

Question #1

What different concepts of regularity and pattern are employed in research, how have they shaped the development and use of theory, what are implications for conducting research in HPE?

How Goldilocks might choose amongst the multiple paradigms in health professions education

Introduction

My 6-year-old daughter started science classes this fall and recently conducted an experiment examining what happens when you combine primary colors. As I listened to her explain her findings, “the water turned PURPLE”, I reflected on the simplicity and linearity of grade one science. It was easy to see how she could be excited by a process that seemingly allowed her to explain, predict, and understand the world around her. In reality, science is anything but simple. There are many approaches to science that in turn inform the way that scientists’ advance, frame, and answer questions (Varpio and MacLeod, 2020). Each of these *philosophies of science* offer a specific way of looking at the world, at the work of building knowledge, and at the appropriate methodologies to use to engage in research (Varpio and MacLeod, 2020). The presence of multiple perspectives and approaches inevitably complicates the task of performing science, particularly in an applied field such as health professions education (HPE), where scientists come from diverse academic backgrounds and domains (Varpio and MacLeod, 2020). Most HPE scholars would agree that ours is a complex field that warrants a scientific approach worthy of addressing its complexity (Ellaway, Kehoe and Illing, 2020; Varpio and MacLeod, 2020). Paradigms are a way in which health professions educators make sense of the complexity and variety in research approaches (Varpio and MacLeod, 2020). Seen in this way, paradigms are regularities or patterns used by scientists to make explicit and apply their beliefs about how

problems should be understood and addressed (Varpio and MacLeod, 2020). Much like other patterns, there is no property, or fixed set of properties that runs through a given paradigm (Pawson, 1989). Instead they can be seen as organizing structures, that provide solutions to problems within given contexts (Alexander, 1979; Ellaway and Bates, 2015). A recent series of articles published in *Academic medicine* advocates for the HPE community to embrace our diversity and the value multiple perspectives and paradigms may bring to our work (Varpio and MacLeod, 2020). While ‘playing nice in the sandbox’ seems like a common-sense goal, the practicality of this ambition is thought-provoking. Given that every paradigm builds and uses theory differently, in this paper I plan to explore the tension between embracing our diversity and continuing to advance theory in an arena with such diverse opinions, worldviews, and methodologies. I will begin by outlining and defending my approach to the concept and use of theory in HPE. Next, by examining 3 paradigms in HPE that sit on the continuum between empiricist and relativist accounts of scientific explanation, I aim to make clear that certain paradigms lend themselves more easily to advancing my conceptualization of theory. Having laid out these arguments, I will conclude by advancing my position that the HPE community should consider and work towards a solution to the challenge of how best to build and advance theory in our multi-paradigmatic environment. I intend to argue that by aligning with the ‘just right’ principle, derived from Goldilocks’ classic fairy-tale encounter with three bears’ domestic contents, realism most evidently supports this goal.

Theory as a concept

The ubiquitous use of the word theory often confuses rather than creates understanding (Merton, 1968). I will define the boundaries of my conception of theory by distinguishing it with what

others in HPE have presented. Varpio *et al.* (2020) consider a theory to be an abstract description of the relationships between concepts that help us to understand the world. Their definition is necessarily broad in order to capture those that argue theory as a stable entity delineated at the outset of inquiry and those that believe theory to be the constantly evolving product of investigation (Varpio *et al.*, 2020). Within their conceptualization, theory may include the day-to-day hypotheses of research and the all-inclusive systematic efforts to develop a unified theory of everything (Merton, 1968). It offers little resolve to the tension between theories as generalizable all-encompassing statements, to detailed orderly descriptions of particulars that are not generalizable at all (Merton, 1968).

I support a more useful and practical conceptualization of theory that provides explanation and thus “direct[s] us to the vital explanatory components within the world, their interrelationships and the things that bring about those interrelationships” (Pawson, 2013: 62). Under this conceptualization, theory acts as “the unit of analysis and the gathering point for cumulative inquiry” (Pawson, 2013: 86). In contrast to Varpio *et al.*’s (2020) conceptualization, this construct provides direction on the generalizability (or lack thereof) of theory, greater opportunity for the advancement in scholarship through continuity, and logically connects philosophy and scientific explanation.

Viewing theory as the unit of analysis for cumulative inquiry allows us to reconsider whether it should be focused towards generalizability or specificity. The physical science model of theory takes the most generalizable view of theory as it suggests that research and technological advancement lead to the progressive cumulation of knowledge and indisputable facts that allow

both prediction and explanation based on context-independent theories (Harre, 1972). A theory is seen as a concept that can be applied in any context to achieve the same result. While facilitating both explanation and prediction, such of narrow view of theory results in the exclusion of most concepts involving the emergent social world with their probabilistic, context-dependent components that largely evade prediction (Harre, 1972). Conversely, total relativism or solipsism, which considers every case to be unique, particular, and situationally-bound, is equally problematic as it does not allow for any effective cumulation of inquiry (Pawson and Tilley, 1997c). There is, however, a middle road between the two. Recognizing the context-dependence of human affairs, some social scientists have focused on explanation and largely abandoned the notion that a theory can predict with certainty (Pawson, 2013). In this view, “inquiry never rests on the bed-rock of hard, indisputable facts; rather the piles are driven down to the point where empirical evidence seems firm enough to carry a particular inference” (Pawson, 2013: 105). Merton’s theories of the middle range strike this important balance “between the minor but necessary working hypotheses that evolve in abundance during day to day research and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behaviour, social organization, and social change” (Merton, 1968: 39). Middle range theories consist of limited sets of assumptions from which specific hypotheses are logically derived and confirmed by empirical investigations (Merton, 1968). These theories do not remain separate but are consolidated into wider networks of theory. In this way, theory becomes a way of expressing how and why something may work and plays an important role in providing continuity between inquiry (Pawson, 2013). It follows that research can “move automatically from the new, concrete situation to be studied and out to a familiar, abstract framework of necessary relationships and back to the then, not quite so new,

concrete programmed to be studied in more detail” (Pawson, 2013: 94). This movement, from concrete to abstract and back to concrete, represented as theory, provides the source of continuity between inquiries (Pawson, 2013). Although HPE has foundations in both the physical and social sciences, it is primarily grounded in human affairs and social interaction; therefore, for HPE I support the middle road approach that views theory as “bundles of hypotheses that can be tested empirically, but are also abstract enough from particular instances that they can be transferred between cases that might have quite different empirical characteristics” (Emmel *et al.*, 2018: 7).

Having clarified my perspective of theory and its application to HPE, I will now move toward delineating how various paradigms can inform our use of theory. Of note, I have intentionally chosen paradigms that lie near the poles of the continuum between positivism and relativism. In reality, distinctions in this regard are less black and white and I have tried to be mindful of this in my arguments. Nevertheless, I am upfront in admitting to somewhat simplifying the matter for the sake of clarity and argumentation.

Post-positivism

While it would have been easier to choose the universal, law-seeking paradigm of positivism as the example of empiricist scientific explanation, I have chosen to examine post-positivism in light of known critiques and challenges of positivism and my impression that there are few scholars within HPE actively engaging in a purely positivist stance. Post-positivism is similar to positivism in that it recognizes the existence of an objective truth (Young and Ryan, 2019). It diverges from positivism in asserting that we are unlikely to find the objective truth, and instead build our understanding of the world within the limitations of our times, techniques, and

currently available knowledge (Young and Ryan, 2019). Particularly important within this paradigm, is the awareness that a theory can never be definitely proven correct, instead the focus shifts to proving a theory wrong or incomplete (Young and Ryan, 2019). Theories form the continuity within inquiry, and science moves forward as theories are refined or refuted through careful testing (Young and Ryan, 2019). Theories are used to organize what is currently known, to provide a basis for hypothesis development, to allow for prediction, and to stand open to testing (Young and Ryan, 2019). Value is placed on reproducibility and on inferences moving from a given study context to a larger populations, to a different context, or to a larger theory (Young and Ryan, 2019).

The post-positivist assertion that theory acts as continuity within investigation is consistent with my own, previously declared, conceptualization of theory as the gathering point for cumulative inquiry. Unfortunately, there are practical problems with how to apply a post-positivist epistemology to consolidate theory into wider networks. Post-positivists believe external reality is static and do not recognize the emergent nature of the social world (Young and Ryan, 2019). As such they believe that if we look precisely enough under the appropriate conditions, we will discover the truth. Their management of complexity through methodological control is particularly challenging to the consolidation of theory (Pawson, 2013; Young and Ryan, 2019).

A useful example from HPE, that relates to my doctoral work, may help to more clearly demonstrate these concerns. Health systems scientists and administrators believe that audit and feedback (A&F), a quality improvement strategy used in HPE, which reports on clinical performance over time and compares it to established best practice, holds great promise as a

feedback strategy in continuing professional development (Ivers *et al.*, 2012). In hopes of convincing policymakers to more broadly adopt these strategies, Ivers et al. (2012) conducted a meta-analysis (an evidence synthesis strategy consistent with a post-positivist paradigm) examining its overall effectiveness in the health professions. Despite three revisions to the Cochrane systematic review over the last 17 years, they continue to obtain the same equivocal results of A&F's impact on professional practice (Ivers *et al.*, 2012). By seeking to approximate the "truth" and reducing the unique implementations of various A&F strategies to discrete singular variables, defining research quality via technical criteria (ie. randomized controlled trials [RCT]), and focusing on reproducibility instead of explanation; they have not been able to meaningfully advance their agenda. Their more recently outlined approach of scaling the size of their studies through implementation laboratories and more head-to-head RCTs may very well result in similarly equivocal results (Grimshaw *et al.*, 2019). By describing and observing cause and effect relationships in search of an objective truth, the post-positivist epistemology prevents meaningful cumulation. Without uncovering and explaining what is actually going on, this paradigm has limited ability beyond technical (methodological) grounds to negotiate between bad theory and good theory (Emmel *et al.*, 2018).

Social constructivism

Having determined that the post-positivist assertion of an objective 'truth' is problematic for the advancement of theory. We now turn to examining the problem from the lens of a social constructivist paradigm. Although there are a variety of sub-groups within this paradigm (constructivist, constructionist, micro-constructionist etc.), they all assert that meaning is constructed (individually, socially, or both)(Rees, Crampton and Monrouxe, 2020). It has also

been reasoned that social constructivists might situate themselves ontologically at any point on the relativist-realist continuum. To argue my point (and offer a more meaningful contrast to the previously described post-positivist perspective), I will consider strong or radical social constructivism in my analysis. This form of constructivism asserts that knowledge of the world is constructed through social interaction and that the external world only exists based on our representations of it (Rees, Crampton and Monrouxe, 2020). Given this epistemology and ontology (and in stark contrast to what we addressed in post-positivism) it follows that that there are no neutral/factual/definitive accounts to be made of the social world (Pawson and Tilley, 1997a). There is no single objective reality (Pawson and Tilley, 1997a). “Phenomena can be understood only within the context in which they are studied; findings from one context cannot be generalized to another; neither problems nor their solutions can be generalized from one setting to another” (Pawson and Tilley, 1997a: 22). Considering this in reference to the framework and role of theory outlined above, it becomes clear that in a radical social constructivist paradigm it is impossible to generalize beyond the specific setting, time, and place within which a theory was constructed. Theory built within such a paradigm cannot be consolidated or be the basis for continuity within inquiry. This effectively terminates any way for this purely relativist paradigm to function within my conceptualization of theory as a structure of continuity within the cycles of scientific inquiry.

To drive this point home, I offer an example that relates to the HPE literature and my future doctoral work. Constructivist grounded theory is a commonly used methodology in HPE. As implied by its name, the aim of this methodology is to construct theory from data through induction. Using constructivist grounded theory, Watling *et al.*, (2013) examined three cultures

of professional training (music, pedagogy, and medicine) at a single institution and built theory regarding the culturally specific ways in which credibility and constructiveness are perceived. Strictly adhering to the phenomenological stance that findings from a particular context cannot be generalized; beyond developing an understanding of credibility and constructiveness at their particular institution in those particular domains, there seems no logical way to delineate transferable findings from this work to my own upcoming work on feedback.

Of note, my experience in HPE suggests that the great majority of social constructivists in our field do not ascribe to the radical social constructivist paradigm outlined above. As Rees, Crampton and Monrouxe (2020) suggest, health professions educators working in a constructivist paradigm often adopt the critical realist ontology that some sense of reality can exist outside of discourse. They accept a multiplicity of perspectives, but consider those different perspectives to be equally true (Rees, Crampton and Monrouxe, 2020). Such an approach makes it easier to argue for continuity in inquiry, as researchers refine theories from various inquiries to more closely move toward reality (but only ever approximating it) (Rees, Crampton and Monrouxe, 2020). This is the approach that Watling (2014) took in advancing the credibility/constructiveness theory into a broader theory of the impact of learner perception and learning culture on feedback (Watling *et al.*, 2013). There remain challenges in this approach, in particular with respect to negotiating between competing theories or irregularities identified in a single context. I also wonder, if there is a better way to clarify the realist constructivist paradigm or fold it into a more entirely realist perspective which we will explore next.

Realism

Realism is a philosophical stance based in the work of British philosopher Roy Bhaskar (Bhaskar, 2008). It is generally considered to be a model of scientific explanation that sits somewhere between the traditional epistemological poles of positivism and relativism (Pawson and Tilley, 1997b). Because it is filtered through our senses, cultures, and experiences, realists argue that the social world is *real* but our understanding of it is always incomplete, (Wong *et al.*, 2012; Ellaway, Kehoe and Illing, 2020). Some of realism's key features are its explanatory focus, and its attempt to show that the usage of the mechanics of explanation can lead to a progressive body of scientific knowledge (Pawson and Tilley, 1997c). Realists acknowledge a stratified account of reality, and move beyond describing what can be measured in the social world to explaining the deeper causal powers that shape that which can be observed (Emmel *et al.*, 2018). These causal powers can be more clearly understood through what Bhaskar (2008) refers to as the "transitive" and "intransitive" dimensions of science. The transitive refers to the changing dimensions of scientific experience, whereas the intransitive refers to the relatively unchanging things which we attempt to know (Bhaskar, 2008). Within this understanding, the ever-evolving explanations and experience or *theories* of science form the transitive dimension which attempt to understand the intransitive causal mechanisms that exist in themselves regardless of whether or not humans exist (Bhaskar, 2008). This of course fits very well with my conception of theory and was in fact the basis for it in the first place.

As compared to the post-positivists, realist methodology contests the hierarchy of evidence, recognising that the key is not some arbitrary measure of methodological rigour but its utility in crafting theory (Emmel *et al.*, 2018). Realists are much more interested in how insights arising from various forms of investigation add to a pool of theory (Emmel *et al.*, 2018) "Overall, that an

RCT or a Grounded Theory study provide compelling insight into some particular process is considered important because it helps the evaluator, synthesizer, or researcher to judge a theory” (Emmel *et al.*, 2018: 4)

As compared to radical social constructivists, realism aims to produce middle-range theory by using concepts able to associate a range of distinct empirical instances into a single schema (Merton, 1968; Wong *et al.*, 2013). It discounts the notion that evidence emerges only from direct observation of the social world, and recognizes that it is our theories of the social processes into which social properties are embedded which are the appropriate source of understanding of the nature of social variables (Pawson, 1989).

I will draw my final example from my future doctoral work where I intend to apply a realist paradigm to examine the use of feedback in professional medical practice. Feedback is a complex social process that relies on the decisions and actions taken by the ‘human components’ of a system/program to generate outcomes (Wong *et al.*, 2012). Existing research in medical education has highlighted the importance of the technical as well as sociocultural aspects of feedback (Ende, 1983; Watling, 2014). Interventions or programs designed to implement feedback in professional medical practice must simultaneously improve quality, assure patient safety, and deliver cost-effective care. Such complex delivery programs have multiple, interlocked components that engage with the particularities of context. Clearly, what works in Department A of one institution may not work in Department B or in community practice.

Designing and evaluating complex interventions such as performance feedback is challenging. Traditional experimental methods, based in successionist views of causation, are able to describe whether an intervention works ‘on average’ but are unable to answer explanatory questions such as ‘how’ and ‘why’ an intervention may or may not work (Greenhalgh *et al.*, 2015). Realist inquiry, a theory-driven methodology based in realist philosophy, aims to advance understanding of why complex interventions work, how, for whom, in what context and to what extent – and also to explain the many situations in which a program fails to achieve the anticipated benefit (Pawson, 2013; Greenhalgh *et al.*, 2015). To understand how an intervention might generate different outcomes in different circumstances, realism introduces the concept of mechanisms – underlying changes in the reasoning and behaviour of participants that are triggered in particular contexts (Greenhalgh *et al.*, 2015). With its focus on explanation and mechanism-based theory building, realist inquiry may add to our understanding of performance feedback in professional medical practice. The main focus of realist inquiry is not to determine whether feedback in professional medical practice ‘works’ but rather to find out the mechanisms that shape, enable, and constrain feedback in the various contexts of professional medical practice.

Conclusion

Although it is accepted that health professions educators approach problems from a variety of different paradigms and philosophies of science, embracing our diversity is more problematic than it seems. Accepting theory as the basis for cumulative inquiry allows us to align with theories of the middle range that in turn have practical value in sitting between the too specific and the too general. Although theories of the middle range are paradigm agnostic, there are clear challenges to deriving them from paradigms that sit at the poles of the continuum of empiricist and relativist scientific explanation. Post-positivism in principle supports cumulative inquiry and

theory, however its epistemology of one truth and quest for generalizability in spite of context is problematic. Radical social constructivism, with its focus on the unique and particular, is entirely incompatible with cumulative inquiry; others have clearly recognized this controversy and articulated various stop gap solutions such as adopting a social constructivist epistemology and a critical realist ontology. Realism, with its clear articulation of the transitive evolving dimensions of science and intransitive *reality* of the social world offers a particularly compelling argument of how to advance HPE. By using theory as the transferable and cumulative components of inquiry, realist methodology provides a structure to use “nuggets” of evidence derived from other paradigms to advance program theory (Wong *et al.*, 2013). It battles complexity by using and testing middle range theories in an ever-widening array of conditions (Wong *et al.*, 2013). As presented, its theory is neither fully generalizable nor so specific that it is rendered useless, its philosophy provides a clear framework for understanding why things may happen but also why they may not. It provides a logical (realistic) way to situate itself among other paradigms. In this way, realism can be considered to apply the most desirable or advantageous parts of a range of values or conditions (typically the center). Much like Goldilocks declared the possessions of baby bear to be ‘just right’, I believe that in pursuit of a way to build theory within the multi-paradigmatic HPE environment, realism may well be ‘just right’.

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