

On the Evident Unevident: A Call Out to the Realizations and Statements of Hidden Assumptions

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How do people achieve knowledge? Person A tells it to person B, but person A does not say *everything* as some things are too evident for him to state; person B, however, might not fill the gaps accordingly, having another feeling about what is evident and what is not. In fact, quite the opposite results: because person B finds other things evident—i.e. things he wasn't told by person A but which seem so evident by association—he will implicitly add his own facts to what person A has said, *not knowing* that they weren't implied by person A.

The same mechanism is present in conversations between person X and Y, where both are already well acquainted with the subject at hand. Both express their view on the matter, but not their *whole* view: person X surely won't mention statement α , as it is too evident; person Y agrees X must not say everything, knowing that β would've been too evident to state. Alas, often $\alpha \neq \beta$. And they are often not just different, but *very* different, such that person Y would be shocked to learn statement α had been believed but unexpressed by person X for so long. Let us call such an implicit assumption (implicit in the sense that *no one* is aware of it) an evident unevident.

One might suspect that an evident unevident would not last long: if α were sufficiently different from β , the statements of person X would soon become incomprehensible from the β viewpoint, and vice versa. In practice, however, this is doesn't have to be the case: a conversation is often not exhaustive and *many* things are left implicit, so that there is a lot of wiggle room for person Y to still think he understands person X. A major culprit for person Y's willingness to ignore the dormant $\alpha \neq \beta$ is that β is *too* different from α , and Y cannot fathom the idea that X would not have mentioned having the odd thought α . Person Y finds β so evident that rather than believing X finds β far less believable than α , person Y rather searches the

blame for any decoherence in smaller issues, and if person Y cannot find a good scapegoat, he'd rather blame it on his imagination.

This phenomenon has found its playground in quantum mechanics. When a student is taught the subject, he immediately attaches an interpretation to it, often not knowing that he does, and the details of the specific interpretation are unreasonably dependent on incidental circumstances. The student often does not know where the *pur sang theory* ends and where the interpretation begins. This could largely be prevented if the instructor were aware of this phenomenon, but in fact he is just another victim. Once he too was a student, thinking he was simply taking established knowledge into himself, when he was instead painting it with his own brush. And as much as an interpretation is ridiculously easy to attach (rather: intertwine)—what one finds evident one does not even introduce explicitly but slides in unknowingly—just as much is it troublesome to remove it. After all, to do the latter, one has to first *find* what one has introduced unknowingly, and what one finds evident, one always skips upon introspection. As such, the mental picture accompanied the student to his professorhood. Once a professor, teaching quantum mechanics, he left gaps in his explanation where his evident unevident lie dormant, with his students ready to replace them with theirs.

While it is without a doubt the most difficult step, it is not sufficient to simply *find* your evident unevident. Altering them by comparing them to the evident unevident of others (assuming one can pry some loose of others) is not easy. If something had been evident enough to initially slide in unknowingly as an evident unevident, one will demand a great deal of arguments in change for a persuasion of his error. I use the word “error”, while of course an evident unevident doesn't have to be false. But even if the evident unevident in question were true, would one call it “correct knowledge”? It had, after all, been introduced without considerable reflection; the option that it could have been false hadn't been entertained.

Some typical evident unevidents for the quantum mechanics student are the interpretation that the wave function is

- the only physical reality and that measurements talk about this entity;
- an expression of our ignorance of the real position of “the particle”;
- one part of the dual entity “wave and particle” which form an inseparable union as part of physical reality.

The evident unevident is still pretty moldable in the beginning, such that remarks from the professor or book can alter it. But it hardens quickly with time, and by the end of the first course, it has sunk deep into the student's notion of quantum mechanics.

A result of the evident unevident in both the students and the professor are situations where a student asks the profesor a question which in fact challenges the professor's evident unevident, in which case it is possible that the professor doesn't even understand the student's question, as he cannot reply with what is self-evident. Note that it certainly doesn't have to be this way, and that experimental physicists are far more likely to suffer from evident unevidents. Theoretical physicists, however, are not exempt from this. All in all, the appereance of evident unevidents is inversely proportional to the person's critical nature.

The presence of evident unevidents open the door to inconsistencies. As people with a lot of evident unevidents are also uncritical people, they will not evaluate all their beliefs on the same day; rather one evident unevident appears on monday, and a second, inconsistent one on thursday. Due to the time length between these days, by thursday one has forgotten what one has said on monday. One is not confronted with them. Eventually one can yield the inconsistent evident unevidents on the same day, still not noticing it because he is so used to using either. This can lead to great frustration to the more critical person, who is baffled by not only the inconsistency, but even more so by how the sinner seems to believe in his consistency.

I end with a personal example: I asked two professors that I know are close friends (they know each other since their student years and now share an office) a similar question on separate occasions. From their answers I could deduce that one believed that there is a particle hiding under the psi function (based on the fact that after relentless inquiry about tunneling he stated that it was evident that *the particle* didn't just disappear at one end of the potential barrier and reappear at the other but that its motion was continuous) while the other believes there is nothing *but* psi (based on the fact that he didn't even understand me when I asked if a measurement tells me something about a particle hiding under the psi function). Even though they must've discussed quantum mechanics with each other for many years, this basic and fundamental difference in their conception of it was (and is) presumably able to slip by undetected because for the former, the word "particle" refers to the particle hiding under the wave function, but for the latter "particle" is simply synonymous to the wave function, only attaining its "classical" meaning in a certain macroscopic limit. Their implicit notions of the word "particle" are one of their evident unevidents. It might not be incidental that both are experimental physicists.