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2 + 2 = 6: A Defense for Goldman's Causal Analysis of Knowledge

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What does it mean for one to say “2 + 2 = 4”? This is meant to be something so basic, something so innate, that it has no definition. Something like that is not supposed to be irrevocable, fallible. It's not supposed to be wrong. However, when that sentence is said, I think there is one key idea that we take for granted and don't take into account. That is, the idea itself.

What if I said to you, the word *yum* had only 2 letters. You would say, “No, it has 3.” You would, according to the vast majority of the population, be correct. However, I would say, “Prove it.” What would you do? How could you explain it? Here is the justification for my answer.

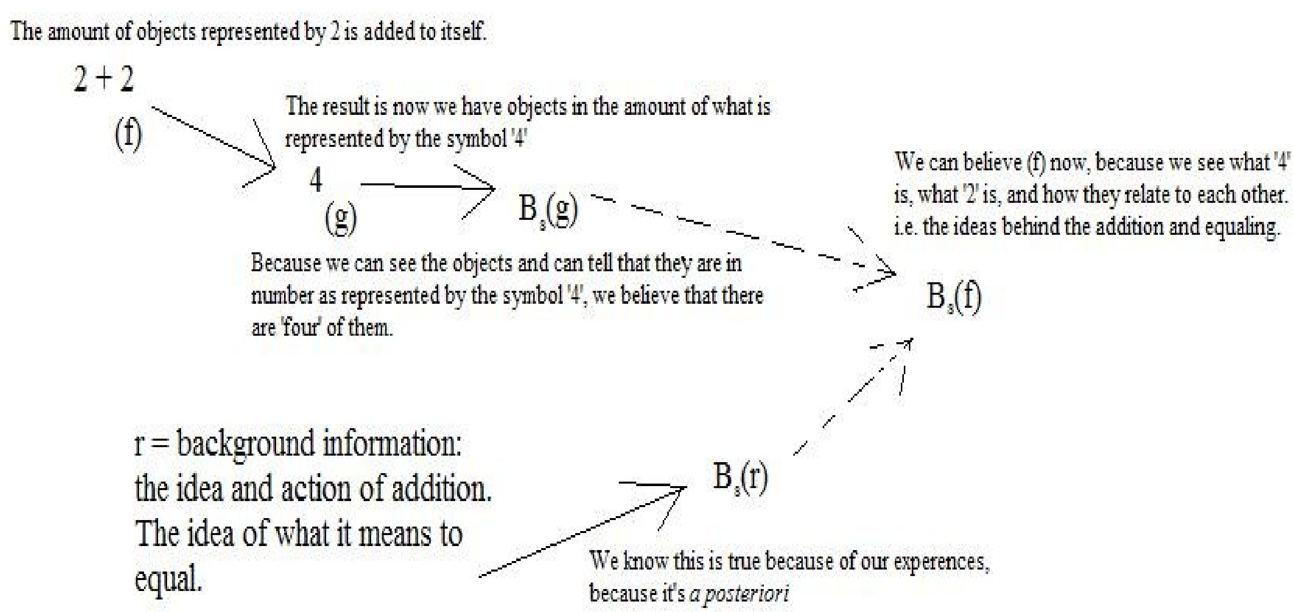
Ever since I was born, I was taught that “. . .” (where “.” represents any single object in the world) was 2. That is to say, if I had “. . .”, I had 2 objects. You would find this nonsensical and irrational. Now, though, here is the key idea: 2, 3, and in fact all numbers and words (more basically, all letters) are all *symbols*. That is, they represent something in the *real*[1] world. That idea is crucial. With it, we can understand how my 2 equals your 3. It is all a matter of *what we were taught*. It is with that teaching, ever since we were born, that we assign **meanings**, such as **values** and **ideas**, to symbols such as **numbers** and **words**. With assigning ideas to words, we learn language. Likewise, by assigning real-world amounts with numbers and actions and ideas to our operands such as addition(+), subtraction(-), and equaling(=), we learn mathematics.

Now we see that all numbers are nothing more than a way to *represent* something in the real world; we understand that they can absolutely differ from person to person, with no amount-number pairing having to be necessary. So how does this all relate to Goldman's Causal Analysis? It all boils down to perception.

1 Anytime I refer to the *real* world, I am referring to the world which we call consider to be real, whether it really is or not.

How do we learn? That is a good question. You may have guessed the answer: perception, of course! In order to be taught, we must receive input from another source. That is how one person transmits ideas or objects to another. A very common perception tool is sight, which will be my main focus. In order to be taught that 2 + 2 = 4, we must learn what 2, +, =, and 4 are. This is done by real world example. A teacher instructing a child with absolutely no previous mathematical experience must show the child ". .", along with a visual 2, possibly written on a piece of paper or notecard. It is in this manner that the child will pair the symbol '2' with the amount of objects (". .") shown to him. This must be done for the remaining symbols. The '4' is shown with the amount the teacher wishes the child to associate with the '4', and the + and = are shown as an action and idea respectively. Now we can see that the previously assumed *a priori* 2 + 2 = 4, is really a learned experience, thus making it an *a posteriori*.

That transition for *a priori* to *a posteriori* is the most crucial one. We now see that have 2 and another 2. We are able to say this equals 4 because of our understanding of the idea of addition: The idea of addition causes '2' objects and another '2' objects to be '4' objects in total. Here is the chart demonstrating this:



So is this a definite defense for Goldman's Causal Analysis? Maybe. Probably not, but it does show how such a 'basic' concept such as 2 + 2 = 4 is really much more, and how it is really causal in nature.