A Framework for Cognitive Biases

We know that people process information in a biased way - but how do the biases work?

by Alex Auerbach

Introduction

Mental performance wasn't what first hooked me into psychology.

What caught my attention originally was Daniel Kahneman's work, *Thinking, Fast and Slow*, and the different factors that lead to biased processing and the ways that people make sense of the world. Once you learn about these biases, you can see them everywhere and in everyone.

Your understanding of human psychology and behavior can improve significantly just by grasping these concepts.

I believe that much of performance is a function of decision-making. What people decide to do and when often is the difference between a "good" or "bad" outcome at the highest level of sport, not whether or not they have the skill.

Most NBA shooters have a form good enough to get the ball in the hoop. It's not a matter of "how."

Only a handful take consistently good shots. It's a matter of the decisions they make.

Applying the framework of cognitive biases to sport performance, including the work I do in the NBA draft and have done in other talent identification and selection spaces, allows us to make quicker, more accurate decisions and to spot the processes that derail a good decision-making process.

If we want to understand how people make the decisions they make and why they behave the way they behave, we have to start with understanding the ways people commonly make sense of the world and the strengths and pitfalls of those sense-making strategies.

A Unifying Starting Point for Understanding Cognitive Biases

A new research paper (Oeberts & Imhoff, 2023) suggests that cognitive biases all share the same "recipe."

That formula:

Prior belief + belief consistent information processing (i.e., confirmation bias).

In other words, people come into situations with a prior understanding or mental model of the circumstance, and then seek out information (unconsciously) that confirms their understanding of the world.

This framework is consistent with predictive processing theory, which suggests that the brain is consistently producing predictions about the world and what we believe will happen next, based on prior experiences and expectations. Once the gap between what we predict and what we experience is essentially 0, the brain can rest easy and stop trying to correct for a gap (what's been called "error").

In the case of cognitive biases, if we process the information we experience in a way that's consistent with our prior beliefs, we arrive at the conclusion of those predictions faster. It's much less taxing on our minds and our energy efficiency system, and as a result, is the preferred mechanism for getting to comfort and resolution as quickly as possible.

This approach, unfortunately, also leads to mistaken conclusions and premature completion of the processing.

The end result is more mistakes or misreads.

Biases and Beliefs

Here's a look at what the research suggests underlies the cognitive biases we've come to know and love.

On the lefthand side, you'll see the prior belief that we look to confirm.

In the middle, you'll see the cognitive bias we're all prone to engage that leads to biases processing of information that confirms that prior belief.

Table 1. Biases and the Fundamental Beliefs on Which They Might Be Based

Fundamental belief	Bias	Brief description
My experience is a reasonable reference.	Spotlight effect (e.g., Gilovich et al., 2000)	Overestimating the extent to which (an aspect of) oneself is noticed by others
	Illusion of transparency (e.g., Gilovich & Savitsky, 1999)	Overestimating the extent to which one's own inner states are noticed by others
	Illusory transparency of intention (e.g., Keysar, 1994)	Overestimating the extent to which an intention behind an ambiguous utterance (that is clear to oneself) is clear to others
	False consensus (e.g., Nickerson, 1999)	Overestimation of the extent to which one's opinions, beliefs, etc., are shared
	Social projection (e.g., Robbins & Krueger, 2005)	Tendency to judge others as similar to oneself
I make correct assessments of the world.	Bias blind spot (e.g., Pronin et al., 2002a)	Being convinced that mainly others succumb to biased information processing
	Hostile media bias (e.g., Vallone et al., 1985)	Partisans perceiving media reports as biased toward the other side
I am good.	Better-than-average effect (e.g., Alicke & Govorun, 2005)	Overestimating one's performance in relation to the performance of others
	Self-serving bias (e.g., Mullen & Riordan, 1988)	Attributing one's failures externally but one's successes internally
My group is a reasonable reference.	Ethnocentric bias (e.g., Ockerst & Matschke, 2017)	Giving precedence to one's own group (*not* preference)
	In-group projection (e.g., Bianchi et al., 2010)	Perceiving one's group (vs. other groups) as more typical of a shared superordinate identity
My group (members) is (are) good.	In-group bias/partisan bias (e.g., Tarrant et al., 2012)	Seeing one's own group in a more favorable light than other groups (e.g., morally superior, less responsible for harm)
	Ultimate attribution error (e.g., Hewstone, 1990)	External (vs. internal) attribution for negative (vs. positive) behaviors of in-group members; reverse pattern for out-group members
	Linguistic intergroup bias (e.g., Maass et al., 1989)	Using more abstract (vs. concrete) words when describing positive (vs. negative) behavior of in-group members and the reverse pattern for out-group members
	Intergroup sensitivity effect (e.g., Hornsey et al., 2002)	Criticisms evaluated less defensively when made by an in-group (vs. out-group) member
People's attributes (not context) shape outcomes.	Fundamental attribution error/ correspondence bias (e.g., L. Ross, 1977)	Preference for dispositional (vs. situational) attribution with regard to others
	Outcome bias (e.g., Baron & Hershey, 1988)	Evaluation of the quality of a decision as a function of the outcome (valence)

Beliefs

Beliefs are "hypotheses about some aspect of the world" that we feel reasonably certain about. Most of us think that our beliefs are accurate and that they're based on good data, which leads us to feel that sense of certainty. You'll learn later where this confidence in our accuracy comes from, and how this leads us astray (a mental phenomenon that occurs across cognitive processes, including thinking and memory).

There's a good deal of research that suggests our minds are uniquely tuned to generate beliefs about the world. We can form beliefs based on repeatable patterns of data, but we can also form beliefs based on little or no data at all (like superstitions). Because our brains are constantly searching for sense and meaning, belief formation, even in the absence of real data, gives our minds a simple framework for organizing and categorizing the experiences we have and making them easier to process. We're naturally prone to categorizing, which drastically reduces our cognitive load.

What's even more confusing is that some of these beliefs with no data are helpful for us.

For example, people who subscribe to nearly any form of organized religion reap the benefits of feeling connected to something bigger than themselves and are often psychologically healthier than their agnostic and atheist counterparts. Religious narratives promote a feeling of predictability, control, and justice, each of which helps us to feel better about the world we live in. Despite the fact that there's no empirical support for any particular religion, subscribing to one can boost your psychological health.

The power of belief is best illustrated, though, in the research on the **placebo effect**. For many people and many medical procedures or outcomes, simply believing that something will help can bring about meaningful change and healing.

Breaking down beliefs

There are two types of beliefs that we hold.

The first is what's called a "philosophical belief," but might better be understood as an (un)informed opinion.

These beliefs are things like "the world is good", "ramen is the best type of noodle" (false), or "climate change is real." Irrespective of the actual, factual information supporting any of these claims, these philosophical beliefs are things we arrive at based on our own experience and our interpretations of these experiences.

The second type of belief is one we're all familiar with - "knowledge." These beliefs are evidence-based.

When it comes to biases, understanding these two types of beliefs matters because:

- Beliefs don't have to be true.
- Beliefs may or may not reflect real processing or depth of thought.
- Beliefs can reflect a wide range of certainty.
- Beliefs can be tested, partly tested, or not testable at all.

Each of these factors contributes to the information people seek subsequently to confirm what they already believe. There's ample evidence that beliefs form the foundation for how we perceive the world, and that we tend to look for features in the environment that conform to our beliefs than alternative hypotheses (Zuckerman et al., 1995).

This selective perception leads to a host of cognitive issues downstream.

For example, people often mistakenly perceive information as confirming an existing belief, and they quickly discredit information that is inconsistent with their underlying beliefs. People also stick to their guns, despite disconfirming evidence.

We perform all sorts of mental gymnastics to maintain what they believe to be true.

Anyone who's ever gotten into a meaningful argument has seen these gymnastics first-hand. The research identifies a range of acts we perform to make our beliefs make sense, like:

- Positive testing: the tendency to scan the environment for information that is more likely to fit what we already believe
- Congeniality bias: people choose belief-consistent information over inconsistent information.
- Biased assimilation: people tend to misperceive (make a cognitive error) and identify new information as confirming their prior beliefs, even when it in fact conflicts.
- Motivated reasoning: people discredit information inconsistent with prior beliefs
- Belief perseverance: people tend to stick to their beliefs, despite evidence to the contrary
- Subtyping: categorizing new information that doesn't fit as a special category, like "exceptions to the rule"

Biases

What the above mental gymnastics illustrate is our tendency toward bias and the systemic processing of information to confirm our existing ideas.

At each stage of processing (attention, evaluation, reconstruction, and search) we are motivated to find information that matches our existing beliefs of the world. And, because there are so many possible ways to make the information fit what we believe, you can imagine the full repertoire people deploy internally and externally to make the world conform to their view.

What makes this process even stickier is that some research shows that people engage in these same cognitive errors even when there is no real skin in the game. As long as a belief is present, bias will show up.

What the research suggests is that the biases we have are based on a consistent set of beliefs that we have about the world, and the way we naturally process information illuminates these biases in different contexts.

Many of these beliefs are commonly shared across people - things like "I make correct assessments" or "my experience is a reasonable reference (the world revolves around me)". When we pair these beliefs with our tendency to process information in a way that confirms our own reference point, we end up with cognitive errors that seem obvious from the outside looking in and make complete sense inside out.

In the table above, you'll see the list of commonly held beliefs that tend to cut across people. And, in discovering this list, you'll probably also find things that you or your loved ones struggle with.

At work, the most common fallacies people fall into include:

- The spotlight effect: believing that people pay more attention to you than they actually do.
- Better-than-average effect: believing that we are better than most people at most things (like when your average worker believes they're due for a raise because they met but didn't exceed standards)
- Fundamental attribution error: ascribing personal failures to external causes and other people's failures to internal causes

As you can see, each of these is based on a fundamental belief about the world, paired with the tendency we all have to process new information in a way that confirms, or at the very least doesn't support, our current view.

What this research means for all of us is that we have to work harder to see the world more accurately. Further, doing so is going to be scary because we're likely to find some things that fundamentally shake our belief system. Making good decisions based on real data often means setting aside what we want or believe to be true in service of finding the truth that lives "somewhere in the middle."

For coaches and leaders, this can be especially challenging.

High performers often rise to the top in part because of an unshakeable belief in themselves, and as a result, an unshakeable belief in their beliefs. As they climb, however, and deal with more people, the perspective has to shift from "I am right" to "I'd like to find what's right." That requires suspending judgment, searching for new information, being willing to be wrong, and entertaining multiple views and arguments at once.

The best high-performance knowledge workers I've been around take a long time to form beliefs and work hard to tease apart themselves from the data they take in. They're able to hold multiple ideas in mind and can identify which idea is based on their own belief (read: their own biases), which ideas might have come from the biased processing of others, and which ideas are most based on fact.

Ultimately, this type of leadership leads to the creation of an environment that emphasizes finding what's right versus being right. This philosophy leads to the best outcomes over time, because people aren't focused on moving their own agendas forward but instead focus on what moves the group or organization forward.

Everyone wins when the best ideas, based on the best data, drive decisions.

Where we stumble

There's one formula that seems to be largely responsible for the way we understand the world:

Beliefs + information-consistent processing.

In other words, we move through the world mostly attempting to confirm what we already believe to be true.

That process leads to a host of cognitive errors downstream.

Notably, it also seems like we have a core set of beliefs about the world that we constantly seek to justify.

Here's a look into several beliefs that are common for high performers that also limit achieving our full potential.

"My experience is a reasonable reference."

In the early days of psychology, Freud popularized the idea of "projection" - the notion that we take something that we feel or believe about us, and "project" that onto the experience of other people.

That concept stems from the first core belief that many of us hold that leads to biased reasoning - the idea that our own lived experience is a framework for making sense of the world.

This fallacy leads to things ranging from the curse of knowledge, or the idea that it's hard to take a perspective that's less informed than our own, all the way to more harmful, subtle biases like microaggressions and other identity-laden thinking processes.

This bias also leads to a host of challenges for coaches and leadership.

For example, sports coaches (incorrectly) believe that their perception of performance is more accurate than athletes. In a study wherein both athletes and coaches were asked to estimate the speed of a boat of rowers, the athletes (without a speedometer!) were significantly closer to the correct speed than their coaches, who had a tool at their disposal to anchor their estimates more realistically (a speedometer!) (Millar, S. K., Oldham, A. R., Renshaw, I., & Hopkins, W. G. (2017). Athlete and coach agreement: Identifying successful performance. *International Journal of Sports Science & Coaching*,*12*(6), 807-813.).

Similarly, this belief combined with belief-consistent processing leads to things like misunderstanding of intentions, alignment, and the importance of specific events.

When you believe that your own experience is a reasonable and relevant reference, you're more likely to overestimate the extent to which other people think about you (spotlight effect), to overestimate the extent to which you believe other people understand your emotions and intentions (illusion of transparency and illusion of transparency of intention), and to overestimate the extent to which you believe other people are like you (false consensus effect).

I've seen each of these come up across the spaces I work.

Leaders who believe that their teams understand their vision, or assume their people know what they mean when they give feedback. Coaches who provide feedback with minimal context because they believe their connection with the athletes is good enough to transfer intention.

The simple way out of this bias is to slow down, ask questions, and seek alternative perspectives. In my coaching, when I'm helping executives or high performers or athletes think through challenging conversations, one of the first recommendations I make is to ask the other person what they'd be thinking, doing, or feeling if the roles were reversed. This simple act of perspective taking allows the leader to better understand another reference point and forces both parties out of their default view. The end result is often a deeper, more collaborative conversation that builds empathy. When we get out of our own head and see the world through someone else's eyes, we can better bridge the gap between what we believe and the truth that lies somewhere in the middle.

This same fundamental belief is also responsible for some of the interesting findings in mindset research. For example, Navy SEALs who possess an attitude toward stress that suggests the best way to manage is to "will your way through it" tend to be worse teammates, simply because they can't understand why their teammates can't also just push through (Smith, E. N., Young, M. D., & Crum, A. J. (2020). Stress, mindsets, and success in Navy SEALs special warfare training.*Frontiers in psychology*,*10*, 2962).

When we believe or assume that our starting point is shared, we end up missing critical context that would allow us to operate more effectively.

"I make correct assessments."

An adjunct to the first belief, the idea that we make correct assessments of ourselves and others leads to biased reasoning in several ways.

First, it leads us to believe we're good judges of character and that we can easily understand what contributes to another person's, and our own, success and failure. This leads to biases like the fundamental attribution error (the tendency to ascribe others' failures to internal characteristics, while ascribing our own to external circumstances) and, ironically, the bias that we don't have any biases (after all, we make correct assessments!)

This bias runs rampant in sports, business, and life. Coaches and front offices alike believe that they've identified the best talent every year. Venture capitalists dole out million-dollar bets at volume to account for the fact that, underneath it all, their assessments aren't all that accurate - but each time they write a check, they build "conviction" that they've made the right assessment.

Conflict also stems from holding this fundamental belief too tightly. After all, if I make correct assessments, then you must be prone to more bias in your reasoning than I am, and therefore you are more likely to be wrong. Whenever you raise a divergent point of view from mine, I'm likely to view your take as coming from a place of inaccuracy, rather than your own experience, and as a result am less likely to adjust my own ideology. We see this at play in the larger discourse in our society that can hardly stand to invite alternative viewpoints.

"I am good."

88% of US drivers believe themselves to be safer than 50% of drivers on the road. 46.3% believe that they are in the top 20% of driving skills. 93% believe themselves to be better drivers than 50% on the road (Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? *Acta psychologica*, *47*(2), 143-148.)

How can this be?

We default to believing we are better than the average.

It's of course adaptive to see ourselves this way. Nobody wants to walk around feeling like they're worse than the majority of their peers, or like they don't have anything special to offer.

Seeing ourselves this way also gives us a very unrealistic view of the world.

We overestimate our view of our own performance and we tend to give ourselves too much credit.

When we are evaluating the performance of other people, this belief underlies many of the more critical views we tend to take. It leads to the trouble many high performers feel managing their frustrations that other people don't perform to the same standard. This belief also leads us to see most other people as worse than us, which is why someone appearing "more successful" than we are feels so upsetting.

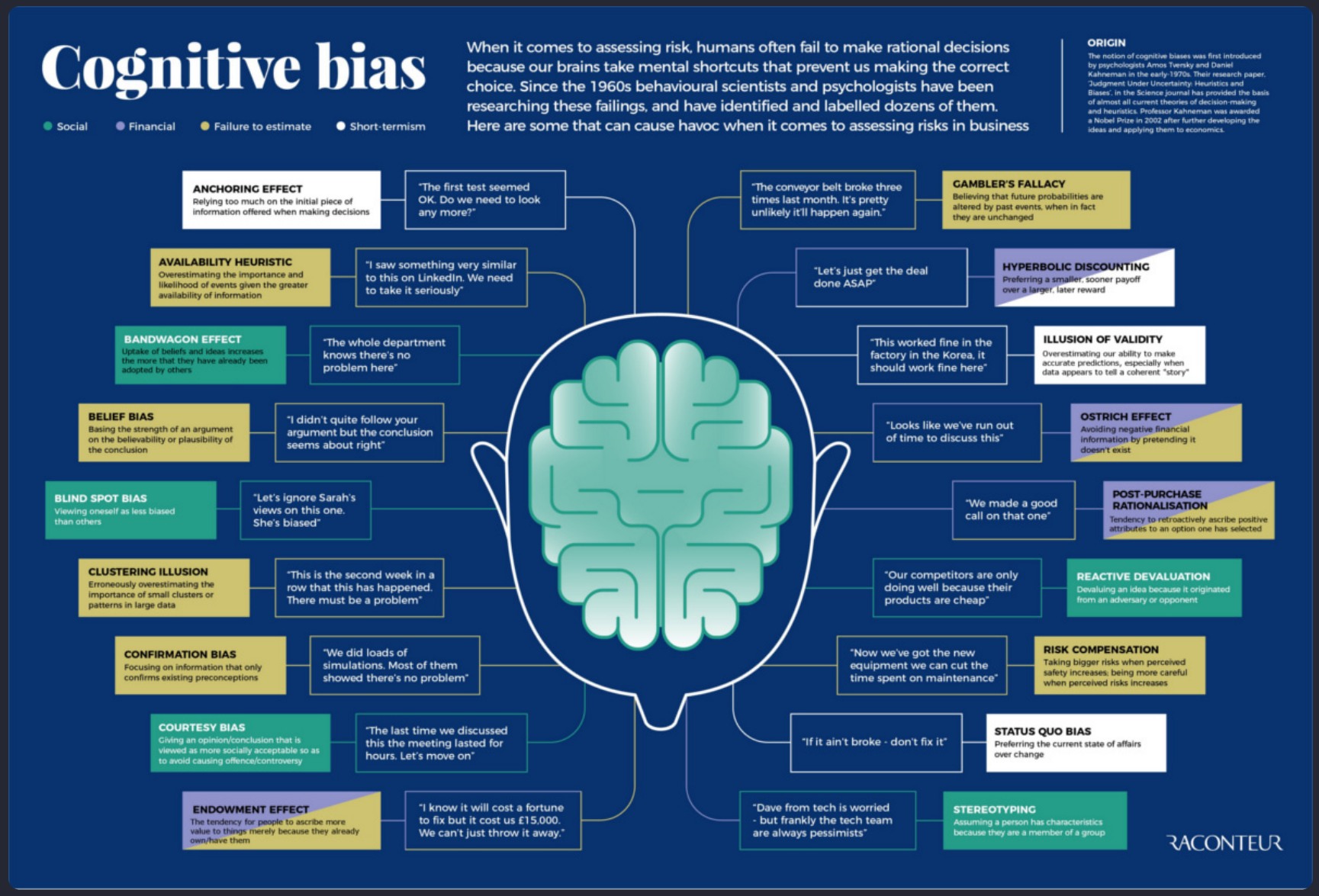
A much more functional way to view ourselves is to recognize that we are simply good at some things.

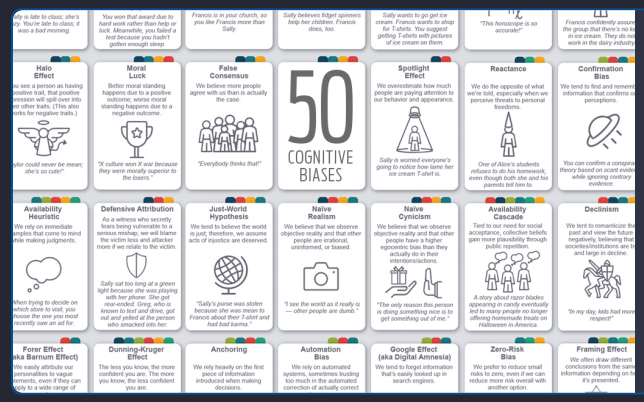
And we're average, and below average, at plenty of others.

This isn't to take away from what makes us special. It's simply to acknowledge our own humanity and to see ourselves more accurately.

When people ask how I deal with the egos of professional athletes, this foundational belief and bias give me the evidence for my answer: we're all a lot more normal person than we think we are.

A list of biases





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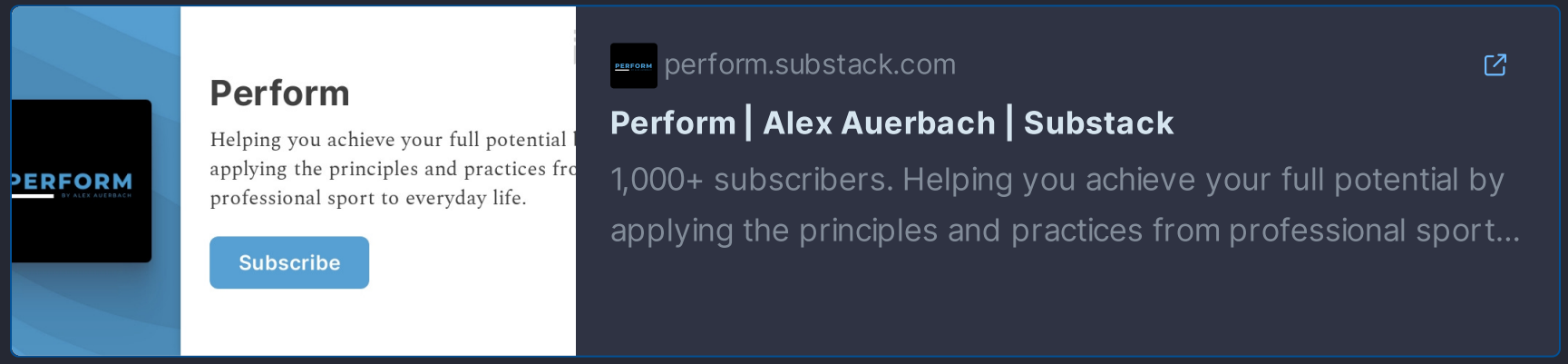

Main Reference

Oeberst, A., & Imhoff, R. (2023). Toward Parsimony in Bias Research: A Proposed Common Framework of Belief-Consistent Information Processing for a Set of Biases. *Perspectives on Psychological Science*, 17456916221148147.