

The Forgotten Emotion

Does Professor Thomas Armstrong's research into the psychology of disgust hold the key to more effective treatments for anxiety disorders?

Written by Daniel F. Le Ray | Photography by Matt Banderas

Two contrasting images appear on a computer screen in Assistant Professor of Psychology Thomas Armstrong's lab. After several seconds, they disappear, to be replaced by a new pair. Participants in this experiment see one "disgusting" object—a rotting apple, a blood-spattered sink—and one "neutral" counterpart—a wall clock or a coat hook. A small device attached to the computer tracks their eye movements, allowing Armstrong to determine what people do when they see something disgusting—look at it, or avert their gaze.

The experiment forms part of Armstrong's research on the psychology of disgust, a field of inquiry that may ultimately help us better understand and treat certain anxiety disorders.

The philosophy of the mind first intrigued Armstrong when he was reading about emotion theory as an undergraduate at Lewis & Clark College: "There were these really cool debates about what constituted an emotion—what the feeling state in an emotion is, what the appraisal processes are that give rise to an emotion, what meaning-making goes on between a stimulus and a response," he recalled.

In graduate school at Vanderbilt University, he went on to pursue "how people with anxiety disorders attended the world differently and sort of tune into threats," he said.

What Armstrong found was that people with anxiety disorders generally honed in on a perceived threat—someone with acrophobia (a fear of heights) might look directly at the vertiginous edge of a cliff face, for example. However, research also indicated that "in certain specific phobias, people actually showed an opposite pattern," Armstrong explained. "You see that once people could get control of their eyes, about a second into their exposure to a stimulus, they would do just the opposite—they would look somewhere else."

People who looked away tended to suffer from anxiety disorders like blood-injection-injury phobia, spider phobia or snake phobia, which are characterized by a prominent disgust response. While acrophobes stare at the edge of a high place because they are afraid, arachnophobes stare at the spider for a second and then look away, because they are both afraid and disgusted.

"So I was interested in this tendency for people to avoid looking at things," said Armstrong, who became intrigued by the role that disgust might play in these disorders.

That's why, earlier this summer, he conducted several eye-tracking experiments pertaining to disgust—often called the "forgotten emotion" because of how little it has been studied by psychologists—with the aim of better understanding our disgust responses. Psychology major **Rachel Leiter '18** helped.

"It's such a seemingly random topic that actually has such huge implications," Leiter said. "As I learned more and more about how disgust relates to anxiety disorders and stigma, I got hooked. And Professor Armstrong's enthusiasm for disgust is so contagious."

LAST SEMESTER, ARMSTRONG shared this enthusiasm in a new class called Perspectives on Disgust. It began with the first scientific writing on the topic, from Charles Darwin's *The Expression of the Emotions in Man and Animals* (1872).

Through the simple act of writing about it at all, Darwin broke taboos.

"But in terms of scientific thinking about disgust and its trajectory, his writing is a little peculiar," Armstrong said.

Firstly, Darwin's examination of the topic is somewhat cursory, concentrating on disgust as a food rejection emotion. This is the earliest documented form of disgust in humans—a kind of behavioral immune system that is overly cautious, errs on the side of false positives and operates by the smoke-alarm principle.

"Just like your smoke detector, you tolerate it going off when you're cooking and something's burning because it would be a really big deal if the house were to burn down."

While true, Armstrong said, this is also far from a comprehensive examination of the disgusting.

Secondly, Darwin unwittingly revealed one of the dark sides of disgust: "He makes this very offensive remark about how, at one point, a 'naked savage' has touched his food, and he was disgusted by it," Armstrong said.

In using disgust to convey moral judgment about this indigent man, Darwin derogates him. This dangerous slippery slope can be all the justification needed for treating someone inhumanely—think of how Nazi propaganda tarring Jews, LGBT individuals or Roma people made it culturally acceptable to discriminate against them.

"You can see that rhetoric of disgust in the realm of morality in Shakespeare, you can see it in non-Western cultures, you can see it in the song in *How the Grinch Stole Christmas!*" Armstrong said.

In some of these contexts, he pointed out, disgust can be a productive, persuasive emotion that leads to personal or social change. "It can be useful in proscribing an action and for expressing outrage." Being morally disgusted by misogyny or homophobia, for example, can encourage people to stand up against inequity.



Thomas Armstrong suggests the feeling of disgust that participants in his experiments often express upon viewing a troubling image.



This cultural approach to disgust is central to *The Anatomy of Disgust* (1997) by William Miller, a professor of law at the University of Michigan. For Armstrong, it is the best work on the topic.

In his book, Miller examines disgust across history in Western culture. “Consider how hard it is, in normal conversation, to give voice to moral judgments without having recourse to the idiom of disgust,” he writes. “Our moral discourse suggests we are surer of our judgments when recognizing the bad and the ugly than the good and the beautiful.”

This kind of social and linguistic connection between disgust and morality is undeniable. However, empirical research on it has mostly been “flashy studies with a small number of participants,” Armstrong said, leaving much more work to be done.

IN HIS LAB AND IN THE CLASSROOM, Armstrong builds on some of the basic psychological principles of disgust. In *Perspectives on Disgust*, he recreated well-known experiments by Paul Rozin, a professor of psychology at the University of Pennsylvania and a pioneer in disgust research, among other topics.

In one experiment, Rozin poured a glass of the participants’ favorite juice and let them take a drink. Then, he did things to the juice.

“He took a sterilized cockroach and dipped it in, and took it out, and made sure that they noticed that none of the cockroach was left in there.” In other variations, Rozin took a brand new comb or fly swatter out of its plastic packaging and stirred the juice. In each variation, nobody would take a second drink.

This is one of the basic tenets of disgust: “once in contact, always in contact,” Armstrong explained. Even when presented with overwhelming evidence that something is no longer contaminated, the rational mind cannot overcome the disgust response.

In another study, Rozin asked students to eat a piece of fudge shaped like dog poop; few students did because, as Armstrong put it, “the image is the object. If something has the appearance of something disgusting, that’s sufficient for rejection.”

This principle fascinates Armstrong because it means that disgust is not like other emotions. Why? Emotions are reactions to the meaning that one gives to a situation, whereas disgust often seems to be reflexive, driven by the perceptual qualities of a stimulus.

Armstrong elaborated: “You can be disgusted by a smell in a way that is different than being afraid because you smell something burning. Or a gross sight, like something slimy or oozy—it’s the sight itself that’s gross. So in that way, disgust is actually quite different than other emotions.”

This summer, Armstrong conducted a new experiment designed to investigate these seemingly contradictory principles. In part one, participants confronted photos of poop while Armstrong tracked their eye movements. People looked away.

In part two, “we show people the poop, and then we tell them it’s fake. We have them hold it. Then we see after that if they continue to look away from it.”

Psychology major **Rachel Leiter ’18**, modeling disgust upon viewing an image that tends to disturb people, received a 2017 Louis B. Perry Summer Research Award for faculty-student collaborations to assist Armstrong. She also is a research team leader in his lab.

Armstrong expected that people would still avert their gaze—“because disgust trumps reality. It’s just what you see in research on disgust.” Surprisingly, when participants knew that the poop was counterfeit, they looked back at it.

The conclusion: “People can reduce their disgust by rethinking what an object is. What doesn’t work is simply trying to convince someone that an object isn’t disgusting.” The next step will be applying these findings to clinical practice, with the aim of improving treatments for disgust-prominent disorders.

FORTY MILLION AMERICANS SUFFER from an anxiety disorder, according to the National Institute of Mental Health.

Psychologists first noticed the connection between anxiety disorders and disgust in relation to spider phobia, snake phobia, small animal phobia and blood-injection-injury phobia. Patients’ disgust sensitivity—how quickly and intensely they experienced such a reaction—“was predicting how likely it was that someone had one of these phobias,” Armstrong said.

In one study, researchers placed a cookie on a table, told participants that a tarantula had walked across it a few seconds ago and asked them to eat it.

“The people with spider-phobia said: No way. And the people without spider-phobia ate it,” Armstrong said. “If it’s just fear, if you’re just afraid of being bitten, then why would you not eat the cookie?”

For arachnophobes, their disgust reflex formed too strong a barrier.

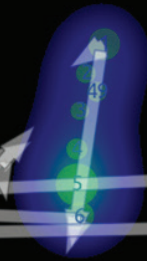
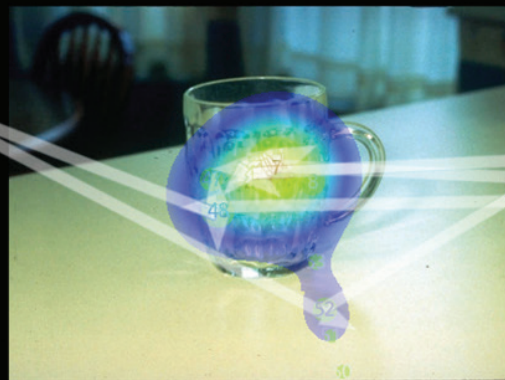
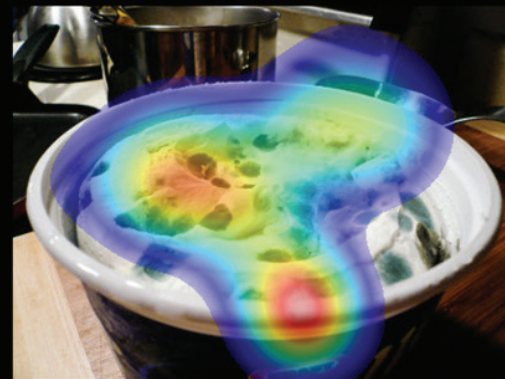
This means that understanding disgust may hold the key to developing treatments for a whole range of disorders. While multiple papers and meta-analyses have shown that exposure therapy is the most effective option for fear-based disorders like claustrophobia or agoraphobia, it does not work as well for disgust-related anxieties like arachnophobia.

Armstrong also hopes that this kind of research may contribute to treating more serious conditions like post-traumatic stress disorder (PTSD).

Christal Badour, assistant professor of clinical psychology at the University of Kentucky, specializes in the psychological effects of trauma and its links to disgust.

“We know that disgust has some resistance to exposure-based therapies typically used for PTSD, so perhaps we need to think about using exposure plus some other things,” Badour said. “There is some interesting work out of Germany on ‘imagery rehearsal.’ They’re having victims of childhood sexual abuse rehearse the traumatic memories, as you would do in exposure therapy, but then having them modify the memory by reimagining it and rehearsing that modified memory.” This modification can train patients to recast their traumatic experience.

Another option is to better habituate patients to their own disgust reactions, so that they can function more normally. For example, a patient of Badour’s with PTSD responded well to exposure therapy, but continued to experience disgust during sexual intimacy. Slowly, thanks to other clinical therapies, that patient learned “to accept the disgust being there while pursuing the things that mattered to her.”



Above: Armstrong and Leiter confer about disgust research in July. Left: In experiments, Armstrong shows participants two unassociated images and uses software to track their eye movements and viewing time and then turns the information into a heat map.

In another application of Armstrong’s eye-tracking research, he works with Jeremy Stewart, an instructor at Harvard Medical School’s Department of Psychiatry and assistant neuroscientist with the McLean Hospital’s Center for Depression, Anxiety and Stress Research, to study suicidal thoughts and behaviors in young people. Armstrong and Stewart met when they were in McLean’s internship program and bonded over their passion for psychological science.

One understudied theory about suicidal behavior is that individuals must overcome an innate drive for self-preservation to engage in potentially lethal self-injury. To do that, they may intentionally habituate themselves to fear-evoking or dangerous stimuli.

“We plan to address this empirical gap through a potential two-site, international collaboration,” explained Stewart, to understand whether the theory that suicidal behaviors correlate with a greater focus on life-threatening situations holds up.

Recently, Armstrong visited the McLean Hospital with a group of Whitman students, including Leiter. Stewart, who served as tour guide,

called them “very bright, talented and exceptionally hardworking. It was so refreshing to witness their genuine enthusiasm for psychological science.”

THERE’S NO SIMPLE ANSWER to the question: What is disgust? It’s culture-specific and socialized, so it cannot be exclusively a reflex. But certain things seem to be considered universally disgusting based on sensory properties alone, so it’s not exactly an emotion, either.

One of the biggest challenges in the field is breaking the taboo of the disgusting. From Rozin’s trailblazing research to Armstrong’s lab at Whitman, “the attitude is: you shouldn’t be taking this into the ivory tower—your fake poop. This is not a proper subject of academic inquiry,” Armstrong said.

By taking disgust seriously—by looking at it instead of away from it—Armstrong hopes to learn more about this rigid, reflex-like reaction that can nonetheless be turned up or down by competing emotional drives; that is simultaneously entirely socialized and yet innate; and that has loaned us a vocabulary for conveying moral outrage.