



Semantic satiation and perceiving meanings

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Abstract

Some argue that we can and sometimes do perceptually experience meaning properties. Roughly, the idea is that when we listen to a speech or read a text in a language we know, our perceptual experience can present words as having certain meanings. One prominent support for this view is the argument from semantic satiation. When one excessively repeats a word by uttering, writing, or hearing it, it appears to “lose its meaning.” This familiar phenomenon is called semantic satiation. Semantic satiation seems to be a form of negative aftereffect, where excessive exposure to certain stimuli biases the subsequent experience in an opposing way. If so, the proponents argue that we can be perceptually aware of meaning properties because aftereffects are arguably perceptual phenomena. If experiences of meaning properties are subject to aftereffects, then they are perceptual. I argue that, unlike other putative forms of high-level aftereffects, semantic satiation does not provide the distinctive explanatory support needed for an inference to the thesis that perceptual experience presents meaning properties.

Keywords Semantic satiation · Semantic perceptualism · High-level perception · Perceptual content · Perceptual adaptation · Aftereffects · Meaning properties

1 Introduction

Can we perceptually be aware of meanings when we hear a speech or read a passage in a language we know? Some argue that we can and sometimes do perceptually experience meaning properties (Siegel, 2006; Bayne, 2009; Brogaard, 2017, 2018, 2020; Nes, 2016). This position can be seen as part of high-levelism. According to high-levelists, properties we can perceptually be aware of are not limited to low-level properties such as colour and shape in vision but also include high-level properties

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such as natural kind properties and so on.¹ Those who argue that we can perceive meanings aim to add meaning properties to the list of properties we can perceptually be aware of. Call this position high-levelism about meaning properties. For ease of exposition, I will use ‘perceiving meaning properties’, ‘having a perceptual experience of meaning properties’, and ‘being perceptually aware of meaning properties’ interchangeably. What matters for present purposes is that meaning properties figure in the phenomenal character of perceptual experience. By contrast, it is compatible with low-levelism that meaning properties are represented or processed by the perceptual system in some subpersonal way, so long as they make no phenomenal difference.

In the recent literature on speech perception and meaning, at least two questions have been run together. One is whether we can perceptually experience written or spoken words as having meanings. Another is whether we can perceptually experience speakers as saying or asserting things – that is, whether utterance comprehension is itself a kind of perception rather than a purely inferential or cognitive process. The present paper is concerned exclusively with the first question. I bracket the second, McDowell- and Brogaard-style question about utterance comprehension, except where it matters for assessing how some authors appeal to semantic satiation.

One central argument for high-levelism is the phenomenal contrast argument, which depends on the introspection of two different perceptual experiences. High-levelists unsatisfied with introspective arguments have sought empirical evidence in favour of high-levelism. Empirical studies on high-level aftereffects have become one of the most influential lines of evidence. They are used in favour of high-levelism about emotional expression properties (Block, 2014), gender properties (Di Bona, 2017), numerosity properties (Fish, 2013), gist properties (Bayne, 2016), and so on.

Recently, proponents of the position that we can perceive meaning properties have appealed to an argument similar to one from high-level aftereffects. I believe all of us have experienced the phenomenon that when we repeat a word excessively, at some point it seems to lose all its meanings. We become somehow alienated from the meaning of that word. Superficially, this phenomenon seems to be a case of aftereffects. If so, high-levelists about meaning properties argue that this has been taken as a strong reason to think that we can perceive meaning properties (e.g., Nes, 2016, Brogaard, 2020). If facial expression properties’ being subject to aftereffects is an argument in favour of the position that we can perceive facial expression properties, then the fact that meaning properties are subject to aftereffects gives us a strong reason to believe that we can perceive meaning properties.

Here, I argue that the argument from semantic satiation does not succeed, because semantic satiation differs from paradigmatic high-level aftereffect cases in ways that matter for the relevant inference to perceptual content. The next section explicates what it means to perceive high-level properties (meaning properties in particular) and the argument from aftereffects employed in favour of it. Then, I will raise two problems against the argument from semantic satiation. I purport to show that the

¹ Proponents of high-levelism about various properties include Bayne (2009), Block (2014), Fish (2009), Johnston (2004), Masrour (2011), McDowell (1994), Nanay (2011), Peacocke (1992), Searle (1983), Siegel (2006), Siewert (1998) among many others.

empirical evidence provided by semantic satiation experiments does not support high-levelism about meaning properties.

More specifically, my aim is twofold: first, to argue that the empirical paradigms on semantic satiation do not establish the claim that meaning properties themselves are perceptually adapted or perceptually experienced; and second, to argue that the phenomenology of ‘loss of meaning’ is better explained by independently available sub-semantic adaptation mechanisms. In these respects, I extend and refine recent sceptical discussions of semantic perception by Gross (2023, 2024) and Calzavarini (2023).

2 Perceiving high-level properties

High-levelism is interested in the range of properties one can perceptually be *aware* of. That is, which properties can figure in *the phenomenology* of perceptual experiences. Susanna Siegel (2006) initiates the debate with her phenomenal contrast argument. First, you look at a pine tree before being able to recognize it as being a pine tree. Second, you look at the same tree after getting trained on pine trees and having the relevant capacity to recognize pine trees. Her observation is that the two experiences differ phenomenally. According to Siegel, the reason is that the latter visual experience represents the pine tree as being a pine tree while the former does not.

As several authors have stressed, the phenomenal contrast argument is best understood as an inference to the best explanation from an overall phenomenal contrast to a difference in perceptual phenomenology. We start from a contrast in what it is like to view the scene before and after acquiring the relevant recognitional capacities, and then argue that the best explanation is that the later experience has additional high-level perceptual content that figures in its phenomenal character (Siegel, 2006; Reiland, 2015). The crucial question, for present purposes, is whether analogous inferences to the best explanation are available for meaning properties.

It is worth noting that the label ‘high-level’ is not used uniformly in the literature. Some authors reserve it for very abstract properties, such as natural and artefact kinds, semantic properties, or moral properties. Others are primarily interested in properties like facial expression, orientation, animacy, or Gestalt structure, which are ‘higher’ than basic features such as colour and edge orientation but plausibly ‘lower’ than kinds or meanings. To avoid terminological disputes, I will use ‘high-level’ broadly for any properties whose representation goes substantially beyond basic sensory magnitudes but will occasionally distinguish ‘mid-level’ cases, such as facial expression, numerosity, or gist, from the more ‘cognitively loaded’ cases of kind, semantic, or moral properties. My focus in what follows is on meaning properties, which are at the most cognitive end of this spectrum.

When one gains the required recognitional capacities for a property, it seems that one has an experience with a new phenomenal property, say, *F*, which is determined

by the representation of the high-level property in question.² Thus, it is the phenomenal content that is the component of the representational content that supervenes on the phenomenology of the perceptual experience. There could be other questions in the close vicinity that might easily be confused with high-levelism. The question, for instance, is not which properties are represented by the perceptual experience, or which information is processed in the perceptual brain to grant the recognition of high-level properties. A low-levelist might agree that high-level properties can figure in the content of experience but, nevertheless, insist that those high-level properties do not contribute to the phenomenal character of the experience at all (e.g., Prinz, 2013). On this account, there is no phenomenal difference between the experience that represents only low-level properties and the one that represents high-level properties as well. Thus, such an account counts as low-levelist. An account would be considered high-levelist if the representation of high-level properties makes a phenomenal difference.

2.1 Argument from high-level aftereffects

Aftereffects occur when one is exposed to a particular stimulus for a prolonged time. Prolonged exposure to the same stimulus biases the subsequent experience. In what we call negative aftereffects, after prolonged exposure to a certain stimulus, the subsequent experience is biased toward the opposing features. The waterfall illusion is a prime example of negative aftereffects. After looking at a waterfall for a certain amount of time, the stationary object one looks at next seems to move upwards because the waterfall moves downward. The prolonged exposure to downward motion biases the subsequent experience of the stationary object, which then looks as if it were moving upwards. Other low-level properties such as shape, colour, and orientation have also been observed to exhibit aftereffects (see Thompson & Burr, 2009).

Further, aftereffects can also be observed in experiences of high-level properties such as causal properties (e.g., being the cause of something) (Rolfs et al., 2013), gist properties (e.g., being a natural scene) (Greene & Oliva, 2010), numerosity (e.g., being densely populated) (Burr & Ross, 2008), facial and bodily properties such as age (e.g., being old or young) (Webster et al., 2004), gender (e.g., being male or female) (Little et al., 2005), emotional expression (e.g., being angry, being fearful, being sad) (Butler et al., 2008; Pollak et al., 2009), ethnic origin (being Asian or being Caucasian) (Jaquet et al., 2008) and many others (see also Webster & MacLeod, 2011).

Using aftereffects to defend high-levelism comes from the idea that aftereffects are a hallmark of perceptual experience. Block states that it would be a “very strong

² Certain theories of perception disagree that perceptual experiences represent. On naïve realism, for example, properties are simply presented, rather than represented in perception. On such non-representational theories of perception, the same discussion can be carried out by using the presentational terminology rather than the representational one. Here, I will use the representational terminology for convenience, and if one disagrees with this, she can replace them with the presentational terminology. The discussion shall remain intact. For discussion of high-level content and phenomenology from a more naïve realist perspective, see e.g. Fish (2009), Johnston (2004).

argument” for high-level perception if one could demonstrate that an experience of a high-level property exhibits aftereffects (2010, p.57). In his later work (2014), he used Butler et al. (2008)’s study on aftereffects to defend high-levelism about facial expressions of emotions. In this experiment, one looks at a fearful face for one minute and shifts her gaze to an ambiguous face (a face created by morphing between fearful and angry faces). This ambiguous test face looks angrier than it looks fearful. Thus, Block concludes that one can perceive such facial properties. Similarly, Fish (2013) uses Burr and Ross (2008)’s study to establish that one can perceive how populated a scene is. Bayne (2016) also appeals to aftereffects (see Greene & Oliva, 2010) to support the thesis that gist properties can be seen.

3 Perceiving meanings

3.1 Semantic perceptual views

A number of authors have argued that we sometimes perceptually experience meaning properties. Siegel (2006) suggests that, when one listens to a language before and after learning it, there is a phenomenal difference that is best explained by the later experience’s representing the speech stream as meaningful. Bayne (2009) and Reiland (2015) develop related phenomenal contrast arguments. Brogaard (2017, 2018, 2020) and Nes (2016) defend more worked-out ‘semantic perceptual’ views, on which comprehension of speech is typically a perceptual, rather than merely cognitive, phenomenon. Gasparri and Murez (2021) defend a related, but explicitly context-sensitive, version of the hearing-meanings thesis, on which sentential and discourse context are crucial for making meanings audible. On these views, meaning properties can figure in the phenomenal character of auditory and perhaps also visual experiences of language.

Semantic perceptual views have been motivated by a variety of considerations: the apparent immediacy and non-inferential character of ordinary speech comprehension, introspective reports of ‘hearing what someone says’, theoretical pressures from the publicity of linguistic meaning, and various strands of empirical evidence. Recently, however, a growing sceptical literature has challenged the case for perceiving meanings. O’Callaghan (2011) argues that we do not hear meanings by appeal to homophones; Reiland (2015) and Di Bona (2020) raise further worries about the phenomenal contrast arguments; Gross (2023, 2024) and Calzavarini (2023) question whether there is an empirical case for semantic perceptualism; and Calzavarini and Voltolini (2024) argue that experiences of understanding linguistic expressions differ in important structural respects from paradigmatic perceptual cases such as pictorial ‘seeing-in’. The present paper focuses on just one line of purported empirical support for semantic perceptualism – the appeal to semantic satiation – and argues that even if semantic perception were otherwise attractive, semantic satiation does not bolster the view.

I set aside McDowell-inspired views on which perceiving that someone is saying something is itself a kind of perceptual knowledge (McDowell, 1994), except insofar as they intersect with Brogaard’s appeal to semantic satiation.

3.2 Phenomenal contrast and semantic satiation

Nes (2016) and Brogaard (2020) appeal to semantic satiation as providing an argument parallel to high-level aftereffects in vision. Roughly, the argument can be reconstructed as follows:

- (1) In cases of semantic satiation, excessive repetition of a word leads to a striking phenomenal change: the word comes to feel meaningless or alien.
- (2) Semantic satiation involves a kind of adaptation or aftereffect at the level of semantic processing.
- (3) Aftereffects are a hallmark of perceptual processing.
- (4) The best explanation of (1)–(3) is that meaning properties figure in the phenomenal character of perceptual experience.
- (C) Therefore, we sometimes perceptually experience meaning properties.

Granting for present purposes that aftereffects can provide evidence for perceptual processing, the question has two parts. First, is premise (2) supported in the strong sense required by semantic perceptualism—that is, do the data show that meaning properties themselves, rather than lower-level forms or associative links, are adapted? Second, even if repetition affects semantic processing in some weaker sense, does this make the perceptual representation of meaning properties the best explanation of the behavioural and phenomenal data? I shall argue that the answer to both questions is negative. Some semantic-satiation effects may well involve semantic processing, but this does not yet show that meaning properties are perceptually presented.

Repeating a word excessively, whether by writing, pronouncing, or hearing it, can make it look or sound meaningless after a while. Due to this feature, semantic satiation seems to be a case of aftereffect because after we are exposed to a particular stimulus excessively for a certain time, we seem to lose our sensitivity to that particular stimulus.³ Nes states that “... semantic satiation and other related forms of positive and negative priming, provide one source of evidence that something very much like sensory adaptation applies even to comprehension [of meaning] (2016, p.82).” So, he uses empirical studies on semantic satiation to argue that we can perceive meaning properties, just like Block uses empirical studies on high-level aftereffect studies to argue that we can perceive emotional expressions. Similarly, Brogaard uses the same phenomenon and argues that “[t]he phenomenon of semantic satiation is another indicator that meanings typically are sensorily comprehended... (2020, p.112).” In the next section, I aim to show that their arguments do not work. I will argue that semantic satiation does not provide the distinctive explanatory support that semantic perceptualists need. Even if some repetition effects occur at the level of semantic processing, this would not yet show that meaning properties are perceptually presented.

³ Notice that in aftereffects, one needs not to perceive the “opposite” of that stimulus as in the colour aftereffects because some stimuli might not simply have an opposite. It suffices that we lose the sensitivity toward that stimulus.

4 Argument from semantic satiation

When the phenomenon was initially brought up by Severance and Washburn (1907), Titchener (1916), and Bassett & Warne et al. (1919), it was defined as the subjective experience of the meaning loss of a word after excessive repetition of it. These early studies depend on the subjective reports of the perceptual changes that occurred after excessive repetition. Since subjective reports might be subject to bias, later researchers aimed to focus on various quantitative methods, instead of focusing on the “apparent loss of meaning”. However, strategies that are used in the other high-level aftereffect studies, such as morphing images of faces expressing two different emotions, are not available in order to test semantic satiation. This raised substantial methodological difficulties about how to operationalise semantic satiation in a way that goes beyond introspective reports. Assuming that not only the repeated word but also its associates are subject to the purported satiation effect, researchers asked subjects to give the first word that comes to their minds (e.g., Smith & Raygor, 1956). The expectation was that subjects would come up with semantically closer associates for the unsatiated words, than for the satiated words. Another method is to have the subject make a lexical decision (Lambert & Jakobovits, 1960; Cohene et al., 1978; Neely, 1976). After repetition of a word, subjects were shown a related word, an unrelated word or a non-word⁴ and asked to decide whether what is shown is a word or not. Yet another method is to ask the subject to come up with as many associate words of the repeated word as quickly as possible (Kanungo & Lambert, 1963). Quickly, however, controversial, and contradictory evidence began to emerge. Neither method yielded univocal results (see Esposito and Pelton (1971) for an extensive overview and a critical discussion of the results obtained until the 70 s).

The relatedness-decision task and the category-membership task, however, yielded more positive evidence for semantic satiation. Using category membership task, Smith (1984) seems to provide evidence for semantic satiation. In this experiment, subjects are repeatedly shown a category word (e.g., FRUIT) and shown a member (e.g., APPLE) or a non-member (e.g., ROBIN). They were asked to decide if the target word is a member of the cue word or not. It is observed that subjects were slower to decide if the target word is a member of that category. If the target word is not a member, then any inhibitory effects of repetition of the word on the decision time is not observed.

Another method yielding positive evidence is the relatedness judgement task. In this method, subjects are repeatedly presented a word (e.g., DOG) and shown a word pair, the first of which was the satiated word (e.g., DOG – CAT or DOG – CHAIR). When subjects are asked to decide whether these two words are related, a significant inhibitory effect on the response time is observed when the satiated word and its

⁴ By ‘non-word’ I follow the terminology of the lexical-decision literature, where subjects are asked to decide whether a target letter string is a word of the relevant language or a non-word (Neely, 1976; Cohene et al., 1978). In the studies relevant here, non-word targets are typically pronounceable pseudowords: orthographically or phonologically possible letter strings, often constructed by altering one or two letters of real words, that are not items of the relevant language’s lexicon. Thus, the term is used here as an experimental category and is not meant to settle any metaphysical question about whether a morphosyntactically well-formed but meaningless expression could count as a word.

pair are related (Balota & Black, 1997). Black (2001) used a more complicated task involving homographs. A homograph is a written word that has two distinct meanings associated with the same orthographic form (e.g., ‘organ’ as a body part vs. ‘organ’ as a musical instrument). Subjects were first repeatedly presented with a word (e.g., HEART). Then they were shown a pair of words, the first of which was always a homograph (e.g., ORGAN) and the second either ‘concordant’ (e.g., KIDNEY, which fits with the bodily reading), ‘discordant’ (e.g., PIANO, which fits with the musical reading), or ‘neutral’ (e.g., CEILING, which is unrelated to either reading). The task was to decide if these two words are related or not. Among concordant, discordant, and neutral trials, no significant inhibitory effect has been observed. In a second experiment, the concordant and neutral trials are used, and the discordant trials are eliminated. Here, Black (2001) observed that in the concordant trials, subjects were significantly slower than in the neutral trials.

A further body of evidence comes from ERP studies of semantic satiation, especially studies focusing on the N400 component. Kounios et al. (2000) explicitly aimed to test whether semantic satiation is merely a by-product of adaptation in upstream, non-semantic perceptual processes or whether it can have a locus in semantic memory. Across visual and auditory experiments, they examined whether repetition of a prime modulated the N400 relatedness effect elicited by related and unrelated critical words. To reduce the contribution of sensory adaptation, the visual primes varied in letter case, and in one auditory experiment the pitch of the repeated primes was varied. They found interacting effects of prime satiation and relatedness on ERP amplitude, especially in the N400 time window, and concluded that semantic memory can be directly affected by satiation rather than the effect necessarily resulting from degraded perceptual input.

More recently, Ströberg et al. (2017) replicated and extended this ERP approach while addressing several limitations in Kounios et al.’s (2000) design. They separated low- and high-repetition trials, excluded response trials from the N400 analysis, and varied the letter case and format of consecutive prime presentations in order to minimize confounds from perceptual habituation. They found that the N400 relatedness effect over centrofrontal electrodes was reduced after 30 repetitions compared with 3 repetitions, and they interpret this as supporting a semantic rather than merely perceptual locus of the effect. These ERP studies therefore make it too quick to claim that all semantic-satiation effects are merely pre-semantic or perceptual-habituation effects.

To assess what these findings show for semantic perceptualism, three broad explanations of the effects of repetition should be distinguished: lower-level satiation, semantic-level satiation, and associative satiation. On lower-level satiation (e.g., Esposito & Pelton, 1971), representations of pre-semantic properties are satiated, and the inhibitory effect is a result of the satiation occurring in the lower-level representation. Pre-semantic properties might include lexical, orthographic, phonological properties, and so on. Any properties processed before the semantic level can be included here. On the semantic-level explanation (e.g., Jakobovits & Lambert, 1962; Smith & Klein, 1990; Kounios et al., 2000; Ströberg et al., 2017), the relevant effect occurs at the level of semantic processing or semantic memory. Recently, Tian and Huber (2010) proposed a third alternative. According to them, what is satiated here

is neither in the lower-level representations, nor in the semantic level, but in the pathway connecting these two levels. This explanation is called associative satiation.

I do not claim that lower-level or associative explanations are new empirical hypotheses. Versions of these explanations are already available in the semantic-satiation literature. What has not been sufficiently appreciated, however, is their significance for the philosophical argument from semantic satiation to semantic perceptualism. The present contribution is to ask what follows from these explanations once semantic satiation is used as evidence that meaning properties are perceptually presented. In that dialectical setting, it is not enough for the semantic perceptualist to show that repetition can affect semantic processing. She must show that appeal to perceptually presented meaning properties explains the relevant behavioural and phenomenal effects better than lower-level, associative, or cognitive alternatives. My claim is that this further explanatory burden has not been met. Positive behavioural and ERP findings should therefore be treated with care. They may support the claim that repetition affects semantic processing. But that is still weaker than the claim needed by semantic perceptualism: that meaning properties themselves are perceptually adapted or perceptually presented.

Notice that for the argument from semantic satiation in favour of high-levelism about meaning properties to work, the relevant adaptation must occur at the semantic level. If either a purely pre-semantic or an associative explanation is correct, then the semantic perceptualist's inference to the best explanation is blocked. The point is not merely that rival explanations are logically possible. Rather, these explanations are independently motivated, fit important features of the experimental paradigms, and do not require the further claim that meaning properties figure in perceptual phenomenology. Thus the semantic perceptualist must show that appeal to perceptually presented meaning properties has the distinctive explanatory advantage required by the argument. However, even if some form of semantic-level satiation were empirically supported, this would still not by itself vindicate high-levelism about meaning properties. Although the empirical investigation of this phenomenon began with reports of phenomenal changes upon repeating a certain word, later studies that yielded positive results typically do not investigate the reasons for this phenomenal change itself. Rather, they operationalize semantic satiation through behavioural measures, such as response times in category-membership or relatedness-judgment tasks, or through electrophysiological measures, such as modulation of the N400 relatedness effect. Unlike paradigmatic empirical studies of other high-level aftereffects, these measures are not directly about how the world, or words in particular, perceptually appear to subjects after the adaptation phase. So, there is no straightforward argument from these studies to high-levelism. Even if semantic-level processing is affected, that would still leave open a crucial explanatory gap. Behavioural slowing or N400 modulation may show that repetition affects semantic processing. But this, by itself, does not show that the subject perceptually experiences meaning properties, or that the relevant phenomenal change is a perceptual loss of meaning. For high-levelism to work, there must be phenomenal change, and this change should occur in perceptual phenomenology (see Sect. 2). These studies therefore leave open the central question for semantic perceptualism: whether the apparent loss of meaning is a perceptual

change in the presentation of meaning properties. The high-levelist must supply this further argument.

In the rest of this section, I will argue that the two steps required by the semantic-perceptualist use of semantic satiation are not established. First, in Sect. 4.1, I argue that even evidence for semantic-level processing does not by itself show that meaning properties themselves are perceptually adapted or perceptually experienced. Moreover, several findings suggest that lower-level repetition and associative mechanisms remain explanatorily relevant. Second, in Sect. 4.2, I argue that the phenomenal changes associated with semantic satiation can be explained without supposing that meaning properties figure in perceptual phenomenology.

4.1 Semantic level satiation

I will raise two problems for using semantic-level satiation as evidence for high-levelism about meaning properties. These problems are not meant to show that all semantic-satiation effects are merely pre-semantic; nor do they need to. The relevant question is whether the empirical literature supports the stronger claim required by semantic perceptualists: that meaning properties themselves, rather than semantic-processing mechanisms, are perceptually adapted or perceptually experienced. The first problem is that some data complicate a simple semantic-level account on which repeated access to meaning alone is sufficient for satiation. The second problem arises when we try to explain why other methodologies, especially the lexical decision task, have not yielded positive data. Available explanations of this either sit uneasily with parts of the semantic-memory literature or result in a position that does not support high-levelism about meaning properties. In other words, the target is not semantic processing as such, but the claim that semantic perceptualism provides the best explanation of the relevant effects.

On a simple semantic-level account, the inhibitory effects observed in the relevant tasks are due to repeated access to meaning itself, rather than to repeated access to lower-level word-form properties or associative pathways. If this simple account is correct, then one might expect similar effects to occur when the same meaning is accessed through different lower-level forms. Such cases might include different words in two languages that have the same meaning, such as *SCIENCE* in English and *WISSENSCHAFT* in German; cross-modal cases, from audition to vision; and cases involving synonyms, which share meaning while differing in orthographic or phonological form.

One reason for caution about a simple meaning-level account comes from Pilotti et al. (1997). In this experiment, subjects were repeatedly presented auditorily with a category word. One group listened to acoustically identical repetitions of a word, whereas the other group listened to acoustically varied repetitions pronounced by different speakers. In the first group, subjects showed significantly slower response times in deciding whether the repeated category word and the related target words were related, replicating the kind of positive evidence reported by Smith and Klein (1990). In the second group, however, where the repeated words differed acoustically, no significant difference was observed between related and unrelated cue-target pairs. This finding should not be treated as decisive against all semantic-level effects:

Kounios et al. (2000) later argued that the many-voice condition may have encouraged subjects to attend to acoustic rather than semantic features. Still, Pilotti et al.'s (1997) result remains relevant. It does more than show that a lower-level explanation is possible. With respect to this class of findings, the lower-level account has a comparative advantage: if repeated access to the same meaning were sufficient for satiation, acoustic variation across repetitions should not remove the effect. By contrast, an account that locates the relevant adaptation partly in repeated acoustic or phonological form predicts why such variation would matter.

Tian and Huber (2010) provide a second reason for caution. They conducted an experiment designed to test whether semantic repetition without repetition of lower-level form is sufficient to produce the relevant effect. Subjects were shown different words from the same category and were then presented with two novel words, which either did or did not belong to the repeated category. Their task was to decide whether the two novel words belonged to the same category. The underlying idea was that, during the repetition phase, semantic content was repeatedly accessed while lower-level word-form properties were not repeated. If repeated access to meaning alone were sufficient for semantic satiation, such a design should also have produced inhibitory effects. However, Tian and Huber observed no inhibitory effect on decision time when no lower-level properties were repeated. This does not show that semantic-level effects are impossible; nor is that claim needed for the present argument. It does suggest, however, that repeated semantic access alone may not be sufficient for the relevant behavioural effect, and that lower-level repetition or associative pathways remain explanatorily relevant. This is a more direct comparative point. The design preserves repeated semantic access while removing repetition of lower-level form. The absence of the relevant inhibitory effect is therefore not neutral between the competing explanations. It is more naturally accommodated by an associative or lower-level account than by a simple meaning-level account on which repeated access to meaning itself is sufficient for the effect.

This is especially relevant because Nes (2016) appeals to Tian and Huber's study when motivating the argument from semantic satiation. Yet Tian and Huber themselves defend the associative explanation described above. If the satiation effect is located in associative pathways connecting lower-level and semantic processing, rather than in perceptually experienced meaning properties, then the result does not support high-levelism about meaning properties. Moreover, their experiment creates a difficulty for using their findings as evidence that meaning properties themselves undergo adaptation: the effect disappears precisely when semantic repetition is preserved but lower-level repetition is removed. This is precisely the kind of contrast that weakens the semantic perceptualist's claim to explanatory superiority: it fits better with a view on which repetition-sensitive lower-level or associative mechanisms are doing the crucial work. Further work on adaptation to orthographic forms and lexicality (e.g., Hanif et al., 2013; Yuan et al., 2017) likewise suggests that various sub-semantic processing stages can exhibit adaptation-like behaviour. This does not rule out semantic-level effects, but it weakens the move from the presence of adaptation-like effects in language processing to the conclusion that meaning properties themselves are perceptually adapted.

This conclusion dovetails with Gross's (2024) assessment of the empirical literature and with Calzavarini's (2023) critique of the empirical case for semantic perceptualism. The point is not that semantic processing is never affected by repetition. Rather, the point is that such effects do not by themselves show that meanings are perceptually represented. Relatedly, Helton (2016) and Smortchkova (2021) caution against treating adaptation as a simple 'marker' of perceptual processing in high-level domains. My aim here is not to replicate their broader sceptical theses, but to focus on the specific case of semantic satiation and to argue that the semantic perceptualist's inference from satiation to perceptual meaning representation is not secured by the empirical literature.

The second problem with using the semantic level explanation in favour of high-levelism about meaning properties is to explain why other methods mentioned at the beginning of this section fail to give rise to any semantic satiation at all. If the meaning representations are satiated, then they are also supposed to be satiated in the other methods. This problem is most evident when we try to explain why the lexical decision task does not work. After excessive repetition of a word, when subjects are asked if the next stimulus is a word or non-word, no significant time difference is observed between the words that are related to the repeated word and those that are unrelated. There are two possible ways to explain this in the existing literature. The first is to argue that the lexical decision task does not require the subject to access the meanings of the words. This is, however, incompatible with other empirical data and theories in the semantic memory literature because when one decides whether a string of letters is a word or non-word, it is believed that one needs to access meaning representations (see James, 1975 and Dilkina et al., 2010 for more discussion and evidence for this).⁵ For this reason, this way of explaining why the lexical decision task does not initiate any semantic satiation is not opted for. Proponents of semantic satiation have offered another explanation.

Smith (1984) and Smith and Klein (1990) developed the theory called the "sluggish link hypothesis." According to the sluggish link hypothesis, meaning representations are not what is satiated. The links between them get satiated. When faced with lexical decision tasks after excessive repetitions of a word, the subject can reach the meaning representation because it is not satiated in this picture. However, in the category decision task, one needs to use the links between meaning nodes because what is asked is if the new stimulus is related to the satiated one. Since the links between the nodes get satiated after the repetition, it takes subjects more time to reach out to the related meanings and decide whether they are related. This explanation can easily explain why category decision tasks work, but lexical decision tasks do not. If true, however, it does not support high-levelism about meaning properties because meanings are not satiated in this picture. Although satiation occurs at the semantic level, the meaning representations (or nodes) remain intact after the repetition. For high-levelism about meaning properties to work, the meaning representations need to be satiated. Satiation in the links between meaning representations does not help

⁵ Interestingly enough, the point that one needs to access the meanings in a lexical decision task is also employed by Brogaard (p.152, 2017), who is a proponent of the argument from semantic satiation, in another argument in favour of high-levelism about meaning properties.

the high-levelist, because the meanings themselves are not satiated. One cannot infer that meanings are perceptually adapted merely from the fact that some effect occurs at a semantic or semantic-memory level. The same point applies to ERP evidence: an N400 modulation may show that repetition has a semantic-level effect, but it does not follow that the meaning property itself is part of perceptual phenomenology or that it is the item perceptually adapted.

4.2 The apparent loss of meaning

The second condition for high-levelism is that perceiving meanings should make a phenomenal difference. In semantic-satiation cases, the relevant phenomenal difference would therefore have to be due to the perceptual adaptation of meaning properties, rather than to changes at lower levels of linguistic processing. Here I argue that the available evidence does not show that this condition is met. The point is not merely that the phenomenal change could, in some abstract sense, be produced by other processes. Rather, the first-person reports and the relevant experimental contrasts are better aligned with independently motivated sub-semantic mechanisms than with the claim that subjects perceptually lose access to meaning properties as such. If the apparent alienation from a repeated word is better explained by changes in orthographic, phonological, lexical-form, or related sub-semantic processing, then the argument from semantic satiation does not support high-levelism about meaning properties. This section therefore targets the explanatory step in premise (4): even if repetition produces a striking phenomenal change, the question is whether that change is best explained as the perceptual loss or adaptation of meaning properties, rather than as sub-semantic word alienation.

The accounts that are discussed in the previous section are the accounts of how the comprehension of meaning is affected after repetition, or more particularly, of why it takes subjects a longer time to decide whether two words are related or not after one of these two words is excessively repeated. They were not accounts of the phenomenal changes that occurred after the relevant repetition. When this phenomenon was brought to our attention first by Severance and Washburn (1907), it depended on the subject's reports on how the phenomenal difference is felt or how the word looks or sounds. However, later experiments typically did not study this phenomenal change directly. They often did not ask whether the subject felt any change at all after the repetition. Behavioural methods such as lexical decision, category membership, and relatedness-judgment tasks focus on task performance; ERP methods such as the N400 studies focus on electrophysiological correlates of semantic processing. Neither kind of measure, by itself, tells us whether the repeated word perceptually appears to lose its meaning. Although the phenomenal difference is labeled as a "loss of meaning," subjects rarely report about meanings. The following are the reports of what subjects experience when repeating a word in Severance and Washburn (1907). For example, upon fixating on the word "career", the subject reported:

"6 sec. *reer* stands out prominently and gives the word an unfamiliar look. sec. Sound suggestion = care – ersec. The second e looks like c. (1907, p.182)"

Fixating on other words also yielded similar reports. After fixating on the word “blood” for one minute and twelve seconds, the subject reported that “b and d look like p and q upside down (1907, p.183).” Recently, new studies provided us with similar reports on repeating words. Similar to the ones in Severance and Washburn (1907), these reports are mainly about sub-semantic properties of words as well. Moulin et al. (2021) asked subjects to repeatedly write the word “the” (60 times max.), and subjects chose one or more among six options that describe their experiences. Half chose “handwriting looks strange”. 45% chose “it seemed to be spelt wrong”. All these reports point out some sub-semantic properties of the stimulus, not the semantic level properties. This can also be supported by the further observation that a similar effect can be seen when you repeat a pronounceable non-word or a word in your language but whose meaning you do not know. The stimulus also seems to undergo some phenomenal changes like what has been experienced when one repeats a familiar word (see, e.g., Voltolini, 2020).

Taken at face value, these reports suggest that the dominant phenomenal changes concern orthographic and phonological aspects of the stimuli, rather than the presence or absence of meaning as such. This gives the sub-semantic account a phenomenological advantage: it explains why subjects’ reports so often concern the look, sound, spelling, or articulatory profile of the repeated item, rather than the perceptual presentation of meaning properties as such. This puts pressure not only on premise (1), but also on the explanatory step in premise (4). The phenomenon to be explained is not, in the first instance, a clearly reported perceptual absence of meaning, but a cluster of changes in the look, sound, spelling, and articulatory profile of the repeated item.

These subjective observations and reports in favour of phenomenal changes induced by adaptation in low-level properties can also be defended by appealing to both philosophical arguments and empirical data published recently. As a part of high-levelism, one can argue that we can perceive properties lower than semantic properties but higher than low-level properties. O’Callaghan (2011) and Tipples (2019) recently argued that we can perceive phoneme properties. If true, then it is highly likely that repeated exposure to a stimulus of a certain phoneme will eventually result in adaptation of it. In the end, our perceptual system will be less sensitive to the particular phoneme or phonemes, and we will “lose it.” The phenomenal difference between losing the phonemes and losing the meaning might not be so easily recognized by subjects. All the subjective reports gathered by the aforementioned studies can very well be the reports of the phenomenology of not hearing phoneme properties. Empirical evidence in favour of similar phenomenal changes occurring lower than the semantic level can come from the verbal transformation effect.⁶ When one repeats a word, the word transforms into another word (meaningless or meaningful). For example, when you repeat the word “tress,” it can become “dress,” or “stress,” and at some point, it may come back to “tress.” This phenomenon is also

⁶ Verbal transformation effect has already been used many times against the existence of semantic satiation (Esposito & Pelton, 1971) and against the argument from semantic satiation in favour of high-levelism about meaning properties (Di Bona, 2020; Voltolini, 2020). For this reason, instead of extensively developing this point, I will only briefly mention it here. One can refer to the studies just mentioned for a detailed explication of this point against high-levelism and semantic satiation.

explained by satiation in the representation of units that are lower than the semantic level, such as a syllable or a phoneme. When repeating a word, subjects might not be able to tell whether they are experiencing semantic satiation or verbal transformation. Especially when the resulting string of letters has no meaning in the languages we know, the phenomenal difference between hearing a meaning or hearing a pronounceable non-word might not be appreciated very well, and those reports can be the reports of such changes in low-level properties.

These considerations give the sub-semantic account a comparative advantage with respect to the phenomenological data. It explains why the reported changes cluster around orthographic, phonological, lexical-form, and articulatory features; why similar forms of alienation can arise for pronounceable non-words or unfamiliar words; and why verbal transformation effects can be confused with semantic satiation. The semantic-perceptualist account can describe the phenomenon as a loss of meaning, but it does not best explain the actual pattern of reports. Thus, even granting that repetition produces a striking phenomenal change, premise (4) remains unsupported: the best explanation of that change is not the perceptual loss or adaptation of meaning properties, but sub-semantic word alienation.

5 Conclusion

Certain proponents of high-levelism about meaning properties argue that semantic satiation, or the apparent loss of meaning after prolonged exposure to a word, supports the view that meaning properties can figure in perceptual experience. The thought is that semantic satiation is a kind of aftereffect, and that aftereffects provide evidence for perceptual processing. I have argued that this argument does not succeed. For the argument to work, the relevant evidence would need to show not merely that repetition affects semantic processing, but that meaning properties themselves are perceptually adapted or perceptually presented. The studies discussed above do not establish this stronger claim.

This conclusion does not require denying that some semantic-satiation effects involve semantic processing. Behavioural slowing and N400 modulation may indicate effects at the level of semantic processing. But such effects do not by themselves establish perceptual experience of meaning properties. Some contrastive findings are better accommodated by lower-level or associative accounts, and the phenomenology of word alienation is better explained by changes in orthographic, phonological, lexical-form, or related sub-semantic processing. Semantic satiation therefore does not support the intended inference from repetition-induced effects in language processing to the perceptual experience of meaning properties.

Nothing I have said rules out the possibility that there are other, independent reasons to endorse semantic perceptualism. My claim is only that semantic satiation does not add the kind of empirical support that proponents of semantic perceptualism have taken it to provide. This conclusion complements the more general sceptical assessments of semantic perceptualism offered by Gross (2023, 2024) and Calzavari (2023).

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