The intimacy of psychedelics, language, and consciousness.
An interview with Jeremy I. Skipper

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Abstract

This interview explores the intimate relationship between language and consciousness, drawing insights from aphasia phenomenology, psychedelic experiences, and neuroscientific theories. Jeremy I. Skipper, a cognitive neuroscientist, argues that language is not merely a tool for reporting conscious experiences but plays a generative role in shaping and sustaining consciousness itself. He critiques localizationist models of language processing, emphasizing the context-dependence and dynamic recruitment of brain regions. Parallels are drawn between the experiences of aphasic patients, who report a loss of self-narrative and increased connectedness, and the phenomenology of psychedelic states, which often involve a dissolution of linguistic categories and a sense of ineffability. Skipper outlines potential neural mechanisms linking language disruption to psychedelic experiences and discusses the UNITy Project, aimed in part at studying post-acute meaning-making processes and predicting changes in language and well-being after psychedelic sessions.

Keywords: *Language*, *Consciousness*, *Psychedelics*, *Neuroscience*, *Phenomenology*

Hello Jeremy. As a specialist in the neurobiology of language, your research explores the intricate relationship between language and consciousness, and you have recently launched the UNITy

Project, short for Understanding Neuroplasticity Induced by Tryptamine, focusing on the effects of psychedelics on brain plasticity and language, among other things. I assume we will delve deeper into these topics. Could you start by telling us about your background?

I got into psychology because I wanted to figure out why I was always getting kicked out of classes. I was in a gifted program and had all of my dreams come crashing down when I was removed from it to be put into vocational school. I'm not diminishing vocational schools as I learned to weld and it was super cool. I was a really bad student and was told that I would never succeed because I couldn't think properly. It was a shock to everybody that I graduated high school.

Only in my second year of college did I become interested in consciousness. That was the cool thing that you talked about in high school and more in college, around the campfire, and with your friends, and got high and said ridiculous things about consciousness. That was what I was really jazzed about and why I went into science. I started reading obsessively. But at the end of it, no way I would get into any grad school. I didn't know if I wanted to do that. I cashed in all the bonds my grandmother gave me when I was growing up and lived in a car with a guy for two years. During that time, I read David Chalmers' (1997) The Conscious Mind and Dennett's (1993) Consciousness Explained.

At the end of two years, I knew that I didn't want to live in a car anymore and wanted to go to grad school. I was so excited about consciousness. I thought the way to get to consciousness was to get there through studying the brain. I ended up in a program, studied the brain, but ended up working on language, which isn't far removed. All of a sudden, there is like a 20-year point where I'm very narrowly focused on this very specific thing getting dumber and dumber and dumber as the years go by. Maybe there's some thread that only the gods know about. I could probably make up a story, but I think that it's almost serendipitously that I've been studying language for so long.

Recently I became unhappy with my position here and I started getting bored with what I was doing. I thought that I needed to switch gears and change careers. I even had a startup and tried different things like building sensory substitution devices for a few years, and that didn't really work out. If I was going to stay in science, I wanted to

go back to where I was when I was really excited. I thus started studying consciousness again, which is the thing that I felt really compelled by around the campfire and in the car. It has just changed my life. I was not unhappy before but I was not sure I was going to stay in science and thought I really was on the verge of having some mental health problems.

Sometimes I think it's interesting to talk about mental health and how it affects lives. It is relevant only somewhat indirectly to the way I do research. I've always been into psychedelic use personally because of some of the hypomania I've had. For example, I didn't read at all until my second year of college when I started reading Tom Robbins. Through him, I learned about Buddhism and how our categories mess up the way we live. Then I started reading Alan Watts. Then I started reading obsessively at some point, probably, 5 to 10 books a week.

Switching from zero reading to doing that in a process of ingesting so much so quickly drove my interest in this idea of losing categories. Alan Watts does a nice job talking about it, especially if you're an undergrad. I grew up in a very Christian household, my mother is a lay preacher and I had very fixed ideas about what the world was until I started reading these. I didn't get this from my education. Then I got obsessive about it when I started doing psychedelics, as a way to explore those concepts. I think it's probably true of everybody so it's not really that unique.

When I hopped back into it, I started looking into the neural correlates of consciousness work. There is zero, maybe one mention and almost no discussion of the relationship between language and consciousness. Yet, philosophically there has been, and phenomenologically, we all think that there's a very strong connection somehow between language and consciousness. Dan Dennett puts it in a nice way. Actually, he's quoting somebody else who's quoting somebody else, going like: we think there's such a strong connection because we don't notice that we're conscious about things that are happening to us or within us until we verbalize it. We spend so much time doing it. I thought, “Oh my god, there's a huge hole in the literature” in the neural correlates of consciousness, which is quite comparable in the psychedelic literature.

I said: “Okay, I really love psychedelics, and I really love consciousness. I'm going to use psychedelics to perturb consciousness.”. I already thought about this connection between aphasia and people's descriptions of having their self mostly disappear and having a stronger connection between them. I was maybe a little naive when I thought about it but I think when I started, I would have said there was nothing about language, the neurobiology of language, and work in the domain of psychedelics, and I wanted to use that as a tool to perturb conscious experience because of that phenomenology of oneness.

I heard a rumor that you used to give talks barefoot. Is that true?

> “I've tried to adapt to my weirdness by becoming weirder sometimes.”

That's entirely true. For 20 years in my life, I have had this weird phase in my life, starting in my second year of college where I only wore flip-flops. I even gave my job talk at UCL in a suit and flip-flops. I always wondered if I liked wearing flip-flops because it made people engage with me: “Why are you wearing flip-flops in the snow in Chicago when it's 30 below zero?” I've tried to adapt to my weirdness by becoming weirder sometimes. I literally have no answer in my own head as to why I did that, and I always make up a different story to the question “why do you wear flip-flops?”. There must be something I should talk about with my therapist.

Has that weirdness manifested in your research and work as a scientist as well?

Thanks, yes for sure. There are two clear examples which we have already spoken about. One is that from my basic science perspective, I study the neurobiology of language and 99% of the study of the neurobiology of languages is people putting people in scanners and making them listen to speech sounds or single words. I really don't think that's the only way to understand the neurobiology of language. It's probably in fact one of the worst ways.

> I've always taken a little bit more tricky approach to the neurobiology of language. We are using it right now, it is a conversational perspective, where we actually make use of the context.

I've always taken a little bit more tricky approach to the neurobiology of language. We are using it right now, it is a conversational perspective, where we make use of the context. From the very beginning of my career in 1999, I studied how the brain makes use of context. My first study putting people in a scanner was having them listen to videos, and movies of me telling stories about my life recorded from the head up. One of the stories is about how I used to get naked and sit in the new fountain that we got on my campus, in North Carolina during the summers. I spent quite a number of years trying to understand the visual context, if the brain makes use of gestures that people produce with their hands, mouth movements, and posture, and how we use that information to help us comprehend the words that people are saying. My approach was always to try to study language as a whole and try to reconstruct how the brain processes all of the individual putative levels of analysis like phonemes, semantics, speech production, attention, memory, etc…

What findings did you make from the perspective of context dependency of language processing?

Philosophically or ideologically, I do not think you can study language outside of the context of its use. I think it is misguided to start with the very fundamental assumption that phonemes and words have any psychological reality in the brain. I can remember this really fun meeting in Indiana with a guy named Robert Port at the end of his career. He spent his whole life studying speech sounds trying to understand phonemes: "what makes a phoneme a phoneme? How do you understand a phoneme? And how do I understand the same phoneme as a phoneme? There must be some stable acoustic properties of phonemes that allow you and me to understand the same thing when I say *dog*". At the end of a 50-year career, he actually told me that he decided that phonemes weren't real and had no psychological reality outside of the context of reading.

> A really interesting way of thinking about speech and language is that it is a grand delusion.

A really interesting way of thinking about speech and language is that it is a grand illusion. Imagine hearing a language that is not a Romance language for the first time. It sounds like a continuous stream of gibberish. If you do not understand anything and there is nothing conveyed in any other channel, you have to kind of drop to the speech level. But when you think consciously about what you're hearing, you hear words, maybe sentences, and even sometimes phonemes. The reason I bring this up is that, i) it makes speech and language interesting because it is a construction in our head, and ii), it makes clear that we use different cues at different times.

I thus do not think that we have settled yet on the very fundamental components of speech and language. With the reductionist approach, stimuli need to be very tightly controlled by people pressing a button in a three-alternative forced choice task comparing phonemes such as “PA”, “KA”, “TA”. The assumption is that phonemes are such a thing that can be studied outside of the context of the rest of language and that it is going to tell you something meaningful about the neurobiology of language. I don’t think this to be true because of the ambiguity in speech sounds and a lack of invariance that is found at all levels of analysis on which we have described language. At the semantic level, words are polysemic and most words have at least five meanings. At discourse level, there's clear ambiguity in the way sentences are formed and understood. How does the brain overcome those levels of ambiguity?

I think the way that it does it is that we don't have divisibles. We don't have individual speech sounds, words, and sentences but always use language in context. We always have cues as to how a specific speech sound should be interpreted and are almost never in the dark about that. The way that we have studied speech and language has actually created this issue that maybe doesn't exist, the issue of ambiguity. In context, I can see your lips when you're talking to me which helps me decode my speech sounds, and your gestures which have semantic meaning that help me to decode what you're trying to

say, I know you and have some background knowledge to help decode what you're saying, *etc.*, *etc.*, like that *ad nauseam*. To understand how people understand each other, we need to study language in the context in which we use it because context is the only place where language can be understood naturally.

I think there's room for pluralism of science here for people who study individual speech sounds or individual words, and there needs to be people who study language completely in context. I've attempted to do that at various levels of reductionism myself, but I have also done speech sound studies or with podcasts or movies where we try to construct how the brain does speech and language comprehension from the activity patterns that we see, making no assumptions about what the levels and units of analysis are. I think some of the things we found may be obvious and some of them are yet to be answered and are not obvious.

One of the obvious things that we had to establish first is that the brain uses all the context. People use gestures or mouth movements, even when they're not visible, which is something weird. Prosody is the aspect of speech that involves variations in pitch, rhythm, and intonation to convey meaning and emotional nuances. People use prosody more or less depending on prior words. When people have some background about what I am saying, people use this prior information at every given moment. We know from individual studies that the brain uses all of these and now we're starting to learn that the brain uses them all simultaneously, and more or less so depending on how informative they are. You can have an extremely informative gesture that might tell you something about people's semantic state or their emotional state and uninformative prosody. There is thus a continually changing dynamic trade-off between the cues that people use.

Your brain is always doing this dynamic dance of going up to levels and down to levels in order to be able to make use of the context that is available. One of the things we're learning now is that context is different. Context is always changing by definition, that's why we call it context. That means that the brain networks that process language are absolutely never the same.

If that is the case, then how do we know what these networks' functions are?

> “There is currently more and more use of the term: “language network”. This concept bothers me because I do not think there are stable regions in the brain.”

This is going to be a little critique of fMRI and my discipline. There is currently more and more use of the term: “language network”. This concept bothers me because I do not think there are stable regions in the brain. If you go back to the 19th century, from the time of Broca, who was famously associated with localizationism, we take the brain out of a deceased patient who couldn't produce speech and, by looking at his brain, we find that his inferior frontal gyrus was gone (which actually Broca's patient didn't but that's a different story). Damage to the posterior inferior frontal gyrus or the superior temporal gyrus specifically leads to problems with speech perception, language comprehension, and speech production. Yet, I think that we got it wrong for 150 years as to why that damage leads to language dysfunction.

This is even more wrong with fMRI, because fMRI is a tool based on averaging, and people use averages indiscriminately. If you're a participant in a study where you just sit there and listen to something like a news broadcast or an audiobook, you're listening and not producing because you're in a scanner. By averaging over individual words and sentences to deal with the problem of signal-to-noise ratio in fMRI, the distributed set of regions involved in speech perception and language comprehension are averaged away. All of these distributed networks that would be involved in making use of contexts, which would, by definition, be idiosyncratic because context is always changing are averaged over and you get rid of what's interesting about language, networks that vary with contexts, leaving what is stable.

What is stable tends to confirm 19th-century neurology: the posterior inferior frontal gyrus, the posterior cortex and all of the superior temporal gyrus are the home of language in the brain. What is left are regions around the auditory cortex, and connectivity hubs because 99% of the studies are auditory-based, or reading-based, so

it's not surprising that you end up with regions around the auditory cortex and connectivity zones because we know the brain has a small world organization. The inferior frontal gyrus is indeed one of the biggest connectivity hubs in the entire human brain.

The inferior frontal gyrus is also a hub for other functions unrelated to language.

> “It would be a mistake to call those regions the “language network” and assume that that is where language is processed only. Such claims in the literature, that we teach our students and that can be found in textbooks, are absurd.”

That is an excellent point. One of my first projects when I got to the University of Chicago was to write a list of what all of the different functions people claimed for the inferior frontal gyrus. At that time, the inferior frontal gyrus was involved in 50 or 60 different functions. People really thought that the inferior frontal gyrus was special for language, which is absolutely not the case; it is a connectivity hub for lots of things. Another hub is the Wernicke area in the posterior superior temporal cortex which is poorly defined in the language domain. Some people call it the middle temporal gyrus, or the superior temporal gyrus, or the superior temporal sulcus when it is convenient. Another connectivity hub is in the anterior temporal lobe, which is also important in language functioning, as it's part of a continuum moving out of the auditory cortex.

It doesn't mean that auditory processing regions and connectivity hubs aren't involved in language processing, because clearly if they're more active in language processing, they're doing something language-related. I just think it would be a mistake to call those regions the “language network” and assume that that is where language is processed only. Such claims in the literature, that we teach our students and that can be found in textbooks, are absurd. That is also my critique of the psychedelic discipline to some degree. I think that it is a new field and there's a lot more to be done, such as taking this naturalistic perspective that I have always had for language to apply it in the psychedelics domain.

At the beginning of the current wave of psychedelic research when most studies were being conducted in Switzerland, neuroscience adhered to a localizationist approach. Later when we commenced our research at Imperial College, network-based approaches for fMRI were already quite well established. It is interesting how you may get sucked into speaking a language that is rebellious in one discipline but just normal in another one.

> “We study language with fMRI, leading to the illusion that we have this specific set of regions that process language. But if we [could] study every neuron in every neuromodulatory system at once, I think we would learn that there are no language networks in the brain.”

I actually think there has even been a regression in the neurobiology of language. We were moving really in the right direction through the early 2000s into starting to think about language in the brain as distributed sets of networks that are dynamically organized. I think that has been normal for other people who think about it, after which there has been almost a regression back to thinking about it in the very localizationist sense. This is hugely problematic.

In the psychedelics field, you guys started almost out of necessity as a network-oriented field. This is not the case for the language field against which I am rebelling as we started as localizationists. Currently, we study language with fMRI, leading to the illusion that we have this specific set of regions that process language. But if we had an amazing tool where we put a human brain in a machine where we can study every neuron in every neuromodulatory system at once, I think we would learn that there are no language networks in the brain.

What about language lateralization? Can it be tested reliably, for instance with fMRI?

Some tests are reliable. One set of evidence comes from using the Wada test, which is an injection of an anesthetic into one of our carotid arteries, after which one hemisphere goes to sleep. Interestingly, people are more likely to go unconscious if they do the Wada test in the left hemisphere. People thought the Wada test was a gold standard for many years. My skepticism and the reason that I have a problem with the Wada test and testing laterality with fMRI is the very specific kinds of tests being used.

Wada test in the left hemisphere disturbs language more than in the right, but that depends on the kind of functions that the left and the right brain operate and goes back to why we have laterality. There has been a very long, maybe misguided, historical connection between the left hemisphere and language. I think it is misguided on many levels and depends on the test performed. People exhibit a lack of awareness that they have language problems when they obtain damage to the left hemisphere, but it's a little bit more complex than that and depends on people's language laterality.

Even amphibians have lateralized brain functions and I think that a reason for the laterality of language functioning in the human brain has to do with motor functioning. Any test that engages the motor control of speech and language is likely to be left-lateralized. But left *versus* right is too gross. There is also plenty of evidence that, for example, if you give the Wada test to the left hemisphere, people can actually still produce some words with the right hemisphere, in some cases. There are also something like 90% or more people that have left-lateralized language, even though we should really ask what that means. If we don't ask what that means, it seems to suggest that there's a really tight connection between the left hemisphere and consciousness on one hand, and the left hemisphere and language on the other hand.

The bridging assumption is that consciousness and language are related. If you have damaged, or get the Wada test, in the left hemisphere, and you have more left-lateralized language demonstrated in separate testing, you're more likely to have anosognosia of your language and more likely to go unconscious and longer to recover consciousness. If you are right-lateralized for language, the opposite is true. So if you do the right hemisphere sodium amytal injection, and you are more right-lateralized for language, you are more likely to lose consciousness, and you are slower to recover consciousness. And if you're more bilateral for language, both sides seem to be associated with consciousness, which is a really interesting set of data.

> “ The idea that language is in the left hemisphere is antiquated and wrong and really depends on what you mean by language. ”

The idea that language is in the left hemisphere is antiquated and wrong and depends on what you mean by language. For example, if you tested language comprehension without any motor production, language is much more bilateral. The coordination of the diaphragm and all the muscles in the lungs required to produce speech is actually the most complicated motor program that any human performs. So it is amazing that we can do it: we are all athletes. People often assume the very complex nature of language and its various levels of analysis but rarely take the complexity of the production element into account.

The more interesting aspects of language are actually, if anything, more right hemisphere lateralized: a whole set of language-related phenomena like getting jokes, making connections between things, and interestingly, the long-standing hypothesis that I do not think anybody has ever tested, that dendritic bushing and the number of connections between neurons is bigger in the right hemisphere, which is supposedly connected to the number of concepts that you can make connections with. This points towards more holistic thinking and all these hippy things that people have said for years.

Are you planning to test those ideas of laterality with Wada tests and psychedelics?

As you may know, I do have a plan to do some self experimenting, where I would like to do the Wada test, but substitute the sodium amytal with DMT. If you go back to the split-brain studies with the first person who did the split-brain experiments (Sperry, 1962) before Gazzaniga (1998) picked it up and did a lot of the experimental work, there was this idea that goes along with the Wada test that disconnecting the two hemispheres ends up with what was initially kind of presented as a conscious left hemisphere and an unconscious right hemisphere. I think that is not the modern interpretation and some more recent views suggest that that is semi-accurate but too gross.

It is not like you end up with a conscious and unconscious brain, but you end up with two conscious brains that have different kinds of consciousness or differently distributed kinds of consciousness, which is in and of itself interesting. There are a few detractors to that idea. Recent imaging works suggest that what predicts people coming out of various levels of unconsciousness, even in a resting state, are language-related regions (Pinto et al., 2017). I review a whole ton of evidence points toward a strong connection between language and consciousness (Skipper, 2022), which may come down to how we define consciousness and left hemisphere functioning.

> “I would like to test some of my own theories by injecting DMT into the right hemisphere and maintain an observing conscious language, a self, to actually describe some of the things that have been typically called ineffable.”

I would like to test some of my theories by, just maybe for fun, injecting DMT into the right hemisphere and maintain an observing conscious language, a self, to describe some of the things that have been typically called ineffable. Imagine, in a perfect world, that you have these amazing hallucinations that arise in your right hemisphere, and you somehow still have your left hemisphere speech production capacities to describe them.

That would be amazing even though I do not think that is how it is going to work out because like I said, language is very complicated for those of us who still have our corpus callosum and rely on the right hemisphere for different kinds of functioning and taking those out could remove a lot of what's interesting about language functioning. As I said earlier, I strongly believe that a lot of why there's a strong connection between language and consciousness is the production element and that a lot of the left lateralization of language tends to be about motor functioning.

How has the perspective on the relationship between language and consciousness evolved over time, and what role do you believe language plays in shaping our cognitive processes and consciousness?

There was a time at various points in history when philosophers thought, like Dan Dennett, that there was a connection between language and consciousness. We have this kind of phenomenological perspective according to which there is clearly something important about language and consciousness. There's probably a reason for which I think a lot of philosophers have abandoned or semi-abandoned the idea. People often consider language just as an add-on to their cognitive systems: these modules in the brain allow you to express what's in your brain and express it to other people. It is just used with verbal reports as a tool for consciousness studies to tell us whether we're conscious or not. However, this is very misguided from the perspective of the neurobiology of language. From my perspective, I think that it is important to step back and understand the neurobiology of language, which is something I'm actually qualified to do, to make sense of the relationship between language and consciousness as compared to a perspective in which you just consider language an add-on.

To understand that, we should understand one phenomenon: you and I probably speak between 47,000 words, each, that is a lot! And, more impressively, we're using them for around 11 hours of the day! I made this calculation, I'm sure somebody will take me up on this, but I think it's actually conservative. We produce outwardly or in terms of inner speech or we're exposed to 150,000 a day, if you scale that up to a human lifespan of 70-something years, around 3,500,000,000 words. That's more input than we are exposed to in terms of faces or basically anything. From the nine months we're in the womb, we get exposed *in utero* to language that we also use *ex utero* (DeCasper & Spence, 1986). At some point before adolescence, you're picking up 150 words a day. Overall, we are exposed to a ridiculous amount of words. It would be very hard to imagine unless you have a very antiquated view of the brain, that it doesn't reshape your brain in some capacity.

There is quite a bit of research showing that even very early processes that we tend to think from textbook neuroscience to be as impenetrable from language as V1 are impacted by auditory language use, because one of its main tools, as I said earlier, is to categorize the world. For properties that are quite complex, as a dog, we ended up with a small number of categories which makes us have a very low information way to communicate with each other, which is why I think it's evolutionarily important to have language.

> “Language organizes our thoughts perceptually, emotionally, and abstractly, and is a tool for organizing the world. […] Language is not separable from consciousness and generates and maintains conscious experience in and of itself.”

Language organizes our thoughts perceptually, emotionally, and abstractly, and is a tool for organizing the world. This is why, I think, some meditators and Buddhists ask us to give up what languages have given us, or at least just observe them. There's a little bit of tension there, I think, between meditation and psychedelics and language. Language deeply changes our brain functioning and impacts consciousness.

Then comes the question, what do you mean by consciousness? There may not be a consensus, but clearly, consciousness is not an on-and-off. Even though it seems to us that we have perceptually a unified world, consciousness is probably multifaceted, and multi-dimensional. If you do a dimensionality reduction on those multiple dimensions, you can at least say that there is something like core consciousness, which I think nobody would disagree that other animals probably have, given how similar their brains are to ours. Then you have something people might call extended consciousness, which is almost circular because it's often defined as a language you use in sort of narrative ways. We may want it to be special as humans, or something definitely human-like, and probably comes from language, from the fact that we use 150,000 words a day, and that has changed our brains.

Where my perspective may differ from other perspectives on the relationship between language and consciousness is that I consider that language is not separable from consciousness and generates and maintains conscious experience in and of itself. I think that the brain through cortico-thalamic-brainstem reverberant loops has a downward causation even on core consciousness. A very good example of this might be that by using a certain color label your whole life, words change how we perceive the visual world even without using these words (Cook et al., 2005). The low-level core process that we share with animals such as visual consciousness, if you will, visual experiences, qualia, *etc.* are clearly changed by language, meaning that language isn't just an add-on

that we can call in relation to extended consciousness, it loops back onto itself, onto these kinds of earlier conceptions of conscious experiences.

The first time we met, we talked about the phenomenology of aphasia and I just wonder if you can expand on this and how it relates to your research on language and even psychedelics.

> “Aphasic people also experience an increased connection to everything […]. This is quite similar to the maybe more intense phenomenological aspects of psychedelics, and meditative experiences”

That is one of the things that got me into psychedelics. Anecdotally, there are probably about 10 to 20 references now of people writing about their experiences of aphasia after their recovery. Aphasia here typically means people having lost all language, inner speech, outer speech, and even some comprehension difficulties. The quite interesting phenomenological phenomenon is that they report after subsequent recovery a lack of self, at least in the narrative sense, and stop worrying about the past and the future. Language is, if nothing else, in my opinion, a tool to categorize things into objects, sensory experiences, or emotions, into labels that we use and convey to each other.

These aphasic people also experience an increased connection to everything - which seems to be more one, almost. This is quite similar to the maybe more intense phenomenological aspects of psychedelics, and meditative experiences where people lose the sense of self and experience more of a connectedness to everything. This leads to thinking about a deeper connection between language and consciousness.

Another group is feral people, these are people who were raised by ostriches and wolves, or isolated from society. Even though their experiences are anecdotal *post-hoc* reconstructions, the general consensus is that these people often lack a narrative self - the self that is comfortable fitting into social and cultural norms and that we lose with aphasia, or with psychedelics. An even deeper sort of connection to consciousness is indicated by claims that feral people fail the mirror self-recognition test.

There were mirror self-recognition tests conducted on feral people?

A lot of these tests are quite old, nothing was systematic and so far, everything we have been talking about is anecdotal and not particularly experimental; though, 10 to 20 case reports are starting to get into the realm of statistical significance. Overall, this needs to be tested and has not really been tested empirically at all as far as I know.

I assume also, children who are deaf and do not know sign language probably exist.

You are thinking of Helen Keller who was both blind and deaf and had no language input, essentially. It is one of the most eloquent descriptions of this idea that she was not conscious, as she literally said "I wasn't conscious before somebody taught me language". The problem with all these anecdotal reports is that it is hard to know what people mean by self and consciousness and self-awareness. Nevertheless, she said that she had no self until she was taught and used language, and then had thoughts for the first time. They all use those descriptions and have a similar phenomenological experience.

So then, even if you, let's say, do something that reduces your language, you're saying that your core consciousness is already modified by language? It wouldn't really, completely strip it to a pre-language state, because it's already kind of modified by language in some ways?

Yes, one hallmark of language is that we carve up the perceptual, emotional world with it. The more you use certain loops, the more they become entrenched. One cool thing is that we can use language as a tool and make poetry and songs and write novels. Those are by definition recombinations of words that have competitive, emergent meanings from them that are unique from the individual words. At a fundamental level, I have to accept that language is a causal determinant of consciousness. I was not allowed to say this in my paper (Skipper, 2022). So I can say that in an interview and be trashed for it, but I actually don't think so.

> “At a fundamental level, I have to accept that language is causal determinant of consciousness. [...] I think people are confused about what causality is, particularly in cognitive neuroscience.”

I think people are confused about what causality is, particularly in cognitive neuroscience. People often think that causality amounts to a double dissociation of necessary and sufficient conditions, and I think that's a feeble view of causality but things can be multiply caused. I do think that language can generate or cause conscious experience. If you remove language, as we've talked about, using a psychedelic, or because of aphasia, or through a particular practice (but I think I'll probably be slapped by a Zen teacher for saying that!) ... you're sitting, attending to your breath and thoughts come in.

Of course, give somebody a hammer, and everything becomes a nail; I study language, so everything conscious becomes deeply related to language because that's my hammer. They made me take their questionnaire at this aphantasia conference, and I scored the lowest possible score on this questionnaire, which makes me aphantasic. I have no visual imagery. I can remember in grad school having conversations with people at the pub like “What do you see when you close your eyes?”. I assumed that I was right from my subjective experience, that everybody else had a black experience. But I think maybe I was wrong: there is a very wide variety. Though I don't think this detracts from my own theory, actually. For example: there are aphantasic people who have claimed to have no inner speech. When I first came out with my paper, I had inner speech people saying that my theory was wrong because they don't have any inner speech, but they’re still conscious.

There's no point where I ever said that we, as animals, wouldn't be conscious if you remove language, but our consciousness would be different. It's been structured by language, our whole life. Even if you have no inner speech, you still probably have 150,000 words the day that you speak or are being spoken at. So, I always found that a weird criticism of my work. I think that consciousness is multi-determined. And I think the way that language generates and sustains consciousness isn't one thing either.

> “ Going back to my own research on the neurobiology of language, I believe that words are deeply tied to every inch and every centimeter of the brain. ”

I tried to elucidate the various ways in which language and inner speech generate and sustain conscious experience. There are different mechanisms and the primary one, I think, is speech production. I think that what we're primarily aware of are both inner speech and outer speech. Our words, in whatever form they come in: we're not conscious of much else that happens in our brain. We may have some imagery here and there, but I think the bulk of what a lot of people do is use a lot of language, so most of our conscious experiences revolve around language.

Going back to my own research on the neurobiology of language, I believe that words are deeply tied to every inch and every centimeter of the brain. As I described earlier, you have this set of core regions that coordinate a much more distributed set of regions. That's a very multimodal perspective. The words we hear aren't just acoustic things, they are acoustic things that are attached to the memories and the emotions associated with them. So, when you activate words, you activate a large, distributed set of regions that are not just acoustic, they activate other parts of the motor system, the sensory systems, the visual system, regions that are involved in emotional processing, *etc.* I think if that's your model of the neurobiology of language, then it has to be deeply tied to conscious experience.

What is your understanding of inner speech and how does it relate to both consciousness and the ways we internally use language?

I'm really into inner speech as one of the ways in which we communicate with ourselves and have a kind of narrative self. There is a debate in the literature about whether inner speech is just outer speech. Inner speech is not speech production minus the actual movement of your lips and is much more complex. Inner speech varies on a continuum from engaging the motor system more or less. So, for example, we do a lot of dialogic inner speech, and we talk to ourselves about what we are doing.

“ Speech is on a continuum more or less far away from consciousness depending on being less likely to engage the motor system. ”

Often we use other people's voices in our heads and communicate with those voices and have basically a dialogue in our heads in one way or another. The more it happens in sentences, the more likely it is to engage the motor system and feedback systems necessary for consciousness, whereas other kinds of speech are more forms of condensed speech, the idea that people do not speak to themselves in their head always in complete sentences. An example is soliloquy. We actually use shorthand sentences when the person we are talking to, ourselves, knows us quite well and does not really have to explain all the details to that person. Condensed forms of speech are almost our own internal language.

Speech is on a continuum more or less far away from consciousness depending on being less likely to engage the motor system. In terms of inner speech studies, people report that their inner speech is clearly using language but without the accouterments of language, without being clearly in words. It is almost like thinking in pure meaning but people do claim that phenomenologically, it is still based on language and not just imagery. This form of speech would even be further away from conscious experience because it engages the motor system less. Mind wandering is also another example of the things that typically happen at a lesser conscious level than overt speech.

How do you see the difference between the narrative self and the images associated with the narratives?

I think the beauty of narrative is that it can be more multimodal, and, unless you mean something very different, narrative typically involves language. By connecting changes to language, at least in terms of the narrative component, these patterns then start making more sense to me as well as the phenomenology. You can have a narrative self that is you manipulating pictures of yourself in the past, but it makes zero sense to me since I don't have any visual imagery as I explained earlier. My narrative self is exclusively word-based.

> There's still some debate and skepticism about whether there is any narrative self at all, and Strawson, I believe, claims that he has no narrative self but just episodic memories, and that's fine for me.

There's still some debate and skepticism about whether there is any narrative self at all, and Strawson, I believe, claims that he has no narrative self but just episodic memories, and that's fine for me.

What are the objectives of your research and how do you conceptualize the relationship between language, consciousness, and narrative self in the context of studying psychedelics?

We have this UNITy Project: Understanding Neuroplasticity Induced by Tryptamines. My model is the HOLISTIC model (Skipper, 2022). I really wanted to move my career back to my origins to study consciousness and understand the basics of the neurobiology of the psychedelic experience acutely and then post-acutely. I thought there was an unnecessary focus on resting state data, which I now completely understand why you would collect resting state data during the acute experience.

I also wanted to use naturalistic stimuli like movies to understand the post-acute experience. I thought that something was missing from the literature, as there wasn't much of a focus on anything that happened in the brain after the psychedelic experience three years ago. The focus was more on the default mode network and interpretations around that as we've discussed. I think that should be more specific. One specificity would be what happens to language functioning during and after the psychedelic experience.

We designed the study, which is three sessions during which people come to watch a full-length movie during fMRI and do a bunch of questionnaires. In session two they take DMT in the scanner, on and off DMT during resting state. They then come back a week later, and do a second full-length movie scan of a different movie. My main interest from the very onset wasn't the acute experience, except kind of really grossly, some hypothesis around language regions being affected during the acute experience, and maybe tying those to the post-interview that we do.

My main interest was using movie scans after the psychedelic experience to understand what brain networks specifically were affected. Because I have some issues with the kind of ICA-based approaches that are typically used during resting state and I'm using a different network-based approach to parcelate the brain into much finer, detailed networks, which is one of the beauties of movie scans.

There's a lot to be done and explored there. That's what our group wants to do for the UNITy Project, at least in part. I've been linking maybe naively, from the very beginning, this aphasia phenomenology to a lesser self and a less connectedness during psychedelics. I associate language with consciousness, and particularly extended consciousness, which you might say is more about self-awareness, and meta-self-awareness, giving a deep connection to thinking about the self.

You drew a lot of compelling parallels between aphasia and the psychedelic experience in terms of explaining the sense of connection and access to primal consciousness, via the loss of categorical thinking. How does this inform our understanding of psychedelics impact language and the sense of self?

> “ I think nobody thinks about the self as a unitary construct anymore: there are different kinds of self. ”

I think nobody thinks about the self as a unitary construct anymore: there are different kinds of self. A gross distinction is between a bodily self and a narrative self. A lot of people in the psychedelics domain associate the narrative self with the default mode network. From a network perspective, default mode regions connect to the language regions, and a dramatic shift in default mode regions as you and others have shown should lead to a dramatic shift in the language regions. Our neuroimaging meta-analysis suggests that this may be the case.

I think that modification in language-related regions might help explain the phenomenology of psychedelics better, potentially, rather than, like whatever ego dissolution is, or thinking of the default mode network as being associated with the self or the *ego*. That's fair enough because some of the literature does outside of the psychedelics domain.

Maybe this experience of connection to everything probably comes in part from everything not being connected anymore by our language categories because categories create a separation. Neurobiologically, some of them are more or less entrenched with some neuroplasticity in the system. When you don't have those labels, you have some kind of rapid reorganization of the brain that's got to be overwhelming. Even though this is my own theory that doesn't feel like it could account for all of the experience, it must account for some of the variance in that experience, when the tool that we have for putting things into categories is diminished, if not removed.

Nobody said this to me yet, but I think, under natural psychedelic use, people probably use less language. In studies in the 50s, and 60s, they were expressly trying to understand what happens to language functioning. If you force people to use it, sometimes they talk more but their language often has more errors. It's more bizarre and unique. There are longer distance associations between words that are used, but for the most part, part of the psychedelic experience is losing language, if anything. I'm interested in what happens to language functioning during and after psychedelic use.

Your understanding of language is this kind of complex dependency. Some experiences might be completely without any relation to context, but many of them have context dependency because our brain is very context-dependent. Is there something in the psychedelic state that we cannot strip away from some of the language processes entangled in context dependency?

One of the ideas behind the experience sampling was to capture people's histories with language beforehand and see if any of that could predict their experience during and afterward. There are zero experiments that I'm aware of looking at how the exposure to language that we have, as adults day to day, through sources like Netflix, web browsing, *etc,* actually impacts our experiences down the road. There are things like monitoring, like giving babies microphones but it is hard to capture.

I wanted to do some work where we get ethical approval to just scrape everybody's internet history, their search history, therefore, all the web pages they went to, or allow us to actually track them. We actually have a student here working to see how we could predict people's subtle changes in ideology if they're reading '*War and Peace*', or '*The*

Idiot', which might impact them profoundly. Like for me as a 20-year-old reading Alan Watts that can probably predict a lot of my behaviors subsequent from just the words.

There's this tension here between the notion of experiences like color consciousness, or a core consciousness that can be stripped from all categories, and the argument that it is all culturally and context-dependent. According to your view, all imagery is subject to some type of story or language, even if we don't feel like we are using language, or if the language does not make any sense. From this perspective, it is inevitable, that we might be influenced by what we read about the psychedelic experience, what we read about religiosity in general, the stories we tell in life, the philosophies, etc. Based on what you're saying, psychedelics can still strip away the narrative self, but even if we just experience a core consciousness self, it has still been through a developmental kind of process through language.

Yes! You can think of the neocortex as a big memory store, to simplify it. Penfield has this paper with his theory of consciousness that was never cited. He is famous for having stimulated people's brain while they're conscious in the context of excision procedures mapping out the epicenters of epilepsy (Penfield & Jasper, 1954). When he stimulated an area in the posterior temporal lobe around the middle temporal gyrus, he gets more than words in response: a full story, for example of a woman describing herself being at a circus when a man approached her and said something (Penfield & Perot, 1963). What mattered was not only the amount of stimulation but also the connection of the region stimulated to this full memory that has been reactivated, a memory that the patients often didn't know that they knew. They recognize their own memories once they're stimulated, but they never reactivated that memory.

There is debate about how detailed these memories were but it was still pretty compelling that it was not just words but also auditory, visual, multisensory, and sometimes even olfactory associations, that you could re-stimulate at the same spot and obtain the same experience. Why do we have these detailed memories? I think it's because all of our memories and experiences are almost always associated with some form of words. So, if you, for some reason, take a psychedelic drug and you have less language function, you're still potentially going to be reactivating all of these language-associated semantics. Language "in pure meaning": somehow you have the phenomenological sense that you're using language, but it's just the meaning, without necessarily manipulating imagery either.

Do you think that people under psychedelics experience a specific type of phenomenology, particularly in relation to the engagement of inner speech?

Yes, when we are actually engaging in production internally, it's usually more abstract and less tied to production. The level of awareness might be associated with the extent to which the speech production system if there is such a thing is engaged. When I first decided that I wanted to use my expertise in the neurobiology of language to study consciousness using psychedelics, I went first through the literature to look at what the theoretical claims were. My cartoon view is that it was kind of centered around the default mode network. I just noted, and it was not a systematic review, that anywhere in the inferior frontal gyrus, or superior temporal gyrus, maybe posterior middle temporal gyrus, some key language cores were active. I reasoned that when we use psychedelics, we change language functioning and maybe knock out some of the auditory functioning, maybe because the visuals are actually so compelling and you spend a lot of your energy shifting the flow of blood flow to the visual system.

So like any other immersive visual experience, the most immersive cinematic experience, your language might be less.

It might be. If you're deeply engaged in an audiovisual task and attending to the visual, you actually get a deactivation in the auditory regions and *vice versa*, almost as if the brain has shifted its energy. My naive conception at the time is that you are probably engaged in the visual system under psychedelics, and in the language system is being either "inactive" or "deactivated", because I had no other rationale for why the language system might be affected by psychedelics, except now the consideration that maybe the distribution of 5-HT2A receptors is elevated in the temporal lobe. One of the sets of regions that were definitely affected were the inferior frontal, middle temporal, and superior temporal gyri.

You have a shift away from language-based regions, essentially a decrease in superior temporal gyrus and inferior fusiform gyrus, a phenomenology like aphasia, and a simultaneous claim in the literature about the role of the default mode network. For my domain, actually, at that time, we were talking about the default mode network in the same way as being deeply related to language functioning. As we discussed earlier, language is ambiguous, our own internal experiences need to decode the acoustic signal into the words in order to be able to understand them.

Let's talk about ineffability. There are a lot of times in a psychedelic experience that feeling of ineffability, meaning we cannot use words to describe those experiences. Is that only because these experiences are so novel and we didn't develop the language to describe them? For instance, falling in love for the first time is such an ineffable experience, like psychedelics, by just the novelty of things. They don't fit categories, and something happens to the language itself being dissolved. I wonder if you thought about this.

> “ One hypothesis could be [that] vision steals the show. At the start of a DMT trip, everything in the visual experience is geometric and crazy and there's almost no room for language. ”

One hypothesis could be like we said earlier, vision steals the show. At the start of a DMT trip, everything in the visual experience is geometric and crazy and there's almost no room for language there. Maybe 5-MeO seems to be more cerebral and its content is a little bit more cognitive. Using different drugs may be a way to actually start carving out the role of language in these experiences. Right now, I don't feel like there's an answer. The primary hypothesis would be that the balance of forward-to-feedback connectivity is radically changing in specific regions or sets of regions such that language is being knocked out.

I think that it is clear that it is really tied to some of the experiences like the self. If you take out language, and you're not constrained by your normal categories anymore, I think that would be ineffable for us who have 150,000 words a day that we used to put people, ourselves, our feelings, what we see visually into categories. That must be a bizarre thing, something like Nagel’s “What is it like to be a bat?”.

My gut feeling is that something weird is happening in the language system, maybe because of the impact on 5-HT2a receptors whose distribution is not uniform and more or actually distributed throughout language core regions like the posterior inferior frontal, superior, and middle temporal gyri. I can't imagine it not being ineffable when you have these activations of the visual system and memory systems, without being constrained potentially by our normal categorical constraints.

We spoke about the effects of psychedelics on language in terms of disability, now let's mention a bit of the meaning-making because it's something so interesting to study. I'm

curious actually how you understand the meaning-making process. Also, the one that happens online if there's an online meaning of making, but also after and how you're planning to study it?

For me personally, the bulk of the beauty of psychedelics is losing my whole self, the whole world becoming one and then trying to make meaning out of that based on my entire history of very specific beliefs about the world that just kind of were shattered. I really wanted to understand the post-acute process, which we've called the meaning-making process.

I thought what we could do is somehow take the movie scans and identify networks that predict changes in people's language functioning subsequent to psychedelic use, which in turn might predict changes in mental health and well-being. We're doing that by tracking people using a mobile phone-based experience sampling app, and some other methods of questionnaires on month 1, 3, 6, and 9 after the experience. We plan to first try to understand if there are any networks that predict changes in language, assuming there are any changes in language, and actually specify what those changes in language might be to try to quantify what happens to people who actually have changes who experienced positive benefits from the drugs.

We have five categories based on Hurlburt (2011) who does descriptive experience sampling with a crazy technique where he records people during the day with a very deep phenomenological analysis of people's inner thoughts. There are five different kinds of inner activity. One predictor is actually a shift away from, at least, a dialogical kind of inner speech. You might even see a gross switch between categories like between more inner speech-based thinking to a more imagistic thinking. We are thus testing a switch between types of categories of inner speech that people have described.

We know from diary and experience sampling studies that certain changes in language predict changes in mental health and well-being (Grégoire et al., 2021; Nezlek et al., 2017; Tov et al., 2013). Who is going to benefit from therapy can be predicted from changes in people's words. I think that's right now in a very nascent stage and not making use of the complexities of language. That tends to be in terms like: how many

times do I refer to me? Which one might predict what changes after experiencing a change in the self, but you can go much more deeply by taking into account the balance of positive, negative, and cognitive words to predict changes in language.

Enzo Tagliazucchi had some nice ideas about using more complex metrics, like the relationship between words. If you're truly knocking out some of the categorical components of language, you might be able to see some of that reflected in the types of language people use. The study for me is an initial attempt to observe what's happening in the brain acutely and post-acutely. We can then use those observations to try to predict changes in language and quantify those in a more data-driven approach as a foundation for doing more detailed work on understanding the relationship between language and consciousness.

Currently, the experience sampling is obtained with a random beep notification five times a day on a smartphone and people speak to the phone and say exactly what they were experiencing, which may be inner speech, inner imagery, or inner feeling, which is actually an advance on previous approaches because typically, it's been text up until now. The next step to involve visual input to look for changes in micro expressions encountered some ethical issues as people were reluctant to provide their faces.

Anne Taves discusses ascription and attribution as key processes in understanding religious and psychedelic experiences (Fortier & Canna, 2018). According to her framework, ascription occurs subconsciously during the experience itself, shaped by cultural and personal contexts, while attribution is a conscious, post-experience reflection assigning specific meanings or religious interpretations. While both processes seem constructivist, they differ in their engagement with consciousness and language: ascription operates subconsciously without conscious language, yet retains a 'core self' influenced by deeper social constructs.

Given this distinction, how do these processes manifest during psychedelic experiences, particularly considering phenomena like the machine elves described by Terrance McKenna or other religious deities? Do you think these experiences are merely attributed meanings post-experience, or does the meaning-making process subconsciously shape the experience itself, without our conscious awareness?

Nick Chater (2018) has a quite controversial hypothesis called the mind is flat. Its basic premise is that we do not have the really deep unconscious minds that we think we have. He argues that what we consider unconscious processes—thought to be wild hidden forces shaping our decisions—are actually shallow, consisting merely of forgotten experiences. I don't know if this interpretation aligns with her views, but I find it difficult to accept this theory.

> "In my view, even during intense psychedelic experiences, such as those induced by high doses of DMT, where one may feel detached from reality, the language system still subtly guides the experience."

In my view, even during intense psychedelic experiences, such as those induced by high doses of DMT, where one may feel detached from reality, the language system still subtly guides the experience. This raises the question of whether we could hypothesize an orchestrator role for inner speech within such experiences. People on our team have developed a method for tracing experiences during our acute scans, allowing us to potentially integrate measurements of inner speech. If we analyze this data from the perspective of dynamic connectivity, rather than as static snapshots, we might observe fluctuations in the sensory-motor system responsible for speech prediction.

I expect that the absence of inner speech during psychedelic states leads to a post-acute meaning-making process, where experiences are integrated into existing categories, such as those derived from religious contexts. This aligns with my approach which emphasizes the contextual foundation of language, which earlier models often overlooked in their representations of the neurobiology of language.

All right, to finish this conversation, let's play a game where we draw from a deck of *Angel Cards* and we can both maybe speak about how those cards relate.

I start with …

… *curiosity* and *faith*.

The relationship between curiosity and faith feels deep. In my work as a researcher and in my experiences as a psychonaut, curiosity is the drive, the passion. It's also guided by this faith that things that I don't really know yet are working in some ways that we can understand.

> “I have given up on the first-person subjective experience to be a scientist and don't have much faith that we may be able to describe that first-person subjective experience.”

That could be completely misguided because your faith is founded neither on Newtonian nor Galilean specifications about what things mean in the scientific realms. I have given up on the first-person subjective experience to be a scientist and I actually don't have much faith that we may be able to describe that first-person subjective experience.

Now your turn, you have ...

... *abundance* and *courage*.

I feel like I had some courage to change my career completely to study consciousness. This is scary for me, it's scary to even have this interview, or scary to talk to anybody about this. I usually refuse to talk to anybody for so long, just with you because you make me comfortable, but jumping fields to consciousness is scary and psychedelics too. I felt like I had some courage to up my career and do something new. It has led to an abundance of really cool people that I've gotten to meet, my lab, you, everybody, people who come out of the woodwork in the psychedelic domain are really interesting people who are often very kind and creative and passionate and I've been the happiest I've ever been.

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