitioners. If scientific goals of different worldviews are orthogonal, it also means they cannot be in direct conflict with one another. There is thus no reason why
developments within one tradition cannot be used to further the scientific agenda of the other. This book is organized around that core idea. Process-based therapy can be linked to evidence from different traditions. By appreciating legitimate differences, the different wings or waves of evidence-based therapy can potentially complement each other.

Consider the dialogue explored in Chapter 7 regarding cognition approached within a “Functional-Cognitive Framework” (FC) model of scientific cooperation. Psychological science can be conducted in two different but supportive levels of analysis - a functional level that aims to explain behavior in terms of elements in the environment and a cognitive level that aims to understand the mental mechanisms by which elements in the environment influence behavior. The FC framework does not interfere with the individual researcher’s goals, nor does it pass judgment on those goals or the reasons behind them. Instead, it seeks mutually supportive interaction. Research at the functional (contextual) level, for example, can provide knowledge about the environmental determinants of behavior – which can also be used to drive mental research and or to constrain mental theorizing. So long as each approach remains committed to its form of explanation, knowledge gained at one level can be used to advance progress at the other (De Houwer, 2011). This meta-theoretical framework has yielded benefits in several areas of research (for a recent review see Hughes, De Houwer, & Perugini, 2016) and there appears to be no reason not to extend it to clinical psychology and issues such as the differences between wings of behavioral and cognitive therapy (De Houwer, Barnes-Holmes, & Barnes-Holmes, 2016a; Chapter 7 of this volume).

**Conclusion**

The main goal of this chapter was to introduce the topic of philosophy of science as it applies to clinical and applied psychology. Philosophical assumptions silently shape and guide our scientific activity and therapeutic practice. These “assumptions or worldviews are like the place one stands. What one sees and does is greatly determined by the place from
which one views. In this way, assumptions are neither true nor false, but rather provide
different views of different landscapes” (Ciarrochi, Robb, & Godsell, 2005, p.81).
Appreciating the role of philosophical assumptions tempers and guides collegial interaction
within the field, and is an important context for research evaluation, communication and
collaboration. Philosophical assumptions make a difference, whether in the laboratory or the
therapy room.
References


