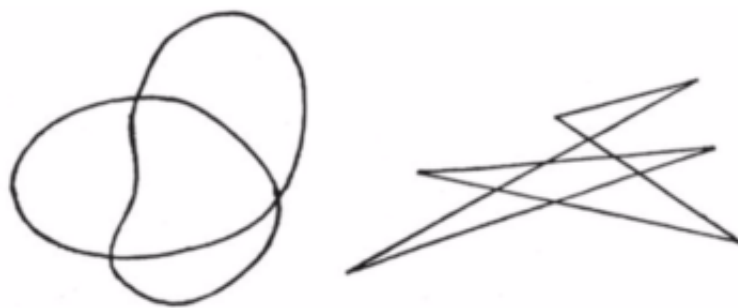


What's In A Name?

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by Tasneem Zehra Husain



No offense to Shakespeare, but I've never quite bought into the philosophy that names are immaterial. Calling a rose by another name might not affect its smell, but it could well impact our association with the flower.

To me, the act of naming borders on the sacred. Names, I feel, shouldn't be easily replaceable; they are not placeholders or dummy variables, but titles, clues to the true nature of something, and as such, they should contain the essence of whatever it is they label.

I know this may sound naive; and I admit it smacks of fairy tales and myths: fantasy worlds where knowing someone's true name (Rumpelstiltskin, for instance) grants you power over them, but there is a fair bit of evidence that even here in the 'real world', a name - both the visual arrangement of letters, as well as their sound - impacts our perception of the named.

The most quoted example is that of German psychologist Wolfgang Kohler's famous study, in which he made up two nonsense words, *maluma* and *takete* and drew two shapes to accompany them - one sharp and angular, the other a rounded squiggle. When asked to pair the object with the name, the vast majority of respondents labelled the rounded object *maluma* and the angular

one *takete*.

Adam Alter describes this and several other studies in his [New Yorker piece](#) before concluding that "as soon as you label a concept, you change how people perceive it."

If I was to argue this point, I thought, I could probably say all I had to on the subject just using the Higgs Boson as a case study. In my opinion, most of the misconceptions about this celebrity particle came about due to wrong names.

The biggest and most persistent problem faced by the Higgs Boson lies not with its name proper, but an unfortunate nickname it acquired along the way.

When Nobel Laureate Leon Lederman wrote his popular science book in 1993, the Higgs Boson was still missing. About three decades had passed since it was first postulated and though physicists persevered in their search, they were beginning to get a little exasperated. To make matters worse, the boson is so integral to the Standard Model that it could not be ignored in any account of particle physics, so even in the absence of any proof that it existed, one couldn't stop talking about it. Lederman shared this frustration with a lay audience by referring to the Higgs boson as the 'goddamn particle' ; an irreverent expression meant to convey the conflicted attitude of the physics community towards this elusive yet essential component of an otherwise widely successful model.

Lederman's publisher - [so the story goes](#) - decided that it wasn't appropriate to use the word goddamn in print, so he cut off the damn and simply referred to the boson as the God particle. This became the title of the book.

The term had undeniable mass appeal, so the press threw it about and soon the Higgs Boson became known globally because of a nickname it acquired

quite randomly. But, regardless of how casually or incidentally they come about, we instinctively treat names as clues. As was bound to happen, most people who heard about this boson simply took off from the word 'God', jumped to completely baseless conclusions, drew parallels that didn't simply exist, and wove a tangled web of unnecessary confusion all around the missing particle. They were curious about it, true, but for all the wrong reasons.

The damage done by that publisher's ill-judged edit has not yet been repaired. The world at large continues to refer to the Higgs Boson as the God particle, packing into that term more mistaken connotations than one would have thought possible. For two decades, physicists have complained about this unfortunate misnomer, pleaded with the public to stop using it, and explained over and over again why it makes no sense.

Even Peter Higgs has spoken up against it. In an interview with BBC Scotland, Higgs said "... I know that name was a kind of joke and not a very good one. I think he shouldn't have done that as it's so misleading."

Then again, naming the boson after Peter Higgs has been fairly controversial too.

The discussion had been going on for a while in physics circles, but it came to a head after the boson was discovered and a Nobel Prize was in the offing. The rules stipulate that a Nobel prize can be shared by three people at most and the obvious question was, which three? Because, as has been the case with many other important developments in physics, (quantum electrodynamics, the electroweak theory, etc), the idea about the boson (that came to be known as the Higgs) alighted on several people, working independently of each other, more or less simultaneously.

Leaving aside the entire argument about the importance of assigning credit to

the experimenters who discovered it, (and how that should even be done now that discoveries are made by teams of thousands) six theoretical physicists were possible contenders for a Nobel Prize.

Robert Brout and Francois Englert, from the Free University in Brussels, published the first paper on the topic in 1964. Peter Higgs wrote up his version a few months later, and - apparently in reply to a referee's comment - he added an extra point which turned out to be key. Where Brout and Englert had already conjectured a field that could endow particles with mass, it was Higgs who clarified how such particles could still obey the laws of symmetry. A few weeks afterwards, Dick Hagen, Gerald Guralnik and Tom Kibble of Imperial College published their version of the idea.

Bound by the rules, the Nobel committee decided to award the 2013 Physics prize to Higgs and Englert. Robert Brout, having died two years earlier, was no longer eligible; the prize is not awarded posthumously. The decision to exclude the group at Imperial was understandable, given the constraints, but it was not popular and it did not sit right, even with the laureates themselves.

In a bid for a name that attributed credit to all parties concerned, Higgs proposed renaming the particle the ABEGHHK'tH Boson, (the generous, inclusive acronym includes both Carl Anderson and Gerard 't Hooft, whose work also played a role in the development of key ideas.) But this unpronounceable name - despite being more democratic than the 'Higgs Boson', and infinitely more justified than the 'God Particle' - was not as catchy, and hence, never took off.

To be fair, there was an added hurdle in that by the time the boson was discovered, it had been known as the Higgs for too long to be easily renamed. A [Nature editorial](#) on the topic made an interesting point: "There are already relatively few concepts in [particle physics] that have achieved widespread recognition without crossing one of them out. In business, it would be considered destructive to take a well-known name and replace it with a long-winded, technical-sounding alternative that no one has heard of." In other

words, re-branding the Higgs would not be a smart move because the familiarity and associations that had accrued to this word would be irretrievably lost; over the decades, this name had acquired meaning.

Both these controversies, surrounding the name and the nickname of the Higgs boson, played out several years ago, but the unfortunate trend continues.

A month ago, when news came out that [the LHC had turned the beam on again](#), in preparation for a new season of collisions and data collection, I found several people asking why: Why is the LHC still running, now that the 'God particle' has been found? (One of the many issues with that name is that it implies a finality and fundamentality the Higgs boson never claims.)

My answer to this question is twofold: when we had not yet seen it, our primary objective was of course to prove that the Higgs boson existed at all, but that was never meant to be an end in itself. We wanted to find the particle so that we could study it in detail, and we're not done yet. We still have to check if the Higgs boson we see is identical to the one in the equations. One way we can do that is by studying its decay modes. The Higgs boson is too evanescent to ever be glimpsed directly; we can know it only through the particles it decays into. There are eight ways in which the Higgs boson can decay, eight 'channels' it can flow into, and the standard model predicts how often each of these eight combination of particles should be seen. On the strength of existing data, some of these channels are better understood than others and the lesser known ones remain to be probed.

Then, too, there are things the standard model is not equipped to tell us, the mass of the Higgs for instance, or why there are two, heavier, copies of the electron, the neutrino, and the up and down quarks; we don't yet understand why these three 'families' are necessary. Successful as the standard model is, we now know that it describes an embarrassingly small fraction - one part in

twenty - of the physical universe. The remaining expanse is occupied by what we can dark matter and/or dark energy - names that parametrize our ignorance. Since we are faced with issues on which theory cannot authoritatively opine, we must count on observation to point the way. The realms we now probe are almost unfathomably small, any new information will have crawled into the ring crevices between decimal places. The collisions should continue and we should comb through the data they leave in their wake, parsing it for patterns, structure and logic - or departures therefrom.

Neither of these two motivations - studying the decay channels of the Higgs boson, or probing physics beyond the standard model - appear to have made their way outside labs and classrooms. There seems to be minimal awareness of the fact that even though the Higgs boson has been discovered, it needs to be studied in ever closer detail.

Again, I think, part of the blame lies with a name. Back when we were still looking to catch the slippery boson, we took to calling the scientists who were on this search, Higgs Hunters. The alliteration is pleasing and the image conjured is vivid - but misleading. The name wasn't entirely appropriate because the so-called Higgs hunters weren't chasing exotic quarry to shoot or cage it. Our aim was never to capture and subdue a wild animal, but instead to go and watch it in its natural habitat. The scientists and engineers who set out on this safari were much more like zoologists than hunters but Higgs Zoologist doesn't have nearly the same ring as Higgs Hunters, and I doubt it will catch on.

A single case study doesn't prove anything, I know, but it can serve to illustrate - or give added weight - to a point. Or, as in this case, to echo a sentiment: ["words carry hidden baggage," to the extent that even a single word has the power to profoundly impact material outcomes over time.](#)

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