Toward a Topological Description of the Therapeutic Process: Part 2. Practitioner and Patient Perspectives of the “Journey to Cure”

Lionel R. Milgrom, PhD, FRSC, MARH, RHom

Abstract

Background: The discourse of quantum theory has been used to describe (1) the homeopathic therapeutic process (in terms of three-way macro-entanglement between patient, practitioner, and remedy, called PPR entanglement), and (2) the homeopathic concept of the Vital Force.

Methods: Combining these two approaches leads to a semiotic (i.e., pertaining to the theory of sign systems in language) geometry that illustrates the nature of this entanglement and how it could facilitate the patient’s journey to cure. Here, this geometry is extended further to gain insight into both practitioner and patient perspectives of the process.

Results: From the practitioner’s perspective, the semiotic geometry predicts PPR entanglement, generating a number of distinguishable therapeutic outcomes that depend on the various patient-, disease-, and remedy-based “contributions” to the overall symptom picture of the remedy arrived at holistically. Furthermore, these outcomes may be seen as different facets of a more generalized PPR entangled state whose semiotic geometrical representation is hyperdimensional. Likewise, the patient’s perspective of the journey to cure can also be represented semiotically, this time as a series of cross-sections through a hyperdimensional figure of similar symmetry, entering and leaving the patient’s notional “dis-ease” space.

Conclusions: The semiotic geometries representing practitioner and patient experiences of the therapeutic process ultimately converge. Where they differ is that in elaborating the patient’s journey to cure, the practitioner’s perspective may be seen as from the outside of a whole process. As it is the patient who ultimately is traveling this journey, the patient’s perspective is necessarily from the inside, of stages or cross-sections of the whole process.

Introduction

T he nature of the therapeutic process, particularly in homeopathy, has recently been illustrated by appealing to the discourse of quantum theory.1,2 Such illustrations tend to be derided3-4 primarily by those who, espousing an essentially scientific (as opposed to scientific) world view, consider further research, explanation, or clarification of homeopathy unnecessary,5 regardless of mounting clinical and biophysical evidence to the contrary.6-21

Scientism6 is now considered a cultural curiosity in philosophical circles,22-24 yet it thrives in biomedicine,25 even though there has been trenchant criticism26 of certain scientific beliefs (e.g., that purely science-based trials are the only acceptable form of evidence for a drug/procedure’s efficacy). Crucially, scientism also dominates the health media discourse,27,28 resulting in a dogmatic intolerance29,30 of anything considered “unscientific” (e.g., homeopathy and complementary and alternative medicine [CAM]), that borders on fundamentalism. Consequently, regardless of whatever discourse is used to illustrate the nature of the therapeutic process,1,2 homeopathy/CAM might be said to have an “explanation problem.”

In the orthodox interpretation of quantum theory,21 a quantum state’s mathematical formulation (Boxes 2 and 3) describes its objective physical reality and is thought to apply only to the incredibly small. Such an interpretation of quantum theory is said to be grounded in an exclusively “realist” or “strongly objective” ontology (i.e., the universe

Program for Advanced Homeopathic Studies, London, UK.
exists separate from us, regardless of whether we observe it or not. Zeilinger, however, has effectively challenged this view, considering the mathematical formulation of a quantum state to be only a representation of what can be known about it. This implies that an equally valid way of interpreting quantum theory is in terms of information, which can have a more fundamental meaning than any notion of "objective reality." D’Espagnet goes further, suggesting our reality is only weakly objective, not strongly objective as assumed by most scientists. The implications for our conception of the universe are profound, for what constitutes information—meaning—is to some extent in the mind of the beholder, a beholder being required for it to be considered meaningful in the first place.

The pre-Socratic Greek philosopher Protagoras preempted this partly solipsistic conception of the universe with, "Man is the measure of all things." Since Protagoras, however, philosophers have tended to "banish" meaning outside and independent of human thought, not as modern interpreters of Protagoras have argued, fundamentally and dynamically grounded in human nature. Thus, Professor Mark Turner has argued that, "Meaning is conceived of...as essentially anchored in states of affairs in an objective reality, with the consequence that the meaning of an utterance must be the reality to which it refers...a semantic express train shoots straight from the linguistic symbols to an objective reality without passing through the human brain, let alone stopping in the human brain, let alone taking its entire journey there." Consequently, Turner argues for an updated, more cognitively aware attitude toward Protagoras, proposing the need for a new theory of meaning that could inform the physical and biosciences.

It is in this context that Zeilinger’s interpretation of quantum theory might prove useful. If a wave function contains within it all that can be known about a system by observation (not its presumed ontological [i.e., pertaining to the philosophical study of the nature of being and existence] reality outside of and separate from an observer), then as Henry Stapp pointed out, the act of observation in part creates that which is observed (or, as 18th-century Bishop George Berkeley put it, "To exist is to be perceived"). It is this realization of an effectively nonlocal coherence between observer and observed, which is how the therapeutic process in any healing modality (including homeopathy) might usefully be described, using the discourse of quantum theory.

For example, consider “entanglement” between such qualitatively and apparently ontologically different “macroscopic” entities as a remedy (something derived from a material substance) and a symptom totality (an abstract idea generalized from one individual’s observations about another). From the standpoint of a realist ontology, such “entanglement” would appear unrealistic and indeed has been contemptuously dismissed. However, if it is realized that remedy and symptom totality are before anything else sources of information and thus have similar ontologies, then they are quite capable of becoming “entangled” (via the practitioner) during the therapeutic process.

Orthodox quantum theory is one of the most successful, pragmatic theories ever devised. Adopting an information-based interpretation of quantum theory allows generalization of its discourse beyond exclusive concentration on the physics of matter, to the therapeutic contexts described here. Indeed, via Weak Quantum Theory, such generalization has already been shown to be relevant to the description and understanding of such nonphysical phenomena as the dynamics of interpersonal relations (Box 1 and Box 2). In addition, two recent trials (one indicating clinical benefits in rheumatoid arthritis solely from the homeopathic consultation and not homeopathic remedies, and the other showing that placebos have meaningful clinical benefits in irritable bowel syndrome even when the patient knows they are receiving placebo) may be understood in terms of a previously described complementary relationship between remedy and consultation, similar to that found between momentum and position, or energy and time, in orthodox quantum theory.

Thus, the discourse of quantum theory could lead to conclusions about the therapeutic process akin to those of current holistic worldviews, and more ancient vitalistic traditions, no doubt provoking negative responses from those who believe anything pertaining to vitalism is an anachronism.

**Representation of the Therapeutic Process as Topology**

Semiotics is the study of signs and symbols, a sign being anything as long as it is interpreted as a sign (i.e., it signifies something). Without signification (by someone), a sign of itself has no intrinsic meaning. From this perspective, it is the meaningful use of signs that concerns semiotics. In this respect, this article represents the culmination of a project to develop a semiotic “geometry” to describe the therapeutic process.

In previous articles, two quantum metaphor/models of the therapeutic process were elaborated. These described the following:

1. the Vital Force (or Vf—a venerable concept used by most forms of CAM, including homeopathy) in terms of the wave function for a spinning quantized gyroscope, and
2. the relationship between patient, practitioner, and remedy as a nonorthodox quantum-type three-way entanglement—called PPR entanglement—between patient, practitioner, and remedy.

It was possible to combine these two representations, so that the Vf gyroscope wave function could be “normalized,” allowing different stages of the curative homeopathic process to be elucidated. Particularly, a semiotically derived geometrical description of the “therapeutic state space” was identified, allowing a topology for the patient’s journey to cure to be glimpsed.

Thus, during the consultation, the practitioner provides the conditions necessary for an active “mirror-like” (i.e., two dimensional) “therapeutic state space” to arise in which the patient’s diseased state—represented as a chiral

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*Indeed, mathematics might have an even more fundamental role in science than mere representation; see for example, Rowlands P. Zero to Infinity: The Foundations of Physics (Series on Knots and Everything, vol. 41; series ed. Kauffman LK). Singapore: World Scientific Publishing, 2007.*
this is the very nature of the homeopathic consultation which
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Recognizing this in effect "chirality," the patient's "journey
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..."through the looking glass" of the mirrorlike therapeutic
"to cure" is represented metaphorically as a movement
passively reflecting back the patient's unwell state, but ac-
"actively" reflects Px dis-eased state

In quantum mechanics, a quantum state is usually denoted by symbols such as \( \Phi \) or \( \Psi \), meaning that these states may be represented mathematically as wave functions. A wave function is an abstract, mathematical description of how a quantum system's multidimensional state evolves with time when it is not being observed. For all practical purposes, this means that a multidimensional quantum state may not be observed directly; instead, it may only be inferred from the effects it produces in our reality.

As used in the theory of quantum mechanics, bra-ket or Dirac notation is composed of angle brackets and vertical bars. It can also be used to denote abstract vectors and linear state functions in mathematics. It is called Braket notation because the inner product (dot or scalar product) of two states is denoted by a bra-ket, \( \langle \Phi | \Psi \rangle \), consisting of a left part, \( \langle \Phi \rangle \), called the bra, and a right part, \( | \Psi \rangle \), called the ket. The notation was introduced in 1930 by Paul Dirac.

Bra-ket notation is widespread in quantum mechanics: almost every phenomenon that is explained using quantum mechanics—including a large portion of modern physics—is usually explained with the help of bra-ket notation. The expression \( \langle \Phi | \Psi \rangle \), for example, is typically interpreted as the probability amplitude for the state \( \Phi \) to collapse into the state \( \Psi \) on observation, which is quantifiable.

tetrahedron'—is not only reflected, but also "inverted." In
terms of this semiotic geometry, the possibility of cure is
represented as the inverted mirror image chiral tetrahedron
(Boxes 1 and 2).

By "inverting" that which is reflected in it (i.e., not simply
passively reflecting back the patient's unwell state, but ac-
tively demonstrating to the patient what a cured state might
be), the therapeutic mirror plane may also be considered to
exhibit the topological features of a Möbius strip.52 The ini-
tially elaborated patient dis-eased state, by active reflection,
may be thought of as taking one "turn" around the therapeu-
tic state space's "Möbius strip,"5 becoming inverted in
the process into the practitioner's reflection of the cured state.
Recognizing this in effect "chirality," the patient's "journey
to cure" is represented metaphorically as a movement
"through the looking glass" of the mirrorlike therapeutic
state space, in effect combining the reflected dis-eased and
cured states into a stellated octahedron representing the cu-
rative PPR entangled state.1

In this respect, the practitioner might also be considered to
be acting as an "impulse"53 on the patient's Vf wave func-
tion, temporarily increasing its "amplitude" so that the
movement "through the looking glass" can be achieved. But
the practitioner is also included in PPR entanglement, not
least by "witnessing" the therapeutic process. Underpinning
this is the very nature of the homeopathic consultation which
because of its length, depth, and subtlety44 effectively iso-
lates the patient and practitioner from the outside world:
conditions, it turns out, that are ideal for their coherence.†

By so providing the ground for entanglement, the practi-
tioner-derived mirrorlike therapeutic state space that arises
reflects in both directions. Consequently, it is possible to
consider the patient as an "impulse" acting on the practi-
tioner's Vf wave function, and to perform on it a series of
normalization operations (similar to those on the patient's
Vf) to see how it too fluctuates through the therapeutic
process.2 Thus, there is a coherent interplay between patient
and practitioner that can be rather aptly represented by M.C.
Escher's etching of "Drawing Hands."54,55

It seems possible, therefore, to render a visualization of the
homeopathic therapeutic encounter in terms of a semiotic
topology on which the various stages of the therapeutic
process can be represented as a changing pattern of geo-
metric shapes. These shapes are themselves derived from a
semiotic representation of the dynamic relationship between

†The conditions for coherence between the entities of a system in orthodox quantum theory are known to involve their isolation from the rest of the universe. See Hameroff SR, Penrose R. Orchestrated reduction of quantum coherence in brain microtubules: A model for consciousness. In: Hameroff SR, Kaszniak A, Scott AC, eds. Toward a Science of Consciousness: The First Tucson Discussions and De-
the patient, the practitioner, and the remedy, which can be understood as becoming “entangled” during the therapeutic encounter.

As such, therefore, the therapeutic encounter may be amenable to the general discourse of quantum theory (which is not to say that the basis of homeopathy is orthodox quantum physics, or that the various geometric shapes discussed and the space(s) in which they exist conform to real physical shapes or dimensions). This article, therefore, describes further work into the nature of these semiotic relationships: in particular, how they might be perceived from the different perspectives of the patient and the practitioner.

**Practitioner and Patient Viewpoints:**
**A Matter of Perspective**

*The Practitioner’s Perspective*

As has been developed in previous articles published here and elsewhere,1,46,47,51 the homeopathic consultation results initially in the practitioner showing the patient their diseased state, represented semiotically as a chiral tetrahedron at whose “epicenter” is the patient (Fig. 1A), itself derived from consideration of the patient, practitioner, and remedy as a tripartite relationship (Box 3).1

Precising the conclusions of the previous article,1 the possibility of cure is then represented as the inverted mirror image of the semiotic tetrahedron, topologically equivalent to the mirrored state going once around the Möbius strip-like “therapeutic state-space,” becoming inverted in the process.1 This now gives rise to two semiotic triangles—the second being a mirrored inverted version of the first (the gray triangle in Fig. 1A), which when superimposed, results in the Star of David configuration shown in Figure 1A and 1B1—

and a contrarotating directionality to the therapeutic sequence, which in terms of the semiotic tetrahedron’s base triangle goes

\[ \text{I} \text{Pr} \xrightarrow{Y} \text{I} \text{Rx} \xrightarrow{Y} \text{I} \text{Pr} \xrightarrow{Y} \text{I} \text{Rx} \xrightarrow{Y} \text{I} \text{Pr} \]

et al. (Fig. 1A—black triangle).

This now gives rise to two semiotic triangles—the second being a mirrored inverted version of the first (the gray triangle in Fig. 1A), which when superimposed, results in the Star of David configuration shown in Figure 1A and 1B1—and a contrarotating directionality to the therapeutic sequence, i.e.,

\[ \text{I} \text{Pr} \xrightarrow{Y} \text{I} \text{Rx} \xrightarrow{Y} \text{I} \text{Pr} \xrightarrow{Y} \text{I} \text{Rx} \xrightarrow{Y} \text{I} \text{Pr} \]

Referring to Figure 1A, the patient’s initial dis-eased state (given by the inverted gray triangle—[II] is reflected back (inverted black triangle—[III]) by the practitioner’s elaboration of a two-dimensional mirrorlike therapeutic state space (III). This is an “active”—as opposed to a passive—mirror so that as described above, the final “cured” state may be represented as its inverted mirror image (black triangle [II]).

The patient’s notional “journey” to cure begins by stepping “through the looking glass” of the two-dimensional therapeutic state-space, effectively combining the initial and possible final states (i.e., “fusing” the two semiotic tetrahedra) into a “curative” stellated octahedron.11

For ease of visualization, Figure 1A shows the plane projections of these three-dimensional figures (e.g., a tetrahedron projected through one of its corners reduces to an equilateral triangle, while similarly projecting a stellated octahedron gives a Star of David or hexagram). The base triangle of the semiotic tetrahedron (projected through its Rx apex) has corners labeled with the symptoms of the patient, Sx(Px), the dis-ease, Sx(Dx), and the remedial substance, Sx(Rm) (Box 1). These represent the practitioner’s combined perception of patient symptoms (Sx) and dis-ease (Dx), plus knowledge of remedial substances (Rm) and homeopathic remedies (Rx; the apex of the tetrahedron which now appears at the base triangle’s epicenter) prepared from them.

In addition to Figure 1A, there is a sequence of non-commuting therapeutic operations,56 which may be considered as directional state functions (Boxes 1, 2, and 3) represented by the sides of the semiotic tetrahedron’s base triangle. These state functions are:

- the patient’s experience of symptoms, state \( \text{I} \text{Pr} \)
- which are observed and considered by the practitioner, state \( \text{I} \text{Pr} \)
- who on the basis of observations, knowledge, and experience, prescribes a remedy, state \( \text{I} \text{Rx} \)
- whose effect on the patient state \( \text{I} \text{Pr} \) is then reported back to the practitioner state \( \text{I} \text{Pr} \).

However, there are a variety of possible therapeutic outcomes depending on the nature of the various state functions which, for simplicity, have been reduced to two for each state. Thus:

- the patient state function, \( \text{I} \text{Pr} \), can be “well” or “unwell” (i.e., states \( \text{I} \text{Pr} \) or \( \text{I} \text{Pr} \));
- the practitioner state function, \( \text{I} \text{Pr} \), can be “helpful” or “unhelpful” (i.e., states \( \text{I} \text{Pr} \) or \( \text{I} \text{Pr} \));
- the remedy state function, \( \text{I} \text{Rx} \), can be “curative” or “noncurative” (i.e., states \( \text{I} \text{Rx} \) or \( \text{I} \text{Rx} \)).

providing a rotational “directionality” to the therapeutic sequence, which in terms of the semiotic tetrahedron’s base triangle goes

etc. (Fig. 1A—gray triangle).

Referring to Figure 1A, the patient’s initial dis-eased state (given by the inverted gray triangle—[II] is reflected back (inverted black triangle—[III]) by the practitioner’s elaboration of a two-dimensional mirrorlike therapeutic state space (III). This is an “active”—as opposed to a passive—mirror so that as described above, the final “cured” state may be represented as its inverted mirror image (black triangle [II]).

The patient’s notional “journey” to cure begins by stepping “through the looking glass” of the two-dimensional therapeutic state-space, effectively combining the initial and possible final states (i.e., “fusing” the two semiotic triangles [II] and [III]) into the “curative” Star of David/hexagram [IV].

This is the two-dimensional projection of a three-dimensional stellated octahedron, which importantly, has cubic symmetry, meaning it can be inscribed within a cube.

Inspection of the hexagram shown in Figure 1B[iiv] (and magnified in Fig. 2A) reveals an interesting relationship between the contrarotational directions of the black and gray (inverted) larger triangles. The overlap of the two larger triangles can be seen to generate six smaller triangles with their own rotational directions (see curved arrows around each corner of the hexagram). These not only “mesh” together as if they were a set of interlocking cogwheels, but they also harmonize with the overall contrarotating directions of the large triangles (see curved arrows inside them).

The significance of this is indicated by inspection of the other hexagrams shown in Figures 1B[iv–iv], for example Figure 1B[iv] (also magnified in Figure 2B). Now opposing rotational directions are mixed into the two larger triangles. This is mirrored in the six smaller triangles of the hexagram. Though their overall inner rotational directions again mesh
FIG. 1. A&B. Plane projections of various stellated octahedral and their directional component sequences of noncommuting therapeutic “operations.”
The “active” mirroring activity of the homeopathic practitioner during the therapeutic process consists of reflecting back to the patient his/her “dis-eased” state and, most importantly, the possibility of cure. This “operation” is denoted by the symbol \( \mathcal{P} \), meaning the homeopathic “operator,” who creates and whose action occurs within a “therapeutic state space.” This space may be better understood in general terms by considering the nature of the space in which quantum systems operate.

A fully specified quantum system is usually represented by a statistical (as opposed to a definitive) description derived from experimental observations, called a state vector, whose governing equation contains complex numbers.

These are numbers of the type \( x + iy \) where \( x \) and \( y \) are “real numbers” and \( i \) is the “imaginary” number \( \sqrt{-1} \). A complex number defines its complex conjugate—its “mirror image” \( x - iy \)—such that their product \((x^2 + y^2)\) gives only a real number. Similarly, a complex wave function defining a quantum state \( \psi \) defines its mirror image complex conjugate \( \psi^* \), the product \( \langle \psi \psi^* \rangle = |\psi|^2 \) being “real” and interpreted as the probability of finding the quantum state in a defined volume of space. Thus, the “space” of a complex state vector cannot be our ordinary space and time, described using real numbers. It is an abstract complex mathematical “configuration space” called a Hilbert “state space.”

Hilbert space is a higher level of abstraction than our ordinary three-dimensional geometric space. It is a mathematical device for arranging pieces of information, whose “coordinates” (which can be infinite in number) are complex. Each complex “coordinate” is not geometric: It represents the possibility for a given quantum state to exist that might correspond to something definite in our “real” space.

Before a measurement/observation is made, all possible states “coexist” and contribute to the wave function. Thus, a wave function does not have inherent properties, only incompletely defined “potentialities.” Put another way, a wave function contains within it all that can be known about a system by observation, not its putative ontological reality “out there,” separate from the observer.

When an experiment is performed on a quantum system, a real number called an eigenvalue is returned. An eigenvalue is not a property of a quantum system: It is what we observe during an experiment; so it is “classical” and it consists of real numbers. However, as has been said, a quantum system is described by a state vector that consists of a set of complex numbers. Therefore, it is extremely difficult to assign definite “classical” eigenvalues from our “real” space to quantum systems in complex Hilbert space.

Partly, this is because complex numbers cannot be contained within real numbers. This is because the real numbers are a subset of complex numbers, not the other way around. In just the same way that a three-dimensional object cannot be squeezed into its two-dimensional projection, likewise, something always gets lost “in translation” when trying to map “classical” eigenvalues onto complex quantum states. This is not due to any carelessness on our part: It is a basic limitation in our form of observation.

This has profound consequences. Prior to quantum theory it was always assumed everything physical is measurable or observable. It is why quantum theory is so difficult to grasp. For without forsaking the requirement of empirical evidence for knowledge of physical characteristics, it is possible for quantum properties (e.g., a particle’s wave function) to be physical yet not directly observable or measurable.

It is for this reason the discourse of quantum theory might be useful in describing the homeopathic process, where signs and symptoms of disease are considered observable manifestations of an “invisible” disturbed vital force, \( Vf \). Thus: “Eigenvalues are analogous to symptoms of a disease, which are disturbances of the body that show up and indicate something that does not show up. Just as a cold persists though its symptoms are suppressed, so a quantum system’s wave function has a definite amplitude, even though it has no eigenvalue.”

The words of a physicist, not a homeopath.

In quantum theory, observables are represented by special mathematical operators called self-adjoint or hermitian operators. Like mathematical functions, they are transformations or mappings, but unlike functions, the range of operators is not just the subset of real numbers: It is the whole set containing the complex state space. This applies to self-adjoint operators even though they consist only of real numbers.

There is a theorem (called the Kochen-Specker theorem), which indicates that in most cases, eigenvalues cannot be considered as properties of quantum systems if there is a one-to-one mapping between self-adjoint operators in a Hilbert space and observables in “real” space. But the theorem shows that this only leads to contradictions if the dimension of the Hilbert space is greater than 2.

This could have huge significance for quantum theoretical models of the therapeutic process, because we have defined the role of the practitioner as actively mirroring for the patient their dis-eased state and the possibility of cure. I have previously argued that the “therapeutic state space” is best likened to an active “mirror”—something that tallies with practitioners’ experience of the therapeutic process.

Now, mirrors are essentially planar (i.e., two-dimensional; 2-D). The homeopathic operator not only operates in this mirror plane but also is an essential feature in its creation. According to the Kochen-Specker theorem, therefore, it should be possible for a meaningful and noncontradictory mapping to be made from observables (i.e., signs and symptoms of dis-ease) by the homeopathic operator \( \mathcal{P} \) in its 2-D therapeutic state-space onto the patient’s \( Vf \). For this reason, the contradictions in orthodox quantum theory arising from one-to-one mappings of “classical” observables onto physical properties appear not to arise in quantum models and metaphors of the homeopathic process.

This, in my view, legitimizes the assumption of symptoms (“eigenvalues”) of disease being considered observable properties of an unobservable “quantum entity,” namely, in this case, the \( Vf \). Thus, the Kochen-Specker theorem delivers back, in terms of a quantum discourse, what homeopaths already know: that signs and symptoms of disease are the manifestations of a \( Vf \) that is not in itself apprehensible or, indeed, comprehensible in purely materialistic terms.

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with each other (the curved arrows around each corner of the hexagram), they now also contain an opposing rotation to the smaller and larger triangles (the small arrows inside the smaller triangles): indeed, this small opposite rotation could be said to constitute a kind of internal "friction"—or "brake"—on the larger rotations. Similar patterns of internal "friction" on the rotations of the larger triangles exist for the other hexagrams shown in Figures 1B3iv–4iv. Thus, because they have no internal "friction," the two states shown in 1B1iv and Figure 2A are distinct from the other six states 1B2iv-4iv, which do have internal "friction" (Box 4).

What the term "friction" could mean in this context can probably be best understood as the relative balance of factors that determine how the practitioner arrives at a remedy solution. Thus, the eight combinations of state vectors shown in Figures 1B1(iii & iv)–1B4(iii & iv) (which affect the overall directionality of the "rotation" in each of the semiotic tetrahedral base triangles) could be said to act as a kind of internal "friction"—or "brake"—on the larger rotations. Similar patterns of internal "friction" on the rotations of the larger triangles exist for the other four states 1B3iv-4iv. C. Faces of stellated octahedron.

FIG. 2. A. Closer inspection of the two states shown in Figure 1B1iv reveals the contra rotational directions of the black (counter-clockwise “up” arrows) and inverted gray (clockwise “down” arrows) larger triangles. The hexagram formed from overlap of these two larger triangles generates six smaller triangles with their own rotational directions (see curved arrows around each corner of the hexagram). These not only “mesh” together as if they were a set of interlocking cogwheels, they also harmonize with the overall contra rotating directions of the large triangles (see inner curved arrows). B. The two states shown in Figure 1B2iv now have opposing rotational directions mixed together in the two larger triangles. This is mirrored in the six smaller triangles of the hexagram. Though their overall inner rotational directions again mesh with each other (the curved arrows around each corner of the hexagram), they now also contain an opposing rotation to the smaller and larger triangles (the small arrows inside the smaller triangles): indeed, this small opposite rotation could be said to act as a kind of internal "friction"—or "brake"—on the larger rotations. Similar patterns of internal "friction" on the rotations of the larger triangles exist for the other four states 1B3iv-4iv. C. Faces of stellated octahedron.
Three-way macro-entanglement between patient, practitioner, and remedy (PPR entanglement) is a three-way entanglement between the various state functions of the patient (\(I^Y_{Rx} \), \(I^X_{Rx} \), and \(I^Z_{Rx} \)), practitioner (\(I^Y_{Pr} \), \(I^X_{Pr} \), and \(I^Z_{Pr} \)), and remedy (\(I^Y_{Rx} \) and \(I^X_{Rx} \)), forming the entangled PPR state function, \(I^Y_{PPR} \). It is modeled on Greenberger-Horne-Zeilinger (GHZ) entanglement of three quantum particles (with “up” and “down” spins for particles or left and right polarizations for photons), and as such gives rise to eight possible entangled states. These are tabulated below:

### Eight PPR entangled states (modeled on...)

<table>
<thead>
<tr>
<th>(I^Y_{PPR} )</th>
<th>(I^Y_{GHZ} )</th>
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<tbody>
<tr>
<td>(I^X_{Pr} ) (I^X_{Rx} )</td>
<td>(I^X_{Pr} ) (I^X_{Rx} )</td>
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<tr>
<td>(I^Z_{Pr} ) (I^Z_{Rx} )</td>
<td>(I^Z_{Pr} ) (I^Z_{Rx} )</td>
</tr>
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The stellated octahedra formed from these eight entangled states are represented in Figure 1B(1iv–4iv), inspection of which indicates that the first two, Figure 1B(1iv), are distinguishable (seen in gray) from the other six, Figure 1B(2iv–4iv). The first two are the only ones in which purely clockwise and anticlockwise directions of “rotation” of the various directional state functions—\(I^X_{Pr} \rightarrow I^X_{Pr} \rightarrow I^X_{Rx} \)—are confined to the separate triangles. The six stellated octahedral in Figure 1B(2iv–4iv) are different as there is some mixing of rotational directions of the various state functions in each of the two triangles. There is an analogy here with the known differences between the first two GHZ states shown in the table (considered maximally entangled) and the other six.

Though eight GHZ states are shown in the table above, the most general pure entangled state between three particles is given by their conflation:

\[
\|I^Y_{GHZ}\rangle = \sqrt{2}(1^X_{Pr}^\dagger \cdot 1^X_{Rx}^\dagger \cdot 1^X_{Pr}^\dagger \cdot 1^X_{Rx}^\dagger) \quad (1)
\]

By analogy therefore, the most general pure PPR entangled state would be given by:

\[
\|I^Y_{PPR}\rangle = \sqrt{2}(1^X_{Pr}^\dagger \cdot 1^X_{Rx}^\dagger \cdot 1^X_{Pr}^\dagger \cdot 1^X_{Rx}^\dagger) \quad (2)
\]

The diagrams shown in Figure 1B and 2 are plane two-dimensional projections of a three-dimensional stellated octahedra (SO—which has cubic symmetry). An example of this is shown in Figure 2C, with the eight corners of the SO labeled as in Figure 1A. The most general pure PPR entangled state shown in equation 2 above, on combination with its complex conjugate via the action of the homeopathic operator \(\Pi_r\), however, most probably forms a higher-dimensional figure with hypercubic symmetry\(^6\) whose various projections in 3-D space produce the SOs in Figure 1B.

Just as the triangles shown in Figures 1B1 and 2A may be thought of as rotating relative to each other (like a hyperdimensional Rubik’s Cube, Fig. 2C), in the process generating all possible therapeutic outcomes represented by the SOs shown in Figure 1B(1iv–4iv).

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\(^6\) For cubes entering 2-D plane, and 4-cubes entering 3-D space see: Online document at: www.learner.org/courses/mathilluminated/units/5/textbook/04.php Accessed June 2, 2011.
therapeutic outcomes represented by the SOs shown in Figure 1B(1iv–4iv).

Finally, to sum up this section: elaborating a semiotic geometry for the therapeutic process, from the practitioner’s perspective, may be seen to employ an increasing number of dimensions from:

1. The two dimensions of the mirrorlike therapeutic “state space” and the basic triangular entangled relationship of the patient, practitioner, and remedy;
2. To the three dimensions of the tetrahedral dis-eased and stellated octahedral states and the patient’s notional “journey to cure” through the therapeutic state-space;
3. To finally, the hyper-dimensional general patient-practitioner-remedy entangled state.

The patient perspective

Multidimensional geometry can also be employed to illustrate the patient’s perspective of the therapeutic process (Fig. 3). Here, one assumes a patient’s dis-eased state is, in the most general sense, necessarily limiting and that cure of that state implies that the role of the practitioner is to in some way assist the patient in removing or becoming free from that limitation. One then imagines that the patient in their diseased state is confined (“stuck”) within a “space” of limited (and limiting) dimensions; the practitioner’s role in cure may then be thought of as helping to free the patient from the confines of a lower-dimensional “dis-ease space” so the patient can occupy a higher-dimensional “healthy space.”

This is relatively easy to represent geometrically. A simple example is to imagine how a three-dimensional cube might appear to hypothetical beings living in a two-dimensional universe if the cube were to enter their two-dimensional “space” corner-first (see Fig. 3A—such hypothetical two-dimensional beings were satirized in the late 19th century by E.A. Abbott in his novel, “Flatland: A Romance of Many Dimensions”).

Thus, on entering the two-dimensional universe, its occupants observe not a cube but a series of fluctuating polygons, beginning with an equilateral triangle that gradually grows in size as the cube penetrates corner-first further into the plane. After the cube has passed a third of the way through, the equilateral triangle begins to truncate (i.e., lose its corners) until half way through, a hexagon is formed. Further passage of the cube through the plane reverses and inverts the previous sequence of shapes, so that the hexagon deforms back through a truncated triangle, then an equilateral triangle (inverted compared to the triangle formed when the cube first entered the two-dimensional space) that diminishes in size until, as the cube leaves the two-dimensional plane, it vanishes as “magically” (as far as the two-dimensional beings are concerned) as it appeared.

Going up a dimension, a similar series of operations can be envisaged for the appearance in three-dimensional space of a four-dimensional hypercube along one of its diagonals (Fig. 3B). Here, it is the sections of the hypercube that are observed as fluctuating polyhedra. Thus, as the hypercube enters and travels through three-dimensional space, a gradually growing tetrahedron is observed. The tetrahedron then becomes truncated as the hypercube penetrates further into the three-dimensional space, before turning into an octahedron. The sequence of polyhedra is then reversed and inverted, finally forming an inverted tetrahedron that diminishes in size and disappears as the hypercube leaves the three-dimensional space.

From the patient’s perspective of the therapeutic process, the significance of this series of operations is that, like the practitioner’s perspective, it too generates a pair of semiotic tetrahedra, one inverted compared to the other, but now near the beginning and near the end of the four-dimensional hypercube’s journey through three-dimensional space. In this respect, the effect of the therapeutic process on the patient can be likened to and illustrated by the passage of the practitioner’s four-dimensional “hypercube” through the patient’s three-dimensional “space.” This results in the patient being first “shown” their dis-eased state (the first tetrahedron), followed by the possibility of cure (the second inverted tetrahedron), while “setting up” the patient for their “journey to cure” from the dis-eased to the cured state. From the practitioner’s perspective, this is the patient going “through the looking-glass” of the therapeutic state space, in effect combining the reflected dis-eased and cured (tetrahedral) states into a stellated octahedron representing the curative PPR entangled state. (Fig. 1A).

This convergence of the practitioner and patient perspectives may be generalized as, Humans are those beings who by their conscious, intentional efforts can ensure the enlivening and fractification of “lower dimensional” states (i.e., those with fewer possibilities) by interfacing with states of higher dimensionality (i.e., those with greater possibilities). No more so is this most likely to be true than in the therapeutic process.

Conclusions

As previously stated, semiotics is the study of signs and symbols, with a sign being anything as long as it is interpreted as a sign (i.e., it signifies something). Without signification (by someone), a sign of itself has no intrinsic meaning. From this perspective, it is the meaningful use of signs that concerns semiotics. In this respect, this article represents the culmination of a project to develop a semiotic “geometry” to describe the therapeutic process.

Walach was probably the first to specifically apply modern semiotics to the homeopathic therapeutic process. Instead of considering the supposed local, causal effects of a potentized homeopathic remedy (i.e., its pharmacologic activity, regardless of the presence or absence of molecules of the substance), he adopted the semiotic notion that the homeopathic remedy is a “sign” working simultaneously in and for two different but connected meaningful contexts. Each of these contexts was represented geometrically in two dimensions as a semiotic triangle.

These are (1) the symptoms of a sick person signifying a disease state (first meaningful context), and (2) a homeopathic remedy in the materia medica (second meaningful context), connected by the Law of Similars. Walach then demonstrated how semiotics illustrates homeopathy as two instances of generalized entanglement: one between the potentized remedy (Rx) and the original unpotentized remedial substance (Rm); the other between the individual symptoms of a patient (Sx[Px]) and the symptoms of the substance produced during homeopathic proving (Sx[Rm]). This double entanglement approach is said to generate testable predictions, and
FIG. 3.  A. How a cube entering flat 2-D space corner first, would appear to “occupants” of such a plane as a growing equilateral triangle (first three frames) which turns into a hexagon and then diminishes back to an inverted triangle, before disappearing (last three frames; see also http://alem3d.obidos.org/i/cubeice/cuihsv.gif). B. Similarly, a hypercube (4-D cube; black outline, first figure) entering a 3-D space along one of its diagonals would appear to beings in 3-D space first as a growing tetrahedron (second figure; gray outline), which truncates (third and fourth figures) and gradually changes into an octahedron (fifth figure), and then via another truncated form back to an inverted tetrahedron (last figure) before disappearing as it leaves 3-D space. See www.learner.org/courses/mathilluminated/units/5/textbook/04.php
is thought to be analogous to the cryptographic and teleportation applications of orthodox quantum entanglement.42

PPR entanglement is a more general approach to the therapeutic process. Adding a third semiotic triad explicitly representing the practitioner (who in Walach’s model is only implied, creating entanglement via application of the Law of Similarities),43 PPR entanglement considers the patient (Px), practitioner (Pr), and remedy or therapeutic modality (Rx) coming together in a potentially therapeutic macro-entangled state, the geometrical representation of which (compared to Walach’s model) can be “folded” into a third dimension.61 By using purely discursively the formalism of three-way quantum entanglement (see Box 4), this may be represented by a state function \( I_{PPR} \) (as are the states of each of the patient, \( I_{Pr} \), the practitioner, \( I_{Pr} \), and the remedy/therapeutic modality, \( I_{Rx} \), Box 1) existing in a practitioner-elaborated, active mirrorlike “therapeutic state space.”

However, it is not yet possible to relate these state functions to quantifiable physical observables, as in orthodox quantum theory (e.g., position and momentum). These state functions represent more qualitative observables, such as the signs and symptoms of a dis-ease, as expressed by the patient and observed by the practitioner. Though a more detailed mathematical proof is needed to flesh out the meaning of state functions and hypothetical spaces used in this semiotic context (Box 3), a topological representation of PPR macro-entanglement as presented here leads to a more generalized (if less quantitative) quantum-type description of the therapeutic process, with possible applications to other healing modalities.

Although not constituting direct experimental evidence of PPR entanglement (and such as there is, is still controversial),62–65 it could be argued that inklings of confirmation of the PPR entanglement hypothesis are beginning to appear. Consider, for example, the trial mentioned earlier, in which clinical benefits were indicated in rheumatoid arthritis solely from the homeopathic consultation and not any homeopathic remedy.44 Though it was too underpowered to draw such a conclusion, far from being evidence against the effectiveness of homeopathic remedies, this trial might actually be hinting at something far more profound: a form of complementarity between remedy and consultation (similar to that between momentum and position or energy and time in orthodox quantum theory), that is imposed as a direct result of the intrinsic reductionist rationale of the randomized controlled trial (RCT).45

Thus, conventional RCTs, with their emphasis on the effect of the medicine/drug, might necessarily lose sight of the consultation. On the other hand, RCTs that attempt to isolate the effect of the consultation (as in the trial mentioned above) would necessarily lose sight of the medicine. For by analogy with orthodox quantum theory, the RCT rationale with its emphasis on blinding, would only allow knowledge of the medicine or the consultation as parts of a complementary pair of phenomena making up a whole, but not both with equal certainty at the same time.65–66 Inspired by the results of an earlier study of homeopathic RCT data,67 it is interesting that such a conclusion had been earlier predicted,66 based on the PPR entanglement hypothesis.

It took around 50 years for Schrödinger’s68,69 original suggestion of the conditions for entanglement in orthodox quantum theory to be verified experimentally by Aspect and Dalibard.70 One can only hope such experimental verification of entanglement in the therapeutic process will not take so long.

In the meantime, the semiotic geometries developed here representing practitioner and patient perspectives of the therapeutic process may be seen ultimately to be convergent. Where they differ is that in elaborating the patient’s journey to cure, the practitioner’s perspective ultimately is from the outside looking in at a potential whole process. But it is the patient who is taking their journey to cure, so the patient’s perspective is necessarily from the inside looking out, at perceived stages or cross sections through a whole process, developing through time.

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References

57. For cubes entering a 2-D plane, and 4-cubes entering 3-D space see: Online document at: www.learner.org/courses/mathilluminated/units/5/textbook/04.php Accessed June 2, 2011.

Address correspondence to:
Lionel R. Milgrom, PhD, FRSC, MARH, RHom
Program for Advanced Homeopathic Studies
17, Skardu Road
London NW2 3ES
United Kingdom
E-mail: Lionel.milgrom@hotmail.com