

## A Conversation with Dr. Avery Gilbert: The Role of Retro-nasal Receptors in Tasting and Evaluating Beer

Recently, I spoke by phone with Dr. Avery Gilbert, a self-described “smell scientist” known for his groundbreaking research into the nature of odor perception. This includes his work on synesthesia, the phenomenon where scents evoke associations to colors, sounds, and textures. In our conversation, we tackle some points that are useful to judges including how to best utilize retro-nasal reception, training to minimize cross sensory suggestion, and the need for periodic recalibration even in the most experienced judges. Dr. Gilbert’s book is entitled What the Nose Knows: The Science of Scent in Everyday Life.

There is a common exercise used when discussing the role of retro-nasal olfactory in flavor. It consists of holding your nose, putting food in your mouth, and then releasing it mid chew. If you haven’t given the nose holding activity a try yet, I would highly recommend you do so. It is a perfectly simple illustration of how our sense of flavor is what Gilbert calls “an illusion created in the mouth.” Humans have a high degree of retro-nasal receptors. Even in comparison to other animals we typically associate with great senses of smell, like dogs. This is why we are better tasters than those with great ortho-nasal capabilities (Sorry, Fido). However, most of us don’t regularly partake in any training that utilizes aroma like we do with some of our other senses. It’s why on most tasting exams the appearance sections are almost always in complete alignment while aroma and flavor can vary significantly. As a result, honing in on our sense of smell and flavor is what typically constitutes the bulk of training necessary to be an effective judge. As such, it seemed a worthwhile endeavor to reach out to one of the recognized leaders in the field of human olfaction.

**Andrew Luberto: In your book, you wrote “Humans are a retro-nasal species.” What exactly is the role of retro-nasal receptors in tasting beer?**

**Dr. Avery Gilbert:** *It has to do with everything about flavor, whether it’s food or beverages. It’s sensing flavor from the mouth. We always think of flavor as a unitary kind of perception, “You know... it’s the flavor of something...” That’s an illusion. It’s the blending of olfaction with the taste from receptors on the tongue. That illusion is created in the mouth and the reason we can smell and get olfactory input from the mouth is the volatile aromas in the air that go up the back of the throat to regions at the top of the nasal chamber. It’s the opposite of way things normally go; normally, we’re breathing in through the nostrils and sniffing at the air. This is the reverse, where the air stream is coming from the back of the throat, and it happens when we swallow beer or wine, savoring those types of volatiles.*

**AL: I would think this would be something that is stronger in beer since it’s carbonated, or would that not make a difference?**

**AG:** *That’s not a bad idea actually, yeah, because the carbonation and bubbles are creating more of a carrier stream and airflow coming up your nose. Also, any alcohol is going to be more volatile than other flavor ingredient which gets them airborne faster as well.*

**AL: As beer judges, how much are we able to distinguish ourselves from cross sensory experience? For example, in your book you wrote that something we associate as sweet in smell will impact our perception of taste as being sweeter.**

*AG: Those are the natural consequences of that basic illusion of flavor. You have smell and taste combined into this apparent unitary perception of flavor. Color also blends into that; in fact, there is a whole lot of research that ambient sounds in restaurants can alter your perception of wine. Same goes for beer, you're looking at the head, the carbonation, you're thinking all these things, the color...and I've done research on this too, where you get this sort of multi-sensory thing where you think darker things have a lower pitched heavier weight to them and lighter colored things are lighter and brighter.*

*It's a very natural way we grasp the world, and to become an expert like the BJCP judges, you have to start paying attention and separating out the different information channels. So you taste a Guinness and discount that it's dark in assessing body and alcoholic strength...and that's how you become an analytic observer and an expert, to decompose the sample.*

**AL: As we make ourselves aware of these separate elements, can we detach ourselves from their influence?**

*AG: Yes, with effort and by paying attention and with practice or if you want to call it training. Focused attention while trying a series of beers. If you pay attention you can start to perceive differences that certainly someone who works in any kind of specialty sensory profession can, wine tasting, coffee tasting, tea ...they need to pay attention. I argue in the book that what makes perfumers different from you and me isn't that their physical nose is any better. What perfumers do is have a flair for remembering and discriminating one close odor from another, imagining how two odors may combine. The same goes with flavor for brewers; they have a flair for those combinations and comparisons and retaining those kinds of information. I have normal color vision, but I can't pick a tie to match a shirt to save my life. However, others say, "That tie would go great with that shirt." How do they know that? I don't get (color coordinating) but they get it. Perfumers or any sensory experts just have a feel for it...it's not the physical nose but the way of thinking that makes you different.*

**AL: That's interesting. I think there's a common perception among some people that with more training and judging you have some sort of ability to taste things that other people can't taste or detect things other people can't detect. And some experienced judges say that's all bunk; it's more your ability to distinguish individual flavors. So, it sounds like you agree with that.**

*AG: Yeah, I think so. Most people, if they have a normal nose and tongue, can start sifting through flavor. You can tell them, "Here's a very citrusy hopped beer. See, it's sort of like a lemon? Try to imagine what other citrus fruits it's like. Now try these other beers and tell me which beer has the most citrus character;" and then, they'll get it. They need to be shown the example, or seek out other well-known examples, and that's how you learn. We don't get a lot of sensory education. It's left to very specialized crews, whether it is homebrewers or home perfumers, whoever it might be.*

**AL: One of the things I found interesting in your book is that you were talking about the comparison of a sniff pattern to a finger print. If we have different sniff patterns, does it affect different ways of perceiving certain things?**

*AG: It could, but I think with sniff patterns a lot of it has to do with a person's decision making psychology. Some people are very happy making a snap decision. They'll sniff and say, "That's hoppy." Another person may also conclude that it's hoppy, but they'll think about it. They'll go back to it again, and then, ponder. So, those are different decision making styles. They come to the same conclusion: "We both have hoppy beers in front of us." But, one person needs more information to get past the decision threshold than the other person.*

**AL: In terms of fatigue, what would you recommend to refresh our senses? How much of the ability to refresh our sense of smell is even possible? In your book, you mention that tasting crackers or bread doesn't really do much which is also a common practice at beer competitions.**

*AG: The refreshing question is premised on whether we are actually getting fatigued. There's a couple of schools of thoughts with that. When you do smell experiments that are published in scientific journals, some people do three sniffs over twenty minutes, which is the way they do vision research, too. They don't want that single cell to get fatigued. From my perspective, if I was going to have a panel rate perfumes or rate beers or wines, I don't worry about fatigue so much. You're not hammering them with the same stimulus so much, over and over again, which leads to that sort of sensory burn out. So, when I do experiments, I say, "Sniff as much as you like. We're going to sniff a whole bunch of them and give me your quick decision." I don't get too bound up in the fatigue issue. At some point, you're going to reach it, but if you can stay focused, sampling and making quick decisions and judgements immediately after, you can do a lot and not have to worry about fatigue too much.*

**AL: Let's revisit retro-nasal for a little bit. Are there any different suggestions that we can use for beer tasting where we can better utilize smell?**

*AG: I like that (retro-nasal) is part of the (tasting) process, pay attention to breathing out, to the retro nasal, because you'll pick up a lot of the aroma there. We are the retro-nasal species. We're the ones who savor our food where other species just rip it off the carcass and gulp it. Exhaling is important, maybe exhale twice because the first time you have all that carbonation in your mouth. Carbonation causes a tingly sensation from the trigeminal nerve being stimulated. The tingling is one of those multi-sensory inputs that can confuse the issue. So, let it bubble off, and then, take a second outward reverse sniff. You might get another look at (the beer sample)... just a thought; I'll try it when I get home.  
{laughs}*

*When wine tasters talk about the finish, they wait for that last impression before a swallow. It's like a gas chromatograph. That first impression has a lot of those volatiles, so you swish it around, and get that impression, and then, exhale. On that model, maybe you'd get a fuller assessment of the beer by keeping it in your mouth a while and giving it a second shot.*

**AL: One last point on the role of suggestion in taste. One of the things judges do is use guidelines. Sometimes with inexperienced judges the guidelines influence their perception maybe more than it should. I was wondering if you have any suggestions for on how to improve that skill of breaking yourself from suggestions.**

*AG: Those types of expectations are a huge factor when it comes to smell...I've done experiments when we've sprayed water vapor in the room and tell people it's either a natural aromatic essence or an industrial waste product and people start coughing when they hear it's an industrial waste product. So, that bias is real, and it can happen. In the case of beer judges, or when it comes to any sort of sensory experts, they need to recalibrate every so often. You got to remind yourself what the anchor pin is for that particular smell. You expect (BJCP Judges) to fight their bias. You don't expect them not to have bias, but they're supposed to be aware of it and fight it more than the rest of us. And the way you do that is to go back and examine those anchor points again because they can drift. So, if you haven't tasted, say, a Wit beer in a while, you need to be reminded.*