Special Section: Introspection
Original Articles and Reviews

First-Person Experiments in Thinking

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Abstract: In psychology, thinking is typically studied in terms of a range of behavioral or physiological parameters, focusing, for instance, on the mental contents or the neuronal correlates of the thinking process proper. In the current article, by contrast, we seek to complement this approach with an exploration into the experiential or inner dimensions of thinking. These are subtle and elusive and hence easily escape a mode of inquiry that focuses on externally measurable outcomes. We illustrate how a sufficiently trained introspective approach can become a radar for facets of thinking that have found hardly any recognition in the literature so far. We consider this an important complement to third-person research because these introspective observations not only allow for new insights into the nature of thinking proper but also cast other psychological phenomena in a new light, for instance, attention and the self. We outline and discuss our findings and also present a roadmap for the reader interested in studying these phenomena in detail.

Keywords: introspection, psychology of thinking, conceptual thinking, phases of thinking, mental representation

Inner and Outer Dimension of Thinking

The domain of thinking continues to be a prominent area of research in psychology – judging by the number of publications on the ISI web of knowledge, it is even more prominent in psychology than in philosophy (16,765 journal articles with the word "thinking" in the article title in psychology-related journals as opposed to 9,099 in philosophy-related journals since 1950, accessed March 2016). This wealth of research comes with a heterogeneity in definitions and concepts, however: when opening a psychology textbook or searching an electronic database for an in-depth account of thinking, concise definitions are scarce and instead a number of different taxonomies and categorization systems emerge. Unlike in areas such as memory research, where universally agreed taxonomies exist (cf. the distinction between declarative and non-declarative, procedural or episodic memory; and the like), this heterogeneity already indicates a certain lack of consensus with regard to an understanding and definition of the domain of thinking.

One such categorization, also called dual process account, is the distinction between Type 1 and Type 2 processes, with the former indicating a rapid and intuitive type of thinking, while the latter is taken to comprise more deliberate, slow, and effortful thought processes, for example (Evans, 2008, 2010; Evans & Stanovich, 2013; Minda, 2015, pp. 146–156; Sloman, 1996). A related – but not identical – taxonomy is one that distinguishes thinking under conditions of certainty (e.g., syllogistic reasoning) from thinking under conditions of uncertainty (e.g., heuristic reasoning, cf. Wentura & Frings, 2013, pp. 139–152).

A third – and probably the most common – taxonomy distinguishes between different domains of thinking, most notably differentiating between reasoning, problem solving, judgment, and decision making. In many contemporary accounts, thinking is in fact used synonymously with these individual domains. We will call this class of thinking processes *applied thinking*. Comparably little research, on the other hand, exists on the nature of thinking proper, that is, thinking independent of its instantiation or use in these particular domains. Why is this the case?

Our understanding is that in contemporary accounts of thinking within psychology, thinking is typically seen as a mental activity that deals with tasks in a way that can be instantiated in a psychological paradigm using experiments and theoretical models. These tasks can be both concrete or abstract in nature (e.g., thinking as it is needed to succeed in an intelligence test, resolve a moral dilemma, perform a statistical reasoning task, etc.). The way thinking is understood in these tasks is largely driven by the way thinking

can be operationalized and opened to empirical testing via the methodological toolbox we have available in psychology today. As an example for this orientation toward testable experimentation (using both concrete and abstract thinking), consider the categories that were introduced in a recent review of thinking (Baumeister, Masicampo, & Vohs, 2011): mental simulation, mental practice; anticipating, planning, intending; replaying, interpreting, reflecting on past events; reasoning, deciding, solving problems; mental framing and goal setting; and others. All of these categories indicate components of thinking that revolve around what can be made accessible via the response categories that we use in psychology. Thinking as a research subject thus becomes accessible to the researcher who uses questionnaires, reaction times, eye-movement or neuroimaging data, and the like.

We would describe the facet of thinking that is used in these tasks as its "outer facet" in that it produces results that can be opened up to third-person scrutiny and examination. But there is also another aspect – an inner facet, as we wish to call it – which is equally important but which is not open to third-person inquiry in the standard sense. It is an equally important but often neglected aspect of thinking – as a matter of fact, the phenomenon that thinking is often used synonymously with tasks like judgment, decision making, or problem solving is an expression of the fact that an insight into the inner nature of thinking proper does not exist or has been lost in psychology; and because, in turn, the outer aspect (as it reveals itself in these respective tasks) is instead used in its place.

In this article, we wish to explore the first-person introspective nature of thinking in more detail and thereby seek to expand and enrich our understanding of thinking proper in a way that gives more justice to this important and undervalued skill (Jäkel & Schreiber, 2013).

Our approach is a process account of basic or elementary, conscious and active thinking. It is an account that is grounded in the direct experience of basic types of thinking, that is, in the different qualities of what it is really like to think, and in how our daily experience of thinking is enriched by different processes of thinking. In order to have a clear focus for our inquiries we need to outline what exactly we mean by "thinking" which needs some preliminary training to get started. We will break down thinking into elementary processes that are present in most, if not all types of thinking that were introduced in the preceding paragraphs but that recede out of awareness in the complex interplay of these factors in everyday thinking. What seems to be straightforward and near to us in that it is an activity that we constantly perform is, as a matter of fact, a configuration of complex processes. We will assess some important and basic factors that are present in the different types of thinking in one way or another. This will be achieved by introducing different subphases of the thinking process; and, in turn, by outlining a classification of elementary or basic thinking processes that have at their core a conceptual phase which we call *focused productive conceptual thinking*. The latter is different from applied or creative thinking as it is understood in the traditional psychology of thinking (see above): it is but a slow and effortful type of conscious thinking that eventually may or may not express itself directly in tasks that can be evaluated in third-person research.

We are not interested in mere thought experiments, nor in the characteristics or definitions of thinking as such, but in the direct and trained experience of basic types of thinking and reflection as tools for – and sources of – self-experience. As we see it this is crucial as it is the basis for any conceptualization of the self through the core aspects of autonomous and self-reliant thinking awareness. This is not to say that the self is mainly a thinking process, but that for any detailed account of the inner self as not merely an event but as an active agency, the role of what is often labeled as the entity of "executive control" (e.g., Reisberg, 2016, pp. 173–175) needs to be more carefully elucidated.

This is where our overarching aims for the psychology of the thinking self are placed. In this paper, we seek to lay the theoretical foundation for an experiential form of researching conscious thinking processes; from our perspective, this will eventually enable us to introspectively explore the inner world of human beings, particularly the active thinking self. From our point of view – which will shortly be spelled out more explicitly – the self that makes us human in its deeper sense is not an event or a sum of events that can be observed and researched from the outside; instead, it is an active entity with intentions and various types of attention which are intrinsically connected with conscious and active conceptual thinking. The core of our article will be a first-hand introspective exploration into the thought process, along with a roadmap that we hope will provide an opportunity to connect to and develop our approach further.

The main benefits of our approach thus are: the opening up of a new complementary field of research within psychology with its own methodology – namely the exploration of thinking via the first-person approach of a trained expert; and second, the exploration of phases of the thinking process with its culmination in an active conceptual phase.

Introspection: Major Issues

Inner experiences occur, we are aware of them, we witness them passing by. They absorb our attention but this attention seems to be absorbed into *experiencing* them, there seems to be no spare attention left to *observe* these inner experiences. This differentiation between experience and

observation has been noted throughout the history of introspection and has been discussed at length by pioneers like F. Brentano, E. Husserl, R. Steiner, W. Wundt, O. Külpe, K. Bühler, among others (Boring, 1953; Lyons, 1988).

We have dealt with these issues, particular the Würzburg School, in a separate paper (Hackert & Weger, 2017); The Würzburg School is often seen as the paradigmatic example of failed introspection; however, from our point of view, it is an example of the failed Würzburg approach to introspection, not of introspection in general, for three reasons: (1) the Würzburgers focused on an extended third-person approach rather than a genuine first-person approach; (2) they dealt primarily with contents, not processes of thinking; (3) they did not include training or proper preparation of thinking processes but focused on spontaneous events of thinking after presenting some questions (further discussions can be found in Bitbol & Petitmengin, 2013; Breyer & Gutland, 2016; Hackert & Weger, 2017; Petitmengin, Remillieux, Cahour, & Carter-Thomas, 2013; Weger & Wagemann, 2015a, 2015b).

Observation in the sense of consciously attending to inner experiences needs its own share of attention that seems to be unavailable given that all attention is needed to produce these experiences to begin with. Several methods have thus been proposed to overcome this difficulty, for example, psychophysiological experiments, speaking aloud, or experiencing sampling techniques, micro-interviews, and the like, all with their own drawbacks and benefits.

Using – as opposed to eliminating – introspective experiences means, among other things, to be aware of (a) their frailty, (b) their first-person nature, (c) the retrospective character of the observable facts, and (d) their overall failure to uncover subconscious thinking events.

(a) Frailty means: we do not know if an experience is disturbed or affected by our observation in contrast to our naïve immersion into them. However, such disturbances can also occur with other types of experiences. As a matter of fact, we already know that – and how – they are influenced and affected, otherwise we could not speak of such influences as being a fact. At the very least we can describe the "how" and "when" of these influences quite clearly.

(b) The first-person nature is not a major issue since all experiences, observations, decisions, inferences, reflections, and so forth, are in the end, and in the beginning as well, facts of first-person experience, that is, experiences within our mind. They need to be compared with the results of other researchers; they should be controlled by inner and outer experimentation, by a variation of experimental parameters, and so forth. Only by such research activities is there a chance to overcome unexpected and involuntary biases through expectations, prejudices, and the like.

(c) The retrospective character can be dealt with by repetition of experiments, by shortening the interval between experience and observation/reflection, and by using trained experts.

(d) The fact that there are subconscious, or pre-reflective, event-like thinking processes that inform our conscious thoughts is well established (e.g., Reisberg, 2016, Ch. 14). However, this does not mean that such influences are always present. Moreover, we maintain that by individual practice and training such subconscious or pre-reflective processes can be uncovered and overcome – in a similar way as to how other habits may be overcome (as difficult as this may sometimes be). We assert that as humans beings we are not exposed *in principle* to such subconscious thinking procedures (although this happens most of the time), but that we can exercise actions in which our thinking remains unaffected by events outside our conscious or reflective horizon.

Phases of Thinking and Active Thinking

In this section, we present a first approach to our main topic, namely active thinking and its contextualization within different phases of thinking. We identify thinking in general through a cluster of not necessarily mutually exclusive, nonoverlapping, or sufficient features (see Table 1). These features are the result of an ongoing and long-lasting process of dealing with – and researching – thinking of one of the authors (RZ). This is in effect the result of a recursive research and training process: there are some observations at the outset which are reflected, put into question by ourselves, colleagues, and/or students, and which then lead to the search for more encompassing as well as specific observations that are again questioned, and so forth (see section Cycle of Validation within the chapter Methodological Considerations).

The results of these investigations are not axioms, premises, or rigid hypotheses but rather (disputable) perspectives for focusing on specific types of thinking that we consider important for a first-person empirical psychology of thinking; and possibly for evaluating the self which is involved in this process, as well as the self-awareness that comes with it. We expect that this inquiry will ultimately offer new insights into what may be considered the inner workings of the individual self, its relation to the outside world, and its cognitions as well as processes of self-development.

The first of these features is that thinking in general is a structured process which has an onset, then a consolidation or focused phase; after this, thinking recedes or stops and

Table 1. Features of focused productive conceptual thinking (active thinking). Qualities of active thinking versus common thinking in the sense of a flow of event-like processes (stream of thought)

Focused thinking	Common thinking, thoughts
Process	Event, stream, or burst of events
Focused	Meandering
Gaining insight	Knowledge, propositional techniques
Rule-based	Associative
Consolidated	Preparatory
Active	Passive
Productive	Receptive
Guided	Introductory
Conscious	Subconscious/unconscious
Slow	Fast
Effortful	Intuitive
Individual	Social, communicative
Internal	External
Direct/explicit	Indirect/implicit
Conceptual	Representational, perceptual, emotional, sensorial, volitional
Object	Reference, representation (symbolic, linguistic, auditory)

Note. Within active thinking there again raises the need to differentiate between a receptive and a productive mode which show different aspects of active conceptual thinking.

flows into what we call a post-thinking phase, with thought reverberations, fixed contents, experiences, reflections, and results from the focused phase. The closure of at least some type of focused thinking is a prerequisite for the reflection about the thinking process referred to in this paper because for someone to be able to reflect about something, the relevant facts have to be present to begin with. We cannot think actively and at the same time reflect or think about this activity – both processes cannot happen at the same time. This suggests the possibility that reflection is not the only type of active thinking.

Our main concern in this section is the consolidated or focused phase, namely *focused productive conceptual thinking*. In other words, we concentrate on core or primary features/experiences of this thinking phase – a phase which, as far as we know, has never been studied as such in psychology. Some aspects of other phases and of accompanying or secondary experiences will be considered in the section Embedded Thinking: Embodiment and Ensoulment and later on in more detail.

The focused phase of conceptual thinking is an active process, not an isolated event; it does not happen by itself, it is a guided activity, an intentional awareness of the subject of thinking – in particular of its conceptual relations (for instance, the conceptual relation between a fixed point *M* in a plane and all its points with a fixed distance from *M* – see section Experimental Setup and Training by Example for more on this example). It is productive in the sense of the thinker consciously exploring conceptual relations; it is slow (as a rule, but not necessarily) and effortful rather than fast and intuitive (see the earlier distinction between Type I and Type II processes).

We consider focused productive conceptual thinking, henceforth *active thinking*, mainly within the realm of gaining knowledge about conceptual contents; it might also be found within applied thinking, including the processes of planning and guiding behavior, but this has to be treated separately in more detail.

Note that sensory experiences cannot be understood without a conceptual perspective. This is not the case for thinking, in particular not for active thinking, since this kind of thinking already implies being aware of the conceptual content without any additional activity (Levine, 2011; Pitt, 2011; Siewert, 2011). Otherwise we would not reach any definite insights; this means that any such insights would have to be interpreted with yet additional concepts which again are in need of interpretation, and so forth – an infinite regress of understanding.

It will be clear by now that we exclude from the consolidated phase of active thinking any kind of memory (representational, propositional, procedural, narrative), perceptions, illusions, intuitions, emotions, volitions, and so forth. This is not to say that these cannot or will not happen during thinking, as a kind of accompanying experience. But, if they occur at all, they do not replace or interrupt the thinking process but rather happen somewhere in the back- or side-ground of the actively thinking mind. Or the other way round: We concentrate on those active thinking processes or phases (as short as they may be) that are not interrupted or replaced by the above-mentioned events.

From a methodological perspective, our main purpose of gaining theoretical insight by direct experiential access to the steps involved in elementary thinking processes has few points of contact with the classical psychology of (applied) thinking, and of the psychology of problem solving in particular.

First, the latter is examined by a third-person approach, focusing on (hidden) mechanisms and inducing capabilities by external triggers.

Second, the discussed problems are of a practical nature whereas our focus is on theoretical insight or understanding without reference either to possible applications or to subconscious mechanisms.

Third, concerning subconscious mechanisms, two things are of note in addition to what has been said above: in focusing on active, not event-like conceptual thinking processes, all there is to consider is that which is present and grasped by this activity; in addition, there is the intrinsic logic of the content of conceptual thinking that leads our activity – our thinking mind – and which does not depend

on anything outside of it. For instance, when dealing with elementary arithmetic or geometry, we come to the conclusion that there is no space for doubt as to whether an inference is true or not. Actively working with these examples is sufficient to rule out the claim that there are inevitably and *always* unknown subconscious processes that inform our thought content.

Fourth, we are examining elementary or basic processes, not complex interactions of multifaceted factors. However, we claim that the processes analyzed below all contribute in a fundamental way to what eventually turns out as applied thinking.

Embedded Thinking: Embodiment and Ensoulment

Active thinking is produced by embodied persons. In speaking of a "person" who is thinking we speak of a being which encompasses all actual and possible facets of experience we have or may have. Taking into account that thinking permeates our whole life ("Lebenswelt") and every aspect of our personality, we do not want to a priori channel our observations into specific facts or domains but keep the scope of inquiry as broad as possible and necessary.

There is no restriction to sensory, material, or measurable events, either in the sense of ontological or of methodological naturalism. We take the appearances as they are, conceptualize and relate them without reducing them in one way or another to some singled-out kind of acceptable facts. This implies once again that we do not limit ourselves to a third-person perspective but make use of a first-person perspective as well. This broad approach is necessary in order to explore the space where thinking happens – otherwise we might miss something due to a limited perspective. In the following, some important aspects of this broad perspective are highlighted.

Thinking and Brain Function

Active thinking is surely associated with a functioning brain. However, a functioning brain is not sufficient to produce thinking; there are many periods in the life of a functioning brain where no active thinking occurs. On the other hand, if the brain is damaged, in most (but not all types of damages), active thinking does not take place. From these observations it follows that: the brain is a necessary, but not a sufficient condition for thinking (Majorek, 2012; Weger & Edelhauser, 2014). It enables thinking but does not cause or determine it. This is corroborated by the fact that in conceptual thinking no explicit use is made of neurological facts or processes.

To illustrate: in order to explain the conceptual content of different types of causal relations, or of the arithmetical expression $9 = 2 + 7$, one does not need to take into account neurological laws or some specific results from neurological experiments – at least nobody has shown up to now that such a thing is necessary in order to understand these concepts. Otherwise, any systematic, analytic, coherent, and conceptually consistent philosophical or mathematical paper or book would need a basic chapter on neurology in order to be conceptually complete and understandable in its logical content. In addition, any neurological law is a law exactly because of the conceptual structure, hence it presupposes the conceptual realm (Ziegler, 2004).

Perception

Perceiving and perceptions are not main topics in this paper. However, in order to contrast them with conceiving and with conceptions, respectively, a few things need to be mentioned. First, there is the constant flow of perceptions in conscious life. They build clusters around something we may call mental objects. The different shades of a tree observed during daylight versus at night, still belong to the same mental object "tree." These impressions come and go and are the basis, the common ground of further experiences regarding the tree, in particular emotions and volitions. That is, these impressions are enhanced and accompanied by or associated with a second flow of experiences they induce and to which they are intimately related: emotions, volitions, memories, imaginations, intuitions, mental representations. They share with the first, the perceptions (which we call *primary* experiences) an event-like character: they happen to us without direct active involvement.

Types of Events

However, the second flow does not happen by itself, but is, as a rule, induced or triggered by the first: an emotion is tied to a perception (of an object of nature: we enjoy trees, we are angry at a human being). The same is true for volitions (we would like to touch the tree), memories (situations with other trees might pop up), and so forth – hence they might be called *secondary* experiences. Secondary means slightly later (in most cases) relative to the primary ones within the stream of conscious events. Sometimes they are also called (passive or receptive) "inner" experiences in contrast to the "outer" experiences of perceptions. These encompass many thought-like events (i.e., intuitions, knowledge, propositional representations) which might be copresent with primary experiences but do not belong to the realm of active thinking, although the latter is induced in

many cases by some content from the primary or secondary flow of experiences. However, active thinking does not appear in the way the events from both of these streams do but needs to be initiated and activated in order to be present.

Ensoulment

The concept of embodiment is well researched in philosophy and psychology. However, we are not aware of any parallel concept of *ensoulment* which seems to us at least as important as embodiment, particularly for a deeper understanding of the thinking process and its different phases (see section Basic Phases of Thinking). Hence, in addition to the well-known concept of embodiment that captures many facets of thinking related to body functions in the broadest sense, we introduce the concept of *ensoulment* to denote certain classes of inner experiences such as emotions, volitions, and mental representations that come along with thinking, that accompany it without being identical with it and, if thinking is strong enough, do not interfere with it. Hence, "ensoulment" does not point to any "esoteric" facts or feelings beyond our reach but to down-to-earth, everyday experiences – it encompasses important portions of our inner life which are as accessible to our experience as any kind of embodied process of the conscious mind.

Ensoulment may have far-reaching consequences for psychological aspects of anthropology and the philosophy of mind if one is able to discern in a sufficiently clear manner soul-type processes from thinking processes as well as from embodied processes. We do not want to say that soul-like processes are not embodied in some general sense; however, they may be embodied at a different, more indirect level. In this paper, the distinctive features of embodied and ensouled events do not depend on the specification of physiological or any kind of material process; they are psychological in the sense of empirical insights by introspection.

Knowledge and Mental Representation

Important further conceptual factors also belong to ensoulment and come along with perceptions (or are at least copresent with them): different types of memories, intuitions, and all kinds of other types of mental representations associated with perceptions. We mentioned them already earlier in this section in the discussion of the primary (perceptions) and secondary (emotions, volitions, etc.) streams of inner event-like experiences. We need to consider them a little more deeply, since they are closely connected to – and easily mistaken for – what we consider as active thinking, our main subject in this paper.

There are two main differences between the concept of knowledge, in particular in the form of mental representations, and active thinking. The first difference between knowledge and active thinking concerns the content and the second the process or form of appearance. First, these kinds of representations (we know what a tree is/looks like, we remember having seen other trees, we envision imaginary trees, etc.) are as such finished, closed, and definitive as long as they are not replaced by other such events – or by active thinking. This closure means that we take them spontaneously to be true or not true (and additionally we might like them or not). Without activating a thinking process we cannot judge (in contrast to believing) them ourselves as being true or not – we have simply to take them as they appear to us (we know what a tree is, but the question if the cluster of perceptions we experience in this moment really shows a genuine tree or a perfect 3D plaster model needs further investigations than just to acknowledge the spontaneous fact).

In the context of concepts of philosophy of science, one talks of the fact that perceptions are theory-laden, that they are not neutral in relation to theoretical knowledge. This knowledge is inherent in – and copresent with – how we experience perceptions and cannot be separated from them, although differentiated from their content proper (Siewert, 2011; Strawson, 2011). Some kind of passive synthesis of perceptive events happens in our mind, depending on our earlier experiences, prejudices, theories, outlooks, and so forth. This can best be seen with well-known ambiguous figures (old woman/young woman, duck/rabbit, Necker cube). In these cases, different types of theoretical knowledge, perspectives, or prejudices bring about one or the other type of experience. However, they oscillate on the basis of a constant perceptual experience while the conceptual representation varies; the former may then be further analyzed according to the conceptual and perceptual components. The important fact to bear in mind is the insight that neither the perceptual nor the conceptual content can be reduced to the other one or eliminated altogether without losing sight of what we actually experience.

We remind the reader that knowledge and/or mental representations encompass a whole spectrum of contents that vary between concrete visual images (or images of another sensory modality) and imageless abstract thoughts, propositions, information, and so forth. All of them have a conceptual component ("This shape is a disk") which takes up the whole content in abstract thoughts (like "All humans are mortal," "Full moons have the shape of disks"). In most, though not all, cases they have a perceptual or imaginative graphic component, the qualities of which depend on the copresence with perceptions they are linked to or on their independence of them (as in mental representations proper).

To sum up, knowledge is fixed or closed up whether it is abstract or imaginative.

Knowledge and Focused Productive Conceptual Thinking (Active Thinking)

The second difference between knowledge and active thinking concerns the specific type of appearance in which they come about. Knowledge (including spontaneous memories, intuitions, spontaneous imaginations, mental representations, etc.) effectively just "appears"; we are overcome or overrun by it, we do not trigger or regulate it directly. However, indirectly we may be able to take charge of it: we may expose ourselves to situations or processes that stir up, enhance, and induce the popping-up of such knowledge which nevertheless appears (or not) without further active involvement from us. In contrast, active focused conceptual thinking might be induced by many kinds of experiences, but never appears by itself. The necessary condition of presenting itself, the *conditio sine qua non*, is our activity, our agency, our active focusing on conceptual relations.

Knowledge is of a two-sided relevance to thinking. On the one hand, knowledge provides the material to start with, the theories to be challenged, the results of earlier research to build upon. On the other hand, it encompasses all kinds of fixed traditions and paradigms, ideologies, automated argumentations, prejudices, and so forth. In other words, we cannot do without knowledge but we have to leave it behind if we want to conduct original research on active thinking and be individually responsible for it.

Experimental Setup and Training by Example

The quality of thinking we are exploring – active focused conceptual thinking – is part of our daily experiential life but often gets lost in the many events that pass by. In order to have a specific mental object, we need to produce it, bring it to our attention through our own activity. In other words, we need to set up an inner form of experimentation which can serve as our starting point for the reflection *about* such thinking. In other words, we need some elementary and repeated training in order to have a reasonable variety of "materials" to reflect on; hence, several kinds of thinking activities will be explored. Ultimately, we seek to explore the conscious conceptual source, the formative or structural force that gives shape to something in our active mind.

The *training* thus has three aims: first to enrich and deepen the experience of active thinking; second to enhance the awareness toward the characterization of the different phases of the thinking process; and third to learn to conceptualize these subtle processes.

Experimental Setup

We will consider an example and explore the interplay between knowledge (or mental representations) and conceptual thinking extensively. Both authors went through this exercise, or parts of it, several times and one of us (RZ) has been working on this for many years, with different students in workshops and seminars. We have redone it repeatedly for the purpose of this paper and summarize our explorations below. In effect, this means that the content of the following narrative went through several cycles of inner observations, reflections, communications, summaries, reworking, repetitions, individual judgments, and renewed observations. However, in this section, we stay as close as possible to our direct experiences and take up methodological and conceptual reflections in the sections Basic Phases of Thinking and Methodological Considerations.

For the setup we chose a quiet place where we could sit comfortably, but not too cozy in order to easily stay awake. We were aware of the bodily environment, comprising sounds, light effects (even with closed eyes), sensory experiences of the body itself, such as warmth, feeling healthy, and so forth. All this would accompany our further adventures and may come to the foreground or stay in the background depending on how strong they are and how dedicated we focus on our subject.

Example: Circle

Seeing, drawing, or building a circular figure in one's mind (e.g., a disk) triggers a range of inner experiences: intuitions of what a circle is (i.e., its definition), memories from earlier similar experiences (i.e., from earlier meditations on this subject or from elementary school textbooks), feelings of excitement, anger, or boredom. These are all in close connection with what we think a circle is or looks like. But during the following process, other things might pop up and thus interfere with what we want to do: distant memories, the grocery list for late afternoon, plans for the coming evening or weekend, phantasies, and so forth. To stay afloat of this receptive stream of inner experiences we have to repeatedly take up the effort to stick to our purpose of exploring the circle and nothing else.

Fixed Shapes

An ideal starting point is to attend to a circular shape that is around us (a watch, coin, cup, plate, etc.). Once we are

aware of it, many more will show up and can be included in our exploratory survey. If we concentrate on one or more of them for a while, we may close our eyes (or look in a different direction at a neutral place: a white wall, an open sky) and remember them. At this point, the mental picture varies widely from person to person or from moment to moment: some have vivid, colorful, exact imaginations, others just know that there was a circle – and everything in between. The important observation here is that we all deal with some kind of fixed shape, some definite object with a circular boundary.

To be sure, to maintain this circular object, namely one particular instantiation of a circle as a mental representation, is quite a challenge to begin with. The circle may move around by itself, change its form (losing the circular shape), disappear altogether. In trying to keep it straight in our mind, we realize that this does not happen by itself. And once we succeed in producing one, it may even disappear again immediately. This production might take the form of an inner drawing with imagined light traces and/or colors, conducted with or without an imaginary hand, pen, or brush. The light trace has the tendency to fade away right before the whole circle is finished such that we have to do it over and over again.

In staying with this particular mental circle which we memorize or imagine, we feel safe, we know what it is, there are no open questions, no uncertainties (in this respect). For this state of mind, we do not need to know in detail what a circle is mathematically, it suffices to know what it looks like. A deeper knowledge of what a circle might be lingers in the background of our mind but does not have to be tapped into for the time being.

It is not obvious to decide where to position the imagined circle: in front of the head, around our body horizontally or vertically (left-right symmetry plane or the plane separating front and back). To have it sideways, above the head, below the feet, oblique, or even in the back is more difficult if not outright impossible. It might feel more relaxed or body-centered if we position the midpoint of the circle somewhere within ourselves, for example, within the left-right symmetry plane. Then it might be easier to produce a mental image of a circle by tracing it with our imagined arm/hand – even by helping with a movement of our real hand.

Variation of Shapes

It is important to take another step here in order to have direct insight into the variety of the active performance of conceptual thinking processes. This brings us more and more to experience what it is like to think actively. The main goal is to unearth, to "unbody," and to "unsoul" the pure conceptual content that governs all this variation as an intrinsic feature.

Taking our explorative adventure one step further, we start deliberately moving or varying the circle. This can be done in several ways and exploring some of them is part of the experience we try to convey. First, we might move the circle or disk within its initial plane, either changing the position or the radius (or, equivalently, the curvature). Second, keeping the center fixed and varying the radius is a particularly characteristic movement: It might turn out to be difficult to sustain the movement and the shape of the circles within the plane, but eventually one gains a feeling of the outward or inward flow of circles. They emerge from – or eventually disappear into – this point respectively. Third, if one moves the center of a circle with a fixed radius along a line in space, a cylinder appears. Fourth, the same circle produces a torus (shape of a bagel) if it is rotated around a line within its plane and not intersecting it.

We now concentrate on the flow of expanding or contracting circles that hold a fixed center and a fixed plane. This might take up quite an effort to keep going. We might fall out of the process several times and need to retry repeatedly. Our attempt is unlikely to be immediately successful. We might even lose our inner sense of orientation and experience a slight vertigo. Eventually this process stops by some distraction and throws us back to the beginning of the ongoing movement. If we can overcome this and start to be comfortable with such an ongoing movement, stay calmly within it for a while (i.e., not zapping in or out or between one direction of moving to another), we may turn the situation around: if the process of moving the circle becomes primordial, the fixed circle will show up as a product of it, namely as an offspring that occurs if we deliberately halt the process or sort out fixed circles while keeping the expanding or extracting process going.

This is a very different situation from before: Circles with a fixed radius are now products of an origin we are keenly aware of: they do not pop up out of nowhere but are products we shape. We do have to take them for granted and we make them appear. Our consciousness of them has changed from a receptive to a productive mode.

From Shapes to Concepts

A further step can be taken in the following way. Up until now we have not explicated what we understand by "circle." We left it to the reader to expand on this. However, having been educated in a regular school system, we know what a circle is. This means that there was no intrinsic necessity to elaborate on the concept of a circle. This is an important observation since we are now going to delve

into an experience where it turns out to be inevitable to direct our attention to this concept.

In a next step, we broaden our attention from just making the flow happen to observing its structure, the conceptual condition of existence. The focus is not on our merely doing this process but on *how* we are doing it: on the structural prerequisites. To stick to our experiences before speculating about possible theoretical prerequisites, we may realize that living in the flow mentioned above there is something that does not flow or move, something that is beyond any kind of spatial or temporal movement and thus invariant. We do not mean the fixed center of the circle which can be moved around in the plane, or the plane itself that can be shuffled within space. As a matter of fact, nothing within space or time needs to be fixed during the movement of the circles.

Instead, the invariant we are looking for is the *conditio sine qua non* of moving circles: it is not *a* circle but *the* circle. Before we appreciate the need to make this invariant explicit conceptually, something more might show up, namely an inner sense of opening up to the universality, to the huge potential of this invariant, its inherent quality: it is the one formative source of all circular shapes, the universal ingredient within all special circles. Taking into account this invariant as an experience of what *the* circle enshrines (not simply as a reflection), it has an intense quality: its forceful potential goes beyond all mental representations or images of any circle, it transcends space and time, it cannot be found in any specific place or peculiar time point.

Breaking it down to the conceptual content, this invariant turns out to be very simple if we consider one possible definition: a circle is a configuration of points in a plane where all points have the same distance from a fixed point within this plane. The distance is called *radius* and the fixed point *center*. Comparing this conceptual content with the dense and varied experience of the flow of circles, or with the universal quality of the circle mentioned above, it seems rather abstract, detached, or disengaged. On the other hand, it comprises an important aspect of what we understand by a circle and hence it is conceptually concrete or specific.

We are not only dealing with an invariance of the concept circle itself, regarding its content (i.e., not the circle but its representations move in space and time), but also with an invariance with respect to our thinking process: thinking does not affect or vary its content; on the contrary, active thinking reveals the intrinsic relationship with all relevant components as well as with other concepts during such a thinking process.

Variation of Concepts

This brings up the issue of different definitions of the circle in addition to the earlier one. One can define a circle as a closed curve with a constant curvature within a plane. This reveals that there are different perspectives on a circle, focusing on different aspects of the overall conceptual structure. They are all related to each other and their equivalence can be proven mathematically in the sense that they comprise the same configuration (set) of points. Although both involve active thinking, the conceptual realm, that is, the conceptual structure proper, and the realm of mental representations are fundamentally different. The focus of the thinking activity points to different realities.

The first reality, the conceptual realm, involves variations of perspectives: we do not and cannot change deliberately any of the intrinsic relations, they are as they appear, otherwise they lose their comprehensibility, their inner necessity, their self-reliance. What we vary conceptually is our perspective on them, not their content proper: we come to realize other relations and/or additional conceptual structures. In other words, through thinking we survey different conceptual possibilities according to their own content, we approach them without creating them, we discover them by our active involvement.

Hence, within pure conceptual variations there is no continuity, no transformation that metamorphoses one concept continuously into another: the elements of conceptual relations and – these relations themselves – are distinct and discrete. To relate them means to become aware of their intrinsic partnership, their relational structure, their own potential of connection.

On the other hand, variations of mental representations of a circle are, within the conceptual constraints of the relevant definition of a circle, deliberate: We can mentally represent any combination of these parameters as we like, namely the position of the plane, the position of the center within this plane as well as the length of the radius. And: To arrive at a specific circle, we ourselves have – and are able to – choose the parameters: there is no constraint, no external power that tells us what to do. We are on our own; we can play around. And it works in a way such that any combination of the parameters can be transformed continuously in any other combination by varying these parameters continuously. In short, conceptual variations are variations of perspective and variations of mental representations are variations of content. This distinction and additional excursion is important at this point because it makes explicit one of the fundamental differences between concepts/ideas and mental representations.

Basic Phases of Thinking

Before we delve into the results from the introspective experiment, we need to narrow our perspective on thinking

in order to differentiate our main focus, active thinking, from other types of thinking. This will be done by characterizing different phases of thinking of which active thinking is but one of several basic components.

Environment of Thinking

What is the environment, the experiential space, in which active thinking takes place? From the perspective of first-person introspection we need to take into account two streams of events which are interrelated with each other (Embedded Thinking: Embodiment and Ensoulment). The first consists of perceptions, including all kinds of bodily sensations. This is the basis of our experiential life. Perceptions are coming and going, they are tied to our body, to our senses; we might call this part of the environment *embodiment*. Their content might vary according to the functioning of our body (hearing impairments, color blindness) but these components are clearly distinct from what we experience as our body-centered self (except in the case that we experience our own body). However, as a rule, *we* are aware that we have these experiences *in* our body at this place and time, not someone else, and not at some other place, respectively.

We are aware that we know spontaneously, not by inference, what it is that we perceive (at least to some extent) and that we have emotions and volitions coming along with these events. But these additional event-like experiences, although they appear directly related to the perceptual content, are something of their own which can be clearly differentiated (not: separated) from the perception proper: they have their own experiential content and they outlast to some extent the presence of the perception that occasioned them. This non-inferential intrinsic knowledge, along with the emotions and volitions, composes what we earlier called the secondary stream of events. This additional stream is triggered by, or dependent on, the first stream: any event of this second stream is experientially (not by inference or reflection) related to events from the first stream and in most cases perseveres the presence of the latter. However, not all events from the first or perceptive stream are accompanied by events from the second stream: some such events might disappear before we may experience a relation to them in the sense of having some knowledge, emotions, or volitions. These are the reasons why we called the first of these streams the *primary* stream and the other the *secondary*. This does not reflect an evaluation but a sequence of appearances and a difference in content. We may say that perceptions are evaluated and embedded in the context or milieu of emotions, volitions as well as of knowledge and theories; this is exactly what we mean by ensoulment – the second environment of the active thinking process.

Embodiment and ensoulment, the primary and the secondary streams of events, have been characterized in detail before. In this and the coming section, we concentrate on active thinking and on some further characteristics that allow us to differentiate between these streams of events and this kind of thinking, namely by referring to different kinds of pre-reflective facts and additional modes of reflection.

Focused Productive Conceptual Thinking (Active Thinking)

From the perspective of the basic phases of thinking we now come to the qualities of focused and productive conceptual thinking, namely the primary active process itself. Next, this process will be differentiated from its products (see sections Post-Productive Traces and Analogy), and then from the results of the reflective actions that are based on these experiences (see sections Reflection of Tertiary Events and Concepts or Ideas; columns 4, 5, and 6, respectively in Table 2), as well as from other types of active thinking (see section From Prejudices to Presence).

For the description of the focused productive conceptual period of thinking we concentrate on the phase where pure conceptual relations are in our active mind since this is the core of all further thinking activities. In this concentrated active conceptual period, direct (non-reflective and non-inferential) insight into elementary conceptual relations is the main characteristic feature. We are not reflecting about these relations but *are involved in* discovering them. We are not constructing them, but bringing them into experiential existence. Our awareness of them depends on our thinking performance: as soon as it stops (or before it started), there is no insight, no clarity in our performance. We might say that in this period we live in these relations, there is nothing else on our horizon (although the primary and secondary streams of events are still there, but remain in the back- or side-ground of our attentional focus). These insights are original in the sense of being present, they do not depend on knowledge from before or beyond this presence. They need not be new in the sense that we never experienced them before. To be copresent with them and having insight into them mean that we do not know in this moment that we were involved with them at some earlier time. The immediate involvement means that we as thinking minds are in unity with them, are within them – there is no basic separation between them and us.

All this happens in a pre-reflective mode of direct (although slow) and immediate – not necessarily instantaneous – insight. We do not want to say that outside of active conceptual thinking there is no clarity or insight. But we

Table 2. Basic phases of thinking

	Enablement			Enrichment		
Processes and actions	Stream of events: preliminary and accompanying (copresent) experiences of thinking		Focused and productive: core experiences of active thinking	Having knowledge of focused productive thinking	Reflection and cognition of focused productive thinking	Extended reflection and cognition, meta-reflection
Types of events	*Embodiment*: body environment, primary events	*Ensoulment*: soul environment, secondary events	*Pro-actment*: actions by agency	*Ensoulment*: tertiary events from actions	*Reflection*: cognitive treatment of tertiary events	*Extended reflection*: cognitive treatment of all kinds of nonconceptual experiences
Features	Sense perception	Receptive	Productive	Receptive	Productive results	Productive results
	Body sensation	Emotional	Dedicated	Attentive	Dedication	Dedication
		Volitional	Intentional	Watchful	Carefulness	Carefulness
		Thoughtful	Thinking	Expecting	Anticipation	Anticipation
		Knowledge	Pre-reflective	Thoughtful	Summary	Summary
		Pre-judicial	Judging	Experienced knowledge	Cognition	Cognition
		Representing	Presence	Post-judicial	Presence	Presence
Types of encounters	Receptive encounter	Receptive encounter	Active encounter	Presence of traces, marks, footprints	Active encounter with tertiary events	Active encounter with nonconceptual experiences

focus here on *performative* or *procedural* clarity or insight that results from our direct, present involvement.

Timelessness and Spacelessness

The fact that this happens within time, with a definite beginning and an end, and within space (through embodiment), is not part of *this* experience but already a reflection about it. On the contrary, acting *within* conceptual relations, producing them in the sense of revealing, and discovering them is an experience of timeless thought, of conceptual relations with no indication of time-dependence or space-like features. They are as they appear, enabled through our activity; we may change our perspective of them but we cannot change them as such – and they show no change or variation by themselves: they are, in short, *within* our direct active experience, beyond space and time. Likewise, our own activity has no time-like feature as long as it endures without pause or interruption; although we are wandering around in the conceptual realm, "before" and "after" have no significance, that is, they have no experiential impact here.

Post-Productive Traces

As soon as this process ends, our primary and secondary streams of events appear as enriched by products (and later by memories) of the preceding process. For example, we know the subject we thought about, we remember what it was like to think, we are aware of the fast or slow quality of the past thinking process, we remember that we were involved intensively, and so forth. These may be called traces or footprints of the active thinking process. They outlast the active phase for a while before they themselves fade away; however, they may be – partly – remembered afterwards. They constitute themselves as a kind of memory from the foregoing process. They are there without us having directly produced them in any direct and conscious way. That is, we did not hold on to some experience *during* the active phase of thinking in order to have them around *after* this phase. But they are there, whether we want them or not. And they are not the product of some reflections or inferences – on the contrary: they are the precondition for any kind of reflection *about* our thinking process. They constitute the material, the facts, the events, the products to think about in order to gain insight into what happened during active thinking in the period before. We call them *tertiary events*.

Analogy

We hope the following analogy will illustrate what we are talking about – and will make it clear that we are not

speaking about an extraordinary event or phenomenon but about something which is in fact close to our everyday life. If we have the chance to sit in a closed room with only one strong and uniform color (say, magenta), and then leave it after some minutes, looking into a neutral, white, or light gray space, we see everything in a uniform, but different color (viz. green); this is called an experience of successive contrast, a *physiological afterimage*. Two things can be observed: first, the second color is seen only after we leave the experience of the first one; and second, the after-color appears without us having consciously and directly prepared to produce it. It happens without our direct interference. However, we prepared ourselves for this experience in the first place by exposing ourselves directly to the first color and second by deliberately leaving this first experience to open up for the second one by looking at a neutral space. In other words, we *indirectly* enabled ourselves to experience this second color.

This is in nearly perfect analogy of what we do in order to experience the traces of our active thinking process. This analogy can make us aware of some important constitutive processes of active thinking that otherwise escape our attention. Hence, we explicate it here in some detail as a preparation for our subsequent reflection. The whole sequence of different phases of active thinking begins by entering an active conceptual experience through focused productive conceptual thinking, without looking back at where we came from; then the thinking process continues by keeping this active process going for a while, stopping it and then, in a neutral mode, letting the experiences, namely the post-productive traces, spring, or dribble out of the foregoing process without delving immediately into the next adventure and thus losing sight of this new string of events. We do not produce these traces, which might be called *psychological afterimages*, by direct conscious actions; instead, they happen to us. We did not prepare our body and our soul to be able to do this: they perform this task without asking us to do it – there is no way to avoid it, in the same way as there is no way to avoid physiological afterimages: they are part of our mind-body constitution.

However, these traces would not have been there if we were not involved in the foregoing thinking process in the first place. They do not happen as such (as other primary or secondary events), but are the consequence, the successive receptive contrasts, of our active thinking process. They are new with respect to their content, but they are nevertheless events in the earlier sense. Hence, this constitutes a new stream of events, adding its specific content to the first two. As such it will be subject to soul-like features such as emotions ("what a wonderful thinking process"), volitions ("I would like to do this again later") – and knowledge: ensoulment also applies to tertiary events. This last observation concerning knowledge is significant: tertiary events also come with the intrinsic knowledge of stemming from our own thinking process, not from someone else's, or from any unknown source; they are specific, we know their content, they are informative enough to reflect about them in a fruitful way; they encompass information about what we thought about, how we thought, what turns our thinking process took.

Reflection of Tertiary Events

Everything we say about the characteristics of the active thinking process is based on these tertiary events and their reflection. Reflection here means the same as in the case of reflection about perceptions: describing them, conceptualizing them, finding their structure, relating them, summarizing the results, building a theory based on these facts. Reflection about tertiary events or about active thinking is a reflection in the most elementary form; it is not a meta-reflection, since active thinking in the sense of thinking within concepts is no reflection itself (see above).

For the reflection process we need to know what we are looking for and what not. We are *not* looking for remnants of conceptual contents in order to decide what we thought about or what their specific contents and relationships have been. We did that already and need not repeat it. If there is something unclear, or not sufficiently thought through, then the thinking process was not complete in the first place and hence has to be revived to come to clarity. But this is not what reflection of active thinking is about; reflection presupposes a clear and active thinking. We need to reflect upon *how* did it, not what we were we thinking about. With this perspective we focus on the traces or memories from the productive thinking phase. For example, we know that we thought about the concept "circle," that we related intrinsic components together, that we experienced a web of relations, and so forth. In a next step, we conceptualize the experiences within these tertiary events and summarize them (this is nothing new if we know how scientific thinking works).

Concepts or Ideas

In active thinking, concepts or ideas are encountered, they disclose the relations of their components as well as (some of) their relations to other concepts. They are embedded in a constellation of relations that has its own necessity, consistency, and bond (Tewes, 2015). The constellation of relations is not something like a knowledge web or its representation in a brain-related network model. Concepts or ideas, in the current sense, are entities that are present in

our conscious mind by active focused conceptual thinking and are as such not dependent on their possible instantiation and/or representation in a brain-based network.

Concepts are timeless and without spatial features; they are *invariant* with respect to our productive thinking and invariant within themselves: they show no change over time – changing concepts or ideas merely demonstrate changing perspectives over time within our personal thinking history or within the general history of ideas. Thinking a concept means having insight into the inner and outer structure, having *clarity* in what it encompasses, without inference and reflection (the latter might play a role in *finding* the conceptual relations that in the end are experienced as crystal clear). Concepts are *units* with a clear extent (no fuzzy or continuous boundary); they are not sums of their components, but are *irreducible* with respect to other domains of experience. Within the network of concepts, they are *discrete* and individual entities, they are specific in the sense of having their *own content* discernible and distinct from any other conceptual, or perceptive, content. Hence, concepts are very much *concrete* within active thinking. Concepts might also be called *pure* with respect to their non-sensory-perceptive content as well as with respect to their sole presence as an expression of our activity. Concepts in the current sense do not pop up by themselves, are not part of any stream of events: they are the ongoing product of action; they reveal themselves through our enduring productive insight and drop out from (in-)sight with respect to their inner necessity, consistency, and bond, as soon as this activity comes to an end. Afterwards they become what we described as *abstract knowledge*: we know what we thought about, we know their content but are not in the position any more to judge their consistency, conceptual truth, and coherent embedding into the web of concepts.

Often, concepts themselves are called *abstract* with respect to the concrete situations they are applied to, since they do not share time-like and/or space-like features with their field of application. They appear as something in themselves, beyond or separate from this concrete realm. They have no auditory, graphic, or olfactory and so forth, components, encompass no images; they are totally detached from perceptions.

From Prejudices to Presence

One of the main strengths of productive thinking is its capacity to overcome fixed knowledge and prejudices as well as presuppositions in certain theory-laden experiences. Note that we are concerned here primarily with cognition-like processes; in behavioral settings, overcoming (social) stereotypes might be much harder and is not considered here. In addition, we do not want to suggest that after some training all prejudices are gone; on the contrary, new ones might pop up – but the potential of overcoming them is always present, if applied or not, if successful or not.

Concepts can be applied to events. We can vary our perspectives to get into direct contact with the perceptive, or more generally, with the experiential (non-inferential and pre-reflective) sensory facts without being blocked by previous knowledge, prejudices, and so forth. In assessing concepts directly, leaving old convictions aside, or circumventing them, we are able to have a fresh look and conceptualize the situation anew. By this process we disentangle our mental representations and we unravel copresent knowledge from the facts they refer to (or have been referring to).

To illustrate, consider the well-known ambiguous pictures such as the duck/rabbit or the young/old woman example. The sensory input is the same in both cases; in order to interpret these invariant sensory facts with different perspectives deliberately, we need to apply different concepts (viz. with respect to the young/old woman: a round and smooth profile from behind vs. caricaturesque, edged and rough features in front). We do not need to wait until the "picture" changes by itself: by consciously applying one bundle of concepts or the other, we can change what we "see." It might be important to note, that the preceding prejudice (or simply the other one) need not disappear altogether to make place for the new one. In order to overcome it, we need to look "through" it, toward the pure sensory facts in order to "see" *them* differently, in a different conceptual perspective.

That is, we are able to overcome and refresh earlier reflections, inferences, and theories and gain insight from experiences that are down-to-earth at the bottom of this experience, at the current time and space. In other words: We are more often than not prejudiced; however, we are *not* inevitably slaves of our prejudices, nor of other kinds of acquired knowledge. We are able, or at least have the capacity, to go back to the roots of every experience without having to be skeptic about cognition in general.

Summary: Basic Phases of Thinking

We now wish to summarize important features concerning the basic phases of thinking discussed so far (see Table 2) and will also make some final points. We remind the reader once more that we do not filter out any particular facts or concepts but include as many aspects, features, facets, and dimensions of human nature as we possibly can. There is no restriction whatsoever as to the kinds of experiences we have or admit, on the methods of exploration or on empirical facts of whichever provenance.

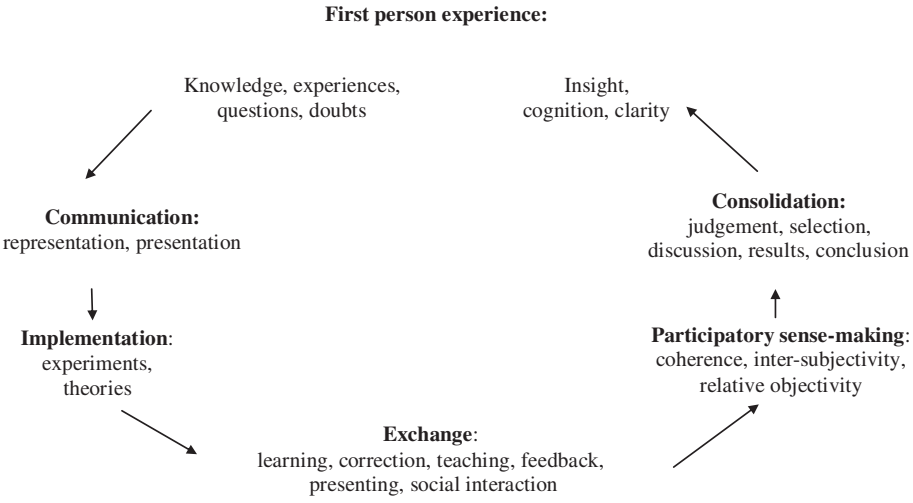

Figure 1. Cycle of validation.

The bodily environment, or *embodiment*, allows us to live and enables us to experience and nurture our basic needs upon which thinking happens. Thinking occurs in this context in a restricted sense as an event-like process with its most characteristic feature being the constant shifting of attention by outer stimuli; in addition, we have some naïve knowledge about what is happening. However, reflection about these *primary events* has no part in this, is not such an event itself, but an activity.

The *psychological environment* of the psyché or soul encompasses further events that are occasioned by the primary events, namely the *secondary events* that constitute *ensoulment*. It is part of the enablement of thinking in several aspects: it contains the material we think about most of the time, it encompasses very elementary and subdued forms of thinking, particularly having and combining thoughts in the sense of fixed knowledge; and it gives us the experiential basis, the environment for staying involved in the active focused conceptual process together with the embodiment. With respect to the active thinking process proper, namely focused productive conceptual thinking, these are preliminary and/or accompanying experiences surrounding this kind of thinking. After ending it we fall back into this environment again, enriched by what we experienced during it. Naturally, active reflection about these events is not an event itself and thus belongs not to these streams as long as it is present.

As soon as we make *active thinking* happen, this enables us to take up conceptual relations to be present and to be varied. These are actions by an agency, namely ourselves, an enactment in contrast to embodiment or ensoulment. Since "enactment" is already in use for a somewhat different purpose, we rather call this *pro-actment* to mark the fundamental shift in attention, effort, and focus this kind of thinking involves. One of the main features of active thinking is the encounter with timeless thoughts that may be viewed from different conceptual perspectives and thus be varied but do not show any disposition either to be bent by us or to change by their own means.

The last basic phases of the thinking process we discussed here consisted first of a *reflection on the traces of knowledge* that appeared after the active part of conceptualizing, that is, after the building process of concepts comes to an end, and, second, of a meta-reflection about this reflection.

Enrichment Through Active Thinking

We want to point out to the reader that active thinking enriches the self and hence our consciousness of it on a much more encompassing level than event-like thinking processes. The latter are part of our embodied experience, but they do not leave many discernible and specific traces in our mind, since they are of the same quality as everyday consciousness consisting of vast amounts of events and depending on the occurrence of other events. On the other hand, active thinking has a beginning and an end, it is not the direct effect of some event-like cause, although an event might have induced it. It needs to be done, it does not happen by itself, it flows out of our self, and afterwards, our inner world, our active self, is not the same as before: it is enriched by experiences that were not there before, namely *tertiary events*. This experience encompasses traces of our active involvement, our inner attention as well as the quality of our thinking process. They are not easily discernible from the whole concert of primary and secondary events, but nevertheless, there are traces or footprints to be found, which would never have been there if we had not actively thought before. They are not yet products of reflection, but post-active, pre-reflective facts to be counted on for subsequent active reflection.

Methodological Considerations

Cycle of Validation

The main feature of the cycle of validation is the fact that every scientific endeavor starts and ends with questions, insights, knowledge, and so forth, in the mode of first-person experience. Everything that happens in between within the cycle makes the result more stable, intersubjective, and so forth (Figure 1): Given our knowledge, experiences, and questions, we start to communicate our ideas, projects, doubts, questions and so forth to other people, thus representing them in the mode of verbal expressions. We then start, as a rule, in a team, implement experiments and devise theories, exchange results, get feedback, learn something, correct our proposals, projects and protocols, and so forth. In teaching or presenting what we are doing we pin down our ideas and projects, get more feedback via social interaction and so forth. This leads to what has been called *participatory sense-making* (De Jaegher & Di Paolo, 2007): We look for coherence of our results with other results, vary the parameters, the surroundings, and the experimenters, in order to stabilize our results, make them independent from accidental conditions and bias from first-person experience. To consolidate our results further, we need to make some type of judgment, select theories and observational material, discuss these with our peers, and finally come to a conclusion. If necessary or convenient, the cycle might be run through several times.

But note that in the end, everything depends on personal insight: With which of the several alternatives do we agree? Which school of thought or expert are we following in their judgments and conclusions, and for what reasons? Even if we do not have any personal opinion or preference and are beyond commitments to any kind of authority, we are the ones who judge what lead we are following – even if it were us that leads the rest. This means that whatever we (or others) do in emancipating our insights from our first-person experiences and perspectives will have to be judged ultimately by ourselves; there is no way to eliminate personal judgment or agreement altogether (otherwise, there would be no judgments at all). Thus, first-person insight is an integral and necessary part of any scientific process.

Methodological Controls Within Introspective Science

By implementing the cycle of validation as part of any introspective exploration, we are on the safe side of doing introspective science. We use the usual methods of linguistic representation to communicate our projects and results – there is no danger, in principle, of merely private speech. We do not rely on dualism between inner experiences and the outer world, since we bring any inner insight into the outer world (through communication, representation, presentation) and integrate experiences in the outer world into our inner judgments and insights (see Figure 1). We do not maintain any kind of solipsism; we want others to reenact or reproduce our results, thus we are eager to describe our methods and results as exactly as possible and make sure that facts are differentiated from hypotheses, inferences, and reflections. We are, naturally, not beyond error, but keep trying to eliminate as many of those as is within our means. As with normal science, practice and long-term experience are needed (nobody is able to perform complicated genetic engineering or experiments on the subatomic level without serious preparation and long-time laboratory and theoretical practice).

Why do we propagate first-person accounts instead of second-person accounts of thinking through interviews, focus groups, and so forth (Bitbol & Petitmengin, 2013; Petitmengin & Bitpol, 2009)? The main reason is the direct access to the experiences we are researching. We think second-person research is very important and informative, but first-person research adds something that is not and cannot be covered by second-person research. A second person brings her own filter to what she says, notes, asks, and comprehends and is not the person who made the experiences we are looking for in the first place. Moreover, if the second person has her own experience in the relevant field (which is necessary to be an expert in the field and ask relevant questions), there is the danger of mixing up one's own experiences and inferences about them with the experience of the first person who is interviewed; and if the second person has no experiences of her own, how can she understand and protocol what the first person is telling her? How can she ask appropriate questions? In the end, the person interviewing the participant within the second-person approach needs as much systematic practice and self-control as we ask for the experimental subject/experimenter within the first-person approach.

Thus, why not use the first-person perspective to begin with? Well, there is still the issue of the identity of the experimenter and the experimental subject. The solution is: Exact description of methods and results, strictly observing the cycle of validation and self-control. Even for normal science it is not sufficient to control ourselves only by some confirmation or recapitulation through other persons – we need to work on our own control processes, on our own way of making our results stable and independent from our personal preferences and perspectives. This is necessary in any case, since, in the end, we as subjects

are deciding which result we judge as true, or at least as adequate.

Conclusion and Outlook

We explored some inner dimensions of thinking and found characteristic features for several kinds of processes that we identified with thinking. The type of thinking that we focus on, active productive conceptual thinking, is embedded in other kinds of psychic processes from which it needs to be differentiated. This opens up a new line of research that is complementary to the usual methods and results from the psychology of thinking: namely, the inner dimensions of the processes that are studied by the measurable outcomes of thinking experiments conducted within the field of traditional psychology.

This is a preliminary account which leaves many questions and further lines of research open. The soundness of introspective research has not been settled definitively. However, its merits and limits become clearer and can be spelled out more exactly as the research moves on.

The main question is: Can introspection contribute something toward a deeper understanding of the inner workings of our thinking processes? We are confident that it may eventually unearth some processes which are fundamental for any kind of conscious and active thinking processes.

The results from the traditional psychology of thinking come in such overwhelming quality and quantity that it may seem unnecessary to add something from the introspective perspective. However, as our inner life constitutes no minor part within our experience, and since the psychology of human beings should encompass all of what there is in experiential life, we consider it appropriate to complement the traditional outer view with an inner view – at least concerning thinking and, in the end, self-awareness.

For further research one needs to expand this preliminary account in several directions. The experimental method of introspection and its validation has to be worked out in more detail. The active conceptual thinking process needs further assessment toward its fundamental character for all thinking processes. Last but not least, the implications of these further results concerning the inner thinking self, its agency, and its importance for self-determination and self-development should be investigated more deeply and in more details.

Acknowledgments

We thank the two reviewers as well as Christopher Gutland and Christian Tewes for valuable suggestions for improving the text. Remaining insufficiencies are solely due to the authors. We thank the Software AG Stiftung for supporting this project.

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Received December 5, 2016
Revision received April 25, 2017
Accepted July 12, 2017
Published online January 11, 2018

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