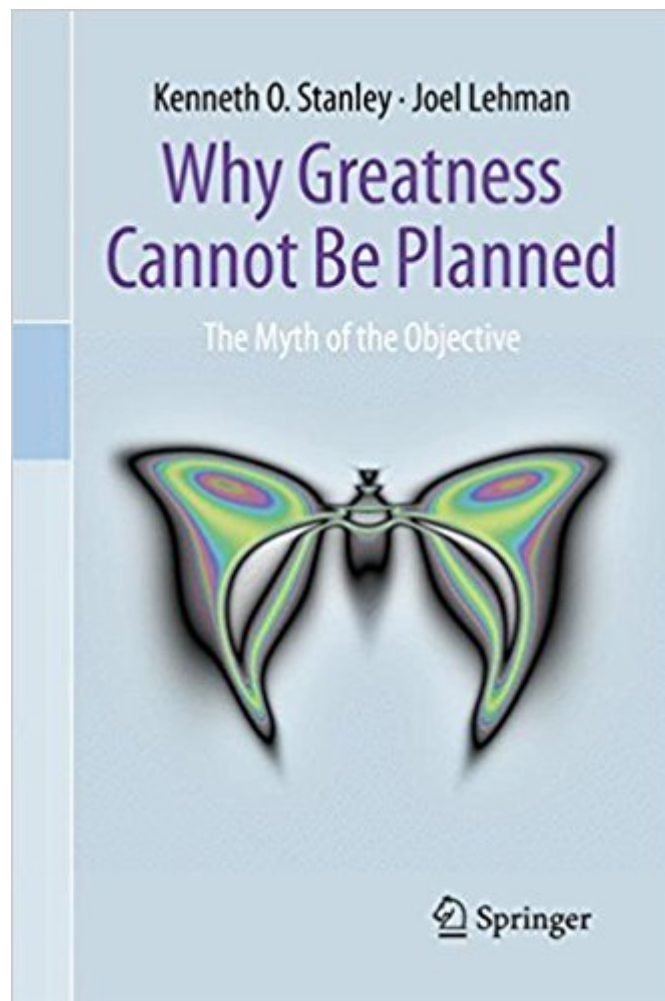




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# **Why Greatness Cannot Be Planned: The Myth Of The Objective**



## Synopsis

Why does modern life revolve around objectives? From how science is funded, to improving how children are educated -- and nearly everything in-between -- our society has become obsessed with a seductive illusion: that greatness results from doggedly measuring improvement in the relentless pursuit of an ambitious goal. In *Why Greatness Cannot Be Planned*, Stanley and Lehman begin with a surprising scientific discovery in artificial intelligence that leads ultimately to the conclusion that the objective obsession has gone too far. They make the case that great achievement can't be bottled up into mechanical metrics; that innovation is not driven by narrowly focused heroic effort; and that we would be wiser (and the outcomes better) if instead we whole-heartedly embraced serendipitous discovery and playful creativity. Controversial at its heart, yet refreshingly provocative, this book challenges readers to consider life without a destination and discovery without a compass.

## Book Information

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## Customer Reviews

“It is a very nicely written and enjoyable book, aimed at a general readership. It is also surely worthwhile reading for Artificial Intelligence (AI) researchers, particularly for those of us working in genetic programming. I recommend *Why Greatness Cannot be Planned*. It is definitely unique within the evolutionary computation community.” (Leonardo Trujillo, *Genetic Programming and Evolvable Machines*, Vol. 16, 2015)

"What is your ultimate goal -- your true objective -- when you pick up a book? The authors of this

one believe that there may be no objective at all involved, just a diffuse feeling that a book can change the way you look at the world. They may be right." (Prof. Christos Papadimitriou, University of California, Berkeley and Co-author of the New York Times Best Seller "Logicomix") "One of the original aspirations of Artificial Intelligence researchers was to help all of us, as thinking beings, understand ourselves better. Stanley and Lehman are among the few who have managed to achieve this. In this book they not only shed light on a glaring bias in the way we approach the creation of intelligent machines, but have also identified this bias at work in many aspects of our society. It is not every day that a technical book so clearly reveals something new about how we live our own lives and how we might enrich them. I cherish such a rarity, and I urge others to do as well." (Prof. Josh Bongard, University of Vermont) "The ideas in this book have revolutionized the field of evolving artificial intelligence. They also help explain why biological evolution, science, and human culture are creative, endlessly innovative processes. Stanley and Lehman's theories are helpful for anyone who wants to foster a culture of innovation in their organization and within their own mind." (Prof. Jeff Clune, University of Wyoming) "Objectives in our lives and careers, and the endeavor to achieve them, can sometimes cause stress and feelings of underachievement. But do we always need objectives? This book challenges common beliefs in our culture and society, revealing indisputable evidence that the biggest discoveries in the arts and sciences are not driven by objectives. The reading provides an uplifting new perspective on creativity, innovation, and happiness." (Andrea Soltoggio, Lecturer in Computer Science, Loughborough University)

Having been an industry AI practitioner, I have witnessed on more than one occasion, the unimaginative and substandard artifacts of a deceptive objective. Traditional diversity maintenance techniques such as fitness sharing and crowding often fall frustratingly short of achieving global optimization, facilitating only momentary freedom from provincial ruts, but ultimately led astray due to an unwitting reliance on objective-imposed trajectories. Similarly, manual encoding of solution space domain knowledge is a time consuming process and often infeasible for all but the smallest of search spaces; especially when we have but a fuzzy idea of the characteristics of the global optimum to begin with. Enter novelty search. Since first happening upon Lehman and Stanley's seminal paper on novelty search, I have been continuously (yet pleasantly) amazed as further experiments continue to suggest its broad, cross-domain applicability. Even so, until the publication of this book, the capability of novelty search and non-objective search in general was limited to AI sub disciplines. Yet as Lehman and

Stanley so eloquently illustrate, non-objective search processes are likely the fundamental under-pinning of creative innovation. From biological evolution to space flight, the “guiding light” of the supposedly omniscient objective is suspiciously absent. What remains are stepping stones branching off in every possible direction through an infinite search space and gradually uncovering unimaginable complexities. The inter-disciplinary applications of this approach are far reaching and the profundity of the ideas presented herein cannot be understated.

The great undiscovered inventions, concepts and art of the future are there to be discovered. The path to the greatness of the future can not be planned. This book presents the case against the current path based on creating and meeting objectives, and the case for a path more likely to lead to success. A path proven to work, discovered and demonstrated in current Artificial Intelligence research. Supported by abundant examples in the real world outside the world of artificial intelligence, this book inspires the reader to greatness by finding the interesting, the different, the new, without regard to preconceived ideas of what will eventually lead to the next great discovery. It is the novel, unexpected, the different that lead to the great undiscovered, one unpredictable step after another. Providing Insight into the exciting world of Artificial Intelligence research with unexpected applications to non-artificial intelligence. A great book for the computer scientist, non-scientist, and anyone looking for the next great thing in what ever they are interested in.

Books that question deeply common-held beliefs rarely manage to succeed in doing so. They build compelling, articulate critiques, but almost never offer a replacement or even an improvement. Picayune non-fiction: entertaining, even informative, but often forgettable. "Why greatness cannot be planned" is an exception. This very short essay-style book questions something so deeply rooted in our beliefs that it almost seems trivial: it questions whether most important things are accomplished by setting them as goals, as objectives. Stanley and Lehman put the proposition they mean to question this way: "The process of setting an objective, attempting to achieve it, and measuring progress along the way has become the primary route to achievement in our culture." (p. 4). In questioning this objective-setting mindset, they encounter something counter-intuitive and remarkable: setting ambitious objectives can make the process of reaching them less successful, because the process almost never resembles the result. Objective-setting is the main way hierarchies organize themselves and deal with uncertainty. Governments, companies, international organizations and even families rely on objectives to command, control, influence and guide the

behavior of its members. But there is something amiss in this process: setting a goal is almost always silent on how to achieve it, especially if the objective is very ambitious. "Objectives might sometimes provide meaning or direction, but they also limit our freedom and become straitjackets around our desire to explore." (p. 3). Ambitious goals (think halting climate change, reducing poverty, increasing economic growth, etc.) can be either too broad, engulfing stationary trends that are not subject to control, or too narrow so that they end up blocking the search for solutions by forcing a path that will not necessarily lead to them. Objectives, as Stanley and Lehman remark, have "[ÅfÅçÃ â ÑÃ Å] stolen our freedom to explore creatively and blocked us from serendipitous discovery. They ignore the value of following a path for its own uniqueness, rather than for where it may lead." (p. 3). Stanley and Lehman's insights come from a computational model they developed: Picbreeder, a web-based program that explores evolutionary art by allowing users to freely combine images and develop new ones - in other words, by applying genetic algorithms to pictures. In an excellent example of how computation can provide theoretical insights, Picbreeder made possible the tractability of the many steps it takes for a particular image to evolve, and by backtracking the process that generated it, Stanley and Lehman found that the discovery of a particular image cannot be replicated by trying to guide the first image towards the final one. "There is always a surprise stepping stone leading to an unexpected discovery." (p. 26), and this feature of the search process is not only unguided, but shoehorning an objective into it makes discovery impossible. (Visit the Picbreeder website to understand the argument better). "The fundamental problem of search and discovery is that we usually don't know the stepping stones that lead to the objective at the outset." (p. 29). If progress towards an objective is measured and assessed along the way by how much it resembles the final expected result, the objective itself can become deceptive and lead the search astray; the process becomes "blind to the true stepping stones that must be crossed" (p. 9) to reach a goal. They take this insight all the way to the general process of discovery and innovation, going as far as to claim that "Almost no prerequisite to any major invention was invented with that invention in mind." (p. 36), and even more eloquently: "The future that the past created was not the vision of the past, but instead what the past unexpectedly enabled." (p. 37). How on earth could you move away from the omnipresent objective-setting mindset? Stanley and Lehman propose novelty search: putting the search for stepping stones at the center of discovery, rather than distant goals. "By foregoing explicit final objectives, novelty search becomes a form of divergent search, thereby joining company with natural evolution and human innovation, and aligning it with this more exotic and radical form of discovery." (p. 50). Nowhere is this insight more relevant than in public policy. In policy, ambitious goals are trademarks of

arrogance as often as they are of determination. And the higher up you go, the more you see this liminality. International institutions claiming that their goal is to end world poverty, philanthropists claiming as their objective the end of world hunger or disease, and governments attributing themselves with economic growth all have three things in common: grandiose objectives, no idea how to achieve them - and the temptation to falsely attribute themselves with improvements along the way. It's a "heads I win, tails you lose" rhetoric: if something good happens, it's because of their diligence, determination and hard work; if something bad happens, they quickly remind everyone of how little control they actually had. Economist William Easterly has described how the narrative that "we are living in a time where ending poverty is finally within reach" has remained unchanged for decades - from Woodrow Wilson in 1919 to USAID in 2017. (This book actually reads like a refinement and generalization to Easterly's "The White Man's Burden" (2006) and "The Tyranny of Experts" (2015)). Has poverty decreased all around the world because it was made into an objective? Of course not! That is a silly proposition. Still, the new United Nations' Sustainable Development Goals - the first of which is "End poverty in all of its forms everywhere" by 2030 - falls straight into the objective trap and doubles-down on the objective-setting culture; a culture that is mostly innocuous, but seizes to be when it imposes itself on searchers and planners alike - forcing the first to behave like the second, and stalling progress by doing so. (Perhaps they should pick a copy of the book, if only to oxygenate their perspective.) "By foregoing explicit final objectives, novelty search becomes a form of divergent search, thereby joining company with natural evolution and human innovation, and aligning it with this more exotic and radical form of discovery." (p. 50). Moving away from past failures is often enough for exploration to foster innovation and gradual improvement - only if it doesn't fall under the tyranny and impatience of the grandiose objective. A worthy and insightful book.

This book is really revolutionary in what it attempts to tackle and in how successful it is in achieving that objective. The authors do an excellent job of supporting the concept that really great outcomes in virtually any field are usually serendipitous. You might reasonably say, "Well, so what? If I can't plan for a great outcome, then why bother to think about it all, or at least why bother to read the book?" This is where the book shows its really great merit. The authors have gleaned and gathered together insights into how to improve the chances of greatness. I don't want to cite examples of those principles here, because I feel that I cannot do justice to them. I simply recommend that you try reading the book, and see if you, like me, find yourself referring to the examples set forth in it on frequent occasions. This is truly an applied philosophy book, and its insights grow more valuable as

one ponders them.

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