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Why is a spider not an insect?

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The popular view of spiders is that they are insects, or that they are a 'kind of' insect. When biologists insist that they are 'arachnids' this just seems like splitting hairs, and making arbitrary and silly distinctions.

Of course, in terms of biology, spiders are not insects because they have eight legs, not six, and two body parts not three. But they do have exoskeletons, are a similar size to insects, and are a similar nuisance.

The question nicely illustrates the links between fact and culture, between realism and human descriptions. If the criteria used for 'insects' and 'arachnids' were changed, then it could well be that spiders could be viewed as a type of insect. The subject of classification does involve an often complicated set of criteria in which the factual expertise of the biologist is linked to human creativity and decision making. The categories of 'insect' and 'arachnid' are in a weak sense, socially constructed ie decided and agreed upon by the scientific community. But the living creatures that exist do exist, regardless of the classification, and regardless of whatever thoughts I might have about them.

It is recorded in Genesis 3 that, before sin entered into the world, and before woman was created, that God brought the animals to Adam, and one of his first human acts for Adam as a steward and a caretaker of the earth and the animal world in particular, was to name the animals - to classify them if you like. The classification was human, but the animals had real existence independent of the thoughts and ideas of Adam.

There are plenty of other examples. Some of the easiest are to do with measurement. Why do some people use Fahrenheit while most people use Celsius? There are good historical and human reasons why. Does this mean that the concept of 'temperature' is 'constructed'? Not at all. Whether water freezes at 32 degrees Fahrenheit or zero degrees Celsius does have to do with culture. But at some point on a temperature scale, water does freeze.

Therefore, if those who study how the knowledge of science is 'constructed' merely concentrated on areas such as establishing the difference between fact and culture, then I and most scientists would have few quarrels with it in principle - provided those using the framework also showed a deep knowledge and understanding of the subject matter being put into language.

But the trouble is that the Constructivists commit the logical fallacy of ‘nothing buttery’ ie ontological reductionism. The simple explanation of this is to look at the following statements

1. man is an animal	true
2. man is only an animal	false
3. man is nothing but an animal	

Simple, reductionist statements like statement 1 are true. It is a valid and highly productive way of looking at the world to reduce it to one aspect. The problem comes when we go on to claim more ground than is warranted.

Most if not all advocates of constructivism I have read are non-scientists, and as relative outsiders they study science and dare to describe their approach as the ONLY or MAINLY valid description of the process of science. In other words, all of science is nothing but the science community/culture establishing what they think are the facts.

It is reasonable to assume that some form of Realism dominates the scientific endeavour. Also, there is a human element in science.

In the field of ESP, Constructivism is very popular, in one form or another. Theses and articles are written describing how scientists supposedly ‘construct’ their ideas ie they formulate them, arrange them in a paper, and try and convince the scientific community. Eventually the community accepts statements and they are labelled as facts, or even, general knowledge. To the outsider it all sounds and feels like another form of relativism. ‘A fact is a statement accepted by the community as true’. In other words, a fact is a convenient statement given the status of fact because the community has agreed to the label for that statement..

Most scientists however are working from some kind of realism. There is an objective world out there that is largely predictable and regular. It is possible to observe, experiment, and carefully reason towards a description of the reality that is true. In the process of establishing facts there may well be a small trace of Constructivism.

To be generous, let us assume that science is 50% Realism and 50% Constructivism and this can be objectively measured.

50% Realism	50% Constructivism
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When linguists who study science view all of science from a constructivist perspective we get:

100% Constructivism

Therefore, half of the 100% is wrong. In addition, it is not clear which part of the Constructivist description is wrong. Scientists in general know that Constructivists are wrong, and when they are wrong so often they will not be taken seriously. Clearly, Constructivists do themselves no favour when they are too strong, and when they do not even acknowledge the existence of a different approach.

Now, to extend this analysis by bring it closer to reality. Let us assume that over 90% of science is based on some form of Realism, and less than 10% could be truly labelled Constructivist. Common sense tells us that this is close to the truth.

90% Realism	10%
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This would mean that when Constructivism claims 100% of the territory, then over 90% is a false claim. When a theory is almost self evidently false over 90% of the time, it is an extremely sterile theory.

When I was studying hard sciences at university, we looked down on those studying only the 'soft' sciences such as psychology. We tended to be contemptuous of those studying the Arts, as those studying luxury subjects which were useless and full of opinion and impressions, where one view was largely as good as another. The subjects, teachers, and students were parasites, and only able to live off the wealth created by the scientists and technologists. A scientist who has spent years at the lab bench to discover then develop a new treatment is not going to take kindly to a social scientist who says that his work is largely empire building and cultural. That may happen in the Arts - to the detriment of the Arts, but it is an entirely wrong picture in the sciences.

Of course, most scientists who consider Constructivism largely reject it out of hand - thus increasing the gap between the two worlds. Is there a meeting point? I believe there is. But the constructivists have first to acknowledge that their approach largely misunderstands the reality of the world of science, and the place for culture is limited. The dominant framework must be some kind of realism.

Secondly, it is a principle of anthropology that the outsider asks the expert insider what they think about what the outsider is saying. Some researchers do this, but probably not enough, and not anything like the extent that is needed. There is still the problem that the linguist outsider is presumed to be right. The balance of doubt is firmly against the outsider as being right. Whenever a Sociologist looks at science, their work should be validated by the insiders, the experts. **Only if they insiders overwhelmingly endorse the work does it begin to have academic credibility.**

This principle is an important one: **the work of outsiders should be confirmed by the insiders.** Working scientists should confirm the work of the linguists. This principle is so basic and so important that Werner & Schoepfle (1987 *Systematic fieldwork vol 1 Foundations of ethnography and interviewing*, Sage Publications USA p266) wrote:

We consider it *absolutely essential* that valid ethnographic data be the results of observations only if such observations have been subject to native comment. [italics in the original].

Werner & Schoepfle were anthropologists who wrote a two volume textbook of research methodology. Linguists when they describe science are like outside anthropologists studying the culture and language of science. Linguists are the outsiders. Their work can only be credible if it is substantially endorsed by the insiders.

I do not see this overwhelming endorsement. On the contrary, as Sokal (see later) and others report, the overwhelming majority of scientists dismiss constructivism and relativism.

That should immediately sound deafening alarm bells in the ears of the Sociologists and Linguists. But it seems that most linguists are deaf.

I have explained in my material on research methodology that scientists are incredibly skeptical and cautious. The demarcation point between convincing results and unconvincing results is biased against the proponent. Results are usually accepted only if the data has a less than one in twenty chance of being wrong. **If this criteria of skepticism, this dislike of a false positive, were applied to the social construction of science almost all the work I have seen would be thrown out!**

Can these two viewpoints be reconciled? If so, how?

There are times when people do play around with facts and interpretations. In the process of facts being discovered, tested, and confirmed, there may well be an element of relativism, for a time.

It appears to me that in ESP, Constructivists are saying that science is nothing but constructed meaning; that science is only constructed meaning. I would agree that some times there are elements of convenient fiction in science. But scientists are very aware of this, and actively seek an accurate description that matches reality. An example of a convenient fiction would be the models of the atom. The model of Bohr's electron shells is an extremely useful and graphic picture of how the electrons in the elements arrange themselves into layers, or 'shells' rather like planets in the solar system. Of course, it is a convenient fiction - the spacial imagery represents energy levels, not distance from the nucleus. Chemistry teachers commonly begin their teaching with such a framework. It is an extremely powerful simplification, and has great use predicting chemical formulae for instance. Unfortunately, many students, especially those who only learn the basics, do not go beyond the model and may come to believe that the shells have physical existence. For students who go on to take A level Physics and Chemistry, the exact nature of the levels can be clarified and re-defined.

The various models of the atom would make a good subject for analysis from a Constructivist perspective, provided the Constructivist recognised that something like what is being described actually exists. The theories of scientists are not imaginary - they are imaginative attempts to accurately describe and understand reality. How close do these models, frameworks, and ideas, come to the underlying reality? They must also come to terms with the fact that approximate truth is still truth, so frameworks which are good approximations can still be true within limits.

Therefore, the unanswered question for Social Constructivism, and one they need to answer carefully, is to objectively formulate (with criteria), discover, and measure, when scientists are behaving in a relativist way, and when they are behaving as some form of objective realist. There is a place for Constructivism, but Constructivism errs when it seeks to explain ALL of science as fiction (though they would hate that word). It would do better to clearly demarcate critical realism from fiction, and study how the two relate. In this they would be providing a useful service.

Confusion has been caused whenever the social sciences seek deterministic explanations. Surely, part of the role of social science theorists is to demarcate what is deterministic and what is inherently indeterministic because of the limited autonomy of people. According to Daniel Little:

The core features of science include at least these criteria:

1. an empirical-testability criterion,
2. a logical coherence criterion,
3. and an institutional commitment to intersubjective processes of belief evaluation and criticism.

All sciences place a high value on the use of empirical research and observation as a central means of evaluating scientific assertion and hypothesis. All sciences require that systems of belief be logically coherent and developed. **And all proceed through a community of inquirers in which the individual's scientific results are subjected to community-wide standards of adequacy.**

www-personal.umd.umich.edu/~delittle/BEYPOSIT.PDF. Beyond Positivism
Toward a Methodological Pluralism for the Social Sciences. Daniel Little,
accessed 30 Dec 2008.

That third area is also worthy of study. The first two belong to realism and related subjects such as logic. The third area is a valid and distinct area of inquiry as to how this works in practice.

Therefore, what can be done? What needs to be done?

1. Within the field of ESP and the ‘Sociology of Science’ there needs to be serious debate to establish the criteria to decide when Constructivism applies.
2. Previous Constructivist work needs re-evaluating. Error needs to be identified and admitted.
3. ESP and the Sociology of Science need to rebuild, and seek to accurately describe the language of science within the frameworks used by scientists.
4. It would help if some researchers were to interpret the same data from the two different approaches, and were able to make comparisons.
5. Whenever scientists do take the time to consider Constructivism, their work needs listening to carefully. Works such as that by Alan Sokal & Jean Bricmont (*Fashionable nonsense: postmodern intellectuals’ abuse of science*. Picador 1998) need serious interaction with. Sokal it will be remembered was the scientist who published an essay in 1996 in the journal ‘Social Text’ <http://socialtext.dukejournals.org> which parodied the theorists. The paper argued that quantum gravity is a social and linguistic construct. Only later he revealed that the whole article was a hoax. This and the discussion following from the now famous ‘Sokal Hoax’ need careful consideration. http://en.wikipedia.org/wiki/Sokal_affair has a good summary. For extensive links see <http://www.physics.nyu.edu/sokal/>

But my experience is that my Arts colleagues are strangely ignorant of the Sokal Hoax and the implications. It was as if the views of scientists were not worthy of consideration.

Direct Constructivism to areas that could benefit

There are many good questions out there which would benefit from a Constructivist approach. **To what extent is Mental illness a social construct?** Thomas Szasz has accused Psychiatry of ‘constructing’ mental illness, particularly in the way that the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) is finalised after the association takes votes as to what to classify as a mental illness and what not. His famous book was called “The myth of mental illness” and his major point was that many/all mental illnesses are behavioural not medical. Now, Szasz may well have overstated his case. I have shown that classification is a human (constructed) skill, but that the constructions are subject to the actual real world existing. Szasz may well have oversimplified his case. But he has some valid points. In turn, the defenders of Psychiatry accuse Szasz of ‘constructing’ the idea that mental illness is a myth. Who is right?

I see a similar problem in the **Global warming debate**. Scientists are human, and sometimes do not want to deal with the opposition, preferring to use insults and other tactics. I do not know who is right on this issue since Global warming is well outside my area of knowledge and interest. There are plenty of references on this. Just googling “the myth of global

warming” will get a few. The point I am making here is that this debate is wide open to looking at the human side to evaluating evidence, and how much dogmatism is maintained by the community closing ranks against inconvenient truth.

These questions might be usefully tackled from a Constructivist framework. But most work by scientists is not so contentious and proceeds with little debate. Failure to focus Constructivism on targets where it is likely to exist, and insistence that most or all of science is constructed has led ESP into pointless directions. There is a place for constructivism, but it needs to find better targets.