

Why It's Hard To Stop Believing In Santa Claus

When, as a child, I first encountered the idea that Santa Claus might not be real, I balked. Usually, I looked up to older, wiser kids, but they seemed naïve to suggest that my [parents](#) were actually stuffing my stocking. Why, on December 24th, would the weatherman bother using his radar to track a hefty gentleman flying around the world in a sleigh if he weren't a genuine, jolly old elf called Saint Nick? On this one, I sided with the younger kids, still enchanted with visiting Santa in the shopping mall and rattling off mile-long wish lists--it appeased my young mind. Once infected with their doubts, however, they didn't escape me, and I began to wonder how one soul could possibly stop off at every single house and deliver toys; besides, my house didn't even have a chimney. With chagrin, I slowly resigned myself to the fact that there was no Santa Claus.

While a less wondrous Christmas reality was replacing the visions of sugarplums dancing in my head, I experienced [cognitive dissonance](#), a theory developed by social psychologists to explain the uneasy feeling we get when we hold conflicting ideas. The concept emerged from the 1956 book *When Prophecy Fails*, by Leon Festinger, Henry Riecken and Stanley Schacter, describing the reaction of a doomsday cult who falsely predicted the world would end in a great flood on December 21, 1954. When December 21 came and went without calamity (or rain), at first the cult members sat in silence, stunned, and some began to cry. Later in the day, rather than admitting they were mistaken, they actually became more convinced the prophecy was correct--it was their impassioned belief that saved humanity. Before the event, they shied away from public exposure, but afterward they called newspapers and solicited interviews. To account for this irrational behavior, Festinger et al. explained that it would have been painful to sheepishly abandon entrenched beliefs, so instead they sought public approval by proselytizing as many people as possible.

[Cognitive](#) dissonance has since been confirmed in laboratory experiments. It's not a phenomenon restricted to prophesizing fringe groups, but is in fact a mechanism we all use to cope with the heart-sinking feeling we get from inconsistencies between our actions, attitudes and experiences with the world around us. When our ideas don't fit the mold, we change them until they do. It's a mental way of making lemonade when life hands our psyche lemons.

How might the brain account for such a complicated mental task, and how can we study it? MRI has become one of the most common techniques for studying the human brain, and it has helped elucidate how a bunch of cells, several hundred-billion of them in fact, work in concert to allow us to perceive and interact with the world around us. Despite the advances in [neuroscience](#) made with MRI, it still requires subjects to sit motionless in a cramped tube for up to an hour, not necessarily an ideal location for

experimenting with complex emotional experiences. Inducing cognitive dissonance within the confines of the scanner would require a clever experiment.

One central feature of cognitive dissonance is the awareness of contradictory thoughts. A similar experience occurs during the Stroop task, where you're asked to identify the color of the font, say, red or blue, when reading the names of different colors. It takes longer to identify blue font as being blue when reading the word 'red,' and during this conflict, a region of the brain called the dorsal Anterior Cingulate Cortex (dACC) lights up with activity. The dACC, also involved in pain perception, is tucked away in the central folds of the brain and lies at the juncture of the rational frontal cortex and the emotional regions such as the amygdala. Might the dACC also account for the more complex discord between actions and attitudes?

A [team](#) of neuroscientists at UC Davis, led by Vincent van Veen, concocted an experiment where research participants could experience cognitive dissonance in the MRI scanner by expressing ideas that they didn't actually believe. van Veen had participants complete a boring task while confined in the scanner and also respond to a series of statements rating the degree to which they enjoyed the tedious experience on a scale of 1-6. One group was asked to exaggerate their enjoyment for a payment of \$1 for each positive response. A second group was asked to overstate their enjoyment because another participant was waiting to be scanned, but was nervous and needed reassurance. The second group was offered no compensation. Both groups also rated a series of neutral sentences to be sure that the difference in activation between conditions was specific to cognitive dissonance, not due to some other factor.

After the participants got out of the scanner, both groups were asked if they felt discomfort when overstating their enjoyment. Further, they were again asked to rate their enjoyment of the MRI experience on a 1-6 scale. The group who received compensation felt little discomfort when [lying](#) because they justified their positive responses with extra money, but confessed later that they didn't actually enjoy being in the scanner. The group that fibbed to put another participant at ease felt more discomfort lying than the group that did it for pay. Surprisingly, they reported enjoying the MRI experience significantly more during the second questioning. These fibbers rectified their cognitive dissonance by altering their attitude: in the end, they truly believed they enjoyed the boring task.

In terms of brain activation, when subjects experienced cognitive dissonance, they had greater activation in the dACC. Additionally, the anterior insula, a neighboring brain region involved in processing pain, showed increased activation. For cognitive dissonance, the activation of the dACC and anterior insula convincingly explains the combination of perceived pain accompanying conflicting ideas. These brain regions are also connected to the autonomic system (fight or flight), accounting for the visceral, sometimes gut-wrenching feeling that can result from realizing you're wrong. It's

uncomfortable to express something you don't believe, or perhaps don't want to believe.

Cognitive dissonance has a powerful psychological effect. Alcoholics often employ it as a strategy for abstaining by publicly announcing their commitment to quit [drinking](#). Once they state their intentions, they're often more likely to follow through with them. It is difficult for us to hold contradictory attitudes and

actions, so we modify one or the other to reduce the tension. With the recent advances in neuroscience, we now better understand both the mechanism that causes this experience and why it is so potent. Even now, sometimes wishing for a little magic in the world and a reward for being a good boy, it's a little painful to admit there's no Santa.

Notes:

Cognitive Dissonance theory emerged from the book *When Prophecy Fails: A Social and Psychological Study of a Modern Group that Predicted the Destruction of the World* (Festinger, Riecken and Schacter 1956). These researchers also conducted laboratory experiments to demonstrate cognitive dissonance.

The study "Neural activity predicts attitude change in cognitive dissonance" was published in the journal [Nature Neuroscience](#) on Sept. 16, 2009. The authors include Vincent van Veen, Marie K Krug, Jonathan W Schooler and Cameron S Carter. To read more about their study, see [here](#).

To see more about how the brain processes pain, focusing on the dACC and anterior insula, see [here](#) the study "Functional brain interactions that serve cognitive-affective processing during pain and [placebo](#) analgesia."

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