

The Epistemological Assumptions of the (Main) Soft System Methodology Advocates

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Abstract

A number of writers have argued that Soft Systems Methodology embodies a distinctly "subjective" philosophical approach and (or) yields a systems methodology based on a "subjectivist" epistemology, and as such it is distinct from "objective" methodologies. It has also been argued that Soft Systems Methodology avoids, or attempts to avoid, the "reductionism" inherent in traditional approaches to the study of natural phenomenon. In this paper it is argued that such arguments contain a number of conceptual and historical confusions, and that whilst the advocates of the developed form of Soft Systems Methodology in fact subscribe to a subjective mode of enquiry, such a mode has its history firmly grounded in the natural sciences. It is also argued that the Soft Systems Methodology advocates (in fact) subscribe to the thesis of *epistemological reductionism*, and this thesis will be contrasted with that of *epistemological holism*.

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1. INTRODUCTION

The purpose of this paper is to examine the basic epistemological assumptions of the Soft Systems Methodology (SSM) advocates, as these are relevant to understanding the nature, scope, and coherence of SSM. It will be argued that whilst the advocates of SSM subscribe to a subjective mode of enquiry, such a mode has its history - and its rationale - firmly grounded in the early modern philosophies of the natural sciences. It is also argued that the SSM advocates (in fact) subscribe to the thesis of *epistemological reductionism*, and this thesis will be contrasted with that of *epistemological holism*.

A number of writers have discussed the philosophical underpinnings of SSM; the general conclusion being that SSM embodies the philosophical assumptions of (some form of) subjectivism (eg Mingers, 1984). Unfortunately, in recent years, two sorts of accounts of the basic process of human enquiry have been put forward by the SSM advocates. Although these two accounts are ultimately contradictory they are similar in that they are both highly psychologistic accounts of epistemology; they both focus on the *process* of enquiry. The two accounts will be termed: (1) *the so-called Kantian account*, and (2) *the Lockean account*.

2. THE SO-CALLED KANTIAN ACCOUNT

In the most recent and detailed account of the developed form of SSM, Checkland and Scholes (1990) see their epistemological tradition as stemming from Immanuel Kant (1724-1804):

When the Spanish conquistadors arrived in what is now Mexico, the indigenous people, unfamiliar with horse riding and seeing riders dismount from horses, thought that creatures had arrived on their shores who could divide themselves in two at will. This story provides a good illustration of the way in which we have in our heads stocks of ideas by means of which we interpret the world outside ourselves. Philosophically the story supports the view of Kant, that we *structure* the world by means of already-present, innate ideas, rather than the view of Locke [John Locke, 1632-1704] that our minds are blank screens upon which the world writes its impressions. But it seems clear that the supposedly "innate" ideas may have two sources. They may indeed be part of the genetic inheritance of mankind, truly innate; or they may be built up as a result of our experience of the world... What is being argued is that we perceive the world through the filter of - or using the framework of - the ideas internal to us; but that the source of many (most?) of those ideas is the perceived world outside... As human beings we enact this process everyday, usually unconsciously. (Checkland and Scholes, 1990, pp. 19-20)

(It should be noted immediately that Locke's theory of perception is not as vacuous as the SSM advocates suggest in this quotation, as should become clear shortly.) The essence of this account is that perception is representational, but representations are only possible via the mediation of ideas pre-possessed by the perceiving subject. As ideas are the necessary pre-requisites of coherent perceptions some ideas must be "innate" - they are "born with us" as part of our genetic inheritance.

Kant's transcendental idealism is far too complex to be explored in this paper, so suffice it to point out that Checkland and Scholes' (1990) account of epistemology should not be construed as Kantian:

No name can do justice to this profound and complex philosophy which arose out of the two

most important philosophical theories of his time: the rationalism of Descartes and Leibnitz and the empiricism of Locke, Berkeley, and Hume... *Kant agreed with the empiricists that there cannot be innate ideas in the sense of anything known prior to any sense experience, but he was not prepared to say that therefore all knowledge must be derived from experience...* Kant's procedure differed significantly from the generally psychological empiricist method, for rather than seeking for the impressions upon which certain ideas are based, he investigated the relationship that exist between the fundamental concepts related to a subject's having experience of objects. He was concerned with theoretical questions of a sort he calls "transcendental", such as "under what conditions is experience of an objective world possible?". (Flew, 1979, pp. 175-176 [emphases added])

Kant was not really interested in the processes of perception - he was more interested in what must be necessary for a subject to be capable of having *any* perception; not how it is that one has a perception of something.

There are two main aspects to the so-called Kantian account. Firstly, the observer is seen as "trying to make sense of" his or her perceptions of the world by applying ideas to his or her "raw" perceptions; secondly, that some of these ideas are innate. The claim that observers try to make sense of the world in this way most closely resembles accounts put forward in the tradition of the Cartesian project of "pure enquiry" - first articulated by Descartes (1596-1650) around 1640.

3. CARTESIAN EPISTEMOLOGY

There are three related features of Descartes's account of epistemology (all of which are central features of the of the SSM advocates' so-called Kantian account). These are: (1) the doctrine of innate ideas, (2) the subjective representation of reality, (3) the intellectual construction of models. These features will now be discussed.

The notion, advanced by Checkland and Scholes, that our thinking is "structured" by innate ideas also hails from Descartes's rationalism (rather than from Kant's transcendental idealism):

Another controversial tenet of Descartes's position is that some of our ideas are innate... [One reason] for the necessity of innate ideas is that we can apprehend the specific quality of our experience only if we possess ideas with which to interpret it. (Aune, 1970, pp. 28-29)

Descartes himself argued:

... I cannot doubt but that there is in me a certain passive faculty of perception, that is of receiving and taking knowledge of the ideas of sensible [physical] things; but this would be useless to me, if there did not also exist in me, or in some other thing, another active faculty capable of forming and producing those ideas. (Descartes, 1912, p. 133)

Checkland and Scholes ground the "active faculty" both in "our genetic inheritance" and in the psychological processes of the individual subject. Descartes also argued that this "active faculty" does not just arbitrarily make up these ideas:

[And] what I here find of most importance is ... that I discover in my mind innumerable ideas of certain objects, although perhaps they possess no reality beyond my thought, and which are not framed by me though it may be in my power to think them, but possess true and immutable natures of their own. As, for example, when I imagine a triangle, although there is not perhaps and never was in the universe apart from my thought one such figure, it remains true nevertheless that this figure possesses a certain determinate nature, form, or essence, which is immutable and eternal, and not framed by me, nor in any degree dependent on my thought ... and which accordingly cannot be said to have been invented by me.

(Descartes, 1912, p. 121)

It should be noted that Descartes ultimately argued that these innate ideas are "transferred" to us from the mind of God, whereas Checkland and Scholes' account is entirely secular, and is expressed in terms of "our genetic inheritance".

For both Checkland (and Scholes) and Descartes, knowledge is to be produced or created *in the mind of an individual subject*; the basic epistemological notion is of an attempted representation (or interpretation) of the world by a subject, and this is clearly a Cartesian legacy:

... Descartes's account ... is expressed in terms of a representational theory of perception. We are given a picture of the mind in direct contact only with its own experiences or ideas, "outside" which there are objects, causing these experiences and imperfectly represented by them. Descartes thinks that, strictly speaking, the purely mental ideas involved in perception do not *resemble* the world at all, and even with regard to the corporeal representations of the world in the brain, which he believes to occur as part of the perceptual process, he emphasizes that the important point is that they should be capable of conveying the required complexity of information about external things, not that they should resemble them (*Dioptic vi* 113). (Williams, 1978, pp. 239-240)

Checkland's account of the purpose of building the conceptual models (used extensively in SSM) is strikingly similar in important respects:

The important point is that, in using SSM, we must never lose sight of the fact that the models are *not* would-be descriptions of parts of the world. They are abstract logical machines for pursuing a purpose ... which can generate insightful debate when set against actual would-be purposeful action in the real-world. (Checkland, 1988a, p. 311)

For both Descartes and the SSM advocates, the same implications are drawn from this "subjective representation" approach to human enquiry: the need for "models" of reality. Of course the SSM advocates are primarily concerned with modelling "social reality", which they believe to be (strictly-speaking) "unmodellable" owing to the free-will that they attribute to actors in the real-world (see Probert, 1992), however this aspect of SSM is not strictly relevant to the discussion herein.

Bernard Williams has recently summed up Descartes's contribution to epistemology in the following manner:

... Descartes is, rightly, said to be a rationalist philosopher... But it's sometimes supposed that he was such a strong rationalist that he thought the whole of science was to be deduced from metaphysics by purely mathematical or logical reasoning ... He thought no such thing. In fact, he is absolutely consistent in saying that experiments are necessary to distinguish between some ways of explaining nature and others. You can build different models. This is a very modern aspect of his thought. You can build or construct different intellectual models of the world within his laws, and experiment is needed to discover which truly represent nature. (Williams, 1987, p. 90)

(Note that this account is only related to the natural world, and not the social world.) Checkland's philosophy of (natural) science is quite definitely of this sort:

... Natural scientists cannot fail to be aware of two fundamental considerations: first, that in the professional talk concerning the work, words are used as carefully defined technical terms ... second, that the words so carefully defined refer to models, to intellectual constructs rather than supposed physical reality. The natural scientist is well aware that he or she is playing a game against nature in which the intellectual constructions are used to predict physical happenings which can be checked experimentally. (Checkland, 1988b, p. 235)

Just how Cartesian Checkland and Scholes' so-called Kantian account of epistemology is can be shown by the following observation:

... many passages showed that he accorded a crucial role to experiment. Descartes's actual conception of scientific method often resembles ... the model where a hypothesis is advanced, and the results logically deduced from it are then compared with actual observation. (Flew, 1979, p. 86)

The conclusion to be drawn is that the epistemological assumptions of the proponents of the so-called Kantian account of epistemology are those of *Cartesian rationalism*.

Two objections might easily be made to the account of the epistemological assumptions of the SSM advocates' so-called Kantian account that has been provided. Firstly, Checkland (1981) explicitly rejected the idea that any form of *systems thinking* could be grounded in a Cartesian epistemology. Secondly, and related to the first point, this whole epistemological approach (Cartesianism) is somewhat surprising, given Checkland's (1981) "Popperian" orientation. These objections will now be discussed, but in doing so it will be necessary to examine the SSM advocates' use of the term 'reductionism'.

4. THE ISSUE OF REDUCTIONISM

Checkland's use of the term 'reductionism' is non-standard in modern epistemological terms, but standard in the "looser" general philosophical sense and this can be (potentially) misleading. Flew defines 'reductionism' as follows:

REDUCTIONISM (or Reductivism). 1. The belief that human behaviour can be reduced to or interpreted in terms of that of lower animals; and that, ultimately, can itself be reduced to physical laws... 2. More generally, any doctrine that claims to reduce the apparently more sophisticated and complex to the less so. (Flew, 1979, p. 279)

It is the latter, philosophically looser, sense that the SSM advocates seem to intend. However, in modern epistemology, a more usual definition would be:

REDUCTIONISM: the belief that each meaningful statement is equivalent to some logical construct upon terms which refer to immediate experience. (Quine, 1980, p. 20)

NB here 'meaningful' means (basically) "grammatical and intelligible" eg 'Barking dogs bark.' is meaningful (but vacuous), as is 'Paris is the capital city of Antarctica.' (this is meaningful, but false). Quine's argument is that statements, and not exclusively scientific statements, do not refer to particular sensory experiences in isolation. Consequently particular experiences will not always give rise to particular statements:

The totality of our so-called knowledge or beliefs, from the most casual matters of geography and history to the profoundest laws of atomic physics or even of pure mathematics and logic, is a man-made fabric which impinges on experience only along the edges. Or, to change the figure, total science is like a field of force whose boundary conditions are experience. A conflict with experience at the periphery occasions readjustments in the interior of the field... But the total field is so underdetermined by its boundary conditions, experience, that there is much latitude of choice as to what statements to reevaluate in the light of any single contrary experience. (Quine, 1980, pp. 42-43)

An example may help here. Prior to conducting chemical experiments we may be told that if sulphur is present on a splint then a bright yellow flame will be present if the splint is immersed in

a bunsen burner flame. If we were to do such an experiment and a bright yellow flame did not appear (although there was good reason to believe that sulphur was present on the splint) we might conclude that there was something wrong with the whole of chemical theory, but *pragmatically* we would probably search for a simpler explanation - say that some other chemical was present which inhibited the experiment from working properly, or that there was an insufficient amount of sulphur for the experiment to work properly, and so on. We would not immediately rush to the conclusion that we had *falsified* the chemical theory that gave rise to the periodic table of elements. As such Quine's *epistemological holism* stands as a rebuttal to Popper's *critical rationalism*. Somewhat ironically Checkland (claims to) support a Popperian philosophy of science, which is ultimately dependent on the validity of *epistemological reductionism*, and which (for example) Quine explicitly rejects:

If a hypothesis implies observations at all, we may stand ready to drop the hypothesis as false as soon as an observation that it predicts fails to occur. In fact, however, the refutation of hypothesis is not that simple... there is the matter of the supporting chorus. It is not the contemplated hypothesis alone that does the implying, but rather that hypothesis and a supporting chorus of background beliefs. (Quine and Ullian, 1978, pp. 102-103)

5. "POPPERIANISM" AND THE SO-CALLED KANTIAN ACCOUNT

There is clear evidence of a Popperian orientation in Checkland (1981):

... [A] number of very distinguished scientists ... have attested to the importance of Popper's ideas in their thinking ... *We have a picture of science, then, as a method of enquiring or learning*, which offers us, at any moment of time a picture of our understanding of the world's reality which consists of certain conjectures, established in reductionist repeatable experiments, which have not yet been demolished... [This] outline of science ... will be relevant to later discussion of whether or not systems thinking can contribute to the difficult problems which face a social science which aspires to be scientific in the full sense of that word. (Checkland, 1981, pp. 57-58 [emphasis added])

Popper is fully aware of the need for the acceptability of *epistemological reductionism* for his philosophy of science to be satisfactory:

... though every one of our assumptions may be challenged, it is quite impractical to challenge all of them at the same time ... Quine formulates (with reference to Duhem) [a view that], ... our statements about the external world face the tribunal of sense experience not individually but only as a corporate body ... it should be said that the [Quine's] holistic argument goes much too far. It is possible in quite a few cases to find which hypothesis is responsible for the refutation... (Popper, 1972, pp. 238-239)

It is very important to note that Checkland (1981) supports Popper's reductionist view of epistemology. This unquestioning support for epistemological reductionism is maintained throughout the SSM advocates' various discourses.

Checkland (1981) argued that Descartes's epistemology was based on *reductionism* in the looser philosophical sense, and was therefore not *systemic*:

The core of Descartes' approach to science ... was "reductionist", in the sense that science should describe the world in terms of "simple natures" and "composite natures", and show how the latter could be reduced to the former. The process of identifying the simple natures in complex phenomena was what Descartes meant by "analysis"... (Checkland, 1981, p. 47)

The above *may* be the case, but there is some considerable evidence that Descartes was not

as naive as such accounts make him appear:

... it is an important feature of his [Descartes's] physics that ... We cannot consider how a body would ideally move if it were not in an environment of other matter influencing its motion, since such a state of affairs, through the equation of matter and physical space, is absolutely unintelligible. For Galileo, by contrast, the consideration of how a body would move under ideal conditions (for instance, a body falling in a vacuum, or a ball rolling on a surface under zero friction) was fundamental to his analysis of motions, and could be coherently employed. (Williams, 1978, p. 255)

Knowledge, for Descartes, was a unified system. For Descartes, "All the sciences are interconnected and dependent on one another..." (Flew, 1979, p. 83). So there is some evidence of a systemic orientation to Descartes's account of epistemology. However this point is not central to the argument that the basic epistemological assumptions of the SSM advocates' so-called Kantian account of epistemology are those of Cartesian Rationalism, and that these epistemological assumptions include *epistemological reductionism*.

Furthermore, the emphases placed by Checkland on *enquiring* and *learning* are somewhat puzzling as Popper rejects the idea that scientific progress (ie the growth of knowledge) has anything to do with learning - because learning necessarily involves a (learning) subject:

The commonsense theory is simple. If you or I wish to know something not yet known about the world, we have to open our eyes and look round. And we have to raise our ears and listen to noises, and especially to those made by other people. Thus our various senses are our *sources of knowledge* - the sources or the entries into our minds. I have often called this theory the bucket theory of the mind... The important thesis of the bucket theory is that we learn most, if not all, of what we do learn through the entry of experience into our sense openings; so that all *knowledge consists of information received through our senses*; that is, *by experience*... My thesis is that the bucket theory is utterly naive and completely mistaken in all its versions, and that unconscious assumptions of it in some form or other still exert a devastating influence ... the bucket theory is a theory of our acquisition of knowledge - and thus it is a theory of what I call the *growth of knowledge*. *But as a theory of the growth of knowledge it is utterly false*... The commonsense theory of knowledge ... took it for granted that there was only one kind of knowledge - knowledge possessed by some knowing subject. I will call this kind of knowledge "*subjective knowledge*", in spite of the fact that ... *genuine or unadulterated or purely subjective conscious knowledge simply does not exist*. The theory of subjective knowledge is very old; but it becomes explicit with Descartes: "knowing" is an activity and presupposes the existence of a knowing subject. *It is the subjective self who knows*. (Popper, 1979, pp. 60-73)

However, the SSM are concerned with enquiring and learning on a subject-centred model. The conclusion, again, is that Checkland and Scholes' so-called Kantian account of epistemology is Cartesian, rather than Popperian, in character (although no implicit advocacy of Popper's epistemological arguments is intended). This is somewhat surprising given the espoused early research aims of SSM (see Checkland, 1981, pp. 100-101). However, in more recent accounts it is clear that the epistemological problem, as discussed by the SSM advocates is always discussed in terms of 'what can I know?', and this is a Cartesian legacy:

... it was Descartes, and almost Descartes alone, who brought it about that the centre of Western philosophy for these past centuries has been the theory of knowledge. He brought it about that philosophy started from the question 'What can I know?' rather than questions such as 'What is there?' or 'How is the world?' Moreover, the question is not 'What can be known?' or even 'What can we know?' but what can *I* know? That is, it starts from a first-person egocentric question: (Williams, 1987, p. 94)

A more detailed discussion of the issues concerning epistemology without a knowing subject lies outside the scope of this paper, but Haack has carried out a thorough analysis of these issues (Haack, 1979).

6. THE LOCKEAN ACCOUNTS

These accounts of epistemology are entirely "Lockean" in character, and appear both before and after publication of Checkland and Scholes' 1990 account (the so-called Kantian account). Their main difference lies in the outright denial of the possibility of innate ideas:

I shall drastically summarise the development of systems thinking ... a human observer tries to make sense of his or her perceived reality ... by means of some intellectual concepts used in some mental process or methodology ... "System" is one of the concepts used in this process, but considerable confusion is caused by the fact the word is used not only as the name of an abstract concept which the observer tries to map onto perceived reality, but also as a label word for things in the world - as when we refer to "the education system" or "the legal system". The confusion is of course not helped by the fact that the ultimate source of "concepts" ... is (can only be) perceived reality; that is the ultimate source of the concepts through which we try to make sense of perceived reality in a never-ending cyclic process of learning ... Perceived reality and the intellectual concepts steadily create each other. (Checkland, 1988a, pp. 305-306)

A similar account has been propounded in a more recent article:

... we may note that in the end the ultimate source of abstract notions ... is the perceived world itself... the world as we perceive it yields concepts by means of which we perceive the world; there are no absolutes, only a continuous process in which the concepts create the perceived world which creates the concepts. (Checkland, 1991, p. 27)

These are Lockean accounts because Checkland quite explicitly states that the only source of ideas (or concepts) is perceived reality - and therefore ideas (or concepts) cannot be innate - and this is one of Locke's most important and influential theses:

... Locke argues in detail in book 2 [of Locke, 1977], we can account for all of the ideas in our minds by *experience*. Experience is of two sorts. There are ideas of sensation, derived from the outer senses, and ideas of reflection, which are those ideas of which we become aware by introspection... (Flew, 1979, p. 190)

In Locke's own words:

Whatever *idea* is in the mind is either an actual perception or else, having been an actual perception, is so in the mind that by memory it can be made an actual perception again... ideas are no more born with us than arts and sciences... (Locke, 1977, pp. 27-29)

However, it will be worthwhile to indicate the full extent of the Lockean nature of the epistemological assumptions of the SSM advocates (as propounded in the non-Cartesian accounts). The main difference between the Lockean and the so-called Kantian accounts is their denial of innate ideas, however it has been noted that there are considerable similarities between Descartes's and Locke's accounts of epistemology:

Locke's theory of thought and knowledge, too, can look superficially like Descartes's. He takes thought to involve a series of ideas which exist 'in the mind', or 'before the mind', and which

represent things outside the mind. Reasoning is a sort of mental operation on ideas which leads to knowledge or belief. (Ayers, 1987, p. 121)

Put this way it may seem that the SSM advocates' account of the relationship between ontology and epistemology is more sceptical than Locke's - that mental ideas do not strictly represent the natural world:

... the world is taken to be very puzzling: there is no reason why we should have evolved brains beyond those needed to survive on the planet's surface; there is no reason to suppose our senses and brains can tell us what reality is really like. (Checkland, 1983, p. 672)

But Locke's argument was that our senses only give knowledge that there are some things outside ourselves (which is clearly assumed above). Locke did not argue that our senses can tell us what those things are really like:

... Locke developed a ... line of thought ... Although the senses give us knowledge, they give us limited knowledge - knowledge of the existence of things, not knowledge of their nature or essence. And because all our thought is restricted to the concepts that we have acquired through our senses, even our speculations about the world are restricted. He thought that there was no method by which scientists could expect to arrive at the underlying nature of things. So, despite his rejection of absolute scepticism about the external world, he was himself a sort of modified sceptic. We know that the world is there, but we don't know what it's really like. (Ayers, 1987, p. 123)

The SSM advocates are also "sort of modified sceptics", and they are at their most Lockean when they are articulating their ideas that holons ('systems' in everyday parlance) somehow "reside" in the enquiring subject, rather than being "in the world". Even here, they are cautious to refer to "perceived reality", rather than invoke a raw ontological notion of "reality itself":

... the process of using 'system' consciously to interpret the world has been rather too successful. It has been so successful that the system idea, though abstract, has long been used as a *label* for parts of the world... in everyday language we ... casually refer to 'the education system' ... But it is too easy casually to say 'education system' *as if* the arrangements for providing education automatically meet the requirements of the notion 'system'... The error here is to confuse a *possibly plausible description* of perceived reality, with perceived reality itself (Checkland and Scholes, 1990, pp. 20-21)

For the SSM advocates, systems thinking is a purely mental activity; its validity is therefore something "internal" to us - something constructed by the enquirer. We can apply systems thinking to "perceived reality" etc, in an unfolding flux of events and ideas. This notion is entirely Lockean in character:

His [Locke's] explanation of the possibility of mathematical science, and geometry in particular, is importantly different from Descartes's. For Descartes geometry is part of the science of space, indeed of matter. It's a part of reality. But for Locke it's an abstract science which is created by us. We so to speak pick geometrical properties of things, and we can go on to construct such properties *ad lib* beyond the limits of our experience. In this way we can create the subject matter of a sort of non-empirical science. Such a science is possible because it's not really concerned with the nature of things at all. It's simply concerned, as Locke puts it, with our own ideas. (Ayers, 1987, p. 130)

Although at no point do the SSM advocates involve themselves in discussions about primary and secondary qualities (these are Lockean notions); the conclusion to be drawn is that, broadly

speaking, the epistemological assumptions of Checkland's 1988(a) and 1991 accounts are those of *Lockean empiricism*. It should be noted that such accounts were precisely the sort of accounts that Kant was keen to deny.

The illustrious Locke ... meeting with pure concepts of the understanding in experience deduced them also from experience, and yet proceeded so *inconsequently* that he attempted with their aid to obtain knowledge which far transcends all limits of experience. (Kant, 1933, p. 127)

Kant's argument is that Locke's ultimate mistake was to conduct his analysis by reflecting on the *process* of perception, rather than on *the conditions of its possibility*. It is *not* argued here that Locke's, or Kant's, accounts of epistemology are superior or inferior to other accounts of epistemology, this is a question for philosophical discussion that lies outside the scope of this paper.

7. "POPPERIANISM" AND THE LOCKEAN ACCOUNT

To use a theatrical metaphor, where Popper displaces the subject to the fringe of the epistemological scene, in the Lockean account the SSM advocates place the subject back into the centre of the epistemological stage. Such an account is one that Popper would surely deny, as it is grounded in the subjectivism characteristic of both Descartes and Locke - which Popper calls the "bucket theory":

Among the many things which are wrong with the bucket theory of the mind are the following:

- (1) Knowledge is conceived of as consisting of things, or thing-like entities in our bucket (such as ideas, impressions...).
- (2) Knowledge is, first of all, *in us*...

To sum up: what I call the commonsense theory of knowledge is something very close to the empiricism of Locke, Berkeley, and Hume and is not far removed from many modern positivists and empiricists... Almost everything is wrong in the commonsense theory of knowledge. (Popper, 1979, pp. 62-63)

Checkland and Scholes' Lockean account of epistemology can neatly and accurately be characterised as a (Popperian) "bucket theory" - and as such, Popper would surely deny that such an account has anything whatsoever to do with the study of epistemology.

It should be noted that the so-called Kantian account is characterised only once in a major work (ie Checkland and Scholes, 1990), whereas the Lockean accounts can be found in several journal articles, and some passages of Checkland and Scholes (1990) are quite definitely in the Lockean mould. A very recent article is also biased towards the Lockean account:

... it is useful to remember that ultimately the only possible source of ... ideas is our perception of the world outside ourselves... (Checkland, 1992, p. 1026)

5. CONCLUSION

It is clear that at least as regards epistemology, SSM does not embody a mode of enquiry that could be construed as Popperian in character, except insofar as the SSM advocates accept the notion that the strict reduction of sentences to sense-data is achievable (epistemological reductionism). Such *epistemological reductionism* can be clearly contrasted with *epistemological holism*. What is less definite is whether they subscribe to epistemological reductionism on the model of *Cartesian rationalism* or on the model of *Lockean empiricism*, as there is conflicting evidence in their literature.

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