DUAL-ASPECT MONISM ACCORDING TO THE PAULI-JUNG CONJECTURE

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Abstract
In the mid 20th century, the physicist Wolfgang Pauli and the psychologist Carl Gustav Jung proposed a conceptual framework, not more than speculative at the time, which may help us to clarify psychophysical phenomena beyond what our knowledge about the mental and the physical in separation are capable of achieving. Their conjecture of a Dual-Aspect Monism, with a complementary relationship between mental and material aspects of an underlying, psychophysically neutral reality, is subtler and more sophisticated than many other attempts to discuss the problem of how mind and matter are related to one another.

Key-Words: Dual-Aspect Monism, Complementarity, Pauli-Jung Conjecture, Mind and Matter.

Introduction

*Dual-aspect monism*merges an ontic monism, reflected by a psychophysically neutral background reality, with an epistemic dualism of the mental and the physical as perspectival aspects of the underlying ontic reality (for a more comprehensive description, see Atmanspacher, 2012). Jung coined the notion of the *unus mundus*, the one world, for this domain.

In the Pauli-Jung version of dual-aspect monism, the aspects are not *a priori* given, but depend on epistemic contexts. Distinctions of aspects are generated by "epistemic splits" of the distinction-free, unseparated underlying realm, and in principle there can be as many aspects as there are contexts. In somewhat more abstract terms, distinctions can be conceived as symmetry breakings. Symmetries in this parlance are invariances under transformations. For instance, the curvature of a circle is invariant under rotations by any arbitrary angle. A circle thus exhibits complete rotational symmetry. Symmetry breakings are a powerful mathematical tool in large parts of theoretical physics, but we can only speculate which symmetries must be ascribed to the psychophysically neutral *unus mundus* (ATMANSPACHER, 2012).

According to the Pauli-Jung conjecture, mind and matter appear as complementary aspects: they are mutually incompatible, but both together necessary to describe mind-matter systems exhaustively. A straightforward reason for this is the fundamentally non-Boolean nature of the underlying reality. As is well known in mathematics, representations of non-Boolean

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systems are generally incompatible, and complementarity can be formally characterized as a maximal form of incompatibility (ATMANSPACHER, 2012).

There are important respects in which this framework differs from *neutral monism* à la Mach, James, or Russell. In neutral monism, the mental and the physical are *reducible* to the underlying domain, whereas they are *irreducible* in dual-aspect monism. The reason for this difference is that neutral monism conceives the underlying domain to consist of psychophysically neutral elements whose combinations determine whether the compound products appear mental or physical. In dual-aspect monism, the underlying domain does ultimately not consist of separate elements at all. It is radically holistic, and the mental and physical aspects emerge by a *decomposition of the whole rather than a composition of elements*. This is crucial because it avoids the so-called "combination problem" in various accounts of panpsychism; see Seager (2010) for a detailed discussion and a proposed solution.

In the Pauli-Jung conjecture, the psychophysically neutral domain is apprehensible only indirectly, by its manifestations in the aspects. Their dual-aspect monism is a metaphysical position including both epistemic and ontic elements. Although large parts of the 20th century witnessed an often pejorative connotation with metaphysics, insights into the nature of reality are in general impossible without metaphysical assumptions and regulative principles. The metaphysical nature of the Pauli-Jung conjecture *implies* a lack of concrete illustrative examples, which is not due to missing imagination but represents an important feature of their approach (ATMANSPACHER, 2012).

This alludes to the situation in quantum theory, repeatedly expressed by one of its main architects, Niels Bohr (1934):"we are concerned with the recognition of physical laws which lie outside the domain of our ordinary experience and which present difficulties to our accustomed forms of perception". Accordingly, the so-called "intuitively appealing thinking" may mislead us by inhibiting rather than advancing our ways to insight. This implies a plea against misplaced concreteness and simplification. As cognitive scientists found not long ago, learning processes can be substantially improved if abstract principles are learned first and concrete examples for them thereafter (KAMINSKI et al., 2008). This result counters a carefully nurtured long-time dogma in education.

Along the same lines, Heisenberg (1971) remembers a conversation with Bohr at Gottingen in 1922. He asked Bohr: "If the inner structure of the atoms is inaccessible to an

illustrative [*anschauliche*] description, as you say, if we basically have no language to speak about this structure, will we ever be able to understand the atoms? Bohr hesitated for a moment, then he replied: Yes we will. But at the same time we will have to learn what the word "understanding" means". As we will see below, it may not be entirely accidental that the issue of meaning arises here -- pretty astonishing for a typical physics discussion but absolutely pivotal for Jung's concept of synchronistic events and the symbolic expression of their meaning.

Synchronicities as Psychophysical Correlations

Conceiving the mind-matter distinction in terms of an epistemic split of a psychophysically neutral reality implies psychophysical correlations between mind and matter as a direct and generic consequence.Pauli and Jung discussed psychophysical correlations extensively in their correspondence between June 1949 and February 1951 (MEIER, 2001, p. 40-73) when Jung drafted his article on "synchronicity" for the book that he published jointly with Pauli (JUNG; PAULI, 1952). In condensed form, two (or more) seemingly accidental, but not necessarily simultaneous events are called synchronistic if the following three conditions are satisfied:

1) Each pair of synchronistic events includes an internally conceived and an externally perceived component.

2) Any presumption of a direct causal relationship between the events is absurd or even inconceivable.

3) The events correspond with one another by a common meaning, often expressed symbolically.

The first criterion makes clear that synchronistic phenomena are intractable when dealing with mind or matter alone. The second criterion expresses that synchronistic correlations cannot be explained by (efficient) causation in the narrow sense of a conventional cause-and-effect-relation as usually looked for in science. And the third criterion suggests the concept of meaning (rather than causation) as a constructive way to characterize psychophysical correlations.

Since synchronistic phenomena are not necessarily "synchronous" (in the sense of "simultaneous"), synchronicity is a somewhat misleading term. For this reason Pauli preferred to speak of "meaningful correspondences", under the influence of an archetypal "acausal ordering". He considered both Jung's synchronicity and the old teleological idea of finality (in the general

sense of a process oriented toward a goal) as particular instances of such an acausal ordering. Meaningful coincidences cannot be set up fully intentionally or controlled reproducibly. On the other hand, "blind" chance (referring to stochastically accidental events) might be considered as the limiting case of meaning*less* correspondence (JUNG; PAULI, 1952).

For a psychologist like Jung, the issue of meaning is of primary significance anyway. For a long time, Jung insisted that the concept of synchronicity should be reserved for cases of distinctly numinous character, when the experience of meaning takes on existential dimensions. With this understanding synchronistic correlations would be extremely rare, thus contradicting their supposedly generic nature. In later years, Jung opened up toward the possibility that synchronicity might be a notion that should be conceived as ubiquitous as indicated (JUNG; PAULI, 1952). Meier (1975) has later amplified this idea in an article about psychosomatics from a Jungian perspective.

From Quantum Physics to (Depth) Psychology

According to Pauli and Jung, the role which measurement plays as a link between epistemic and ontic realities in physics is mirrored by the act in which subjects become consciously aware of "local mental objects", as it were, arising from unconscious contents in psychology (JUNG; PAULI, 1952).

We use the term "local mental objects" to emphasize the analogy with local material objects, meaning that neither of them are non-local or non-Boolean. More concretely, local mental objects should be understood as distinct mental representations or categories endowed with a Boolean (yes-no) structure: a mental state is either in a category or it is not. Using the formal apparatus of the theory of complex systems, such categories can be defined, e.g., as attractors in an appropriately defined phase space (VAN GELDER, 1998; FELL, 2004).

In this sense, Pauli and Jung postulated the possibility of transitions between the mental and/or the material mediated by the psychophysically neutral *unus mundus*. This idea is most clearly elaborated in Jung's supplement to his *On the Nature of the Psyche* (JUNG, 1969b). The German version of this essay was first published as "Der Geist der Psychologie" in 1946, and later revised and expanded (essentially by the mentioned supplement) as "TheoretischeUberlegungenzumWesen des Psychischen" in 1954.

Let me first quote from a letter by Pauli which Jung cites in footnote 130 in this

supplement (this letter is contained neither in the published Pauli-Jung correspondence - MEIER, 1992 - nor in Pauli's correspondence edition by von Meyenn. Since Jung presents the quotation with the remark that Pauli "was gracious enough to look over the manuscript of my supplement", the letter is likely of 1954):

> "the epistemological situation regarding the concepts of "consciousness" and the "unconscious" seems to offer a close analogy to the situation of "complementarity" in physics, sketched below. On the one hand, the unconscious can only be made accessible in an indirect way by its (ordering) influence on conscious contents, on the other hand every "observation of the unconscious", i.e., every attempt to make unconscious contents conscious, has a *prima facie* uncontrollable reaction back onto these unconscious contents themselves (as is well known, this precludes that the unconscious can be "exhaustively" brought to consciousness). The physicist will *per analogiam* conclude that precisely this uncontrollable backlash of the observing subject onto the unconscious limits the objective character of its realityand, at the same time, provides it with some subjectivity. Although, moreover, the *position* of the "cut" between consciousness and the unconscious is (to a certain degree) up to the free choice of the "psychological experimenter", the*existence* of this "cut" remains an inevitable necessity. Thus, the "observed system" would, from the viewpoint of psychology, not only consist of physical objects, but rather comprise the unconscious as well, whereas the role of the "observing device" would be ascribed to consciousness. The development of "microphysics" has unmistakably led to a remarkable convergence of its description of nature with that of the new psychology: While the former, due to the fundamental situation known as "complementarity", faces the impossiblity to eliminate actions of observers by determinable corrections and must therefore in principle relinquish the objective registration of all physical phenomena, the latter could basically complement the merely subjective psychology of consciousness by postulating the existence of an unconscious of largely objective reality" (JUNG, 1952, paragraph 439).

This excerpt describes Pauli's position concerning objective and subjective aspects of the mental, a distinction that he adopted from Jung quite early. Already in a letter to Kronig of August 3, 1934 (letter 380 in VON MEYENN, 1985, p. 340-341), he talks about the "autonomous activity of the soul" as "something objectively psychical that cannot and should not be explained by material causes." Hence, the "objective reality" at the end of the quote refers to the psychophysically neutral background reality, while the "subjective" relates to its contextual, epistemic, manifestation in the psyche.

As a consequence of Pauli-Jung style dual-aspect monism, mind-matter relations, or psychophysical relations, can be understood due to their common origin in the underlying domain of reality. Although there is no direct causal pathway between the mental and the physical, Pauli and Jung conjectured indirect kinds of influence via their underlying domain. These influences are possible because the relation between ontic (psychophysically neutral) and epistemic (mental

and material) domains is conceived as *bidirectional* (see also Sec.3.2 below).

If, for instance, unconscious contents become conscious, this very transition changes the unconscious left behind. Analogously, physical measurement entails a transition from an unobserved to an observed state, and this very measurement changes the state of the system left behind. This picture, already outlined in Pauli's letter to Fierz of October 3, 1951 (VON MEYENN, 1996, p. 377), represents a genuine interdependence between ontic and epistemic domains. It can entail mind-matter correlations in addition to those *unidirectional* correlations that are due to mere epistemic manifestations of the ontic realm.

The Pauli quote above emphasizes parallels between basic conceptual structures of quantum theory and psychology. One of the key common features in these two scientific areas is arguably the fact that an observation does not only register an outcome, as in classical thinking, but also changes the state of the observed system in a basically uncontrollable manner. This holds for physical quantum systems as well as for mental systems and, as simple as it sounds, it has far-reaching consequences which psychology and cognitive science are just about to realize (AERTS et al., 1993; ATMANSPACHER et al., 2002; KHRENNIKOV, 2010; BUSEMEYER; BRUZA, 2012).

A most evident effect of this backreaction on mental states is the almost ubiquitous appearance of order effects in surveys and questionnaires. This has recently been addressed in detail (ATMANSPACHER; RÖMER, 2012) on the basis of non-commutative structures of mental observables. Since the mathematics of such structures is at the heart of quantum theory as well, this parallel is not a mere analogy - it points to a constitutive joint principle underlying the mental and the physical: "almost too good to be true", as one recent commentator expressed it (TRESAN, 2013).

Relative Onticity

As appealing and compact as the sketch outlined in the preceding section may appear, it is not subtle enough. For instance, the boundary between the mental and physical aspects on the one hand and their underlying domain on the other is unsharp: there is always a grey zone between conscious and unconscious states, and no physical state is ever exactly disentangled from the rest of the material world.

Rather than speaking of a grey zone, one might conceive of a whole spectrum of

boundaries, each one indicating the transition to a more comprehensive level of wholeness until (ultimately) the distinction-free *unus mundus* is approached. A viable idea in this context might be archetypal levels with increasing degrees of generality: the *unus mundus* at bottom, the mental and physical on top, and intermediate levels in between. Depending on the status of the individuation process of the individual concerned, Jung's *transcendent function* regulates the exchange among these levels.

This entails that a tight distinction of one fundamentally ontic and two derived epistemic domains is too simplistic. However, an idea originally proposed by Quine (1969), developed by Putnam (1981, 1987) and later utilized by Atmanspacher and Kronz (1999) comes to help here: *ontological relativity* or, in another parlance, *relative onticity*. Similar ideas have been developed independently by van Fraassen (1980) in terms of "relevance relations" and Garfinkel (1981) in terms of "explanatory relativity", though with less, or less explicit, emphasis on issues of ontology.

The key motif behind this notion is to allow ontological significance for any level, from elementary particles to icecubes, bricks, and tables - and all the same for elements of the mental. One and the same descriptive framework can be construed as eitherontic or epistemic, depending on which other framework it is related to: bricks and tables will be regarded as ontic by an architect, but they will be considered highly epistemic from the perspective of a solid-state physicist. Schizophrenia, depression, and dissociative disorders will be considered as basic ontic features in psychiatry, yet a detailed psychological or philosophy-of-mind analysis will try to find its own ontic terms with which these impairments can be described as epistemic manifestations.

Quine (1969) proposed that a "most appropriate" ontology should be preferred for the interpretation of a theory, thus demanding "ontological commitment". This leaves us with the challenge of how "most appropriate" should be defined, and how corresponding descriptive frameworks are to be identified. Here is where the notion of *relevance* becomes significant. For particular degrees of complexity, the "most appropriate" framework is that which provides those features that are relevant for the question to be studied. And the referents of this descriptive framework are those which Quine wants us to be ontologically committed to.

This can be applied to the Pauli-Jung conjecture in an interesting way: An archetype which may be regarded as ontic relative to the perspective of the mind-matter distinction, can be seen epistemic relative to the *unus mundus*. This twist is additionally interesting because it also

relativizes Jung's (overly) stern Kantian stance that archetypes *per se* as formal ordering factors in the collective unconscious must be strictly inaccessible epistemically, and thus empirically (KIME, 2013, for more discussion). A relativized notion of ontology allows us to see clearer why and how a more sophisticated blend of epistemic and ontic realms in dual-aspect monism can acquire systematic and explanatory status.

Taken seriously, this framework of thinking entails a farewell to the centuries-old conviction of an absolute fundamental ontology (usually that of basic physics). This move is in strong opposition to many mainstream positions in the philosophy of science until today. But in times in which fundamentalism - in science and elsewhere - appears increasingly tenuous, Quine's philosophical idea of an ontological relativity offers a viable alternative for more adequate and more balanced worldviews. And, using the scientifically tailored concept of relative onticity, this is not merely a conceptual idea, but can in fact be used for an informed discussion of concrete issues in the sciences.

Coupled with an ontological commitment to context-dependent "most relevant" features in a given situation, the relativization of onticity does not mean dropping ontology altogether in favor of a postmodern salmagundi of floating beliefs. The "tyranny of relativism" (as some have called it) can be avoided by distinguishing more appropriate descriptions from less appropriate ones. The resulting picture is more subtle and more flexible than an overly bold reductive fundamentalism, and yet it is more restrictive and specific than a patchwork of arbitrarily connected opinions.

More than Physics "plus'' Psychology

A Semi-Fictitious Historical Excursion

Imagine a scientist specializing in the science of electricity in the early 19th century. At this point in time, Faraday just started investigations that ultimately led him to the concept of electric and magnetic fields, which Maxwell picked up and developed into a unified theory of electromagnetism, culminating in the set of four basic equations which Maxwell published under the title*On Physical Lines of Force*, a four-part article that appeared in the *Philosophical Magazine* in 1861 and 1862. The four parts are devoted to "the theory of molecular vortices applied to magnetic phenomena" (I), "... to electric currents" (II), "... to statical electricity" (III),

and "... to the action of magnetism on polarized light" (IV).

At the beginning of the 19th century, however, electricity and magnetism were regarded as basically unrelated phenomena. Now consider our imagined scientist experimenting with electric currents on his laboratory desk. Incidentally, a compass, unwittingly left by a visitor the other day, is sitting on a side-table not far from the desk. The scientist starts his experiments and connects the wires on the table with a battery (invented by Volta just a few years back).

He looks around in the room to look for some additional equipment, and suddenly rivets on the compass. The compass needle trembles, and points into an entirely wrong direction -- not north, not south, but something completely different! What happened? An outright spooky apparition it seems, inexplicable by anything he ever learned. Which impudent specter tries to fool him with such a kind of nuisance? Did the compass get inhabited by naughty spirits, moving the needle at their pleasure?

Indeed, the body of knowledge in physics at the time of this fictitious story does not offer any compelling explanation of the distorted behavior of the compass. Of course, this changed half a century later, when it became well known that electric currents generate a magnetic field, and that this field naturally moves the compass needle, such that it deviates from the orientation of the magnetic field of the earth.

Maxwell's electrodynamics succeeded in describing both electric and magnetic phenomena in the same compact framework, specifying the relations by which the two are linked together. Without this framework, magnetic phenomena in the presence of electricity and electric phenomena in the presence of magnetism were regarded as inexplicable magic, miracles, or misconduct - depending on who reported them and for what purpose.

What can this little story teach us? It expresses a historical analogy of the contemporary situation concerning the psychophysical problem of how mind and matter are related. Exactly as the moving compass needle (due to electric current), a moving hand (due to mental decision) represents a paradigm example of an anomaly not understood by current science. Needless to say, there are more stunning psychophysical anomalies such as out-of-body experiences, premonitions, etc.- more about them later.

At present, we do not have a theoretical framework for psychophysical phenomena, just as the early 19th century did not have electrodynamics. The analogy tells us also that it is misleading to try and study psychophysical phenomena as if they were either mental or physical,

exactly as electromagentic phenomena are neither solely electric nor magnetic. They are not, and it is likely that they need to be recast in a way even more radical than Maxwell's breakthrough has been.

Structural and Induced Psychophysical Correlations

The development of Pauli's and Jung's views about psychophysically neutral archetypes and their role in manifesting psychophysical correlations (e.g., "synchronicities") suggests a distinction between two basically different kinds of mind-matter correlations for which we propose the notions of "structural" and "induced" correlations.

Structural correlations refer to the role of archetypes as ordering factors with an exclusively *unidirectional* influence on the material and the mental (Pauli's letter to Fierz of 1948 *apud* VON MEYENN, 1993, p. 496-497). They arise due to epistemic splits of the *unus mundus*, and manifest themselves as correlations between mental and material aspects. These correlations are a straightforward consequence of the basic structure of the Pauli-Jung conjecture, and they are expected to be ubiquitous, persistent and empirically reproducible.

*Induced correlations*refer to the backreaction that changes of consciousness induce in the unconscious and, indirectly, in the physical world as well. Jungian psychology describes this in more detail: When a subject becomes aware of some problematic unconscious content, the corresponding unconscious complex may be (partially) dissolved. This affects the archetypal core that is constellated in the complex, which in turn is supposed to manifest itself in the physical world. Likewise, measurements of physical systems induce backreactions, which can lead to changes of mental states. In this way, the picture is extended to a *bidirectional*relation (Pauli's letter to Jung of 1954 *apud* JUNG, 1969, paragraph439). In contrast to structural, persistent correlations, induced correlations depend on all kinds of contexts (e.g., personal situation, environment). They occur occasionally, and are evasive and not (easily) reproducible.

What Pauli wrote to Fierz on June 3, 1952 (VON MEYENN, 1996, p. 634-635), yields an almost seamless fit with this distinction: "synchronistic phenomena...elude being captured in natural "laws", since they are not reproducible, i.e., unique, and are blurred by the statistics of large numbers. By contrast, "acausalities" in physics are precisely described by statistical laws (of large numbers)....I would personally prefer to begin with always reproducible acausal dispositions (incl. quantum physics) and try to understand psychophysical correlations as a

special case of this general species of correlations".

Pauli's proposal to begin with "always reproducible acausal dispositions" relates perfectly well to the structural mind-matter correlations due to epistemic splits of the *unus mundus*. What he referred to as special cases of psychophysical correlations can then be mapped to the induced correlations superimposing those structural, "general species of correlations".

Pauli speculated that synchronicities exhibit a kind of lawful regularity beyond both deterministic and statistical laws, based on the notion of *meaning* and, thus, outside the natural sciences of his time (and also, more or less, of today): "a third type of laws of nature consisting of corrections to chance fluctuations due to meaningful or purposeful coincidences of causally unconnected events" (VON MEYENN, 1999, p. 336). It remains to be explored how the key issues of meaning and purpose can be implemented in an expanded worldview not only comprising, but also exceeding both psychology and physics. A comprehensive substantial account of psychophysical phenomena needs to address them beyond the distinction of the mental and the physical. This excludes considering them as a simplistic ("additive") composition of these two domains.

While structural correlations define a baseline of ordinary, robust, reproducible psychophysical correlations (such as mind-brain correlations or psychosomatic correlations), induced correlations may be responsible for alterations and deviations (above or below) this baseline. Induced excess correlations, above the baseline, are experienced as unconventional "coincidence" phenomena -- similar to "salience" phenomena (KAPUR, 2003; VAN OS, 2009). Numinous synchronistic events in the sense Jung proposed originally clearly belong to this class. Induced deficit correlations, below the baseline, are experienced as unconventional "dissociation" phenomena. Below we will relate these features to the phenomenology of exceptional human experiences.

It is important to keep in mind that in both induced and structural correlations there is no direct causal relation from the mental to the physical or *vice versa* (i.e., no direct "efficient causation"). The problem of a direct "causal interaction" between categorically distinct regimes is thus avoided. Of course, this does not mean that the correlations themselves are causeless. The ultimate causes for structural correlations are the epistemic split of the unus mundus and the ordering influence of psychophysically neutral archetypes. The causes for induced correlations are interventions in the conscious mental domain or the local material domain, whose backeffects

on archetypal activity must be expected to manifest themselves in the complementary domain, respectively.

Formal and Experienced Meaning

In the characterization of synchronistic events given above, the common meaning of mental and material events figures prominently. However, meaning is a notoriously difficult notion, used differently in different areas. Formally speaking, meaning is a two-place relation between a sign and what it designates, or a representation and what it represents. Meaning in this formal sense is simply a reference relation, in accordance with the philosophical usage of the term intentionality since Brentano (1874).

What Jung had in mind when he emphasized meaning is different, however. He did aim at meaning as an element of experience, not as a formal relationship. This can be rephrased in Metzinger's (2003) representational account of the mental, where intentionality - a reference relation between a representation and its referent - is itself encoded as a (meta-)representation. In Metzinger's parlance this (meta-)representation is a "phenomenal model of the intentionality relation" (PMIR). It should be noted that Metzinger's general position is usually understood as an attempt to naturalize mental processes such that they are understood as a result of physical brain activity. Nevertheless, his (epistemic) categories of self model and world model are in one-to-one correspondence with the (epistemic) mental and material aspects of the Pauli-Jung conjecture.

Mental representations have intentional content and they have phenomenal content. While the intentional content explicates their reference, as mentioned above, their phenomenal content refers to "what it is like to" instantiate a representation, in other words: to experience it. So the phenomenal content of a PMIR refers to "what it is like to" experience a particular meaning. Jung's usage of meaning refers to the phenomenal content of PMIRs: the subjectively experienced meaning of a synchronistic event.

It should be stressed that the meaning of synchronistic events, although being subjectively ascribed (by the experiencing subject), is not completely arbitrary. It depends on a subject's life situation as a whole, likely including conditions that are not consciously available to the subject. According to Jung, synchronistic events arise due to constellated archetypal activity. This activity limits the range of possibly attributable meanings by "objective", metaphysical constraints(see below for more details).

In typical situations of "ordinary" structural psychophysical correlations, the *formal intentionality* due to plain reference is hardly experienced explicitly - subjects are not actually aware of its phenomenal quality. This is different for induced psychophysical correlations: their deviation from the ordinary baseline stimulates that *experienced intentionality* is incurred, referring to the phenomenal content of the appropriate PMIR. In this case, the corresponding meaning is distinctly and phenomenally inflicted upon the experiencing subject.

It is plausible to assume that the extent to which contextually induced correlations deviate from the baseline of persistent structural correlations complies with the degree of intensity to which the corresponding PMIR is phenomenally experienced. Small deviations indicate quasi-persistent, almost reproducible correlations, while large deviations signify what Jung insisted on for truly synchronistic events: the "numinous" dimension of the experience.

In his concept of synchronicity, Jung typically emphasized induced psychophysical correlations in the sense of meaningful coincidences, i.e., excess correlations above the ordinary baseline. The more comprehensive approach presented here also includes baseline correlations and deficit correlations below the baseline, appearing in dissociation events rather than coincidence events. Jungian synchronicities may be regarded as special cases of induced psychophysical excess correlations with large deviations above the baseline.

Occasionally, Jung also characterized out-of-body experiences as synchronicities (JUNG, 1952, p. 949-955). This expands his understanding of synchronistic events from deviations above the baseline to deviations in general, including those below the baseline - which will be addressed in more detail in the following subsection.

Exceptional Human Experiences

The rich material of exceptional psychophysiological correlations comprehensively reviewed by Kelly (2007) suggests various concrete types of psychophysical correlations deviating from the correlation baseline. Moreover, a recent statistical analysis of a large body of documented cases of extraordinary human experiences, also called exceptional experiences (FACH, 2011; BELZ; FACH, 2012) provides significant evidence that the Pauli-Jung conjecture matches with existing empirical material surprisingly well. For more details see Atmanspacher and Fach (2013).

Particularly relevant with respect to the discussion of psychophysical correlations are

exceptional experiences which refer to the way in which mental and physical states are merged or separated, connected or disconnected, above or below ordinary baseline correlations. In coincidence phenomena, ordinarily disconnected elements of self and world, inside and outside, appear connected; in dissociation phenomena, ordinarily connected elements of self and world appear disconnected.

1) *Coincidence phenomena* refer to experiences of psychophysical excess correlations above the persistent ordinary baseline. Typically, these correlations are experienced as acausal meaningful links between mental and material events, e.g. meaningful coincidences such as Jungian "synchronicities". Spatiotemporal restrictions may appear as inefficacious, as in several kinds of "extrasensory perception".

2) *Dissociation phenomena* refer to experiences of psychophysical deficit correlations below the persistent ordinary baseline. For instance, subjects are not in full control of their bodies, or experience autonomous behavior not deliberately set into action. Out-of-body experiences, sleep paralysis and various forms of automatized behavior are among the most frequent phenomena in this class.

In order to assess whether and how these classes are empirically relevant, they have been compared with empirical data from the counseling department of the Institute for Frontier Areas of Psychology (IGPP) at Freiburg (Germany) since 1996. For details of the documentation system and the statistical analyses, see Bauer et al., (2012). It is important to note that the patterns obtained by statistical factor analyses reflect the subjective views of the clients about their experiences - not their veridicality. The collected data yield an exclusively phenomenological classification scheme, not a system for clinical diagnosis. Such systems are the "Diagnostic and Statistical Manual of Mental Disorders" (DSM) of the American Psychiatric Association or the "International Classification of Diseases" (ICD) of the World Health Organization. While both DSM and ICD are continually developed based on more or less heuristic criteria, the classification scheme used by Belz and Fach (2012) can be systematically derived from the basic structure of a dual-aspect picture.

It turned out that coincidence and dissociation phenomena represent key patterns in the documented material from IGPP clients. The full spectrum of exceptional experiences reported by those clients contains internal and external phenomena in addition to coincidence and dissociation phenomena. An additional study, together with the Psychiatric University Hospital

Zurich, based on subjects from ordinary population (rather than advice-seeking clients) was recently published (FACH et al., 2013). As expected, the average intensity of their reported experiences is rated significantly lower than for IGPP clients. However, the patterns extracted from the ordinary population sample as well as their relative frequencies are in good agreement with the IGPP sample.

Exceptional experiences are typically difficult to communicate in conventional language. This often leads to paradoxical formulations (BAGGER, 2007) or metaphorical descriptions in which (Boolean) categories are used to circumscribe the experience. One way to do this amounts to projections onto physical or mental phenomena, e.g., experiences of joy, bliss and lucidity are then referred to as experiences of "inner light". Repeating a point made earlier, this should be understood as a genuinely *psychophysical phenomenon* - neither a physical (electromagnetic) field within the body, nor a mental image of light.

As discussed before, it is crucial for such experiences to be experiences of meaning. Insofar as explicit (or explicated) meaning is a two-place relation between a representation and what it represents, psychophysical phenomena might be conceived as meaningful *relations* between the physical and the psychological. On Metzinger's account, this relation would be (meta-)represented by a PMIR. This is logically consistent as long as PMIRs are neither ascribed as belonging to the physical nor to the mental - possibly a problematic point in Metzinger's approach. Dual-aspect monism suggests that this relation of meaningfulness arises due to the epistemic split of the psychophysically neutral *unus mundus*: without this split there would be no mental and physical referents which could be related by meaning.

Alternative to an explicitly relational view, it might also be possible to understand the experience of meaning *implicitly*, not as a relation between distinguishable entities. Such experiences transcend the realm of Boolean categories and could be examples for the refinement indicated by relative onticity. Elements of the psychophysically neutral reality could be apprehensible without a mind-matter distinction, thus relaxing Jung's neo-Kantian conviction that elements of the unconscious are immutably inaccessible in themselves.

More systematically speaking, archetypal activity could be the carrier of that implicit meaning which can be explicated in terms of meaningful psychophysical phenomena. This adds a further kind of "meaningfulness" to formal and experienced meaning as addressed above. As Aziz (1990) indicated and Main (2004, Chap. 2) demonstrated, Jung referred extensively to such a

kind of "objective" meaning in his synchronicity essay (JUNG, 1952). Dual-aspect monism provides places for all these kinds of meaning, from the purely formal notion of intentionality to the metaphysical dimension of archetypal activity itself.

In this spirit, a key difference between the experience of archetypal activity and psychophysical phenomena would be the difference between implicit and explicated meaning. Maybe Pauli's understanding of the "reality of the symbol" (in Jung's sense) comes close to the notion of implicit, not yet explicated meaning (letter of Pauli to Fierz of August 12, 1948 *apud* VON MEYENN,1993, p.559): "When the layman says "reality", he usually thinks that he is talking about something evident and well-known; by contrast it seems to me that it is the most important and exceedingly difficult task of our time to work out a new idea of reality ...What I have in mind concerning such a new idea of reality is - in provisional terms - the idea of the reality of the symbol".

Conclusions

The conceptual framework of dual-aspect monism according to Pauli and Jung stipulates that phenomena based on psychophysical correlations are misconstrued if they are described physically (plus some mental context) or mentally (plus some physical context). It is suggested that genuinely psychophysical phenomena are more properly regarded as *relations* between the physical and the mental rather than *entities*in the physical or mental realm. This challenging idea elucidates why meaning is so essential for psychophysical phenomena - either as an explicitly relational concept or an implicitly holistic experience.

In a recent commentary, Tresan (2013) expressed the intuition that the theory of complex systems, which has been widely applied to the description of synchronicities and their archetypal origin, still relies "on dependency (neither strictly reductive nor random, but nonetheless still causal, albeit diluted)". By contrast, the more radical vision of the Pauli-Jung conjecture hits the core of psychophysical phenomena: a holism in which *wholes do not consist of parts* to begin with. Elements of the theory of complex dynamical systems, such as networks of attractors (archetypes) and their basins of attraction (complexes) can be useful descriptive tools within epistemic contexts (CAMBRAY, 2009). However, Pauli's and Jung's daring ideas in their full scope may persuade us to believe that the repertoire of complex dynamical systems is not deep enough.

Unlike numerous neuroscientists and philosophers of mind seem to assume -- including essential elements of Metzinger's position - the Pauli-Jung conjecture implies that brain science alone will be unable to unveil the mysteries of psychophysical phenomena, neither in the "decade of the brain" nor in decades to come. What is needed is a new idea of reality, implying novel and refined metaphysical structures. If we can make progress on this route, it will provide us, and our culture, with a satisfactory and beneficial worldview - a key element of Jungian psychology besides its therapeutic values.

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