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Editorial

Introspection in Science

1. Introduction

The interest in consciousness in "experimentally oriented psychology" (e.g., cognitive science) has brought us to a methodological challenge. In cognitive science, we are raised to believe in objective data as our primary source of evidence, and to consider subjective reports as secondary or to disregard them completely. For conscious mental events, this approach seems however futile: Subjective consciousness cannot be observed "from the outside." Accordingly, we are left with the challenge to make use of subjective reports within the framework of experimental psychology.

In 2003 and 2004, Anthony Jack and Andreas Roepstorff published a two-volume special issue of *Journal of Consciousness Studies* entitled "Trusting the Subject" (Jack & Roepstorff, 2003, 2004). Here, they presented a series of very different papers debating subjective reports in cognitive science and neuroscience, and, in doing so, they took important steps to embrace this challenge. Along with this, parallel discussions have appeared among advocates of the marriage of phenomenology and experimental science (e.g. Lutz, Lachaux, Martinerie, & Varela, 2002; Varela, 1996).

In spite of these important moves towards an integration of subjective reports in experimental psychology, the discussion has not even found a common ground. It is at present unclear whether "phenomenology," "introspection," "subjective reports," etc., should be understood as more or less synonymous in these discussions, or whether, say, phenomenology should be interpreted closer to Husserlian phenomenology, thus being rather distant from introspection.

The papers in this volume continue these discussions in the attempt to clarify the history of introspection, to understand what introspection is, and to apply introspective methods in concrete experiments. Here, some background and possibilities in the unsolved debate over introspection are lined up.

2. The unsolved debate

The debate over access to one's own mental states arguably traces back to Augustine who suggested that a process of bracketing "the outside world" is necessary to focus on "inner mental events," and that such attending to inner events produces indubitable knowledge (Lyons, 1986). Essential aspects of the historical and ongoing metaphysical conflicts can however be illustrated in a discussion between Franz Bentrano, Comte, William James and Wilhelm Wundt.

Brentano argued that a paradox exists in the relation between observations of "inner" mental states and "outer" objects. In order to observe and know about, say, an experience of a red apple, one must turn one's attention from that outer object which was cause to the sensation. This should logically make the relevant experience cease to exist, thus also the attempted introspection. The only possible kind of introspection, Brentano argued, is a passive inner perception consisting of a change of focus.

Wilhelm Wundt adopted Bretano's conception but argued that the passive inner perception could become a scientific enterprise by systematically training subjects to report what thus is passively perceived. Wundt believed that one should only do experiments in areas where one has external control over stimuli, as in

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perception, and that training was necessary to avoid destroying the introspected experience and thus necessary to give reliable reports. Wundt's introspective experiments were thus carried out under in principle replicable circumstances, with controlled stimuli that were claimed to be "passively observed with inner perception" by well-trained subjects. In the Wundtian version of introspection, a clear difference between a systematic use of "normal reports" and "introspective reports" is hard to find (Lyons, 1986).

Comte raised two strong objections to a science based on introspection. Comte's first objection was that one cannot have an identity between the observer and the object of observation in science. He argued that the observer cannot be "split in two" so that one part observes the other, and, thus, observation of one's own inner experiences is an impossible project. Comte's second objection was of a more empirical kind: He argued that even if we would set aside the principle problems with introspection, it will generate unreliable and conflicting data. This second objection that seemed more of a claim than a real argument related to the controversies over data that came out of the laboratories in Cornell or Würzburg. Such controversies and the lack of success replicating results were likely what led to the increase of interest in behaviourism rather than any theoretical problem related to introspection.

By the term introspection, James meant something different from Wundt's inner passive perception: a kind of active observation which Brentano also had discussed. James was aware of the objections raised by Comte, and responded to them in a defence of introspective methodology. First of all, James argued that Comte surely cannot deny that we know about our own mental states, so when we cannot "split into two," our best knowledge of our "inner states" are by way of memory, attending to experiences we previously had. In seeing introspection as "retrospection," James also responded to Wundt's and Brentano's worry that active observation of mental states may change or destroy the first-order content.

One may speculate that one could have taken a different perspective in a response to Comte than the one James chose. Comte argued against a split of consciousness in "two parts" but stated no reason other than the "prima facie oddness" hereof. Today, some researchers have in different contexts argued exactly for the possibility that the self is not always acting as one, indivisible unit. Empirical support for such arguments has however mostly been more "extreme" cases, such as anosognosia for hemiplegia (Marcel, Tegnér, & Nimmo-Smith, 2004).

One could also have raised the contrary argument, which may seem stronger in terms of logic, that the description of introspection giving rise to a split in consciousness is in fact a misleading description. "The self" or the subject is obviously not identical to the content of his or her consciousness; for instance, the subject enjoys an uncountable number of conscious "states" throughout his or her lifetime. Were the subject identical to conscious content, he or she would be as many selves as possible number of contents, continuously beginning and ceasing to exist. Thus, introspection could be conceived of as a simple split between the subject observing his or her conscious content, which should serve no theoretical problem.

One problem arising with James' solution, turning introspection into retrospection is this: if his solution is to work, the memory being actively observed must be an unconscious memory. If the memory was in fact conscious, introspection of ongoing mental events would be a possibility. Were the memory part of the subject's consciousness, Comte's objection would seemingly still apply. So in order to argue that introspection is retrospection, one is forced *not* to accept introspection of currently conscious states. However, in practice, would not an attending to the unconscious memory make its content conscious? Whereas such difficulties make James' solution look less attractive, the problems contained in Comte's second objection caused the most serious difficulties to introspectionism. Also, the idea of introspection not being a reliable method has been a prevailing notion in experimental psychology up until today. History has made it the case that reports about, say, the perception of a red apple (that is, reports specifically about conscious states or introspective reports) are met with more scepticism than reports about, say, the red apple itself (non-introspective reports).

As it was the case for Mark Twain, however, the reports of the death of introspection are greatly exaggerated. It could be argued that even the most methodologically rigid experiments in cognitive science need introspective methodology at some level. For one thing, cognitive science often uses subjective reports as if there really were no problem. In experiments about consciousness, subjects are asked how certain they feel to give the correct report or which colour they have perceived without pre-existing methodological work regarding how to handle subjective data empirically. Such reports are clearly introspective reports as they are specifically about conscious states, but as long as the categories can be easily quantified, the resemblance with introspec-

tionism is happily ignored. But even if one stays completely clear of using verbal reports of any kind, introspective or non-introspective, there must at least be some motivation for conducting an experiment in a certain way. For instance, a scientist may raise questions about the difference between seeing different colours, being in different emotional states, whether certain cognitive processes exist unconsciously, etc. The underlying motivation in all those instances must in the end be the scientist's experience with his or her own conscious states, or, so to say, be based on introspection. That is, even experiments that only make use of non-introspective evidence will, in psychology at least, rely on introspective evidence. This fact, it seems, makes it seem unthinkable to do experimental psychology, or perhaps any kind of psychology without introspection.

The conclusion seems to be that one should either skip psychology altogether, or one should find a way to meet the second objection of Comte (and the objection of many other scientists and philosophers). A perhaps obvious reply is that introspection can function as one method among many other methods (analysis of behaviour, etc.) and that it is not intended to acquire knowledge about all aspects of human cognition. Introspection, rather, involves an attending to the content of one's consciousness and nothing more than that. Thus, an introspective report is to reflect the contents of consciousness as exactly as possible.

Arguing, say, that some objective method like neuroimaging lends a "more direct" insight into the contents of consciousness rests upon circularity. There may be fixed *contingent* relations between certain physical phenomena and experience, so that the presence of such gives us right to claim that a subject has a certain experience. However, finding those relevant physical phenomena is impossible without making use of subjective data, e.g. an introspective report. That is, associating a certain physical phenomenon, such as gamma hertz oscillations, with consciousness is only possible with empirical evidence, i.e. a correlation between the given physical phenomenon and the relevant conscious state. Since the conscious state cannot in itself be observed from the outside, the use of an introspective report about the relevant state seems the only possible methodology. Accordingly, no physical phenomenon can be a more reliable indication of a given conscious state than the introspective report. This conclusion logically follows from the fact that the physical phenomenon is associated with the conscious state only by way of its correlation with the introspective report.

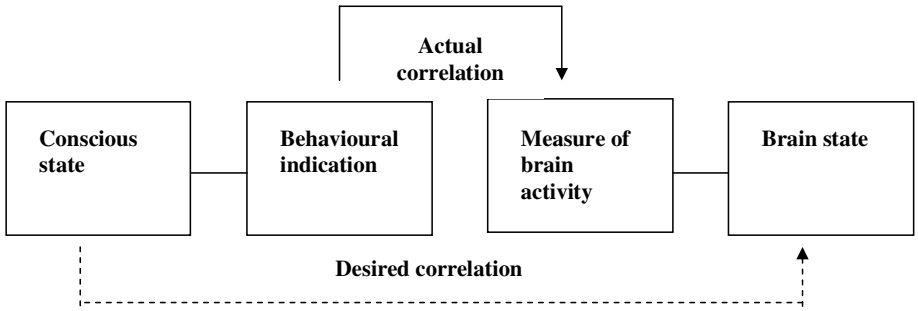
3. The case against introspection

Whereas most modern psychologists find themselves very distant from the historical take-over of behaviourism from so-called introspectionism, more recent experimental studies questioning the validity of verbal reports have remained influential. Above all such studies, Nisbett and Wilson (1977) has been taken as a still undisputed argument that introspective report have no place in scientific research. It could be argued, however, that this conclusion misconstrues the evidence of Nisbett and Wilson. Subjects giving an introspective report about liking objects presented to the right for some other reason than the object's location in space may be giving a perfectly good and scientifically usable report of what they experienced. Nisbett and Wilson correctly rejected introspection as a methodology to learn about (some aspects of) choice and decision making, as the behavioural data suggested a very different explanation from the one that subjects themselves reported. Another interpretation of the results could be, however, that in some unknown (but probably vast) number of situations, people do not have introspective access to their own cognitive processes. However, not surprisingly, they still have some experience and interpretation of their own actions. Thus, a conflict in data between subjective report and behaviour could be interpreted to show that the subject's experience differs from what can be analysed from his or her behaviour, and, thus, it does not automatically follow that the introspective report is invalid.

4. Applying introspection

Even though such arguments can be listed that introspection is unavoidable in research on consciousness and that no current empirically based argument, there is little consensus how introspection should be practiced.

Consider however the attempt to find the neural correlates of consciousness, which clearly must be considered the current leading research strategy in consciousness studies. Here, a basic framework of thought could be this.



In this model (Overgaard, 2003), it is shown how the correlation between states of the brain and states of consciousness with current research methods is more of a theoretical abstraction than a real measure. What is really observed in the scientific experiment is a correlation between behavioural indications of specific conscious states (verbal reports, button pushes, etc.) and measures of brain activity (data from fMRI, MEG, etc.). To derive the desired correlation—the "NCC"—from the actual data, one is fully dependent on the nature of the relation between the brain state and the measure hereof, on the one hand, and the relation between the conscious state and the report on the other.

This relation between the conscious state and the report about it is the subject of this collection of papers. Costall gives an impressive insight into mistakes and fiction in how psychologists view the history of their discipline. He argues that the understanding of classical introspectionism involves a highly exaggerated notion of its use and demise. Furthermore, and perhaps even more interesting to the modern reader, he argues that the re-appearance of consciousness and introspection is another psychological myth in its making. Johansson, Hall, Silkström, Tärning and Lind pick up the original thread from Nisbett and Wilson (1977) by introducing the "choice blindness paradigm". The authors make notable improvements to Nisbett and Wilson's classical experiments, and they report extraordinary examples of subjects that fail to notice that the outcome of their actions do not match their intended choices. However, and contrary to the classical papers, the paper does not argue against the use of introspection, but, rather, aims to give us a new methodological framework to learn more about what really happens when people introspect.

Pinku and Tzelgov analyse the distinction between explicit and implicit knowledge, and argue that consciousness of the self can be classified in three different "types," corresponding with three different states of consciousness. For instance, attending to one's own experiences can be separated from automatic behaviours and from reflexive thoughts. Overgaard, Koivisto, Sørensen, Vangkilde and Revonsuo also argue that introspective and non-introspective states of consciousness can be separated, but on empirical grounds. They argue that different ERP signals can be obtained when subjects are asked to give introspective reports of visual stimuli compared to non-introspective reports. The experiment indicates that people "do something different" when introspecting and when issuing reports that are not explicitly about conscious states.

Other papers use introspective reports to study learning, perception and emotion. Gaillard, Vandenberghe, Destrebecqz and Cleeremans argue that a combination of introspective and objective methods is necessary to investigate whether a subject has been conscious of a given information or not. The authors review and discuss results in implicit learning research. Overgaard, Rote, Mouridsen and Ramsøy study conscious perception using the introspective methodology "the Perceptual Awareness Scale" (PAS). In this study, PAS is compared to a more simple introspective method, and data reveal that results depend on how subjects are instructed to introspect. Norman, Price and Duff show how introspective methodology in emotion and personality research can help us show graduations of consciousness. This again makes it possible to investigate functional roles of fringe consciousness.

The scientific study of consciousness is prepared to enter a new phase of development. In an emerging field of research it can be necessary to be very explorative and try out a multitude of different ideas. After a while, however, if the research field is to keep existing, an opposite more "conservative" development must also take place, where the participating researchers find agreement in basic methods and key concepts. It is the hope that the here presented papers can help such a development underway: That they can give rise to an increased understanding of introspection and its place in consciousness science.

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