Research Article

How to cure the Wittgensteinian anxiety? A two-dimensional approach to speakers' intuitions in linguistics

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Despite great popularity and usefulness of intuitions in modern linguistics, their application is sometimes considered "unscientific." Historically, the hostility to intuitionist and, more broadly, mentalist approach can be traced back to the group of linguists known as American structuralists. Their worries were not unlike the ones expressed by Wittgenstein; therefore I use "the Wittgensteinian anxiety" as an umbrella term for principled suspicion about mentalism motivated by the worries about high scientific or epistemic standards. Taking a critique of the rationale behind the Wittgensteinian anxiety as a starting point, the article sketches a positive picture of intuition-driven linguistics. I argue that anti-mentalistic arguments have some force only against certain phenomenological aspects of mental experience; other aspects can be submitted to public scrutiny indirectly through verbal reports. Reportable properties of mental experience appear to be correlated with structural and relational properties, and can be distinguished from the non-reportable properties in the course of the conceptual analysis carried out by means of two-dimensional semantics (a theory of reference developed in analytic philosophy of language). Thus, with two-dimensional semantics as a guide, intuitionist linguistics is compatible with the structuralist vision of science, at least in principle.

1. Introduction

Modern linguistics relies heavily on intuitive judgments of speakers. This does not mean, however, that all linguists agree on how intuitions should be used in their field and some may even deny that their research involves the use of any speakers' subjective judgments. Nonetheless, if the term "intuition" is understood broadly as any subjective evaluation of linguistic expressions performed by

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a speaker, after a moment's reflection most linguists would probably admit that at some point of their research such evaluation does take place.[1]

Linguists generally agree that even naive speakers without expertise in linguistics are capable of producing some kinds of judgments about spoken and written utterances. For example, the ability to recognize syntactically or semantically anomalous sentences comes for free with the ability to produce and comprehend speech. Similarly, the ability to evaluate the degree of politeness of an expression in a given situation is implicit in general social and cultural competence of a speaker. While speakers are capable of producing a number of subjective judgments about their speech, not all of the judgments are equally relevant for the study at hand and specific research procedures determine (sometimes implicitly) the kind of information a consultant is expected to deliver. Since linguistics is a very diverse discipline, speakers' intuitions are used in a number of different ways and it is impossible to overview all of them in this article,[2] but three cherry-picked examples will help to appreciate their importance.

Generative linguists of the Chomskyan denomination (cf. e.g. Chomsky, 1965; Chomsky, 1995) attempt to create a formal model of grammar capable of "generating" grammatical sentences in a given language. Since Chomsky's *Aspects of the Theory of Syntax* (1965), the model has been known as the Universal Grammar, postulated as an inborn linguistic faculty of all humans and comprising abstract rules governing sentence production in all languages. One of the central distinctions in generative linguistics is between grammaticality and acceptability of expressions. Grammaticality pertains to syntagmatic well-formedness, which is not always equivalent to semantic meaningfulness or "practical" acceptability. For example, sentences (1a) and (1b) are grammatical, but semantically anomalous and "awkward" respectively.

(1)

(a) Colorless green ideas sleep furiously. (Chomsky, 1957, p. 15)
(b) I called the man who wrote the book that you told me about up. (Chomsky, 1965, p. 11)

A generative linguist may ask a consultant not only whether the sentence "sounds right," but also what is wrong with it specifically. The guiding principle is the assumption that linguistic competence comes with the ability to evaluate (via intuitions) acceptability of sentences, even though expert

knowledge may be crucial for distinguishing genuine ungrammaticality from mere stylistic or semantic anomalousness. Consequently, intuitions from naive consultants may be welcome, but judgments of trained linguists are equally or even more important. In general, generative grammarians prefer a hypothesis-driven research in the falsificationist spirit, where a hypothetical model of linguistic competence is used to predict grammaticality of sentences and intuitions of speaker are used to test the predictions.

In Ronald Langacker's Cognitive Grammar (cf. e.g. Langacker, 1987; Langacker, 2008) intuitions are used somewhat differently. Langacker's theory is similar to Chomsky's in that both of them are intended as models of linguistic competence, but their theoretical assumptions differ significantly. Most notably, the quest for the Universal Grammar is abandoned in favor of more local language-specific descriptions and the sharp distinction between grammaticality and acceptability is rejected. A cognitive grammarian is also interested in various types of intuitions regarding acceptability, but unacceptability of certain expressions is accounted for in broadly semantic rather than purely syntagmatic terms. For example, the unacceptability of (2b) compared to the acceptability of (2a) is explained by noting that the verb "to stand" involves vertical orientation in its semantic characterization, while watermelons, due to their shape, are not typically perceived as resting in the horizontal position, "unless we concoct a bizarre context (e.g. it might be impaled on a spike)" (Langacker, 2008, p. 87).

(2)

(a) The clock is standing on the table.

(b) *The watermelon is standing on the table. (adapted from Langacker, 2008, p. 87)

Cognitive grammarians are more open to a descriptive style of research, but an empirically adequate grammar of a language should allow for predicting acceptability judgments made by speaker, so the theory is open to hypothesis-driven falsificationism. Intuitions from naive speakers are welcome, but typically an exhaustive description of an expressions requires expert knowledge. Cognitive grammarians may also construct expressions with the sole purpose of demonstrating a specific theoretical point and consequently the processes of producing a sentence, deriving an intuition, and interpreting the intuition in terms of the theory are inextricably mixed with each other.

Finally, in Sperber and Wilson's Relevance Theory (cf. e.g. Sperber and Wilson, 1996; Wilson and Sperber, 2004), the meaning of linguistic exchanges in real-life communication is accounted for partly in terms of presupposed and implied meanings, which can be inferred only when participants' intentions are taken into account. Relevance theorists observe that in real-life conversations the intended meaning is not always the overt meaning. For example, in (3) Mary does not even seem to address Peter's question on the superficial reading.

(3)

Peter: What do you think of Martin's latest novel?

Mary: It puts me to sleep. (adapted from Wilson and Sperber, 2004, p. 619)

Of course, the exchanges are not really unrelated, since Peter may infer that Mary finds the book boring (rather than that it literally puts her to sleep). Mary, in turn, probably inferred that Peter does not ask whether she merely read the book (even though this is the overt question), but whether she liked it. Thus, a possible interpretation of the exchange in (3) is very different from what the exchange is overtly about. The Relevance Theory emphasizes that when both linguists and non-linguists try to "make sense" out of real-life conversations, they need to take into account the intentions of interlocutors and not only what the interlocutors explicitly say. Here, intuitions are once again crucial; this time, however, they are not about properties of isolated expressions, but about intentions of interlocutors acting in particular situations. Relevance theorists invite us to exercise empathy with interlocutors and intuit, largely on the basis of our own experience as language users, what the interlocutors intended to express in a given context. Taking speaker's intentions into account is particularly important in analyzing phenomena like verbal irony, where the overt meaning is frequently opposite to the intended one.

All of the above research procedures involve making intuitions about linguistic data and reporting them in the form of (typically verbal) reports. These kinds of procedures are the bread and butter of most research in modern linguistics. Yet despite the popularity and apparent usefulness of speakers' intuitions in the study of language, the discipline has been plagued by the fear that subjective judgments are not reliable sources of knowledge about language. Section 2 traces the fear back to the worries about low scientific standards of "mentalistic" linguistics. The worries are not entirely unlike

the ones expressed by Wittgenstein in his well-known "beetle in the box" thought experiment devised against the mentalist approach to linguistic meanings. In Section 3, I partly agree with the anti-mentalist argument that the phenomenal aspects of speaker's mental experiences are publicly unobservable and ineffable, which makes them inaccessible to public scrutiny essential for science. Nonetheless, I will defend the view than some non-phenomenal aspects of mental experience are communicable through reports and can be used for public science. Section 4 analyzes the distinction between ineffable phenomenal properties and reportable non-phenomenal properties in terms of two-dimensional semantics. The two-dimensional analysis of mental experience is cashed out in modal terms: the phenomenal aspect of a mental experience, including an intuition about linguistic material, corresponds to necessary properties of the mental experience, while the non-phenomenal aspect corresponds to contingent properties. Section 5 relates the contingent non-phenomenal properties to structural properties, whose importance is emphasized by scientific structuralists. The overall conclusion is that some aspects of speakers' mental experiences can be studied indirectly through reports and these aspects suffice for capturing some structural properties of the experience. Hence, it appears that intuitions about linguistic data can be used fruitfully in structure-oriented linguistics and conceptual analysis within the framework of two-dimensional semantics can help to keep apart structural and non-structural properties of mental experiences.

2. The Wittgensteinian anxiety

The fear of everything mental, including intuitions of speakers, has been present in linguistics almost from the very inception of the discipline in the early 20th century. The fear was perhaps most vocally expressed by American structural linguists, who dreamed about turning linguistics into a "real" natural science by purging it from "mentalism": the practice of describing or explaining linguistic phenomena in terms of mental entities or processes. For example, in the following passage William F. Twaddell offers a critique of a "mental definition of the phoneme." A phoneme is a basic unit of phonological analysis, roughly corresponding to a sound, and influential linguists like Ferdinand de Saussure (1966 [1916]) and Nikolai Trubetzkoy (1969 [1939]) proposed that the unit is a psychological entity rather than a physical sound. Twaddell opposes:

> [A mental definition of a phoneme] is invalid because (1) we have no right to guess about the linguistic workings of an inaccessible "mind", and (2) we can secure no advantage from such guesses. The linguistic processes of the "mind" as such are quite simply

> unobservable; and introspection about linguistic processes is notoriously a fire in a wooden stove. Our only information about the "mind" is derived from the behavior of the individual whom it inhabits. To interpret that behavior in terms of "mind" is to commit the logical fallacy of "explaining" a fact of unknown cause by giving that unknown cause a name, and then citing the name x as the cause of the fact. "Mind" is indeed a summation of such xs, unknown causes of human behavior. (Twaddell, 1958 [1935], p. 57)

American structuralists' concerns resonate well with Wittgenstein's reservations against identifying meanings of linguistic expressions with mental concepts, elegantly illustrated with the famous "beetle in the box" thought experiment from *Philosophical Investigations*:

> Suppose everyone had a box with something in it: we call it a "beetle". No one can look into anyone else's box, and everyone says he knows what a beetle is only by looking at his beetle.—Here it would be quite possible for everyone to have something different in his box. One might even imagine such a thing constantly changing.—But suppose the word "beetle" had a use in these peoples language?—If so it would not be used as the name of a thing. The thing in the box has no place in the language-game at all; not even as a something: for the box might even be empty.—No, one can "divide through" by the thing in the box; it cancels out, whatever it is. (Wittgenstein, 1986 [1953], §293).

Twaddell and Wittgenstein would probably disagree on how language should be studied (the precipice between linguistics and philosophy of language is wide and difficult to bridge) and the arguments that they make are different in several important respects. What they share, however, are two basic reasons for rejecting "mentalism": the first is that mental entities are not publicly observable and the second is that the mind itself is too mysterious and nebulous to be used as an explanans of concrete linguistic phenomena. It is worth noting that this view does not entail the denial of mental experience as such, at least not for Wittgenstein:

> Why should I deny that there is a mental process? But "There has just taken place in me the mental process of remembering . . . ." means nothing more than: "I have just remembered . . . .". To deny the mental process would mean to deny the remembering; to deny that anyone ever remembers anything. (Wittgenstein, 1986 [1953], §306)

Thus, Wittgenstein acknowledges the existence of mental processes, yet he warns that when we talk about mental meanings of words, "[we] talk of processes and states and leave their nature undecided" and consequently advises "to deny the yet uncomprehended process in the yet unexplored medium" (both quotations in Wittgenstein, 1986 [1953], §307). Since Wittgenstein's arguments in *Philosophical Investigations* are more balanced and sophisticated than Twaddell's militant, but rather unrefined anti-mentalism, I will call the worries expressed by the two authors "the Wittgensteinian anxiety."

The history of linguistics was not kind to such radical anti-mentalism: American structuralism was swept away by the cognitive revolution of the 1950s and the 1960s, spearheaded by Noam Chomsky's *Syntactic Structures* (1957) and *Aspects of the Theory of Syntax* (1965). Yet linguistics has never fully freed itself from the anxiety about low scientific standards of intuition-driven research and the Wittgensteinian anxiety typically goes hand in hand with well-meant positivist concerns about what constitutes "good science." Despite vitriolic overtones in the passage criticizing the mental definition of the phoneme, Twaddell and other American structuralists had a positive goal in mind: they intended to design a reliable and respectable science of language. Their efforts were not limited to sanguine anti-mentalism; in "Linguistic aspects of science" (1938), Leonard Bloomfield, the founding father of the school, attempted to sketch a positive picture of scientific linguistics based in the ideas of logical positivism, but the picture inherited all the faults that eventually led to the fall of the philosophical movement. Moreover, Bloomfield tried to solve the problem of demarcation of science, at least in the field of linguistics:

> [We] can distinguish science from other phases of human activity by agreeing that science that science shall deal only with events that are accessible in their time and place to any and all observers (strict *behaviorism*) or only with events that are placed in coordinates of time and space (*mechanism*), or that science shall employ only such initial statements and predictions as lead to definite handling operations (*operationalism*), or only terms such as are derivable by rigid definition (*physicalism*). (Bloomfield, 1938, p. 231; original emphasis)

The list offered by Bloomfield is disjunctive, which suggests that a truly scientific enterprise needs to have at least one of the properties mentioned. Public observability, under the term "behaviorism," is repeated after Twaddell as an important property of science and scientists should limit themselves to the study of physical phenomena ("physicalism"). Since mental phenomena are publicly unobservable

(they are not "accessible to all observers") and it is far from obvious whether they identical with their physical correlates in the brain, both of these requirements are at odds with mentalism.

From the modern perspective, it is not hard to see that framing the discussion about mentalism in terms of necessary and sufficient feature of science is sterile. Firstly, after Thomas Kuhn's *The Structure of Scientific Revolutions* (1996 [1970]) and Paul Feyerabend's *Against Method* (1993 [1975]), few philosophers would seriously argue that science is defined by a checklist of clearly delineated and unambiguous characteristics. Secondly, no philosopher of science would seriously argue that scientific theories feature observable entities only, even though the ontological status of unobservable theoretical entities is hotly debated. Thirdly, proponents of anti-metaphysical empiricism (cf. e.g. Fraassen, 1980) would be rather suspicious about the physicalism advocated by Bloomfield as a defining property of science, since physicalism is an essentially metaphysical doctrine. Fourthly, Nancy Cartwright's distinction between theoretical and phenomenal laws (cf. Cartwright, 1983) shows that many scientific laws are not about "events that are placed in coordinates of time and space," which undercuts Bloomfield's criterion of "mechanism."

Nonetheless, some credit should be given to Twaddell, Bloomfield, and Wittgenstein. It seems that the two main problems fueling the Wittgensteinian anxiety, the unobservability of mental phenomena and the mysterious nature of the human mind, are serious obstacles for mentalist linguistics. Consultants' intuitions are not directly accessible to researchers and may be studied only indirectly through reports, which may compromise the reliability of the results in various ways. Since consultants' intuitions are inherently private, reports about them cannot be evaluated or rectified by another party. What is more, it is hard to imagine how consultants' mental experiences could be measured either publicly by researchers or privately by consultants themselves, which makes them inaccessible to quantitative methods.[3] On the whole, mental experiences cognizable through intuitions appear to be too ephemeral and nebulous for fully-fledged natural sciences studying concrete objects of the physical world. All this discourages many linguists, especially those who emphasize the importance of third-person observation in natural sciences, from relying on intuitions.

The other party in this methodological tug-of-war are mentalists. The fall of behaviorist linguistics, whose methodological shortcomings were aptly criticized by Noam Chomsky (1959), convinced linguists of most persuasions that a theory without a mentalistic level of description is incomplete and a methodology that rejects speakers' subjective judgments is seriously crippled. It is hard to imagine how a grammaticality/acceptability of the sentences in (1) and (2) could be determined without asking

about speaker's intuitions or how the exchange in (3) could make any sense without making allowances for interlocutors' intentions. Moreover, the arguments against mind-to-body reduction in philosophy of mind, comprehensively summarized by David Chalmers (1996, 2010), challenge the view that a mental phenomena can be exhaustively characterized by characterizing nothing more than physical events in the brain.[4] This, however, should not overshadow the genuine problem noticed by Wittgenstein in his "beetle in the box" thought experiment, which mentalist linguists are still unable to satisfactorily address.[5]

3. Genuine and apparent problems with intuitions

The "scientificness" of intuition-driven research is hard to evaluate without at least provisional evaluation of criteria or standards against which the evaluation is made. American structuralists might have had a misconceived picture of "standard science," but they did make the picture explicit. This is particularly important in the context of Bloomfield's metaphysical commitments and more recent debates about the nature of consciousness in philosophy mind. On the one hand, if one agrees with Bloomfield that science rests on the metaphysical postulate that only physical events fall within the purview of science, linguists should talk about mental entities only to the extent to which the entities can be cashed out in terms of physical (neural or behavioral) processes. On the other hand, the metaphysical status of mental events vis-à-vis the physical events supporting them is anything but clear. Does being a "good scientist" consist in flatly ignoring the mysteries surrounding the ontological nature of the mind and uncritically embracing eliminative physicalism? Is it necessary for scientists to take a metaphysical stance in the first place? Perhaps the anti-metaphysical path, paved by Fraassenian constructive and structural empiricist (Fraassen, 1980; Fraassen, 2008) is a way of by-passing the ontological conundrums?

In practice, most linguists lean towards non-metaphysical positions, at least in the context of ontology of the mind. This is not say that the linguist are declared anti-realists about the status of theoretical entities. Rather, this is to say that virtually no theory in modern linguistics attempts to address explicitly the metaphysical mysteries of the mind. A successful account of the semantics of the sentences (2a) and (2b) within the framework of Cognitive Grammar has to mention semantic restrictions imposed by the verticality inherent in the verb "to stand," which render (2b) semantically anomalous, but the account does not have to explain how the semantics of the verb is cashed out in terms of physical events in the brain. Questions of this sort are happily delegated to departments of

philosophy and neuroscience, so that no theory of language is considered unsuccessful only because it fails to take a definitive metaphysical stance.[6] This means that one of the pillars of the Wittgensteinian anxiety, the mysterious nature of the mind, loses force as an argument against mentalism in linguistics. Mental events and entities postulated by linguistic theories may be, in Wittgenstein's parlance, "uncomprehended processes in the yet unexplored medium," but their metaphysical mysteries fall outside the scope of linguistics in its modern shape.

The problem of public unobservability of mental phenomena, that is the second pillar of the Wittgensteinian anxiety, cannot be delegated to "another department" in a similar fashion. What is worse, modern philosophy of science offers little guidance for a linguist in how to approach this difficulty. The distinction between publicly observable and publicly unobservable entities is heatedly debated by philosophers (cf. Fraassen, 1980; P. M. Churchland, 1985; Teller, 2001, Alspector-Kelly, 200; Alspector-Kelly, 2004), but intuitions do not fit well into this distinction. On the one hand, intuitions are certainly not publicly accessible to all observers, so they do not qualify as observable in the sense typically discussed in philosophy of science. On the other hand, many (if not all) having an intuition involves entertaining robust qualitative content, i.e. a certain phenomenal "what-it-feels-like," experienced directly by the consultant. Therefore, intutions cannot be straightforwardly reduced to theoretical terms inaccessible to any kind of human experience. It may not be obvious whether all mental entities have their own robust phenomenology (does it "feel like something" to understand, for instance, a differential calculus?), yet it seems beyond reasonable doubt that most intuitions used as cues in modern linguistics involve some sort of phenomenal content. To take a couple of examples, if a consultant has an intuition that the string of words "On cat is mat the a" is not a grammatical sentence in English, entertaining this intuition involves "feeling in a certain way" about the combination of words and the sentences in (1a) and (2b) "feel strange" as well. Thus, even though Wittgenstein rightly asserts in his "beetle in the box" thought experiment that mental phenomena, like intuitions, are not available to all observers, Twaddell is wrong in suggesting that such phenomena are not observable at all: in an important sense, they are observable to the person who entertains them. This assertion may challenge the traditional definition of observation, understood typically as observation of public phenomena, but it would be difficult to argue without risking logical incoherence that the phenomenal content of intuitions is never apprehended by anyone, even by the person experiencing the intuitions.

Yet even if the notion of observation is extended to embrace intuitions and consequently mental phenomena are accepted as observable phenomena, the problem remains. The crux of the Wittgensteinian anxiety is not that mental phenomena are unobservable even to the one entertaining the phenomena; on the contrary, the "beetle in the box" thought experiment is explicit about everyone being familiar with the content of their box. The key problem is that science requires *public* rather than *private* observability of the phenomena under investigation. A subjective judgment, even if deemed observable in some broad enough sense, is still inaccessible to public scrutiny and cannot be studied by the scientific community.

This argument has some force, but it goes against as a strong commonsense conviction that we successfully communicate details of our subjective experiences in everyday situations. On the one hand, it is certainly true that when I complain about a toothache to my dentist, I cannot communicate the "phenomenal feel" of the pain itself. I can, however, report that "The pain is in the upper left canine, I've been having the pain since Monday, and its quite strong." Of course, after such verbal reports the dentist still does not experience my pain from the first-person perspective, but she does learn something about the pain nonetheless: she may correctly locate the aching tooth, correctly infer that the pain lasts for two day (assuming that my visit is on Wednesday), and is able to relate the pain to some tentative intensity scale (perhaps consisting of only two regions: strong sensation and weak sensation).

This conclusion does not necessarily clash with Wittgenstein's and Twaddell's claim that mental experiences of a person are accessible only to this person. It merely suggests that there are two types of knowledge about the subjective experience, or more precisely, there are two aspects of subjective experience that we may be familiar with. To the first approximation, let us conclude that the first aspect is the "phenomenal feel," the subjective qualitative content constituting the experience; this is indeed cognizable only from the first-person perspective and ineffable in public communication. The second aspect are various non-phenomenal properties of subjective experience that can be successfully communicated to others. The natural question that arises at this point is what are exactly these reportable non-phenomenal properties and how to distinguish them from the ineffable phenomenal ones.

4. Two-dimensions of an intuition

An answer to this question can be fruitfully pursued by means of two-dimensional semantics: a theory of reference developed since the 1970s in analytic philosophy of language. Like all theories of reference, two-dimensional semantics attempts to capture the relationship between certain kinds of linguistic expressions, usually proper names and natural kind terms, and objects in the physical world. Two-dimensional semantics is an intensional theory: its central tenet is that successful reference is secured by users' knowledge about the referent. The knowledge is constituted by the so-called intensions, which can be usually modeled as properties of the referent known to users.[7] Two-dimensional semantics is an attempt at defending Frege-style intensional semantics (cf. Frege, 2010 [1892]) against the objections from Kripkean causal theory of reference (cf. Kripke, 1980). The crux of Kripke's critique of intensional theories is that the reference of proper names and natural kind terms is not secured by the knowledge possessed by name users, because proper names and natural kind terms refer rigidly (i.e. they always refer to the same object in all possible worlds) regardless of what name users happen to know about the referent. Kripke argues that proper names successfully refer even in the cases when the user is ignorant or mistaken about important properties of the referent (cf. Kripke, 1980, "Lecture II").

A well-known illustration of the problems facing intensional theories is Hilary Putnam's Twin Earth thought experiment (cf. Putnam, 1973). Putnam invites us to imagine a planet almost identical to Earth except that the liquid transparent potable substance filling Twin Earth's lakes and oceans is not Earth's water (H_2O), but a different substance whose complex chemical structure is abbreviated as XYZ. Intuitively, XYZ is not water (H_2O), because the two substances have different chemical compositions.[8] Yet if the natural kind term "water" picks out its referent by virtue of name users' familiarity with an intensional description associated with H_2O, the term refers to XYZ as well, because XYZ also satisfies this description. Thus, if a speaker associates "water" with the intensions 'liquid', 'transparent', 'potable', 'fills lakes and oceans', etc., the term refers to both H_2O on Earth and XYZ on Twin Earth. This conclusion is counterintuitive, and therefore (the argument goes) it does not seem that natural kind terms refer in this fashion. What seems to be the case is that despite superficial similarities between H_2O and XYZ, the term "water" picks out only the former and when applied to the latter, it misrefers. Putnam's conclusion is that "water" does not refer by virtue of users' familiarity with an intensional description. Kripke adds that reference is fixed by a causal chain of actions

originating from an initial act of baptism passed down to other users in the community (cf. Kripke, 1980).

Two-dimensional semantics attempts to confront the problems revealed by the Twin Earth experiment by introducing two kinds of intensions. The modal logic interpretation of the problem with Fregean intensions (like 'liquid', 'potable', 'fills lakes and oceans', and so on for "water") is that such intensions are contingent, i.e. they vary across possible worlds. Reference, in turn is necessary, i.e. names and natural kind terms pick out the same referent in all possible worlds. Yet instead of claiming that intensions do not secure reference at all, 2D semanticists introduce the distinction between *primary intensions* (henceforth 1-intensions) and *secondary intensions* (henceforth 2-intensions). Primary intensions behave like the ones defined by Frege: they correspond to contingent properties associated with referents in the actual world and may vary across other possible worlds. Secondary intensions are necessary, i.e. they remain stable across all possible worlds, and correspond to the properties that secure the rigidity of reference. 2D semanticists generally agree with Kripke and Putnam that the contingent properties like 'liquid', 'potable', 'fills lakes and oceans', etc. do not secure the reference of the term "water" and therefore XYZ is not picked out by the term. However, they disagree with Kripke and Putnam that reference is not fixed by any properties at all; the property that fixes the reference of "water" is the property pertaining to waters chemical composition: 'H_2O'. In other words, 2D semanticists argue that the term "water" necessarily refers to Earth's water in every possible world, because it picks out the substance via the necessary 2-intension 'H_2O'. Contingent 1-intensions do not secure the reference to Earth's water in all possible worlds, but they may be associated with the substance in some possible worlds; notably in "our" world. By introducing the distinction between primary and secondary intentions, two-dimensional semantics reintroduces the element of knowledge into theory of reference: it vindicates Frege's intuition that users fix the reference of proper names and natural kind terms by virtue of knowing something about the referent.

Is it possible to apply two-dimensional semantics to a name of a mental experience ("E")? If so, "E" should have two kinds of intensions: 1-intensions corresponding to contingent properties of the mental experience and 2-intensions corresponding to necessary properties. To take a more concrete example, let us consider the term "pain" analyzed by Wittgenstein in his "beetle in the box" thought experiment and, in a slightly different context by David Lewis (1980). Lewis invites the reader to imagine a mad man experiencing pain just like regular humans, but who does not react to pain like

regular humans: instead of groaning and trying to avoid pain, the mad man turns to mathematics and pain makes him more focused. Lewis also invites the reader to imagine a Martian who experiences pain and reacts to pain like regular humans, by groaning and trying to avoid it, but whose pain is caused not by C-fiber firings like in humans (as traditionally and somewhat simplistically assumed in philosophical disputes), but by inflating of cavities in the Martian's feet. Lewis argues that the mad man and the Martian are at least logically possible, i.e. their existence is not ruled out by logic. One point that the philosopher tries to make is that if it is logically possible to have a person experiencing pain, but not engaged and behavior associated with pain and a creature experiencing pain, but without human nervous system, what we term "pain" in everyday language is not "pain behavior" and physical correlates of pain in humans. So what does "pain" refer to? According to Lewis, it refers to a qualitative phenomenal sensation: "[to] have pain and to feel pain are one and the same (...) A theory of what it is for a state to be pain is inescapably a theory of what it is like to be in that state, of how that state feels like, of the phenomenal character of that state" (Lewis, 1980, p. 222).

Lewis does not explicitly endorse two-dimensional semantics in his article, but his conclusions are amenable to a 2D analysis. The necessary 2-intensional property that allows us to pick out the referent of "pain" in counterfactual situations (like the mad person and the Martian scenarios) is the phenomenal character of pain. "Pain behavior" and physical correlates of pain in regular humans, in turn, are contingent (1-intensional): we may recognize a sensation as pain even though "pain behavior" and pain's physical correlates may vary across possible worlds. Other contingent properties of a token of pain, i.e. an instance of pain experienced by a particular organism on a particular occasion, include its specific location, specific duration, and specific intensity. Certainly, a token pain is necessarily sensed in a body part, necessarily lasts for some time, and necessarily has some intensity, so the properties 'having location', 'having duration', and 'having intensity' are 2-intensional, but tokens of pain can be sensed in various body parts, for different periods of time, and to different degrees; thus, exact values of location, duration, and intensity in various tokens of pain are contingent. What remains stable across different pain tokens is the phenomenal character of pain mentioned by Lewis: experiencing pain feels in a certain way and this phenomenal "feel" is what distinguishes pain from other subjective experiences. Thus, I am inclined to judging "I feel pain" only when something feels like pain; when something feels like tickling, I am not inclined to judging "It is pain, but it feels like tickling." In other words, if on a particular occasion an experience does not feel like pain, it is not recognized as pain at all, rather than it is recognized as pain experienced as

something else. Therefore, it is this "phenomenology feel" of a mental experience that is the necessary 2-intension securing the reference of "pain" across all possible worlds.

The distinction between primary and secondary intensions partly overlaps with the distinction between reportable and non-reportable properties: 2-intensional phenomenal content is ineffable, while 1-intensional non-phenomenal properties are communicable. This, however, is not to say that *all* 2-intensions of mental experiences are phenomenal and ineffable. As already noted, the intension 'having intensity' is a necessary (2-intensional) property of a token pain, but the property abstracted away from any particular sensation does not have any phenomenal character; it feels like something experience a token pain with certain intensity, but it does not feel like anything to have intensity generally and abstractly.

5. Intuitions and the structure of mental experiences

From the point of view of two-dimensional semantics, there is a partial analogy between Putnam's Twin Earth thought experiment and investigating mental experience through intuitions. In the Twin Earth scenario, there are two planets on which two chemically different substances perform similar relational and functional roles (as well as share some superficial properties like transparency). On their respective planets, H_2O and XYZ fill lakes and oceans, support life, are used for washing and laundering, enable transportation between continents, etc. Generally speaking, both substances partake in the same geographic, geological, biological, as well as social and cultural relations in their respective worlds. These relations are contingent (1-intensional), since in various possible worlds various substances could partake in these relations. More generally, the Twin Earth scenario establishes a logical possibility of two different entities performing the same relational roles. In the 2D formalism, the Twin Earth scenario establishes a logical possibility of two entities with different 2-intensions having identical 1-intensions. The scenario could be extended by imagining that scientists from Earth and Twin Earth are not able to determine the chemical structure of the liquid potable substances filling their lakes and oceans (possibly because advanced chemistry was never developed in these worlds), so that they are not able to determine the 2-intensional properties differentiating the substances. Both Earthlings and Twin Earthlings alike would need to limit themselves to the study of 1-intensional properties of H_2O and XYZ, even if they suspected that the substances may not be the same with respect to 2-intensions.

Mutatis mutandis, this is the situation of an mentalist linguist faced with the problem noticed by Wittgenstein. The linguist may acknowledge the logical possibility that the 2-intensional phenomenal content of intuitions is different for different speakers, despite the fact that the speakers produce the same reports. This is the modal crux of Wittgenstein's though experiment: a speaker cannot communicate the 2-intensional phenomenal content of someone else's mental experience through reports, since the causal link between the phenomenal content of the experience and the report is contingent rather than necessary. This is consonant with Lewis's conclusion from the mad man scenario: the causal link between sensations and behaviors, including verbal reports about the sensation, is contingent. What about 1-intensional properties of mental experience? At least some of them appear to be amenable to reporting, especially the ones involving some sort of relations and it seems that this is how mental experiences are characterized in everyday communication.[9] While the 2-intensional phenomenal sensation of a pain token may be ineffable, one may still describe pain by mentioning its relation to body part (location), relation to a point in time (duration), and whether the pain is weak or strong (relation to a region in the logical space of intensity).

Linguistic intuitions have a similar two-fold character. For instance, when a consultant reports the intuition that sentence X is ungrammatical in language Y, the consultant cannot report what this intuition "feels like" phenomenally and the linguist cannot investigate the "feel" through direct observation. It is logically possible that linguists' and consultants' intuitions are constituted by different phenomenal content, i.e. that the intuitions feel differently for the two consultants, just like Wittgenstein speculates. Yet both the linguist and the consultant may agree that the intuition about sentence X in language Y is such that the rules of language Y prevent speakers from producing sentence X. Notice that also in the case of linguistic intuitions, many 1-intensions can be cashed out in relational terms. For example, although grammaticality is a theoretical concept and its definition varies across theoretical frameworks, it appears that any definition of grammaticality should feature a relation between a sentence and the respective linguistic system.[10] More technically, phenomenally different intuitions may similarly relate sentence X in language Y to a particular region of grammaticality scale. The similarity between the mentalist linguist and a scientist on Twin Earth (given the ignorance of advanced chemistry) is that they both may investigate certain 1-intensional relations in which entities partake, even though it is logically possible that the entities have different 2-intensional character.

This picture harmonizes with structuralist approaches philosophy of science, which emphasizes the importance of structure of phenomena constituted by relations between its constituent parts. I will set aside the debates between the proponents of the realist versus the empiricist version of structuralism, as well as the ontological and the epistemic versions (cf. e.g. Worrall, 1989; Ladyman, 1998; Fraassen, 2008; Bueno, 2011; Becker Arenhart and Bueno, 2015), since the issues discussed in this article are largely independent of the problems crucial in these disputes. At this point, it is worth noting that since reports about intuitions may reveal contingent relational properties of mental experiences and structures are characterized in terms of relations between constituents, the reports may reveal structural aspects of mental experience. The wording may be misleading, since the *structural aspect* of mental experience is not identical to the *structure* of mental experience. Strictly speaking, the structure of, say, an intuition about grammaticality is the internal make-up of the experience. For instance, the temporal structure of an intuition is how its phenomenal quality changes over time. Most linguists express little interest in this facet of the mental experience. The structure that linguists are most interested in is the structure of a linguistic system, a body of linguistic data, psychological and neurological mechanisms of language production and comprehension, etc. In this respect, intuitions are treated as explananda: a true or empirically adequate model of language Y is meant to account for the fact that speakers of Y have linguistic intuitions of a certain sort. For example, a true/empirically adequate grammar of English should account for speakers' intuition that "On cat is mat the a" is not a grammatical sentence in English, while "The cat is on a mat" is grammatical. In this sense, intuitions are treated similarly to data derived from public observation: in van Fraassen's parlance, intuitions are isomorphic to empirical substructures embedded in a larger model of language (cf. Fraassen, 1980). Needless to say, these substructures are a part of model's overall structure, that is, they partake in relations constituting the model. Hence, most linguists are interested in relational/structural properties of mental experiences not because they want to learn about the internal make-up of the experience, but because mental experiences reveal something about the structure of language.

To summarize, there is a dichotomy inherent in our knowledge of a subjective experience. The "phenomenal feel" of the experience is ineffable, necessary (2-intensional), and secures the reference of the term denoting the experience. Various relational properties are reportable, contingent (1-intensional), and they constitute a structure with the subjective experience as one of parts. Since the 1-intensional relational properties are reportable, they can be submitted to public scientific inquiry.

The 2-intensional phenomenal properties are non-reportable and therefore unavailable for public science.

Wittgenstein's and Twaddell's objections against intuitions fueled by unobservability of mental entities have force against the 2-intensional phenomenal properties. This intrinsically phenomenal non-relational facet of subjective experience is the genuine "beetle in the box," that is to say, it is something that we are intimately familiar with through introspection, but can never compare with what other speakers have in their minds. However, some 1-intensional properties of mental experience can be revealed in acts of public communication, so that the hearer can become intersubjectively familiar with some aspects of the speaker's subjective experience. Partial and indirect as this familiarity may be, this possibility significantly weakens the force of the arguments behind the Wittgensteinian anxiety. Since the many reportable properties involve some sort of relations, the reports can be used to pursue linguistic research in the spirit of scientific structuralism.

6. Residual problems

Surely, this brief sketch of a two-dimensionalist and structuralist approach to intuitionist linguistics offers more questions that answers. I will leave aside the problems specific to two-dimensional semantics (discussed at some length by Chalmers (2006)) and scientific structuralism. In this concluding section, I will focus on a couple of problems that arise specifically for the approach to intuitions in linguistics advocated above. One important question regards the dichotomy of primary and secondary intensions. First of all, the discussion may suggest some correlations between seemingly uncorrelated areas: phenomenology, modality, relational character, and reportability. Is there any deeper connections between the properties or are the correlations incidental and limited in scope? Is there any reason why, for instance, reportable properties are at the same time contingent and relational? It seems that the classes of contingent, reportable, and relational properties, as well as the classes of necessary, ineffable, and phenomenal ones, are overlapping, but not entirely coextensive. As already noted in Section 4, 'having intensity' is a necessary property of pain, even though it is not a phenomenal property. This topic deserves more attention, but a plausible part of the answer is that all relational properties are contingent, because of the logical possibility that relations can be implemented by different phenomenal content. If speaker's A intuition about ungrammaticality involves sensation_A and speaker's B intuition about ungrammaticality involves sensation_B different from sensation_A, this means that sensation_A and sensation_B constitute intuitions

about ungrammaticality contingently. Reportability of relational properties, in turn, may be partly explained by the fact that many relations properties are fairly abstract and not specific to any particular subjective experience. For instance, the property of intensity is reportable and characterizes pain, but it also characterizes volume of sound, saturation of color, and degree of emotional excitation. However, the non-reportable phenomenal quality of pain characterizes only pain. Properties that pertain to different objects and phenomena are cognized in a greater variety of contexts and perhaps this makes them easier to express verbally and comprehend more consistently in intersubjective communication.

Nonetheless, nothing in my approach depends crucially on whether *all* reportable properties are also contingent and relational, and non-phenomenal. My approach requires minimally that *some* relational properties of subjective experience are reportable, so that reports from intuitions can serve as sources of information for structuralist linguistics. If these properties also have particular modal character, linguists can recognize them through conceptual analysis and therefore two-dimensional semantics can serve as a handy guide to the realm of mental experience. Modality seems to play an important role in the traditional arguments against mentalism: Wittgenstein's "beetle in the box" thought experiment pivots on the *possibility* of speakers having different objects in their boxes. Perhaps a better understanding of possibility as such can help us understand the Wittgensteinian anxiety and find a way of alleviating it. Yet modal logic and two-dimensional semantics are not prerequisites for successful application of intuitions in linguistics, so there is little harm done if there is no deep link between modality, phenomenology, reportability, and relational character.

Another apparent problem is that the emphasis on the importance of verbal reports may suggest that my approach is a type of behaviorism or Wittgenstein's pragmatism. After all, behaviorist and pragmatic approaches use publicly observable verbal behaviors to account for certain aspects of language, just like I advocate publicly observable verbal reports as a way of learning about the mental aspect language. If this is so, perhaps it would be more "economical" to omit the mentalist level of linguistic description altogether and use the public reports in order to account for linguistic facts more directly? The natural answer is that behaviorists and Wittgenstein share a deflationary account of mental experiences and argue that linguistic meanings are located in the realm of publicly observable verbal behaviors. My approach is clearly inflationary: I argue that linguistic meanings are primarily mental and that verbal reports grant access to a certain kind of properties of mental experience. In

mentalist linguistics, a verbal report is not taken to be the data for linguistic analysis, but a means of indirect access to mental phenomena, which are the data proper.

Footnotes

[1] Notable exceptions may include phonetician interested in purely physical aspects of speech production, some experts on language acquisition working with infants and toddlers, and perhaps neurolinguists with strong physicalist proclivities.

[2] Probably the most ambitious project aiming at investigation of speakers' mental realm is Cognitive Semiotics (cf. e.g. Sonesson, 2012), which attempts to combine the study of signs with Husserlian phenomenology and neuroscience.

[3] Giulio Tononi's integrated information theory (cf. Tononi, 2012, Tononi et al., 2016) offers a way of calculating the overall amount of consciousness in an information processing system, but it does not offer a way of measuring or calculating any aspect of one particular conscious experience.

[4] For a more detailed discussion on why linguistic phenomena cannot be adequately described in terms of neurology, see Kowalewski (2017).

[5] In a rare attempt to address the objections raised by Wittgenstein, the cognitive linguist John R. Taylor concludes plainly that knowledge of how to use words is as private as the knowledge of concepts, so Wittgenstein's pragmatic approach does not cancel out mental phenomena after all (cf. Taylor, 2002, pp. 62-65). Taylor misses Wittgenstein's key point: the philosopher did not deny that there is some private mental dimension of language; he merely stated that the dimension should not play any role in theoretical descriptions and emphasized the importance to public rules of language use.

[6] Even ambitious neurolinguistic projects attempting at locating neural correlates of mental phenomena shy away from metaphysical questions. For example, in his publications about the Neural Theory of Metaphor George Lakoff (Lakoff, 2009; Lakoff, 2014) does not make any explicit statements about the ontological relation between conceptual metaphors and their neurological underpinnings.

[7] Strictly speaking, intensions correspond to knowledge of name users in general, regardless of whether the knowledge is a knowledge about discrete properties. For example, the two-dimensional semanticist Frank Jackson argues that intensional knowledge is not the property knowledge in the case of grammaticality evaluations made by non-linguists: "We can say, for particular examples,

whether and why [linguistic expressions] are or are not grammatical – this is why behaviourism about our grasp of grammar is a mistake – but we cannot give the general story in words" (Jackson, 2004, p. 272).

[8] Pace Tobia et al. (2017), I assume that term "water" refers to a particular chemical substance, which constitutes a natural kind. Therefore, I do not assume that there is a naive sense in which XYZ is water in virtue of having superficial properties of water and participating in the same causal relations. In other words, on my view, the term "water" refers to a chemical substance rather than any substance that happens to be similar to water in certain respects.

[9] Cohen (2005) attempts a similar strategy for undermining the conclusion of the beetle in the box. He argues that the beetle could be characterized by relating it to other publicly observable objects: "Someone would look at a red berry and say, 'that is the colour of my beetle.' Someone would look at a coin and say 'that is the size of my beetle' and someone would look at a scurrying spider and say 'that moves like my beetle'" (Cohen, 2005, p. 89). It does not seem likely that such comparisons would eventually produce a full picture of the beetle, but at least some properties of the insect would be intersubjectively communicated.

[10] For instance, in Ronald Langacker's Cognitive Grammar grammaticality is gradable and corresponds to the degree to which a sentence is sanctioned by a constructional schema in the given language. Thus, in this theory a grammaticality judgment is effectively an intuition about the relationship of similarity between a sentence and a relevant schema (cf. Langacker, 2008, ch. 8).

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