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ON EXPERIENCING MEANING: IRREDUCIBLE COGNITIVE PHENOMENOLOGY AND SINEWAVE SPEECH

abstract

Upon first hearing sinewaves, all that can be discerned are beeps and whistles. But after hearing the original speech, the beeps and whistles sound like speech. The difference between these two episodes undoubtedly involves an alteration in phenomenal character. O'Callaghan (2011) argues that this alteration is non-sensory, but he leaves open the possibility of attributing it to some other source, e.g. cognition. I discuss whether the alteration in phenomenal character involved in sinewave speech provides evidence for cognitive phenomenology. I defend both the existence of cognitive phenomenology and the phenomenal contrast method, as each concerns the case presented here.

keywords

irreducible cognitive phenomenology, sinewave speech, experiencing meaning

It helps to think of sinewave speech as a phenomenal contrast. In the naive case, you hear the sinewave as noise. In the informed case, you hear the sinewave as speech. So undoubtedly, an alteration in phenomenal character has taken place. How did this happen? In between the naive and the informed case, you heard the original speech, from which the sinewave is derived. After having heard the original speech, you hear the whistles and beeps as syllables and words. Since the audio stream does not change from one case to the next, one is motivated to consider whether the alteration in phenomenal character is attributable to some extrasensory faculty, such as cognition.¹

In this paper, I discuss whether and to what degree sinewave speech provides evidence for cognitive phenomenology. Before proceeding, I wish to dismiss a possible misconception. If you wish to claim that sinewave speech involves an alteration in the phenomenal character of sensorial content, I believe there is only one possible path open to you, other than perhaps building a case based on shifting one's attentional focus, which will be discussed later. You need to argue that the difference between the two cases can be accounted for by appealing to mnemonic recall of the original speech. In other words, upon hearing the sinewave the second time, one recalls and replays the sounds of the original speech. This claim, however, does not correspond to the phenomenology of hearing the sinewave the second time. If you are like me, when you hear the sinewave in the informed case, it does not seem to you that you hear a mnemonic recall of the original speech; rather, it seems to you that you can actually hear the words of the original speech in the sinewave, whereas before you heard only beeps and whistles. Appealing to the phenomenology of hearing the sinewave the second time is not meant to deny the role that memory plays in hearing the sinewave as speech. The argument provided by concentrating on the phenomenology simply amounts to denying that one hears an internal, monological echo or mnemonic replay of the original speech.

- I. Let us now discuss to what extent sinewaves provide evidence for irreducible cognitive phenomenology. To clarify, by 'irreducible cognitive phenomenology' I mean a phenomenology of cognition that is not reducible to the phenomenology of the senses, whether imagined or otherwise (see Chudnoff, 2015).

¹ I strongly suggest that readers experience sinewaves themselves. Some examples can be found at the following web-address: http://www.lifesci.sussex.ac.uk/home/Chris_Darwin/SWS/ (accessed July 5th, 2017).

I would like to begin by performing an anatomy of both the naive and the informed cases. The method here is similar to the method developed by Siegel (2007), based on introspection and inference to the best explanation. Recall that the naive case involves hearing the sinewave before having heard the original speech, whilst the informed case involves hearing the sinewave after having heard the original speech. To conduct an anatomy of these cases, I find it helpful to concentrate on the distinguishing phenomenal character involved in each. In the naive case, merely beeps and whistles are heard. These sounds do not seem to refer to, indicate, or otherwise mean anything that the listener can yet parse. I will call the conscious content of hearing the beeps and whistles the “content” of the episode, which I take to be almost entirely comprised of sensorial elements. I say ‘almost’ because the content of auditory experiences is rarely ever meaningless and thus possesses cognitive elements.

If you hear a screech and subsequent bang from outside your window, you may think you just heard a car accident. The screech referred² to the brake drums applying pressure to the wheels, while the bang referred to the sudden impact of the car crashing into something solid. In this case, the content of the auditory experience had meaning, that is to say, the content of the experience referred to something in a meaningful way. In the case of sinewaves, the listener has never heard these sounds before, so she does not know what the sounds refer to, which is an altogether different claim than saying that the content is meaningless and without referents. Rather, the content of hearing the sinewave in the naive case possesses, as of yet, unknown referents. If you are like me, when you first hear the sinewave you wonder about what you just heard, to what it might refer. So it can be said that the content of the auditory experience in the naive case is mostly comprised of sensorial elements and partially comprised of cognitive elements due to the content’s possession of, as of yet, unknown referents. In this sense, unknown referents can be thought of as placeholders for possible, forthcoming referents.

I will now continue the anatomy by examining the informed case. Recall that the informed case involves hearing the sinewave a second time after having heard the original speech. Now the sinewave seems to sound wholly different. What before was a beep has become a syllable, and the fade in the whistle’s pitch has begun sounding like a word. Nothing has changed about the sinewave, and yet the sinewave seems to sound like a digitized human voice, so that what the listener hears is the language of the original speech.

Dissecting this episode reveals the same sensorial content as before; however, I will argue that the sensorial content of the informed case is arranged differently than the naive case due to how the listener focuses her attention. If you are like me, when you hear the sinewave the second time, you find yourself attending to the modulation in pitch and tone more acutely. O’Callaghan makes this point clear when he discusses the role phonetics plays in language learning (O’Callaghan, 2011). As learning to hear the phonemes of a foreign language requires learning to shift attention to the sounds that segment and distinguish the phonemes, hearing the sinewave after having heard the original speech demands attending to certain minute shifts in pitch and tone. Learning to hear the phonemes of a foreign language is similar to learning to hear the phoneme-esques of sinewave speech. Having heard the original speech, one is provided with a kind of map, with which the strange auditory landscape can be navigated. This leads me to claim that, although the sensorial content is the same, it has a slightly different form in the informed case because the listener has shifted her attentional focus to those sounds that distinguish the phoneme-esques of the sinewave. But can the

² This use of ‘refer’ is non-standard. I mean that one infers from the sound that some particular event is the cause of that sound; so in this loose sense, the sound refers to the event.

alteration in phenomenal character from naive to informed case be explained completely by an attentional shift?

- II. The attentional shift helps explain how it is possible for a listener to hear one and the same audio stream and yet undergo two different experiences. In the naive case, the listener does not know the referents of the sounds – she does not even know how to interpret the sounds she hears. Upon hearing the original speech, she experiences the dynamics needed for parsing the sounds. Hereafter, she attends to the sinewave with enhanced focus, due to having already experienced the dynamics of the original speech. The sensorial elements of the content can now be arranged, so that the sinewave sounds similar to the original. However, a question now arises about how this concerns the cognitive elements of the content, i.e. the (un)known referents.

In order to address this question, the “referent-resolution” of the informed case needs to be examined. By ‘referent-resolution’ I mean resolving the referents of the sounds into words, so, for example, resolving a whistle into a word. Recall that in the naive case, the cognitive content consists of unknown referents, which is wholly different from consisting of no referents, since the unknown referents act as placeholders for possible, forthcoming referents. In the informed case, the question mark of the unknown referents is resolved: the listener knows what the sounds of the sinewave refer to. It is clear that this referent-resolution is, in part, due to the listener’s attentional shift, but the question is not whether the attentional shift brings about the referent-resolution, which it certainly does; rather, the question is whether the referent-resolution can be *reduced* to the shift in attentional focus.

To begin, I need to clarify what experiential states and phenomenal properties are. Any state is an experiential state if it makes sense to ask what it is like for an agent to seem³ to be in that state. Imagine that you are looking at a red apple. It makes sense to ask what it is like for you to seem to be in this state, so this state is an experiential state. You might describe what it is like to seem to be in this state by saying that this state seems to possess redness – due to the apple seeming to appear red. You have thus provided one phenomenal property of the state of looking at a red apple, i.e. redness. In other words, any experiential state possesses a phenomenal property, if it makes sense to ask for a description of what it is like to seem to be in that state, while any meaningful description will single out a phenomenal property of that state. It is now possible to define the following condition for reduction:

For any state α , α can be reduced to some other state β , if and only if β possesses all the properties of α . Conversely, if α possesses some property, for which no combination of β -properties suffice, then α is irreducible to β .

Returning to the above question, “Can the state of referent-resolution be reduced to the state of shifting one’s attentional focus?”, it is now possible, with the conceptual toolkit above, to sketch an answer. Again, I will begin by performing an anatomy of the two states. What is it like for you to seem to be in a state of shifting your attentional focus? If you are like me, in the sinewave scenario, you found yourself concentrating on the tones of the sinewave, extending your attentional focus on these tones, molding your focal point according to the dynamics provided by the original speech. This is not to say that you changed the sound, but rather, you molded your attention in order to shape the reception of the sound. In addition, you

³ The emphasis on ‘seeming to be’ is meant to indicate that the experience need not be veridical; i.e. it does not matter whether the agent is under an illusion or hallucinating; all that matters here is that it merely seems to be so.

found yourself emphasizing those tones that seemed to match the original speech, and thus prolonging your attention to them. So, one may say that the state of shifting one's attentional focus possesses two properties: the molding property and the emphasizing property.

Let us now move to the state of referent-resolution. In our scenario, if you are like me, you found yourself visualizing the different objects the sounds refer to. One might think that the sounds refer to words, but, if you are like me, you did not find yourself visualizing (or imagining in any other way) any words. So for instance, for the sinewave, whose original speech is "The kettle boils quickly", I found myself, upon hearing the sinewave a second time, visualizing a boiling kettle. I will call this the "imagery property" of the state.

Comparing the state of referent-resolution with the state of shifting one's attentional focus, it becomes clear that shifting one's attentional focus is a poor candidate for reduction. It seems to me that there is no possible way to reduce the imagery property to some combination of the molding and emphasizing properties. Perhaps, molding and emphasizing are required to hear the word 'kettle', but hearing 'kettle' is not sufficient for explaining the visualization of an imagined kettle-percept. As it concerns the overarching discussion, the imagery property is, however, not sufficient for establishing sinewave speech as evidence of irreducible cognitive phenomenology, since image-based thinking can be reduced to sensory phenomenology. But the imagery property is not the only distinguishing characteristic of referent-resolution.

While listening to the sinewave in the informed case, I seemed to imagine not only a boiling kettle, but also a context in which it is appropriate to utter the statement "The kettle boils quickly". When I reflect on what I had in mind, I realize that I was aware of a situation, in which two friends were meeting for tea, with the speaker of the utterance being the host, implicitly telling his guest by the statement "The kettle boils quickly" that the tea would have soon been ready. Now, you may have had a different situation in mind; perhaps, your situation was so transient that it did not provide an imaginary host; but regardless of how you thought the situation to be, I am convinced that an awareness of context is a necessary property of being in a state of referent-resolution and an awareness of context "feels" like something (more on that feeling later).

Notice that an awareness of context cannot be reduced to an awareness of sensory imagery, whether this imagery is imagined or otherwise. Suppose you watch two films: the first, a horror film; the second, a drama about modern medicine. Suppose further that the producers of both films purchased identical stock footage for a scene involving surgical equipment. So, the only difference between the scenes is the context in which each is situated; and awareness of this context cannot be reduced to an awareness of on-screen images. You might claim, however, that the context can be reduced to the previous scenes in the film. It seems to me that this claim may be unpacked in two ways: either atomically or holistically. Atomically, the context is reduced to the sum of all individual scenes. But this does not hold. Upon seeing the surgical equipment, one does not recall and visualize the previous scenes. This means, the awareness of context does not reduce to awareness of the previous scenes. Holistically, context is reduced to the individual scenes taken as a whole. But this does not seem to support the claim. I find it difficult to imagine what "the scenes taken as a whole" would look like. And yet, I *do* seem to have an awareness of the scenes taken as a whole, from which the context for the surgical equipment is determined. So, it seems that an awareness of context is not reducible to an awareness of sensory imagery, imagined or otherwise.

Above I said that an awareness of context is a necessary property of being in a state of referent-resolution. In other words, without being aware of some context implied by a meaningful statement, one cannot be said to be in a state of having resolved the linguistic reference of that statement, and thus cannot be said to have understood the statement. This

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is a large claim, and the irreducibility of cognitive phenomenology as it pertains to speech perception hinges on it, so allow me to unpack it.

The claim can be unpacked as follows: given any linguistic statement, understanding that statement requires one to be aware of a possible context, in which it is meaningful to utter it. I will argue for this claim with three examples: indexicality, ambiguity and vagueness. The first example involves indexicals. A statement such as “I am here now” is only meaningful if one can resolve the referents of ‘I’, ‘here’ and ‘now’, which change depending on the context. Therefore, understanding the meaning of that statement requires being aware of context. The second example dispenses with indexicals and instead focuses on semantic ambiguity. A statement such as “The letter is in the drawer” can only be meaningful if you seem to be aware of the correct referent of ‘letter’. If you think that ‘letter’ refers to an alphabetic symbol, and not a missive, then this statement verges on meaninglessness. That said, perhaps you and I are both working at the cinema one summer. The latest blockbuster has come to our town, and we are charged with the task of updating the marquee. You go into the office and grab the box of marquee-letters, but notice that ‘A’ is missing. So you shout from behind the desk “Where is A?” and I respond “The letter is in the drawer!”. In order to find the appropriate referent for ‘letter’ in the first scenario, one must draw an inference from the adverbial phrase ‘in the drawer’. But, as the second scenario shows, the referent of ‘letter’ is not explicated by the adverbial phrase, but merely implied by it; thus awareness of context is needed in order to resolve semantic ambiguity.

The third example dispenses with indexicality and semantic ambiguity and focuses on vagueness. Consider the statement “The man threw the ball”. At first glance, the referents of this statement do not seem to depend on the context. But, depending on the situation, one could be talking about either the man or the ball. Consider the following questions: “Who threw the ball?” and “What did the man throw?”. For each of these questions, a different context is implied, and without at least one of them, the statement remains vague. I would therefore claim that the person who is unaware of a possible context has not understood the statement and has not resolved its referents.

- IV. Returning to our discussion of irreducible cognitive phenomenology, I will now discuss how referent-resolution fits into the larger picture. If it can be shown that the phenomenal property of the awareness of context involved in the state of referent-resolution cannot be reduced to any combination of the properties of a wholly sensory state, imagined or otherwise, then the state of referent-resolution is a possible candidate for irreducible cognitive phenomenology, and, furthermore, sinewave speech provides evidence for it.

In what follows, I will examine whether indexicality offers support for irreducible cognitive phenomenology. To begin, I will stipulate the state in question as the state in which you are aware of the referents of the indexicals ‘I’, ‘here’ and ‘now’ in the statement “I am here now”. When one is in a state of referent-resolution of the above statement, what is one aware of? In order to address this question, I will draw upon the direct reference theory developed by Kaplan, who builds a conceptual framework for determining the referent of an indexical (Kaplan, 1989). Kaplan’s framework is based on two notions: content and character. He holds that the content of a statement consists of those factors that determine the truth-value of the statement, and argues that the context of a statement containing an indexical needs to be, by way of the indexical’s character, determined before the content can be determined. So, character + context = content.

Since the content is equated with the referent of the indexical, I will focus on resolving the content of the indexicals – for the sake of brevity, I will consider only the indexical ‘I’ in the above statement. I will call ‘I’'s content a “phenomenal property” because it seems to

make sense to ask what it is like to be in a state of referent-resolution of the statement “I am here now” and you might reply meaningfully “It is like being aware of the content of ‘I’”. Understood thusly, awareness of ‘I’'s content becomes a phenomenal property of the experiential state of referent-resolution. So the question becomes, can this property be reduced to any combination of the properties of a wholly sensory state?

Consider hearing and seeing someone saying, “I am here now”. You hear the word ‘I’ being spoken and see the word being enunciated. According to Kaplan, one arrives at the content by way of the indexical’s character. The character of ‘I’ is a function that takes some context as argument and returns the agent of that context, while the agent is the content of ‘I’ (Kaplan, 1979). This means that being in a state that possesses awareness of ‘I’'s content consists of being aware of a context through which ‘I’ comes to have its content. So, a question arises about whether hearing and/or seeing the speaker seems to make you aware of the context required to render the content of ‘I’.

I have serious doubts that a wholly sensory state seems to make you aware of the context necessary for rendering the content of ‘I’. In order to determine whether the sensory state can do this, we should answer this question: what is required of the sensory state in order for it to render the content of ‘I’? It seems plausible to respond that two conditions need be met: 1) the sensory state seems to make you aware of the context, and 2) the content of the sensory state is sufficient for rendering the content of ‘I’. That said, I believe that conditions 1) and 2) cannot be met by the sensory state.

The first condition hinges upon the sensory state seeming to make you aware of the context. Arguably, context is the background information relative and relevant to a situation, where ‘background information’ means ‘other than the presently and immediately available information’. In order for the sensory state to meet the first condition, its content would need to include some background information, that is to say, the content of the sensory state would need to include some information other than the presently and immediately available moment; but the sensory state of looking and hearing someone saying “I am here now” cannot include anything other than the present moment. This means that the content of the sensory state alone cannot seem to make you aware of the context.

Now consider the second condition. You might respond by claiming that the speaker-percept is sufficient for rendering the content of ‘I’. But this is only possible if the speaker is the referent of ‘I’; and that is not necessarily the case. For example, the speaker could explicitly say, “He said, ‘I am here now’”, so that ‘I’ no longer refers to herself. Alternatively, ‘that he said it’ could be implied by the speaker. Either way, ‘I’ does not always refer to the agent speaking, so there is no guarantee that the speaker-percept is sufficient for rendering the content of ‘I’. So, the second condition is not met as well.

This means that the state of referent-resolution, due to its dependency on awareness of context, possesses properties that cannot be reduced to properties of wholly sensory states, imagined or otherwise. In turn, this means that, provided that referent-resolution possesses phenomenology, it would be a candidate for irreducible cognitive phenomenology, while sinewave speech provides evidence for it.

It is time now to return to sinewave speech. Recall what it was like for you to hear the sinewave as speech. Ask yourself, “was there something it was like for me to resolve the referents of the strange sounds?”. If you are like me, along with a host of other phenomenal properties, you also had a feeling of understanding, or an experience of meaning, which you did not undergo the first time. I believe that this feeling of understanding is no different

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than an awareness of context, which I have argued is a candidate for irreducible cognitive phenomenology.⁴

In addition to the evidence from the arguments above, I would like to share some further evidence for irreducible cognitive phenomenology provided by the neurological research on sinewaves. Several studies provide reason to believe that phonetic perception, compared to acoustic perception, involves distinct neurological locations and processes (Lambertz *et al.*, 2004; Benson *et al.*, 2005; Möttönen *et al.*, 2005). In these studies, listeners engaged with sinewaves in much the same way as presented here: in the naive case, sinewaves were heard as beeps and whistles, while in the informed case, sinewaves were heard as speech. Brain imaging (fMRI) revealed increased activation of the superior temporal sulcus in informed cases only, providing evidence for the claim that phonetic perception involves a distinct neurological mechanism. If one assumes a correlation between brain activity and phenomenology, the independence of phonetic perception from acoustic perception bolsters the present case for irreducible cognitive phenomenology. Furthermore, according to Lambertz *et al.* (2004), sinewaves show that perceiving phonemes has an inhibitory influence on perceiving acoustics. If one assumes the correlation mentioned above, then the inhibiting effect on acoustic perception by phonetic perception lends support to the claim that cognitive phenomenology is decoupled from sensory phenomenology, which, in turn, lends support to the claim that the phenomenology of speech perception involves irreducible cognitive phenomenology.

- VI. In conclusion, I would like to respond to some objections. Prinz (2012) provides four challenges to the existence of cognitive phenomenology. I will argue that the case presented here meets these challenges. Fish (2013) raises concerns regarding the phenomenological method. I will argue that the contrast provided by sinewaves addresses his concerns. Brogaard (2016) defends the view that meanings are perceived. I will argue that meanings are the result of cognitive, not sensory, phenomenology.

Prinz Prinz (2012) raises four challenges for cognitive phenomenology: *distinctiveness*, *isolability*, *inaccessibility*, and *inner speech*. Concerning *distinctiveness*, the challenge is to provide a contrast in which the difference between the two cases is solely cognitive. By keeping the sensory data fixed, sinewave contrasts seem to meet this challenge. Regarding *isolability*, Prinz believes that if cognitive phenomenology cannot be isolated from other episodes, then there is no phenomenology associated with cognition. The feeling of understanding, as the result of an awareness of context, can be isolated: I have no trouble isolating the moment that “it all clicked” for me. Thirdly, due to sub-personal factors involved in language comprehension, such as parsing syntax, Prinz thinks it is plausible to maintain that there is no phenomenology of cognition. The feeling of understanding, however, is readily *accessible* to introspection. Finally, Prinz argues that any putative cognitive phenomenology is reducible to sensory phenomenology of either mental imagery and/or *inner speech*; but as I argued above, due to its dependency on awareness of context, the feeling of understanding is neither reducible to sensory phenomenology, nor derived mental imagery. So, the case presented here meets Prinz’s challenges.

⁴ If you find that the feeling of understanding still eludes you, I suggest that you read the analysis of understanding an ambiguous newspaper headline at the end of this paper; there you may find that the feeling of understanding is more palpable.

Fish (2013) raises the following objection to Siegel's method of phenomenal contrast, "... unless we can eliminate the concern that the phenomenological method reproduces antecedent assumptions, rather than delivers new evidence, such a claim should be treated with skepticism" (p. 53). Call this *Fish's Challenge*. The challenge is directed at what Fish calls the "phenomenological method", which includes the contrasts presented by Siegel and the contrast presented here. That said, I would like to point out a fundamental difference between the contrast discussed here and Siegel's; I believe this difference enables our contrast to meet Fish's Challenge.

Fish

Consider the contrast (presented by Siegel) concerning seeing trees as pine trees. In the naive case, you have little experience with the concept PINE TREE, and so you do not discern pines from other trees. In the informed case, on the other hand, you have acquired some skills regarding the concept and, therefore, you are able to discern pines from the rest. Siegel asks you to introspect and infer the best explanation for the difference. Fish's Challenge results from discrepancies between Siegel's and others' testimonies regarding what it is found upon introspection (see e.g. Lyons, 2005). However, Siegel's method of phenomenal contrast seems to depend on more components than the one presented here. To see this, compare the pine-tree contrast to the sinewave contrast. First, concerning the pine-tree contrast, you do not undergo the experience of seeing a pine tree as a pine tree: you imagine the experience. So when asked to introspect, you do not introspect the experience: you introspect an imagination of the experience. Regarding the method presented here, you actually undergo the experience. So, when you introspect, you introspect the experience, not an imagination of the experience. Returning to Fish's Challenge, it seems to me that there are two ways to unpack it: one trivial, the other not. The trivial account can be expressed as follows: results produced by the phenomenological method should be met with skepticism, so long as this method is based on prior assumptions. I find this account trivial because a method lacking any prior assumptions would be implausible. The non-trivial account can be read in the following terms: the phenomenological method reproduces assumptions that may be avoided, and until they are, the results of the method should be met with skepticism. It seems to me that Siegel's method reproduces assumptions because, at least in part, it depends on imagining undergoing the experience. By avoiding the need to imagine, the method presented here, call it "phenomenological anatomy", arguably eliminates the assumptions involved in Siegel's method and so meets the non-trivial reading of Fish's Challenge.

In explaining the perceptual view of linguistic comprehension, Brogaard (2016) describes reading ambiguous newspaper headlines, "...our expectations at a higher level of processing automatically influence lower-level processing, quickly generating an appearance of the intended meaning" (pp. 12-13). What is exactly meant by "an appearance of the intended meaning" is not clear. Since Brogaard defends the perceptual view, a plausible reading may be that the perceptual appearance of the sentence changes. That said, when I read these headlines, I do not undergo any experience that could be described as a change in the appearance of the sentence. In what follows, I will perform an anatomy of the episode involved in undergoing an experience of understanding an ambiguous newspaper headline taken from Brogaard's paper. Before I begin, I suggest you spend a moment understanding the sentence yourself. Here is the sentence: "Eye drops off the shelf".

Brogaard

If you are like me, this sentence will seem meaningless to you at first; that is to say, you did not undergo a feeling of understanding the content of the sentence, and this is why you probably reread it. If you are like me, upon re-reading the sentence, you had a feeling of understanding the literal content, viz. '(the) eye drops off the shelf'. Furthermore, the feeling exhibited a particular quality, which can be described as a "lack of confidence", and so you read the

sentence again. Upon third reading, ‘eye drops’ seemed to form a compound noun easily and was read almost effortlessly alongside ‘off the shelf’. At this moment, you underwent a feeling of understanding the content of the sentence as based upon the (pharmaceutical) context and the pun involving the word ‘drops’; this feeling also seemed to exhibit two (metacognitive) qualities, which can be described as “fluency” – it felt easy to understand – as well as “confidence” – you felt confident you had understood it – and thus you no longer needed to re-read the sentence.

Let us take stock of what this anatomy says about the appearance of meaning. The meaning of the sentence *did* appear, though it did not appear in perception; one might say it appeared in cognition. Similar to how the solution to a math problem appears as the result of deduction, the meaning of the sentence appeared as the result of an awareness of context. Thus, the appearance of meaning does not result from the sensory content of perception, aided by sub-personal, higher-level processing (as Brogaard suggests). Instead, the appearance of meaning results from the cognition involved in resolving linguistic referents in context. So, an appearance of meaning is perhaps better understood as an experience of meaning, whose upshot is the feeling of understanding, which is, as argued above, an example of irreducible cognitive phenomenology.

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