Calculus of Qualia: Introduction to Qualations 7 5 2022

Abstract

The basic idea is to put qualia into equations (broadly understood) to get what might as well be called *qualations*. Qualations arguably have different truth behaviors than the analogous equations. Thus 'black' has a different behavior than ' █ '.   This is a step in the direction of a 'calculus of qualia'. It might help clarify some issues.

[1] Introduction

On the one hand, we can write X = red. On the other hand, we can write Y = 🟥. I believe that X ≠ Y. This is worth exploring. The purpose of this paper is to give a beginning to one path of exploration. I do not assume that everyone agrees about every proposition. Indeed it might be that positions on the mind-body problems (physicalism, dualism, monism, idealism, etc.) can be classified by one's take on various equations and qualations.

It could be argued that it is not that science cannot handle qualia. Rather, it's just that qualia have to be treated somewhat differently than 3rd-person entities.

1. Introduction
2. Qualia + Equations = Qualations
3. Functions with Qualia
4. Hard Problems
5. Names and Referents
6. Do Qualia exist *Necessarily*?
7. Time
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[2] Qualia + Equations = Qualations

Consider

(2.1) the phenomenal character and/or the phenomenal concept engendered in a human with normal color vision by photons of wavelength 700 nm

and

(2.2) 🟥

I assert that (1) and (2) are *irreducibly different,* if understood in the correct language. That is the crucial point. I further assert that the difference between (2.1) and (2.2) is not 'obvious and superficial' but rather 'not obvious and profound'.

One may try to improve (2.1) by something like

(2.3) the phenomenal character and/or the phenomenal concept engendered by photons of wavelength 700 nm in a human with normal color vision as understood in the correct language

But the point is now that (2.3) is also irreducibly different than (2.2), and in the same way that (2.1) is different than (2.2).

It is worth noting some consequences.

1. (2.1) and (2.3) only *point* to the term in (2.2). Supposing that their terms were the same as the term in (2.2) is to make the classic mistake of supposing that the finger that is pointing to the moon is actually the moon itself.

2. Taking into account the differences between (2.1) and (2.3) on the one hand, and (2.2) on the other hand, are necessary if we are going to say that qualia are irreducibly 1-st person (which is to say, not reducible to the 3rd-person *in any way*) and that 3rd-person terms are not reducible to 1-st person terms *in any way*.

3. (2.2) uses a different term from (2.1) and (2.3) in our language. This difference is 'non-trivial'. The difference carries a non-zero amount of information.

4. There is no expression in black-on-white (black words on a white background, on paper or a computer screen or what have you) *whatsoever* that coveys the information in (2.2).

5. I cannot tell if you are a zombie. But, given (2.2), I can tell that *I* am not a zombie. The upshot is that 'is *he* a zombie?' is an ill-posed question. So it is then not surprising that an answer is not forthcoming. This is expanded on below.

6. It's irrelevant whether *Mary* can see colors when she exits the black-and-white room and steps into a the colorful world. The relevant question is whether *I* can see colors.

7. The terms in (2.1) and (2.3) cannot contribute to the statement of a hard problem (or hard question). And if they do not ask a question it is no wonder there is not an answer forthcoming.

8. Clearly, various solutions to (2.1) and (2.3) can be given that are nevertheless *not* solutions to (2.2). If you will forgive this locution, I would say that this may not be obvious, but it is self-evident.

9. It is conceivable that we can vary (2.1) and (2.3) independently of varying (2.2). For all we know, this actually happens in our universe.

10. The *copyright* of this paper *must* include actual red. Otherwise it is not a copy. This fact is not true of any philosophy paper ever written up to this point (or up to several previous papers in this line).

11. Suppose we assume that the behavior (in some given sense) of the terms in (2.1) and (2.3) is the same as the behavior of the term in (2.2). What that shows (proves, I would say) is that 'behavior' is *not* what we're talking about when we say 'irreducibly 1st-person'.

12. Suppose there is a professor who writes the number '5' on a chalkboard in a classroom that has 30 students in it. Then, clearly, there is some sense in which there is just *one* number 5 in the classroom. This mathematical object is known by intuition, its relation to other mathematical objects, and physical objects. Thus in this sense these are independent of the particular person who apprehends the number.

But suppose the professor has colored chalk and writes the term in (2.2) on the chalkboard. Then, clearly, there is some sense in which there are then *31 different* reds in the classroom (30 students + 1 professor).

Let us resume the development. One might try to capture (2.2) by something like

(2.4) in two-valued semantics define the term $t = t(x, y)$, where x is 1st-person and y is 3rd-person.

But this doesn't work either, for the same reasons that (2.1) and (2.3) don't work: it doesn't specify the information contained in (2.2).

We will consider (2.2) a qualation even though it is only one term. (2.1), (2.3), and (2.4) are not qualations.

One may write

(2.5) blue light + red light = magenta light

(2.6) blue paint + red paint = purple paint

and yet

(2.7)   + = ⌒

where, in (2.7), the two terms on the left hand side are apprehended by two different subjective states, but the two terms on the right hand side are apprehended together by one subjective state. Setting aside the issue of the operators for the moment, there are two qualia on the left hand side: first blue and second red, (or, depending on how they are apprehended, first red and second blue), but only one quale on the right hand side: blue and red. This is developed further below.

The upshot is that (2.7) is different from (2.5) and it is different from (2.6). I conclude that (2.7) *cannot* be reduced to (or even stated by) either (2.5) or (2.6).

We have

(2.8) blue = red

versus

(2.9) ⬛ = 🟥

Here (2.8) is not a qualation, but (2.9) is a qualation even though it is false. On the other hand, a color-blind person would give (2.9) as true. This is considered below.

We may call

(2.10) red = 🟥

a mixed qualation. It contains a reference to red and an actual red. But (I claim) it is false too.

A qualation necessarily contains qualia, and not merely references to qualia. Neither of these are qualations:

(2.11) the term in (2.2)

(2.12) let's suppose *X* is a quale or a qualation

It could be that tomorrow we discovered that the correlates to consciousness are radically different than what we now think they are. But the qualation (2.2) *would have exactly the same meaning*. It would be the same qualation. However, one could ask what is the set of 3rd-person configurations and processes that makes this qualation true?

[3] Functions with qualia

Write R for a variable that ranges over the possible [R]'s, and [R] for a quale of red itself. We will pretend [R] is a quale, for the sake of discussion, but [R] is not 'actually' a quale of redness, which the right side of (2.2) is. Let G be a variable that ranges over greens, [G] be 'actual' green, B be a variable that ranges over brains, [B] be an 'actual' brain, and [B_2] be another actual brain. For a function f_i both domain and range can be specified.

For example

(3.1) f_1: (B, [B]) –> ([B_2])

is a function from a domain variable B ranging over brains, and an actual brain [B], and has range actual brain [B_2]. The Dualist has it that there is no reduction of qualia to 3rd-person brains, so f_1 cannot solve (or even state) a hard problem.

(3.2) f_2: (R, [R], B, [B]) –> (B) where R is a variable that ranges over the possible [R], and [R] is a red quale. F_2 cannot solve a Hard Problem either.

Note a Physicalist would have something like

(3.3) f_3: (R, ■, B, [B]) –> (B, [B_2])

which could be said to be a *mixed qualamap* because not all the terms are qualia. The Dualist would have answers to the Hard Problems be something like

(3.4) f_4: (R, ■, B, [B]) –> (B, ■)

Indeed the dualist's notion of spectrum inversion is that

(3.5) f_4: (R, ■, B, [B]) –> (R, ■, [B_2])

cannot be experimentally distinguished from the mixed qualamap

(3.6) f_4: (R, ■, B, [B]) –> (R, ■, [B_2])

But clearly there are many ranges to try for a good model of answers to the hard problems. One could

define a *qualimorphism*

(3.7) Q(■) –> (■)

One could define two identity qualimorphisms

(3.8) Q_1(■) –> (■),   Q_2(■) –> (■)

Obviously, there is a mathematical structure as to the relations between qualia and qualimorphisms. This is different than morphisms among *representations* of qualia. However, to a person who cannot distinguish between red and green, all three of these equations are the same qualations, and in some sense there would be only one, identity, qualimorphism.

An analog of

(3.9) f_5: (R, [R], G, [G]) –> ([G])

is

(3. 10) f_6: (red, ■, green, ■) –> (■)

[4] **Hard Problems**

A hard problem is a qualation. Thus

(4.1) why is my red *red*?

is not a hard problem, but

(4.2) why is my red ■?

is a hard problem. I would contend that there are solutions to (4.1) that are nevertheless *not* solutions to (4.2).

Hard problems might be able to be solved this way: on Dualism, record the neural processes R that correlate to experiencing red qualia. Then record the neural processes W that correlate to having the subjective experience of answering a *why*? question. Then, in some judicious way, induce the processes of R and W together (if possible), and a (1st-person) answer to the relevant hard problem should be forthcoming. The answer to a hard problem (in addition to the question) is a qualation. There is a different hard problem for each quale.

[5] Names and referents

We'll use this notation. We suppose that red names a quale of red (i.e. redness). We'll suppose that ˈredˈ names the English word red. We can iterate this. Thus ˈˈredˈˈ names ˈredˈ. We can take this further. Just as ˈredˈ names red, we could use the notation that ˌredˌ is what is named by red. This can be iterated too, so that ˌˌredˌˌ is what is named by ˌredˌ and so on.

Then ˌˈredˈˌ is what is named by ˈredˈ. This is red. In contrast, ˈˌredˌˈ is the name of what is named by red. This is also the word red. Obviously there is a calculus here.
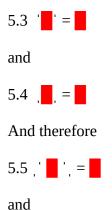
Now, for equations we have

5.1 ˈredˈ ≠ red

as the former is the name of the latter.

Also

5.2 ˌredˌ ≠ red

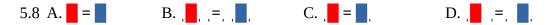as the former is what is named by the latter.

However, for qualations we have

5.3 ˈ█ˈ = █

and

5.4 ˌ█ˌ = █

And therefore

5.5 ˌˈ█ˈˌ = █

and

5.6 ' ˌ🟥ˌ ' = 🟥

We can have a mixed qualation in that contains both 3rd-person information and 1st-person information:

5.7 ˌredˌ = 🟥

These four are different from each other (without further assumptions):

5.8 A. 🟥 = 🟦   B. ˌ🟥ˌ ˌ=ˌ ˌ🟦ˌ   C. ˌ🟥ˌ = 🟦ˌ   D. ˌ🟥ˌ ˌ=ˌ 🟦ˌ

Here, A. is a qualation. B. is a qualation involving what is named by the left-hand-side, what is named by the equals sign, and what is named by the right-hand-side. C. a qualation of what is named by just the one quale (see 2.7). D. is the qualation that is what is named by: the left-hand-side, what is named by the equals sign, and the right-hand-side.

These can also be iterated or extended in various ways. Various equalities and inequalities can then be derived or proposed.

A color-blind person would give different answers to various propositions. For example a person with normal color vision would see that A. is false, but a person with sufficient color blindness would see that A. is true.

These considerations generalize to all 3rd-person and 1st-person entities.

A proof in qualia calculus involves actual qualia.

(5.9) X = ˌ🟥 + 'red = 🟥' + 🟥 = ˌ'🟥' + ˌblueˌˌˌ

Solve for X.

Is there a notion of multiplication? One way to understand a qualation
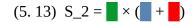
(5. 10) 🟥 × 🟦

is to suppose 1. there are as many red qualia as there are blue qualia, and 2.

(5. 11) 🟥 × 🟦 = 🟦 × 🟥

Then we may suppose the multiplication in (5. 10) gives either 1. the set S (with and expanded notion of 'set' so as to accommodate qualia), or else 2. an un-selected one of its elements, or else 3. a selected one of its elements, where the un-ordered set S contains un-ordered elements such that

(5. 12) S_1 = { (empty set), (🟥, 🟦), (🟥, 🟥, 🟦, 🟦), (🟥, 🟥, 🟥, 🟦, 🟦, 🟦), … }

and

(5. 13) S_2 = [green] × ([blue] + [red])

gives

(5. 14) S_2 = { (empty set), ([green], ([blue] + [red])), ([green], [green], ([blue] + [red]), ([blue] + [red])), ([green], [green], [green], ([blue] + [red]), ([blue] + [red]), ([blue] + [red])), … }

And of course there might be other definitions of multiplication.

[6] Do Qualia Exist *Necessarily*?

Abstract to this section
Why is there something rather than nothing? I don't know. But 'nothing' may not be the correct default state. It may be that the existence of *possibilities* (possibilia) requires fewer (weaker) assumptions. In this case, arguably, we should start with the existence of possibilities and not 'nothing'. In this case, there exists the possibility of (for example) red qualia. But the possible existence of a red quale does not delineate what it is the possibility *of* if the possibility contains only a *reference* to red. Instead, the possibility must contain an actual instance of red to delineate what it is the possibility *of*. But, if possibilities are the weakest starting assumption, and the *possibility* of a red quale must itself contain an *instance* of red, then red exists necessarily. This argument would work for all qualia. Further, it could be that physical things and physical laws are (in some sense) instances of qualia. Incidentally, this would solve the problem of evil: pain, too, is made of qualia. These considerations align with some suggestions by Leibniz.

Leibniz: the greater the quantity of its essence, the more it exists. "But in order to explain a little more distinctly how temporal, contingent, or physical truths arise from eternal or essential or metaphysical truths, we must first acknowledge, from the fact that something exists rather than nothing, that there is in possible things, i.e. in possibility or essence itself, a certain demand for existence or (so to speak) a straining to exist, or (if may so put it) a claim to exist; and, to sum up in a word, essence in itself strives for existence. From this it follows further that all possible things, i.e. things expressing an essence or possible reality, strive with equal right for existence[2] in proportion to their quantity of essence or reality, or to the degree of perfection which they contain; for perfection is nothing other than quantity of essence." [1].

Why is there something rather than nothing? I don't know. And if there were *absolutely* nothing—not even potential logical structures or anything it's hard to see how things could get off the ground. But it's simply not clear that that's the right question. It may be that it requires fewer (weaker) assumptions to allow that there are *possibilities*.[1] If that's the case, we may at least consider the existence of such-and-such possibility.

To express things a certain way, suppose we have the existence of the possibilities that

(6.1) p_1: 2 + 3 = 5

(6.2) p_2: 2 + 3 = 6

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1   I'm going to use the word *possibilities* instead of the word *possibilia* because the former is more dynamic.

If we regard p_1 and p_2 as abstract mathematical propositions, then both propositions could exist, in the sense of abstract mathematical propositions. These would exist in the realm of 'numbers' or, more generally, 'structure'. If we allow the existence of possibilities, then the *possibilities* of p_1 and p_2 could both exist. But consider

(6.3) p_3: $2 + 3 = 5$

(6.4) p_4: $2 + 3 = 6$

Where, here, we interpret p_3 as saying: if there were 2 things (perhaps physical objects) and 3 (other) things, then there would be a total of 5 things. But then it is the case that it could not be that if there were 2 things and three (other) things, then there would be a total of 6 things. So in this case the existence of the possibility p_3 rules out the existence of the possibility p_4. In this case, p_3 delineates what it is the possibility *of*. p_3 cannot be interpreted as p_4.

I am assuming

(6.5) if X is possible, then there exists a possibility, namely the possibility of X

The possibility need not have the same kind of existence that X would, but there is something that exists in some sense nonetheless. That is all we are after.

We want to consider the possibility 'the quale red exists'. The problem here is that this simply does not rule out that what 'red' means within the possibility is not what we would call 'green' (for example). The locution 'red exists' does not rule out that 'red' could refer to any particular quality whatsoever. Thus, 'red' cannot be part of the existence of the possibility, as the possibility does not mean what we want it to mean.

Instead, we have the existence of the possibility p_5 that

(6.6) ██ exists

which is to say, if there were the possibility of ██ then ██ would actually exist.

Now, (6.6) rules out that the possibility in question *could* be talking about anything other than what I would call a red quale and (I would claim) it is the only way to do so. But notice that to merely *specify* the possibility of the existence of red *qua* redness, we had to give an *actual* red. Otherwise, the possibility does not know (so to speak) what is meant by 'red'. So in p_1 and p_2 we have it that 'it is possible that …' does not require the actual existence of anything, but in p_5 we have it that the subjunctive 'if there were …' *does* require the actual existence of some particular thing.

What I have been struggling to argue is that 'the possibility red' must itself contain actual redness, since otherwise the possibility cannot specify what it is a possibility *of*. If this possibility wants (so to speak) to rule out that it is the possibility of the existence of greenness, then it must specify 'red' in the possibility in such a way that it can be differentiated from 'green'. But a mere *name* for a color cannot do this. The only way to do this is to use the actual quale of redness.

This argument evidently applies to any possible quale whatsoever. On the one hand that sounds bad. But on the other hand, it could turn out that physical laws and physical things can be understood as particular kinds of qualia.

Incidentally, this would solve the problem of evil: there is pain in the universe because pain, too, is qualia.

There is a further consideration. Since we experience red qualia. Then it is the case that in retrospect red qualia *could* exist. But what allowed for the potential existence of redness in the first place? Why is it that out of all of the possible qualia there is redness? I don't know.

We briefly consider the question of which requires weaker assumptions: nothing, or the existence of possibilities.

To start with, note that 'nothing' might itself require an axiom (Inwagen ?). Namely, that there 'is' 'nothing'. But note, this is unstable on some considerations. If there is 'nothing' it must be *possible* for there to be 'nothing'. But in that case the *possibility* itself exists. Thus, something exists.

But the question of weaker assumptions hinges on what we assume the 'background' formal logical system is (the one in which we evaluate the axioms). A problem is that an assumption a_1 might be weaker (and therefore more probable) than another assumption a_2 in one formal system FS_1, but a_1 might be stronger (in the sense of requiring or assuming more) than a_2 in another formal system FS_2.

The natural thing to try is to then evaluate which is weaker: FS_1 or FS_2. But this depends at least partly on the role the formal systems (as mathematical or structural objects) are to play in relation to what is supposed to exist in its particulars, and is therefore a big mess. See the No Free Lunch theorem.

Further, things depend on what we take to be the primitive terms of the formal systems. Compare term ' ' (i.e. an instance of nothing) to term '██'.

[7] Time

I will assume the reader is already fluent with McTaggart's A-series and B-series, [2].

Qualia are phenomenal. McTaggart's A-series is often taken to be or argued to be phenomenal. So it is worth asking what qualations involve the A-series. For example, qualation (5.3) reflects the fact that, if presentism is true, then the *description* of presentism must also be in the present. And the description of the present is 'becoming' just as much as the actual present is 'becoming'.

Let the domain of functions f_i be

(7.1) $(\tau, [\tau], t, [t])$

The B-theorist asserts there is a function with domain (7.1) and range

(7.2) (τ, t, [t]) that doesn't lose information, and the presentist asserts there is a function with domain as in (7.1) and range something like

(7.3) ([τ], [t])

(These may need refining.)

[8] Conclusion

The beginning of a 'calculus of qualia' has been given and seen to be non-trivial. It is possible that various takes on qualations delineate various positions on the mind-body problems. Several other applications were given.

References

[1] LEIBNIZ: ON THE ULTIMATE ORIGINATION OF THINGS, Source: Manuscript held by G. W. Leibniz Bibliothek, Hanover, Shelfmark LH 4, 1, 10 Bl. 2-4, [LH 4, 1, 10 Bl. 2R], 23 November 1697, http://www.leibniz-translations.com/ultimateorigination.htm

[2] See McDaniel, Kris, "John M. E. McTaggart", *The Stanford Encyclopedia of Philosophy* (Summer 2020 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/sum2020/entries/mctaggart/>.