

Decoding apathy in Huntington's disease: a new lens on motivation and decision-making

Apathy in Huntington's disease isn't just a lack of motivation—it's a shift in how the brain weighs decisions. A new study sheds light on how targeted treatments could help restore motivation and improve quality of life.

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Many people living with Huntington's disease (HD) lose motivation to carry out some tasks. A new study shows that these apathetic behaviors are because of a change in the brain's ability to weigh cost vs. reward. Pinpointing exactly *why* people with HD experience these changes can help develop treatments to improve quality of life.

Cost vs. reward

Apathy can be generally explained as a lack of interest, enthusiasm, or concern. But in psychology, it's more than just feeling "lazy" or unmotivated—it's a change in how the brain decides whether something is worth the effort. Imagine your brain is like a shopper in a grocery store, deciding what to put in the cart. Each potential action in your day—like cooking dinner, going for a walk, or calling a friend—is an item on the shelf. Before choosing, the shopper (your brain) checks two things: the price tag (cost) and the value of the item (reward).



Apathy in Huntington's disease isn't just laziness and a lack of motivation. It's a change in how tasks are viewed as a cost vs. reward, causing the brain to weigh whether something is worth the effort.

Cost can come in different forms. Some items may be on a high shelf or require heavy lifting, like a large bag of flour. The shopper must decide if the physical effort to grab it is worth it. Similarly, the brain evaluates if an action—like tidying the house—is worth the energy it takes. On the other hand, some items might not be available immediately and need to be pre-ordered, requiring patience, or costing time. The shopper must decide if waiting is worth it.

The shopper evaluates how much they want or need each item. Is it something delicious, useful, exciting, or just “meh”? If the cost (effort or time) outweighs the reward, the brain decides to leave it on the shelf.

Tipping the balance

In apathy, the mental shopper can become overly focused on costs, or less interested in the reward, often deciding that even valuable items aren't worth it—or opting to skip the shopping trip altogether.

Although apathy is a symptom in many neurological disorders, the causes of apathy vary. In Parkinson's disease, people with apathy feel less motivated by small rewards, thinking, “I just don't care about that.” In another brain condition, frontotemporal dementia, the effort feels overwhelming: “I don't want to do what it takes.” Even though both result in inaction, the brain's reasoning behind the inaction is different. Understanding these differences can help scientists target treatments more effectively.

Apathy in HD

“Understanding the mechanism of apathy is crucial because simply trying to motivate someone without addressing the underlying cost sensitivity may not be successful. ”

HD often affects thinking and decision-making, and apathy is a common symptom for many, though not everyone with HD experiences it. Apathy can have a big impact on daily life, making it harder for people to stay independent, work, or maintain relationships.

Researchers from the University of Otago in New Zealand and the University of Oxford in the UK were interested in figuring out whether the reduced activity seen in HD apathy is because people are more sensitive to the effort or time involved (“this feels too hard” or “I don't want to wait”) or because rewards feel less motivating (“I don't want it that bad”), or a combination of both. Understanding these differences could lead to better ways to support people with HD and improve their quality of life.

Measuring the make-up of apathy

Measuring something as complex as apathy isn't easy, but researchers have developed creative ways to observe how people make decisions. They focus on how effort or time affects choices and how long it takes to make those choices.

In the Apple Gathering Task, participants play a computer game where they decide whether to squeeze a handgrip to gather virtual apples as a reward. This measures the "cost" of physical effort. In the Money Choice Task, they must choose between getting a small amount of money right away, or waiting for a larger amount later. This tests how they view time as a cost.

Of course, it's not just about the decisions themselves, but also how the brain reaches them. In this study, the researchers used a technique called "Drift Diffusion Modeling" to analyze how quickly the brain gathers evidence for one choice over another. Think of it like a mental race between options. For example, someone sensitive to effort might be very quick to decide not to squeeze the handgrip, even if it's for a lot of apples.



Apathy is a common symptom of Huntington's disease that can have a big impact on daily life. Losing motivation to carry out tasks and make decisions can affect work, life, and relationships.

Image credit: Tara Winstead

In these ways, the study examined whether in HD, people with apathy showed different patterns in their decision-making processes, shedding light on how their brains weigh costs and rewards.

Effort and time drive HD apathy

First, the researchers had to identify who was apathetic, which they did using clinical questionnaires. They also considered other HD symptoms like movement difficulties, cognitive issues, depression, and impulsivity, which can overlap with apathy, or influence the measurements in their experiments.

In the Apple Gathering Task, where participants had to squeeze a handgrip to earn virtual apples, people with HD who were apathetic were less likely to go for the apples *as the effort levels went up*, but not *as the apple rewards got smaller*. This gives a clue about the underlying cause of apathy in people with HD.

In the Money Choice Task, those with apathy were more likely to pick the immediate reward, finding it harder to wait for a bigger reward. Once again, this seemed to stem from a sensitivity to the delay, as if the cost of waiting was just too high.

As expected, the researchers found that compared to people without HD, it took longer for people with HD to weigh the options and come to a decision. However, the advanced analysis (drift diffusion modeling) revealed that people with HD with apathy were quicker to reject high-effort tasks and choose immediate rewards—the “do nothing” option won the mental race.

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Overall, the study highlighted a “cost hypersensitivity” in apathetic individuals with HD, affecting both effort and time costs. This distinct brain mechanism may explain how apathy in HD differs from other conditions, and suggests that unique approaches to treatment are needed.

Research for managing everyday challenges

Apathy is not just a lack of motivation—it reflects a deeper change in how the brain processes and weighs the costs of actions, like effort or time, against potential rewards. This altered decision-making influences behavior, making certain tasks feel overwhelming or not worth it. Understanding the mechanism of apathy is crucial because simply trying to motivate someone without addressing the underlying cost sensitivity may not be successful.

By fine-tuning our understanding of psychological symptoms like apathy, we can pave the way for more targeted treatments. Future research will focus on connecting the physical brain changes in HD to these decision-making patterns, as well as therapeutic options, such as cognitive behavioral strategies that reduce perceived costs, medications that adjust brain signaling, or assistive technologies providing encouragement and feedback.

HD is a complex condition with many options to enhance quality of life. This study adds an important piece to the puzzle by exploring how restoring motivated behavior could bring us closer to improving the lives of those affected. Alongside research into disease-modifying therapies that address the root cause of disease, studies like this provide valuable tools to better manage the everyday challenges faced by people with HD.

The authors have no conflicts of interest to declare. [For more information about our disclosure policy see our FAQ...](#)

GLOSSARY

frontotemporal dementia a degenerative brain disease that can cause problems with speech and behavior

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