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Exploring the workings of the psyche: Metatheoretical and methodological foundations

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Abstract

Introspection is considered a key method for exploring the workings of the psyche because psychical phenomena are accessible only by the individual him- or herself. But this epistemological concept, despite its importance, remained unclear and contentious. Its scientificity is often questioned, but still introspective findings from psychophysics are widely accepted as the ultimate proof of the quantifiability of psychical phenomena. Not everything going on in individuals' minds is considered introspection, but clear criteria that qualify explorations as introspective are still missing. This research applies the Transdisciplinary Philosophy-of-Science Paradigm for Research on Individuals (TPS-Paradigm) to metatheoretically define the peculiarities of psychical phenomena of which various kinds are differentiated and to derive therefrom basic methodological principles and criteria applicable to any investigation. Building on these foundations, the TPS-Paradigm introduces the concepts of intro*question* versus extro*question* and reveals that intro*spection* cannot be clearly differentiated from extro*spection* and that psychophysical experiments and some first-person perspective methods are not introspective as often assumed. The chapter explores the challenges that arise from the fact that psychical phenomena can be explored only indirectly through individuals' behavioural and semiotic externalisations and scrutinises what, when, where and how to externalise in introquestive explorations. The basic principles and criteria elaborated also allow for determining which kind of psychical phenomenon can be explored by using which kind of method for establishing an appropriate phenomenon-methodology match.

Keywords:
Introspection – extrospection;
First-person perspective methods;
Psychophysics;
Introquestion – extroquestion;
Quantification in psychology/ Quantitative psychology.

Among all the phenomena of life, the psyche is unique. Psychical phenomena constitute the reality of each of our waking moments, enabling us to perceive and conceive of the world. Albeit this intimate familiarity, the phenomena of the psyche are intangible; they have remained inaccessible to physical investigation, despite advanced technologies. Psychical phenomena can be perceived only by the individual him- or herself but not by others, and their accessibility is strictly bound to the present moment (Uher 2015d; Valsiner 2012).

The workings of the psyche have fascinated and challenged philosophers and scientists for millennia. Entire disciplines and research traditions, each with their own particular perspectives, theories and methods, are devoted to their exploration (Fahrenberg 2013; Hirschberger 1980a,b). These explorations entail particular challenges because psychical phenomena are inherent to any science—they are the very means by which all science is made (Valsiner 2012; Wundt 1920).

This research elaborates metatheoretical and methodological foundations for exploring the workings of the psyche by applying the *Transdisciplinary Philosophy-of-Science Paradigm for Research on individuals* (*TPS-Paradigm*). First, relevant metatheoretical foundations that the TPS-Paradigm provides for exploring individuals are outlined, focussing on psychical[1] phenomena of which various kinds are differentiated. These fundamentals are then used to derive methodological implications that appropriately consider the peculiarities of each of the different kinds of psychical phenomena and the challenges entailed for investigations. The aim of this research is not to comprehensively review previous lines of research but rather to complement the existing knowledge with new insights that can be gained from transdisciplinary and philosophy-of-science perspectives and that are not well considered.

1. The Transdisciplinary Philosophy-of-Science Paradigm for Research on Individuals (TPS-Paradigm)

The phenomena of the psyche are inextricably bound to the individual; a science of the psyche must therefore also be a science of the individual. The TPS-Paradigm is targeted toward making explicit and scrutinising the philosophical assumptions that different

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[1] The TPS-Paradigm uses the term *psychical* rather than psycho*logical* because "events, processes and structures that are properly called psychical do not become psychological until they have been operated upon in some way by the science of psychology" (Adams & Zener in Lewin 1935, p. vii).

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disciplines make about research on individuals and the metatheories and methodologies used for explorations. It comprises interrelated philosophical, metatheoretical and methodological frameworks in which concepts, approaches and methods from different disciplines are systematically integrated, advanced and complemented by novel ones (Uher 2011a, 2013, Desiderata 1a,d,e, 2015a,d).

In its philosophical foundations, the TPS-Paradigm explicitly considers that scientists are always individuals themselves who can perceive and conceive of the world only on the basis of their own psychical abilities (e.g. Kuhn 1962; Nagel 1974; Weber 1946). Hence, scientists exploring individuals and especially scientists exploring psychical phenomena cannot be independent from their objects of research. After all, how can a mind explore itself? This age-old question entails fundamental challenges that make the exploration of psychical phenomena even more important.

Three metatheoretical properties that determine the phenomena's perceptibility by individuals

Given that all science is made by humans, the TPS-Paradigm considers[2] three spatio-temporal properties that can be conceived in various forms for the phenomena studied in individuals and that determine the ways in which humans can perceive a given phenomenon under everyday conditions. Therefore, these three properties also determine the methods required to overcome the limitations of human abilities under research conditions for enabling scientific investigations.

1) Spatial location in reference to the studied individual's body is considered because, without technologies, humans can directly perceive only phenomena that are external to individuals (e.g. faces) but not phenomena internal to individuals' intact bodies (e.g. bones, muscles).

2) Temporal extension is considered because humans can perceive only phenomena that are present in the moments of investigation. Perceptibility is increased in temporally extended phenomena (e.g. facial structures) but complicated in momentary and fluctuating phenomena (e.g. facial expressions). Momentary phenomena can be recorded only in the moments in which they occur (e.g. heartbeats). This requires methods enabling the real-time recording of momentary phenomena, which are called *nunc-ipsum methods* in the TPS-Paradigm (from the Latin *nunc ipsum* for *at this very instant*).

3) Physicality versus "non-physicality" is considered because physical phenomena are spatially extended (see similarly Descartes' *res extensa*, Hirschberger 1980b); therefore, they are or can be made perceptible by multiple individuals. Material physical phenomena feature *spatial units* that are identically repeatable (e.g. atoms, molecules) or at least repeatable to considerable extent (e.g. cells, bones). Spatial units help an intersubjective consensus to be reached on how to demarcate and categorise events (e.g. different cells). Spatial units do not occur in immaterial physical phenomena (e.g. movements), but such units can be defined on the basis of the material phenomena to which immaterial physical phenomena are systematically related (e.g. facial muscles to demarcate facial expressions).

"*Non-physicality*"[3], by contrast, denotes the immaterial properties of psychical phenomena that show neither spatial units nor systematic relations to the material or immaterial physical phenomena to which they are bound (see below; Fahrenberg 2013; Kant 1798; Wundt 1894).

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[2] The presuppositions that the TPS-Paradigm makes about the three metatheoretical properties and the distinctions between various kinds of phenomena need not be consensually shared by all scientists. Scientists who do not agree or who agree only partially with these presuppositions must develop metatheoretical and methodological concepts other than the ones that are explored in this research, thus precluding direct comparisons (for details, see Uher 2015a,d).

[3] The term "non-physical" is put in quotation marks because it denotes properties that are not simply contrasted against the physical but are complementary instead (see below; Uher 2015a).

Different kinds of phenomena and basic principles of phenomenon-methodology matching

The TPS-Paradigm differentiates[2] various kinds of phenomena[4] explored in individuals—morphology, physiology, behaviour, the psyche, semiotic representations, artificially modified outer appearance and contexts. These differentiations are based on the *particular constellation* of forms that can be conceived for any given phenomenon with regard to the three metatheoretical properties. For example, muscles can be conceived of as internal, temporally extended and material physical, and behaviours as external, momentary and (mostly immaterial) physical (see below).

Their specific and different constellations of properties entail that each kind of phenomenon has its own *frame of reference* that is applicable to other kinds of phenomena only to some degree or not at all. These frames of reference therefore determine the ways in which information from one kind of phenomenon can be represented in another one; this is called *conversion* in the TPS-Paradigm. Conversions of information happen all the time individuals are communicating (i.e. transmitting meanings; see below; Uher 2015d).

Conversions of information are also fundamental to all methods of data generation—thus, to *phenomenon-methodology matching*. Specifically, the ways in which information from the phenomena under study can be converted into semiotically encoded information depend on the particular constellation of metatheoretical properties that can be conceived for the phenomena under study and for the phenomena used as data (Uher under review a). Given this, the TPS-Paradigm derived from these three properties clear-cut criteria and basic principles that determine unequivocally which methodologies are appropriate for exploring a given kind of phenomenon. These foundations highlighted that insufficient differentiation between phenomena for which different properties can be conceived entails mismatches with the methodologies used for investigations (Uher 2014, 2015a,b,c).

Specifically, when the same constellation of properties can be conceived for different phenomena, then their frames of reference are considered *completely metatheoretically commensurable* (from the Latin *commensurabilis* for having a common measure). This enables *appropriate* conversions of information between them. But when only partial or no metatheoretical commensurability can be assumed because the involved phenomena differ in their forms with regard to one or even all three properties, then commensurability must be established on the basis of decisions. These decisions are made by the persons (e.g. observers, study participants) who convert information from their perceptions and conceptions of the phenomena under study into semiotically encoded information (e.g. for generating data). When these decisions are made explicit and are intersubjectively specified, this is referred to as *consent-based commensurability* in the TPS-Paradigm.

The TPS-Paradigm specifies the particular constraints that arise from each of the three properties for appropriate conversions of information. *Conversion Principle 1* states that differences in the phenomena's spatial location relative to the studied individual's body (i.e., internal versus external) may constrain conversions of information if, through these conversions, the phenomena under study are altered in and of themselves. *Conversion Principle 2* states that constraints for conversions of information may arise if one or all of the phenomena involved have only brief temporal extensions (i.e. are momentary) and, in particular, if one or even both of them feature temporal units of variable extension that are therefore identically repeatable only to some extent. *Conversion Principle 3* states that differences in the phenomena's physical properties may constrain conversions of information between them if one or even both phenomena involved feature spatial units of variable extension that are thus identically repeatable only to some extent or if spatial units cannot be conceived at all.

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[4] In the TPS-Paradigm, the term *phenomenon* denotes anything that is or can be (technically) made perceptible and/or that can be conceived by humans. This differs from various historical thought traditions in which phenomena are conceived of as mere sensory perceptions and are differentiated from non-sensual concepts (sometimes called *noumena*; e.g. Kant 1781; for details, see Uher 2015d).

These principles specify the particular challenges of phenomenon-methodology matching that arise in explorations of individuals' inner morphology, physiology and behaviour—and especially in explorations of their psychical phenomena (Uher 2015a,b,c, under review a).

2. What is the Psyche?

The TPS-Paradigm defines the *psyche* as the entirety of the phenomena of the immediate experiential reality both conscious and non-conscious of living organisms (Uher 2015a,b,c,d; see Wundt 1896). Importantly, the term psychical denotes not only mental but also emotional, volitional and other psychical phenomena; hence, psychical is not synonymous with mental (Wundt 1896).

Psychical phenomena occur entirely internal[5] to individuals' bodies. They can be perceived only by each individual him- or herself but by nobody else no matter what invasive or technical methods are used. Therefore, one and the same event can never be perceived by multiple individuals and direct comparisons between individuals are precluded (Kant 1786; Locke 1689; Weber 1949).

Considering their temporal extension, the TPS-Paradigm differentiates experiencings (Erleben) from experiences (Erfahrungen). *Experiencings* are bound to the immediate moment and highly fluctuating—they are actualities (Gillespie & Zittaun 2010; Uher 2013; Valsiner 1998). Experiencings that are processed, abstracted and memorised become *experiences* that are interconnected with other experiences and integrated into the individual's psychical system that thereby continuously changes and develops (Le Poidevin 2011; Valsiner 2012). Thus, experiences are the *a posteriori* of experiencings; they are *memorised psychical resultants* that the individual retains of past experiencings in processed forms and that are therefore temporally more extended (e.g. psychical representations).

Memorised psychical resultants cannot be directly accessed; they can only be retrieved into an individual's experiencings. But a revived experiencing is never merely identically repeated. It is always reconstructed anew in the context of all other concurrent events both internal and external to the individual's body (Schacter & Addis 2007) before it is reintegrated again into the hitherto reached structures of the individual's psychical system.

The TPS-Paradigm differentiates two kinds of structures of memorised psychical resultants. *Compositional structures* refer to the contents of individuals' experiential reality, such as psychical representations of past experiences, ideas, beliefs and knowledge. *Process structures* refer to basic patterns in the processing of these contents, such as capacities for abstraction, (re)construction, memory span and self-organisation (Uher 2015c).

The TPS-Paradigm conceives of psychical phenomena as "non-physical" because spatial properties cannot be conceived (see similarly Descartes' *res cogitans*, Hirschberger 1980b; Kant 1798). The non-spatial properties of the psyche[6] do not offer any point of reference that the introquesting individual could use to reliably demarcate and categorise in the continuous flow of experiential phenomena particular units that could be conceived as identically repeatable at least to some extent. Rather, psychical events can be demarcated only by mere thought, but the psychically demarcated elements cannot be kept isolated for enabling systematic demarcations, comparisons and categorisations (Kant 1786; Uher 2015a,d).

Further complicating is the fact that, unlike immaterial physical phenomena (e.g. electricity), psychical phenomena also lack systematic relations to the material and immaterial physical phenomena by which they are accompanied (e.g. brain morphology and physiology). This is the core of the body-mind problem, called the *psyche-physicality*

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[5] For a differentiation to the concepts of internalism versus externalism, see the Section "Indirect exploration through individuals' behavioural and semiotic externalisations".

[6] Given these non-spatial properties, the entirety of psychical phenomena cannot be conceived of as a material physical entity that could be directly perceived as is possible for individuals' bodies; thus, notions of "the psyche" in the TPS-Paradigm cannot and do not imply reification as a concrete entity.

problem in the TPS-Paradigm (Uher 2015a,d). In this problem, the TPS-Paradigm adopts the presuppositions of *epistemological complementarity*, which takes a metaphysically neutral position without either monistic or dualistic presuppositions (see Fahrenberg 2013; Kant 1798; Wundt 1894).

Epistemological complementarity was originally introduced by Bohr (1937) as a solution for the wave-particle dilemma in research on the nature of light. Bohr pointed out that, by using different methods, apparently incompatible information can be obtained about the properties of the same object of research. These properties seem to be maximally incompatible with one another but are both equally essential for an exhaustive account of the results obtained, and may therefore be regarded as complementary to one another.

Given this, the Bohrian principle of complementarity rejects methodological compromises while implying no limitations to the application of methods. Rather, this epistemological principle argues for analysing the presuppositions and the appropriateness of the conceptual structures involved, and for conceiving for the different properties under study different frames of reference that are categorically different, self-contained and mutually complementary and that are all essential for exploring the particular object of research. The TPS-Paradigm builds on the principle of epistemological complementarity in several ways (for details, see Uher 2015a,b,c,d).

The metatheoretical properties of psychical phenomena thus-specified allow for deriving methodological implications as explored now (see Uher 2013, Desideratum 7).

3. Perceptibility by individuals: Extro*questive* versus intro*questive* methods

The TPS-Paradigm defines all procedures for studying phenomena that individuals can perceive as from outside of themselves and that therefore are or can be made directly perceptible by multiple individuals as *extroquestive methods* (from the Latin *extro* for beyond, outside). Under everyday life conditions, individuals' inner morphology (e.g. muscles) and physiology (electric brain potentials) cannot be perceived by multiple individuals. But this is possible under special conditions, such as by using invasive methods (e.g. surgery) and technical means (e.g. electroencephalography). Hence, all physical phenomena internal and external to individuals' bodies and both material and immaterial are or can be made extroquestively accessible.

Extroquestive accessibility of phenomena is important because it enables multiple individuals to perceive *one and the same* event. This helps an intersubjective consensus to be reached on how to demarcate and categorise events. It is also essential for establishing scientific facts, which requires that scientists make the observational facts that they believe to have established accessible to public scrutiny—for the direct and repeated perception by multiple individuals, especially colleagues (Uher 2015a, under review a,b).

Importantly, extroquestive methods are necessary for establishing objectivity, but their application per se does not guarantee that particular criteria of scientific objectivity are fulfilled. Rather, one and the same physical object can be perceived and conceived of in different ways depending on the particular presuppositions made (Collingwood 1940; Uher under review b).

Introquestive methods (from the Latin *intro* for in, within), by contrast, are defined as all procedures for studying phenomena that can be perceived only from within the individual him- or herself but not *by multiple individuals in principle under all possible conditions*. This applies only to psychical phenomena. One and the same psychical event cannot be made extroquestively perceptible, no matter what methods are used; psychical phenomena are accessible only introquestively. Therefore, objective facts about psychical events cannot be established (Uher under review b); this is often referred to as incorrigibility (Schwitzgebel 2014).

Importantly, internal location of the phenomena under study is not sufficient for defining introquestion. For example, when, in medical investigations, individuals follow their own ultrasonic or endoscopic investigation on video screen, they extroquestively perceive records of their own bodies' internal properties (e.g. tissue structures). This is extroquestion

because these internal physical properties are technically converted into external physical ones (e.g. ultrasound videos) that individuals can perceive as from outside of themselves (e.g. through their eyes), and this is possible for both the individuals themselves and others (e.g. physicians). But the sensations that ultrasound and endoscopic investigations may cause (e.g. pains) can be perceived solely from within and only *by the individual him or herself*, thus introquestively (Uher 2015c).

The TPS-Paradigm introduces the concepts of extroquestive, introquestive and nunc-ipsum methods to denote the particular kinds of methods that were derived from the three spatio-temporal properties that it considers (Uher 2015a). The concepts of extroquestion and introquestion differ from previous related concepts in important ways.

Differences to intro**spection** *versus extro*spection

The ending *–questive* or *–question* (from the Latin *quaerere* for to seek, enquire and from *quaestio* for enquiry, question) implies that these methods involve perceptions of all kinds (e.g. haptic, acoustic, olfactoric) rather than only visual ones as is implied by the ending *–spective* or *–spection* (from the Latin *spectare* for to look at, see).

Introspection commonly denotes individuals' inward perspective on their own experiencings; extrospection denotes individuals' outward perspective onto the "world" (Boring 1953; Schwitzgebel 2014). These concepts thus refer to the epistemological *object-subject problem*. As methods, extrospection is often considered objective and introspection subjective. But, just as with extroquestion, perceptibility of one and the same event by multiple individuals is necessary but insufficient for establishing objectivity. Moreover, person-perception cannot be as neutral as object-perception can be to some extent because self- and other-perception are known to interact with one another in complex ways, and the formation of impressions of others is known to be influenced by various kinds of attribution biases (Fahrenberg 2013).

Importantly in individuals' immediate experiential reality, inward and outward perspectives are not given as separate channels of information. Rather at any given moment, individuals perceive a multifaceted unity that emerges from the entirety of all information available—including conceptual representations previously developed (see Uher 2015d). The perceptually given is more than the sum of their components (see the principle of emergence[7]); their decomposition can therefore be reconstructed only *a-posteriori* to some extent (Wundt 1896).

Individuals can always perceive and conceive of both external events (e.g. apples) and own psychical events (e.g. appetite); thus, individuals can extrospect and introspect at the same time—both the individuals studied and the researchers studying them (Kant 1781; Wundt 1896). This interwovenness entails major methodological challenges (see below).

Because extro*spection* and intro*spection* are defined and differentiated with reference to the *particular individual under study*, they cannot be clearly differentiated as methods (Uher 2015a). By contrast, extro*question* and intro*question* are defined and differentiated on the basis of a) *the particular phenomena under study*, considering that various other phenomena may be present as well and that all individuals involved can introspect and extrospect at the same time; and of b) *the particular persons who perceive the phenomena under study* and who represent information from their perceptions and conceptions of these phenomena in particular external physical phenomena that are used for communication or as data (e.g., spoken or written words, see below; Uher 2015a).

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[7] Given that complex organismal systems function as organised *wholes*, the so-called *principle of emergence* denotes that their properties cannot be deduced from knowledge of the constituting elements and their interrelations. When such systems are assembled from their elements, new characteristics of the whole emerge, and these could not have been predicted from knowledge of their constituents and the interrelations between them. The whole has different properties, structures and functionings (e.g. Rothschuh 1963; Uher 2015a,d; Wundt 1863).

Psychophysics relies on **extro***question but not on* **intro***question*

Psychophysical experiments are commonly interpreted as introspective explorations because the individuals under study are asked to report about their perceptions of particular physical stimuli that are presented to them (e.g. light flashes; Fechner 1888; Wundt 1896). But psychophysics clearly rely on extroquestive methods—the stimuli are external to the individuals studied and can therefore be perceived by multiple individuals (e.g. researchers). As the focus on the individual under study does not allow for differentiating introspection from extrospection, scientists sometimes try to determine an investigation as either introspective or extrospective by wording their instructions differently (e.g. "tell me if you visually experience a flash of light" versus "tell me if the light flashes"; Schwitzgebel 2014). But perception is always involved; otherwise, individuals could not tell whether or not a light flashes.

The defining criteria of introquestion/extroquestion clarify that psychophysicists explore individuals' outward perceptions of external physical phenomena. Physical events can be quantified with physical methods (Uher under review a). It is these extroquestive methods that first enable experiments (i.e. systematically varied and identically repeatable conditions) and quantitative comparisons with individuals' perceptual judgements as described, for example, in the Weber-Fechner Law (Fechner 1888).

Our perceptions of external physical events are determined by properties of these events for which we are sensually receptive (e.g. lightness). From invariants perceived, we infer properties that belong to these external events and we commonly experience these properties as features of these events rather than as intrinsic features of our experiencing (Gibson 1967; Harman 1990; Peirce 1902, 5.384; Uher 2015d).

Consequently, the quantitative relations of stimulus perception determined in psychophysics solely derive from the quantitative properties of the external physical events studied and from the internal physical events that are involved in the sensations[8] elicited—but not from the psychical events that are involved in their perception. These *extroquestive findings therefore cannot provide any evidence that psychical phenomena in and of themselves are quantifiable* as widely assumed[9]. This erroneous generalisation laid the foundation for the large-scale application of so-called quantitative methods to explore psychical phenomena of all kinds rather than only those involved in extroquestion (Uher under review c). This vital point is obscured by the conceptual weaknesses of introspection.

Perceptions of external physical phenomena are always involved in any situation in both research and everyday life. Intro*question* therefore requires that the phenomena under study—and not just their perception—are entirely internal to individuals.

Differences to first-person versus third-person perspective methods

The idea of exploring individuals from the inside versus outside perspective also underlies the concepts of first-person versus third-person perspective (Butler 2013; Roth 2012). The third-person perspective denotes the views that others have on the individual under study—thus, the public view that can generally be shared with others. The first-person perspective denotes the private view of the studied individual him- or herself. This terminology suggests clear-cut differentiations between the observer and the observed, the objective and the subjective. But as with extrospection/introspection, these two perspectives cannot be clearly differentiated; they are false dichotomies that ignore important epistemological questions (Fahrenberg 2013).

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[8] *Sensations* are physiological processes, operating at the border from the physical to the psychical into which they become processed as *perceptions*. Sensory phenomena enable conversions of information from external physical events into internal psychical events. Importantly, the patterns according to which sensations are converted into percepts are not fixed and sensations are not the only ways in which perceptions are generated (Gibson 1967; for details, see Uher 2015d).
[9] Wundt (1874) already emphasised that the possibilities for quantification are restricted to simple psychical phenomena accessible by psychophysical experimentation and that such possibilities are not given for higher and complex psychical phenomena for the exploration of which he developed his comprehensive research programme of cultural-historical psychology (German: *Völkerpsychologie*).

Moreover, first-person versus third-person perspective methods are frequently equated with introspection versus extrospection (Butler 2013; Roth 2012). But whereas concepts of introspection explicitly refer to individuals' own views on their own psychical phenomena (Schwitzgebel 2014), concepts of first-person perspective often denote only the studied individuals' own perspective but not what it is that is being explored from this perspective.

This vital difference is illustrated nicely by the methods *of first-person perspective digital ethnography*. In these methods, mobile devices such as miniature video or photo cameras worn at eye or chest level are used to (audio-)visually capture the individual's own perspective during a task or everyday activities (Lahlou 2011; Pink 2015). Hence, they capture individuals' *outward perspective* on external events including some of their own (e.g. manual and verbal) behaviours in the recording field. But these first-person records cannot capture individuals' *inward perspective* in terms of own perceptions and interpretations of the events recorded (aside from spontaneous comments made during recording). Their private views can be explored only in subsequent steps in which individuals are interviewed about their own first-person records (see below; Lahlou 2011).

Thus, the methodological concepts of introquestion and extroquestion introduced by the TPS-Paradigm differ from first-person and third-person perspective methods in essential ways. Specifically, the individuals under study can generate data about themselves using both extroquestive methods (e.g. recording their behaviours) and introquestive methods (e.g. externalising their experiencings)—both methods involve the first-person perspective and both are commonly categorised as subjective. When many persons judge a particular individual (e.g. using questionnaires), they apply introquestive methods (see below)—such methods involve the third-person perspective and are commonly considered objective.

4. Indirect exploration of psychical phenomena through individuals' behavioural and semiotic externalisations

The exclusively introquestive accessibility of psychical phenomena entails intricate challenges because the scientists themselves cannot perceive the particular events under study. Instead, psychical phenomena can be explored *only indirectly through individuals' externalisations* in phenomena that others can perceive (e.g. behaviours, spoken language; see Schwitzgebel 2014). Even if scientists and philosophers introquestively explore their own psychical phenomena (e.g. Brentano 1874; James 1890), they ultimately have to *publish* their findings—make them public, thus extroquestively accessible to others. Otherwise, this would not be research and would not be known. The TPS-Paradigm therefore broadly refers to all methods of self-observation and self-report as introquestive methods (see below).

The TPS-Paradigm specifies that any externalisation from psychical phenomena involves conversions of information from internal "non-physical" phenomena into phenomena that are external and thus necessarily physical. This so-called *external physicalisation* (Uher 2015d) entails that information must be converted between frames of reference that differ in at least two of the three metatheoretical properties considered in the TPS-Paradigm (see the Conversion Principles) and that thus cannot be completely metatheoretically commensurable with each other. This lack of isomorphism precludes one-to-one externalisations of information from individuals' psychical systems as well as one-to-one inferences from individuals' externalisations to their psychical events. This is a crucial point for research methodology (see below; Uher 2013; Toomela 2011).

These conversions of information are further complicated by the ways in which psychical phenomena are connected with individuals' external surroundings. The TPS-Paradigm conceives of psychical phenomena as located entirely internal to the body of the individual under study—just like the morphological and physiological phenomena with which they are connected in complementary ways (e.g. brain matter and neurochemistry). Through some of these internal physical phenomena (e.g. sensory organs), direct and highly flexible

conversions of information are possible from phenomena in individuals' external surroundings into their psychical systems (e.g. sensation and perception[8]; Uher 2015d).

But in the other direction, from the individual's psychical phenomena and the internal physical phenomena with which they are complementarily connected (e.g. nerve tissue and electric potentials), direct and flexible conversions of information to phenomena in the individual's external surroundings are not possible. This is called the *one-sided psyche– external surrounding connection*[10] in the TPS-Paradigm.

Bridging this gap requires externalisations, other kinds of phenomena that mediate[11] information from individuals' psychical phenomena to phenomena in their external surroundings—these are the phenomena of behaviours and semiotic representations.

Behaviours—the essential bridge from the individual's psyche to his or her external surroundings

Individuals' primary externalising phenomena are behaviours. Behaviours are primary because they develop(ed) before semiotic representations during both ontogeny and phylogeny and because all semiotic representations inherently involve behaviours (Uher 2013). The morphological and physiological phenomena that are necessary for behaviours to occur (e.g. muscle fibres and enervation) cannot fulfil this mediating function[12] because these phenomena are internal and therefore cannot directly connect to phenomena in individuals' external surroundings (Uher 2015a,b,c,d).

The TPS-Paradigm defines *behaviours* as the "external changes or activities of living organisms that are functionally mediated by other external phenomena (Millikan 1993) in the present moment" (Uher 2013, 2015a,b,c). Hence, behaviours are not just movements (e.g. freezing) and not all movements, external changes or activities, are behaviours (e.g. heat as mere chemical by-product); they are behaviours only if their functions[12] have *reference to* other external phenomena or to connections with them (Millikan 1993). Importantly, behaviours are neither physiological responses nor mental activities because different metatheoretical properties can be conceived for these kinds of phenomena; this differs from previous research paradigms in psychology (Uher 2015a).

Behaviours are located entirely external to individuals' bodies. Behavioural events are momentary and of variable temporal extension (e.g., vocalisations). Behaviours can be conceived of as (mostly immaterial) physical phenomena; spatial units can be demarcated on the basis of the material properties of individuals' bodies or other external phenomena to which behaviours are bound (e.g. vocal cords, air). But these units often vary considerably in their spatial and temporal extensions (e.g. different intonations) so that behavioural events are identically repeatable only to some extend.

The behaviours' momentariness facilitates flexible and timely conversions of information from individuals' experiencings (see Conversion Principle 2). This nearness-in-time is essential for individuals' abilities to interact with and to adapt to dynamic and flexibly changing external surroundings, such as social interactions. Such flexibility and plasticity are not enabled by temporally more extended phenomena (e.g. outer morphology; Uher 2013, 2015a).

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[10] Previously also called the *one-sided gap of the mind-environment connection* (Uher 2013).

[11] The term *mediation* refers to the Latin *mediare*, to be in the middle.

[12] The TPS-Paradigm conceives of *functions* as temporal interrelations that regularly occur between particular kinds of phenomena, events or properties—thus, as established effects (derived from the Latin *effectus* for "worked out, brought about, accomplished"). Functions thus-defined imply neither purpose nor intention because teleological properties presuppose that possible prospective outcomes are simulated and evaluated on the basis of a posteriori analyses of experiences made in the past, which is possible only for psychical phenomena (Uher 2015d). Moreover, functions denote not only causal connections of various kind (Kausal-Zusammenhänge) but also compositional connections (Gefüge-Zusammenhänge) in which the interacting elements co-occur in coordinated ways and match and cooperate with one another such that the entirety of their joint interactions results in complexes and functions of higher organisation (Rothschuh 1963; Uher 2015a,c,e).

Behavioural phenomena are so flexible and so neatly intertwined with psychical phenomena that individuals commonly hardly notice their vital function for connecting with external surroundings. This may contribute to conceptions of psychical phenomena as "inner behaviours" (e.g. Koffka 1935; Skinner 1957). The one-sidedness of the psyche-external surrounding connection, the vital function of behaviours for bridging this gap and the significance of differentiating psychical phenomena from behavioural phenomena become strikingly apparent in pathological conditions in which individuals loose their voluntary motor control for producing behaviours and thus their abilities for externalising information from their psychical systems (e.g. locked-in syndrome; Uher, 2013; 2015a).

Species-specific behaviours have evolved for externalising information of vital importance in rather fixed (likely evolutionarily derived) ways. This limits the range of externalisable information.

Semiotic representations: Composite kinds of phenomena that are both internal and external to individuals

Information can also be externalised in external changes or activities other than species-specific behaviours and to which information can be assigned in *arbitrary* and thus varying ways (e.g. vocalisations). These assignments make these externalisations functional—thus, (*semiotic) behaviours*. When multiple individuals make such as*sign*ments in socially shared ways, the particular behaviours become *behavioural signs* (e.g. gestures, spoken language). Information can also be assigned to material phenomena other than those of individuals' bodies (i.e. ink on paper) that thereby become *material signs* (e.g. written language; Uher 2015d).

Signs are created to represent *meanings*—i.e. psychical associations—in external physical events (see external physicalisation) to facilitate and enable the social co-construction of these meanings. Human communities have developed comprehensive systems of behavioural and material signs that help individuals to overcome the fundamental imperceptibility of psychical phenomena by others and to externalise complex information beyond the information externalisable in species-specific behaviours, thus promoting social exchange and coordination (see Uher 2015d; also Kant 1786).

Importantly, meanings are not inherent to the particular physical phenomena (e.g., movements, ink on paper) of which signs are composed; rather, meanings are only as*sign*ed to them by particular individuals. Because meanings are psychical phenomena, meanings are bound to the individuals who construct them. Thus, although meanings can be physicalised in material signs, they are inextricably *bound to the individuals who co-construct them*. The TPS-Paradigm therefore refers to signs as *semiotic representations* and conceived of them as *composite kinds of phenomena* comprising external physical phenomena that are tightly intertwined with psychical phenomena (e.g. meanings) and that cannot be understood as signs without considering these psychical phenomena.

Consequently, dualistic conceptions exploring signs (e.g. language) separately from the individuals who use them are inherently circular. Rather, the different kinds of phenomena comprised by semiotic representations *can be conceptually separated from one another*—and thus from the individuals studied—*only inclusively* (see Valsiner 1987) using the three metatheoretical properties that the TPS-Paradigm considers.

Thus, semiotic representations are phenomena with *heterogeneous metatheoretical properties* that comprise both "non-physical" and physical events, both internal and external events, and they may also comprise both momentary and non-momentary events. Therefore, semiotic representations comprise phenomena with different frames of reference that can be metatheoretical commensurable only partially.

Signs can be used to refer to anything humans can perceive or conceive of—thus, any phenomenon[4]. These so-called *referents of signs* are not the same as the particular physical and psychical events of which signs are composed. Signs can refer to other external events, such as a tree. But a tree is not the same as the letter combination TREE or an icon of a tree carved in stone that are used to semiotically represent real trees in necessarily more generalised and abstract ways. This is uncontroversial, but it is often

overlooked that the same is also true if the semiotic referents are psychical phenomena (e.g. feeling nervous). The meaning of "feeling nervous" attributed to particular behavioural and semiotic externalisations is not the same as that feeling in and of itself. The meanings assigned to signs implicitly reflect abstractions and generalisations from concrete events—otherwise, signs could not refer to different events of the same or similar kind. Therefore, signs cannot reflect the phenomena, events and properties that they denote in the same ways in which individuals perceive them in a given moment (Vygotsky 1934).

The TPS-Paradigm's conception of signs *as composite kinds of phenomena* comprising external physical *and* psychical events that are inclusively separated on the basis of three spatio-temporal properties differs from previous semiotic theories (e.g. Peirce 1902, 7.364; Mead 1934). It also opens up new perspectives on the *externalism-internalism* debate.

Excurse: Differences to externalism versus internalism

The externalism-internalism debate in the philosophy of mind revolves around the question of how individuals' can get to know about the world if their psyche is entirely internal to their bodies as assumed in internalism. Externalism contends that psychical phenomena are determined also by external phenomena and therefore cannot be only internal (Rowlands 2003). Like internalism, the TPS-Paradigm conceives psychical phenomena as being located entirely internal. But, unlike internalism, it refrains from idealistic assumptions of a-priori knowledge (Kant 1781). Instead, on the basis of the three spatio-temporal properties and presuppositions of epistemological complementarity, the TPS-Paradigm specifies the ways in which psyche-external surrounding connections can be established in both directions for enabling individuals to get to know about, to adapt to and to intentionally act in their external surroundings (see Uher 2015d). The conception of signs as composite kinds of phenomena allows for incorporating various externalistic ideas, such as the idea that implicit meanings and structures contained in semiotic systems (e.g. phonetics, semantics) also influence individuals' psychical systems (Lau & Deutsch 2014), while still conceiving psychical phenomena as being located entirely internal to individuals' bodies (Uher 2015a,b,c,d).

What *to externalise—Challenges to be considered*

Researchers are often divided about what to consider intro*spective* knowledge—e.g. whether this involves only conscious experiences or also beliefs (Schwitzgebel 2014). The TPS-Paradigm specifies the targets of intro*question* as both experiencings and memorised psychical resultants.

To be introquestively accessible, experiencings need to be conscious or at least be capable of becoming conscious[13]. Commonly, experiencings of different kind are distinguished (e.g. visual percepts, thoughts, emotions). But experiencing is always given as a multifaceted unity that emerges as a whole in each given moment (see the principle of emergence[7]; Wundt 1896). Hence, the workings of the psyche cannot be explored by studying only mental experiencings—even if such could be (hypothetically) isolated. Introquestive methods are therefore targeted at exploring *experiencings of all kinds* and however concrete or abstract, distinct or ambiguous, specific or global they may occur for a particular individual in a given moment. This diversity intrinsically calls for methodological pluralism (see epistemological complementarity, Uher 2015a; also Schwitzgebel 2014).

The concept of introquestion implies the assumption that individuals introquest spontaneously and fragmentarily in their everyday lives. Scientists capitalise on these abilities and introduce particular procedures for increasing individuals' awareness of their experiencings, promoting self-disclosure and facilitating externalisations and their recording (see below).

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[13] The corresponding German terms are *bewusstseinspflichtig* and *bewusstseinsfähig* (Hacker 1986).

Memorised psychical resultants—both compositional structures and process structures—are targets of introquestion because they are accessible only while they are being reconstructed and executed, respectively, in individuals' experiencings. Moreover, as outcomes of the psyche's past workings, memorised psychical resultants constitute essential parts of individuals' psychical systems. Without these abstracted, processed and integrated experiences derived from past experiencings, psychical systems could perhaps not function at all. For example, the perceptual representations acquired early in ontogeny first enable individuals to perceive material objects as steady and events as repeatable although single sensory perceptions are always fragmented and vary rapidly due to individuals' own movements (Uher 2015d).

Experiencings—and thus, memory reconstruction—are always interrelated to *all concurrent events* both psychical and physical, internal and external to the individual, which constitute the individual's *situation*[14] in the TPS-Paradigm (Uher 2015a,d). Therefore, contextualised methods are always required (see below). The question on whether or not beliefs constitute introspective knowledge most likely arose from the widespread use of decontextualised methods in which individuals are asked to report about themselves in situations that hardly have any relevance to the psychical phenomena enquired (e.g. questionnaires; see below).

An essential difference between experiencings and memorised psychical resultants concerns their degrees of abstraction. Experiencings are more detailed, and they may be erratic, vague, inconsistent and multi-layered rather than logic and coherent as this is possible for memorised psychical resultants. Thus, if individuals are asked to provide clear and rational accounts of what is going on in their experiencings, then they may more likely reconstruct their pertinent beliefs of what they may or should have experienced rather than the specific experiencings that they actually have had. Interpretation, categorisation and analyses of externalised experiencings are secondary and tertiary steps of exploration (see below).

Experiencings and memorised psychical resultants can be differentiated metatheoretically, but such distinctions are commonly not perceived by individuals. Rather, in the continuous flow of experiencings, events of the present merge indistinguishably with memories from the past and with their projections into an imagined future, making every moment unique and never repeatable (Le Poidevin 2011; Valsiner 2012). It is precisely this tight and smooth entanglement that first makes the workings of psychical systems so functional. This entanglement enables individuals to capitalise on experiences and abilities acquired in the past and to develop, maintain and refine psychical resultants that enable orientation, adaptation and action in complex and changing conditions and in the face of an uncertain future (i.e. to learn), while meeting the limited capacities of experiencings that can be processed simultaneously at any given moment (Uher 2015d).

Clear empirical differentiations between experiencings and memorised psychical resultants are not—and are not claimed to be—always possible. But their metatheoretical differentiation provides clear criteria for scrutinising what kinds of psychical phenomena can be reflected by the empirical data that are generated by particular methods.

When *to externalise—Temporal requirements*

The momentariness of experiencings entails particular intricacies for their exploration. Once an experiencing ceased to be and is processed into an experience, it can only be reconstructed again in another experiencing. This new experiencing can be externalised, but it is not the same as that previous one (Valsiner 1998, 2012). Moreover, individuals always have experiencings during waking hours[15], consciously and subconsciously. There never is a moment to hold on to become more fully aware and reflect on a given experiencing,

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[14] A *situation* is defined in the TPS-Paradigm as the particular constellation of the *internal and external* events that are present in a given moment and that the individual can therefore directly perceive, consciously or not (Uher 2015a).

[15] Experiencings also occur during some episodes of sleep (e.g. dream experiencing).

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because reflection itself is an experiencing yet a different one than the experiencing reflected on.

The momentariness of experiencings actually requires real-time explorations, thus *nunc-ipsum introquestion* (see concurrent introspection; Schwitzgebel 2014). But attention and externalisation inevitably change the course of experiencings (see Conversion Principle 1; Kant 1798). This hinders nunc-ipsum explorations of more complex experiencings, thus allowing for explorations of only brief and less complex experiencings (Wundt 1874[9]).

In methods of *retro-introquestion*, individuals are therefore asked to reconstruct the experiencings that have occurred during a specified time (e.g. while completing a task)— thus, *ex post facto* and without disturbing them (see Bühler 1907; James 1890; Rosenbaum & Valsiner 2011). This enables investigations of more complex experiencings, yet at the expense of details that may already be forgotten (Wundt 1896). Experiencings can be reconstructed most accurately if their reconstruction occurs immediately after the experiencings under study have ceased to be and thus before many further experiencings and reconstructions occur that inevitably change the memorised psychical resultants that the individual has retained of the experiencings under study. The essential element of retro-introquestive methods therefore is their application in *closest possible temporal proximity to the experiencings under study*—hence, these methods are inherently *short-term memory-based* (see immediate retrospection; Schwitzgebel 2014). Particularly suited are microgenetic methods, which are aimed at reconstructing the genesis of actualities—their *Aktualgenese*[16] (Diriwächter & Valsiner 2008; Wagoner 2009).

The more time elapses between experiencings and their introquestive reconstruction, the more likely will the corresponding memorised psychical resultants already be changed through subsequent experiencings, reconstructions, abstractions and (re-)integrations into the systemic structure of the psyche. With increasing temporal distance, individuals are therefore more likely to reconstruct past experiencings using abstracted psychical representations (e.g. schemata), thus reviving what they *believe* they often do experience or should have experienced in the given kind of situation rather than what they have *actually* experienced in a particular moment.

Self-reports in questionnaires and some interview methods, by contrast, rely on *long-term memory-based introquestion*. In such methods, individuals are asked to reconstruct psychical representations (e.g. by enquiring *habitual* experiencings, beliefs), rather than to reconstruct particular experiencings that they have had in particular moments. Abstracted and generalised psychical representations are illuminative about the compositional structures of an individual's psychical system. But these psychical representations are *only the outcomes* of complex multi-layered processes. They *cannot reveal the workings of the psyche* in and of themselves as they occur at any given moment (Rosenbaum & Valsiner 2011; Toomela & Valsiner 2010; Uher 2015b).

Thus, although *long-term memory-based introquestive* self-reports are reconstructed in the individual's experiencings in the moments of enquiry, their contents reflect *outcomes of the processing of past experiencings* in terms of, for example, beliefs, self-concepts or personal narratives (McAdams 2001) but not those past experiencings in and of themselves. This is well considered in many explorations of psychical processes (e.g. intelligence tests; Uher under review a) but not in psychological assessments (Uher under review c).

Where *to externalise—Requirements of retrieval situations*

As psychical phenomena are *functionally integrated within the individual as a whole*, experiencings are dynamically interrelated to and co-determined by all concurrent (internal and external) events. The functionality of experiencings arises from this multi-layered

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[16] The German term *Aktual*genese, coined by Gestaltpsychologists for perceptual processes, is derived from the Latin *actualis* for in action, operative. This German term refers more explicitly to the time-bound properties of the phenomena studied than the corresponding English term *micro*genesis, which refers to the smallest, moment-by-moment transformative occurrences of continuous developmental processes (Diriwächter & Valsiner 2008).

embeddedness (Uher 2015d) and therefore becomes apparent—and can thus be explored—only within the particular circumstances of their emergence. The settings in which individuals are asked to reconstruct past experiencings—the *retrieval situation*—should therefore be representative and ecologically valid for the particular experiencings under exploration (see encoding specificity principle, Tulving & Thomson 1973; also Brunswik 1955).

The complex concurrent internal and external events experienced by individuals are not memorised in unitary holistic ways but rather in complex and interconnected arrays of various memory traces (Tulving 1983). Therefore, retrieval is possible via different memory traces each of which may allow for reviving different arrays of the memorised complexes of concurring experiencings (see multi-trace theory; Bower 1967; Hintzman & Block 1971; Semon 1909).

For promoting comprehensive reconstructions, retrieval settings should therefore provide cues that activate different memory traces. Retro-introquestion meets these requirements if the individual is still in the particular setting in which the experiencings under study have occurred. This setting is representative and ecologically valid but not identical because individuals' internal situation—their perceptions and conceptions of the given setting—is no longer the same as before. These issues are well-researched in fields where accurate retrieval of past experiencings is of utmost importance—in criminal investigations (Fisher & Geiselman 1992), but these issues are often not well considered in other fields of psychological research.

Suitable methods promoting comprehensive and accurate short-term retro-introquestion are, for example, the methods of *subjective evidence-based ethnography* (SEBE, Lahlou 2011; Lahlou et al. 2015). In these methods, first-person perspective audiovisual recording (see above) is used to capture events[17] that are extroquestively accessible in the individual's own visual and acoustic field (e.g. activities with the own hands, interactions with others) during specific tasks or everyday life situations.

Reviewing the own first-person perspective audiovisual records provides a complex multi-modal retrieval setting, highly representative and ecologically valid, that helps individuals to reactivate various traces of their pertinent episodic memories and to revive and reconstruct the particular experiencings that they have had in the particular moments captured on video, thus based on both *memory and evidence* (Lahlou 2011). Moreover, the video records are extroquestively accessible so that multiple individuals can perceive one and the same event recorded from the individual's unique perspective, which helps to reach intersubjective interpretation and understanding (see below).

Interviews about past experiencings conducted in settings other than those in which the experiencings under study have occurred are necessarily much less representative and ecologically valid. Some interview forms aim to reduce these limitations by asking individuals to *mentally revisit the context* in which the experiencings under study have occurred (e.g. cognitive interviews; Memon & Bull 1991). The multi-modality and vividness of interpersonal communication may stimulate reconstructions of multifaceted past experiencings far more intensely than the impersonal, rather oligo-modal settings of standardised self-report methods (e.g. questionnaire assessments).

Questionnaires and other standardised self-report methods constitute a lexically encoded and thus primarily thought-based retrieval setting that may therefore trigger reconstructions of primarily thought-based memories that can be revived and reconstructed repeatedly and more or less at will (e.g. declarative self-knowledge; personal narratives). But experiencings of other kind (e.g. emotions, visual percepts)—rather than thoughts about such experiencings—can seldom be generated or retrieved on demand; their reconstruction is bound more strongly to the complex internal and external conditions of their emergence (Eich & Metcalfe 1989).

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[17] Of course, what individuals can extroquestively access and what cameras can technically capture is necessarily not exactly the same. Audiovisual cameras may be less or even more sensitive to audiovisual events, but are generally insensitive to physical events of other kind (e.g. of smells, temperature, humidity, air pressure) that individuals can extroquestively access.

How to externalise—Risks for biases introduced by the methods used

Given that psychical phenomena are accessible only introquestively, it is only the individual him- or herself who can decide which particular external physical events are most accurate for externalisation. Constraining the externalising events that the individuals under study can use therefore entails serious limitations for the investigations of psychical phenomena. Specifically, if externalising events are predetermined (e.g. item statements and answer categories in standardised questionnaires), individuals may be prompted to reconstruct only those memories that match these predetermined events, to reconstruct memories *such that* they match or to simply indicate answers that do not match at all. Psychical phenomena not envisioned by the scientists cannot be studied. This opens doors to all kinds of ethno- and ego-centric biases (Lahlou 2011; Uher 2015a).

Wittgenstein (1922) highlighted the difficulties that are entailed by externalising psychical phenomena in language. Language sets boundaries for externalising thoughts[18]— but not for the thoughts in and of themselves as there are also inexpressible ones. The limitations and intricacies entailed in language-based investigations of psychical phenomena must therefore be carefully explored and considered (Uher 2013, Desideratum 1g; for details, see 2015a,b,c,d).

External physicalisations other than language-based ones (e.g. drawings, music, dance) provide multi-modal and less standardised possibilities for externalising psychical events. Such physicalisations may be particularly suited for externalising experiencings and memories that are subconscious and preverbal and only difficult to verbalise (e.g. emotions; see Freud 1915; Kelly 1955). They are also suited for investigating individuals with (still) limited language abilities (e.g. children's drawings are studied as "mirrors to their minds"; Cherney et al. 2006). But the lower degrees of standardisation of these externalising events also complicate the interpretation and intersubjective recoding of the meanings that individuals aim to externalise in this way.

5. Intersubjective interpretation of externalisations and inferences to the psychical phenomena under study

Introquestive methods inherently rely on the studied individuals' abilities to memorise and reconstruct their psychical events. As nobody else can perceive the events under study, the accuracy of individuals' memorisations and reconstructions cannot be validated by methods that are independent of these individuals (see incorrigibility; Schwitzgebel 2014). But vice versa, the individuals under study can validate the researchers' demarcations of the externalising events that they have used and the researchers' interpretations and reconstructions of the psychical events under exploration.

Therefore, the individuals under study should ideally be involved at least in some extent as is done in so-called qualitative methods (see communicative validation; Flick 2008). Some methods (e.g. cognitive interviews in criminal investigation, Memon & Buli 1991; subjective evidence-based ethnography, SEBE, Lahlou 2011; Lahlou et al. 2015) employ *in-depth interviews* in which the validity of the researchers' intersubjectively recoded (e.g. reformulated, verbalised) interpretation of the individual's externalisation is checked with the individuals under study. The studied individuals' interpretations of results need not be accepted by the researchers or be directly reflected in scientific theories, but their involvement will help to become aware of and to minimise potential ethno- and ego-centric biases (unintentionally) introduced by the researchers (Lahlou 2011; Uher 2015b).

In *standardised self-report methods*, by contrast, scientists aim to intersubjectively encode individuals' introquestive reconstructions by *determining a priori* the externalising events (e.g. item statements and answer categories). This practice not only constraints the studied individuals' possibilities for externalising their psychical events in appropriate ways. It also opens doors to all kinds of biases, in particular, when scientists, as is commonly the

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[18] Original wording "dem Ausdruck der Gedanken eine Grenze ziehen"—literally translated "to draw a limit to the expression of thoughts" (Wittgenstein 1922, Preface).

case, do not enquire the meanings that the individuals under study construct for these predetermined encodings—although these meanings are known to vary intra-individually and inter-individually (e.g. Rosenbaum & Valsiner 2011; Uher 2015a, under review c).

6. Summary

The Transdisciplinary Philosophy-of-Science Paradigm for Research on Individuals (TPS-Paradigm) was applied to metatheoretically specify the unique properties of the psyche (i.e. internal, temporally variable yet accessible only momentarily, and "non-physical) and to differentiate various kinds of psychical phenomena (e.g. experiencings, memorised psychical resultants comprising both compositional and process structures). These metatheoretical foundations were used to derive methodological principles (e.g. Conversion Principles; metatheoretical commensurability; nunc-ipsum methods, introquestion, extroquestion, retro-introquestion) and criteria (e.g. temporal proximity to the experiencings under study, ecologically valid retrieval situations).

The philosophy-of-science analyses identified various weaknesses in concepts of introspection and first-person perspective methods. The analyses also revealed that psychophysical findings actually rely on extroquestion, not on introquestion, and therefore cannot provide any evidence that psychical phenomena are quantifiable in and of themselves as is widely assumed to justify the application of so-called quantitative methods in psychology.

The chapter highlighted that psychical phenomena can be explored only indirectly through individuals' behavioural and semiotic externalisations. The various methodological challenges that this entails were discussed, specifying what, when, where and how individuals should externalise in introquestive explorations. The basic principles and criteria specified by the TPS-Paradigm help researchers to determine which particular kinds of psychical phenomena can be explored by which particular kind of method for establishing an appropriate phenomenon-methodology match in empirical investigations.

The transdisciplinary and philosophy-of-science analyses presented in this research have revealed novel insights that are still not well considered and that can meaningfully complement the existing metatheoretical and methodological knowledge for exploring the fascinating workings of the psyche.

Acknowledgements

Author biography

Jana Uher is a Senior Research Fellow at The London School of Economics and Political Science. She received her PhD from Free University Berlin in 2009, where she headed the group Comparative Differential and Personality Psychology from 2010-2013, funded by the Deutsche Forschungsgemeinschaft (DFG). In 2013, Jana Uher was awarded a Marie Curie Fellowship by the European Commission. Her research is transdisciplinary, concentrating on philosophy-of-science issues of psychological and behavioural research on individuals from culture- and species-comprehensive perspectives. She employs a broad portfolio of methods in studies with human children and adults with different sociocultural backgrounds and more than ten different nonhuman species, in particular primates. Jana Uher has been working at the Max Planck Institute for Evolutionary Anthropology in Leipzig (2003-2005) and has also been a visiting scholar at the Institute of Cognitive Sciences and Technologies, National Research Council of Italy (ISTC-CNR) in Rome (2011-2013).

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