

Starting Strength

Induction and the Squat

by

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In the world of strength training, the squat is a contentious topic. Camps and opinions proliferate but reasoned argument does not. How should one squat? High-bar position, low-bar position, no bar, single leg, on a bosu ball, suspended on thera bands over a pit of lava? There seems to be no end to the hand wringing and clucking on the matter. Each party in this debate brings arguments to advance their position. What's an objective observer to do? How does one decide what is true? For that we must turn to epistemology, or the study of how one knows what they know. Epistemology offers us the tools by which we may parse opinion from fact.

Let's zoom in on one particular part of epistemology crucial to helping us resolve this squat debate.

Those who are in favor of the high-bar squat predicate their argument almost entirely on *induction*. Induction is the process of deriving generalizations from observations. One observes the world and then derives conclusions on the data therefrom. Sound familiar? It should. It's an essential component of scientific method. In fact, it's been recognized as such since the publication of Sir Francis Bacon's *Novum Organum* in 1620, where the method in its recognizable form was first systematized. I should stress here that there is nothing inherently wrong with induction – in point of fact, effective reasoning always requires induction – however, we must distinguish the use and abuse of induction in steering the ship of reason.

This abuse of inductive reasoning is usually known by any of three names: the induction fallacy, the naturalistic fallacy, and the “is-ought” fallacy (these three fallacies are distinguished by more technical hair splitting that is beyond the scope of this article). The lattermost is probably the most well known and is where we will draw our attention. The original framing of the is-ought fallacy is attributed to David Hume, specifically in his seminal work, *On Human Nature*. He writes,

“In every system of morality, which I have hitherto met with, I have always remark'd, that the author proceeds for some time in the ordinary way of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when of a sudden I am surpriz'd to find, that instead of the usual copulations of propositions, is, and is not, I meet with no proposition that is not connected with an ought, or an ought not. This change is imperceptible; but is, however, of the last consequence. For as this ought, or ought not, expresses some new relation or affirmation, 'tis necessary that it shou'd be observ'd and explain'd; and at the same time that a reason should be given, for what seems altogether inconceivable, how this new

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relation can be a deduction from others, which are entirely different from it ... [I] am persuaded, that a small attention [to this point] would subvert all the vulgar systems of morality, and let us see, that the distinction of vice and virtue is not founded merely on the relations of objects, nor is perceiv'd by reason."
[On Human Nature, David Hume, section 3.1.1, "Moral Distinctions Not Deriv'd from Reason"]

The phenomenon of human reasoning and error Hume notes is the assumption that because something *is*, it is thus assumed that it also *ought to be*. But, as Hume is at pains to point out, this is logically invalid. This is really a much more thorny point than it might appear at first glance, because there is in fact a connection between *is* and *ought* – it is merely not a *necessary* one. This is to say that evolutionary processes are usually quite good at producing good results, and it is thus tempting to assume that those results must necessarily be good by virtue of having been selected, i.e. survived the process.

At most, though, this is a useful data point and not a conclusive argument. Using competitive selection environments for determining what *ought to be* is a valid tool and one widely used, be it by natural selection, free markets, or the many inborn cognitive heuristics the brain uses to make ready and rapid judgements. Be this as it may, it still does not necessarily follow that those selected survivors of these processes are what always necessarily *ought to be*, though they very often are a close approximation of it.

On top of this, there is also the “is-ought fallacy” fallacy – having stymied much useful inquiry, this is the belief that there is an impregnable firewall between *is* and *ought*. In reality this barrier is navigable, it merely requires – as Hume notes in the offending paragraph – “*'tis necessary that it should be observ'd and explain'd; and at the same time that a reason should be given*”. Meaning that, because the leap from an *is* to an *ought* is not essential, it must necessarily be explained by due reason to justify said leap were it to be asserted.

So in plain english, what in the “fahves” is an induction fallacy? Well, did you hear the one about the guy that jumped off a ten-story building? As he passed by the third floor he was overheard to have said, “so far, so good.” That, in a nutshell, is it. The falling man’s past experience of not being crushed against the pavement he takes as evidence that this historical data point is a good predictor of his future or of what *ought to be*. The crux of the fallacy hinges on the word “necessary”. If something is observed to be such a way now, then to assume that it must necessarily be so or necessarily *ought to be* is fallacious. His past and current experience of not hitting the pavement and being splattered in every direction is not a good predictor of either his future or of what *ought to be*. Just because you haven’t hit the pavement yet, doesn’t mean that jumping off a ten story building isn’t a bad idea.

Still not clear? I know, we’re all thick-skulled meat heads so let’s try again. To assume that because something worked in the past, one can then infer that it *ought to work* in the present or future is a logical fallacy, meaning not valid, Do Not Pass Go or Collect \$200. Now don’t mistake me for knocking induction. Induction as noted by Bacon is requisite for reason because it in essence means observation and nothing can be known in the absence of empirical data and data cannot be had in the absence of observation.

Unfortunately for Olympic weightlifters and gym bros across the globe, the high-bar argument reduces largely to this inductive fallacy. SHOCK! GASP! Fitness industry professionals are incompetent boobs you say!? Yes, I know, calm down and put that EZ-curl bar down, I’m here to help.

If you’re reading this, you’re probably one of those disgusting Rippetoe-nut-huggers obsessed with the low-bar squat. I know, I’m guilty too. What makes this model so compelling and contentious against the high-bar? The Starting Strength analysis is derived from first principles, meaning that it reduces to fundamental or evident propositions (though we might more rightly call it fallibilistic and Bayesian – more on that in a future article). Essentially, it is irreducible.

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For example, saying that squatting should be done thusly because everyone else who is really good at it does it thusly could be further reduced to asking ‘why are those others choosing to do it that way?’ and thus not irreducible. Alternatively saying that squatting should be done thusly because it is in accord with the limiting conditions of physics and biology is maximally reductive (for those of you familiar with game-theory, you might recognize this as a mini-max solution). From there the only place to further reduce the mechanism of causation would be to question those physical and biological constraints. Either our understanding of those limitations is incorrect or our interpretation of the application of the constraints on the system in question is incorrect. Barring that higher evidentiary standard of questioning the physics and biology, it seems fair to conclude that this is as reductive an analysis as we can currently get.

Professional curmudgeon Nassim Taleb harps on this fallacy like a tourette tic citing it most often in the form of “The Turkey Problem”:

“The turkey is fed by the butcher for a thousand days, and every day the turkey pronounces with increased statistical confidence that the butcher ‘will never hurt it’ – until Thanksgiving, which brings a Black Swan revision of belief for the turkey. Indeed not a good day to be a turkey. The inverse turkey error is the mirror confusion, not seeing opportunities – pronouncing that one has evidence that someone digging for gold or searching for cures will ‘never find’ anything because he didn’t find anything in the past.” [\[Silent Risk\]](#)

Once you have a clear grasp of this you may start to see it everywhere. It’s an easy mistake to make, one that human cognition is not well suited to recognize.

If I could be so bold as to steel man – meaning, to present an argument in its strongest form, in contradistinction to its opposite, the straw-man – the high-bar argument, it goes roughly like this: the strongest lifters in the history of the world have squatted high-bar, ergo, it is the best way to squat, quod erat demonstratum (latin, meaning “thus it has been demonstrated”). If there were an alternative style of squatting or doing gymmy-lifty things that produce superior results, then why haven’t the great lifters been doing it that way? They may even go so far as to admit that the Starting Strength logic is sound yet insist that there must still be an unseen logical hole that we are falling through, otherwise all these lifters would have switched to low-bar by now.

It’s actually a good argument but it doesn’t prove the case, let’s consider why. When someone comes into the gym and starts throwing weight around for the first time, when they are as close to a tabula rasa (latin, meaning “blank slate”) as a lifter can get. They are going to have to develop their technique from one of only a handful of sources. They can either 1) be instructed, 2) observe and imitate others, 3) do what is intuitive, 4) or reduce to first principles via controlled experimentation with sound epistemology to substantiate their conclusions.

The first two ways of learning are nearly synonymous as in most cases the origin of the instructor’s knowledge comes from a chain of either instruction or observation until, if traced back sufficiently far, that chain can only terminate in either reason #3 or #4. To my knowledge no one before Rippetoe has ever attempted anything even approximating #4 and so by process of elimination we are left with #3, intuition.

Why is the high-bar intuitive? Why is the low-bar not intuitive? Why haven’t more lifters stumbled upon it? Why do my knees hurt? Who is John Galt? Where are my keys?

First, when left without any instruction nearly everyone will place the bar high, way up on the traps. Now you might argue that this is a spoiled sample and invalid data point because there is too much widespread awareness of that high position on the traps – very much like the healthy user bias in nutritional studies. Maybe. But, to further the point, what about the absence of a natural low-

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bar “shelf”? The low-bar shelf does not exist unless specifically generated by the lifter (unless they are already huge enough to have sufficient back topography to rest the bar on the rear deltoid). So the low-bar position has an inherent disadvantage in discovery and adoption.

Second, people will tend to direct themselves in the direction they are looking. They will either try to “look up to go up” or look straight ahead to maintain symmetry with their vertical torso. I suspect there may be an innate neurological mechanism responsible for this behavior but will leave that hypothesis for someone expert in that field to investigate.

Third, people can see the front of their bodies and thus have years of practice learning to use those parts that they can see, developing neuromotor pathways specific to the anterior chain. Conversely, they can't see their backs and hips, and most people, especially men, have terrible control of their posterior chain. The proprioception and motor control necessary to properly execute a low-bar squat is thus lacking in all but those who specifically practice these skills. That generally precludes men, and supports the point that the specific motor control needed to execute the low-bar squat is absent as a native attribute in nearly all people.

If these points are valid, then that means that it is

- Intuitive to hold the bar high on the natural shelf of the traps
- Counterintuitive to hold the bar low on the meat of the rear delt
- Intuitive to look either forward in line with the lifter's desired torso angle or up to go up in the desired direction of the lifter
- Counterintuitive to look down at the floor
- Intuitive to utilize those muscles and joints one is most proprioceptive of, those on the front of the body, i.e. thinking of the squat in terms of knees forward
- Counterintuitive to utilize those muscles and joints one is least proprioceptive of, those on the back of the body, i.e. thinking of the squat in terms of the hips back.

Lastly, do the best lifters in the world really squat high-bar in the first place? Many of the best do squat high-bar but a great many do not. It is not a homogenous monolith. To list only a few who use the low-bar consider Andrey Malanichev, Paul Anderson, Dan Green, Jeremy Hamilton, Michael Tuchscherer, Heather Connor, Ed Coan, Ray Williams, Mike Pena, Kirk Karwoski, and Fred Hatfield. So perhaps their very point of argument may be undercut out of the gate, as it is clearly not the case that all the best lifters squat high-bar. For the sake of argument let us elide that point and continue.

Let's not forget also that in addition to the induction fallacy – in its several forms – people are subject to a raft of other logical fallacies, many of which interplay and support one another. For example, let's say I intuit the high-bar squat when I first go into the gym, tabula rasa. Then I observe after doing this for several training sessions that the weight on the bar has gone up progressively each session. I start to notice how much stronger I am in daily life, how I look and feel. This is good enough evidence as is needed for most to conclude that doing things this way must be the right way. What I could fairly grant is that this is much more efficient than whatever it was I was doing prior, in so far as progress is being driven, but I really have no way of knowing that this is a near-optimal way to drive progress on the squat or strength in general. I merely know that it is a better way than whatever it was I was doing previously. But this effect will help encourage my belief in the practice and thus help cement

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my forthcoming induction fallacy: “It worked for me before, why shouldn’t I keep on doing this? Why should I switch to your silly low-bar shenanigans? You silly English Kanniggits!”

I’m not here to prove the low-bar case, or to argue its merits – that’s been done well enough elsewhere. I merely point out that the entire argument for the high-bar position rests on an obvious logical fallacy. Just because something *is* doesn’t necessarily mean that it *ought* be, and to argue so is logically invalid and doubly so without the due reason Hume called for. So the next time you get into an autistic screeching match with a high-bar acolyte, tell them that one about the guy who jumped out of the ten-story building.

“If the majority is always right, let’s eat shit! Millions of flies can’t be wrong.” – Waldemar Lysiak

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