

CONDITIONING AND LEARNING

Edition: 3.0

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Preface

About the Manuscript

This manuscript evolved as the result of my desire to communicate all the things that I was left to learn the painful way when I was a student. It's often said that until you blunder and make a painful error, you can't see the value of many things, and that you can't have the motivation to learn a better way. As a result, students are often left to learn the hard way. I refuse to accept that the hard way is the only way.

This “experience is the best teacher” approach is what it is because it's immediate consequence is actually easier for the faculty and easier for the student, even though in the long run it is surely the hardest and most painful way to learn. This course takes the opposite approach. It's goal is to provide what is best in the long run. Unfortunately the immediate consequence of taking this course is that it requires that you have a willingness to learn what is necessary, so that you will take the appropriate action in the future, and secondly, it requires that you work through complex and subtle issues now as a student when no one's life depends on it. The immediate consequence of teaching this course is that it requires that very complex and subtle issues be communicated in a compelling way.

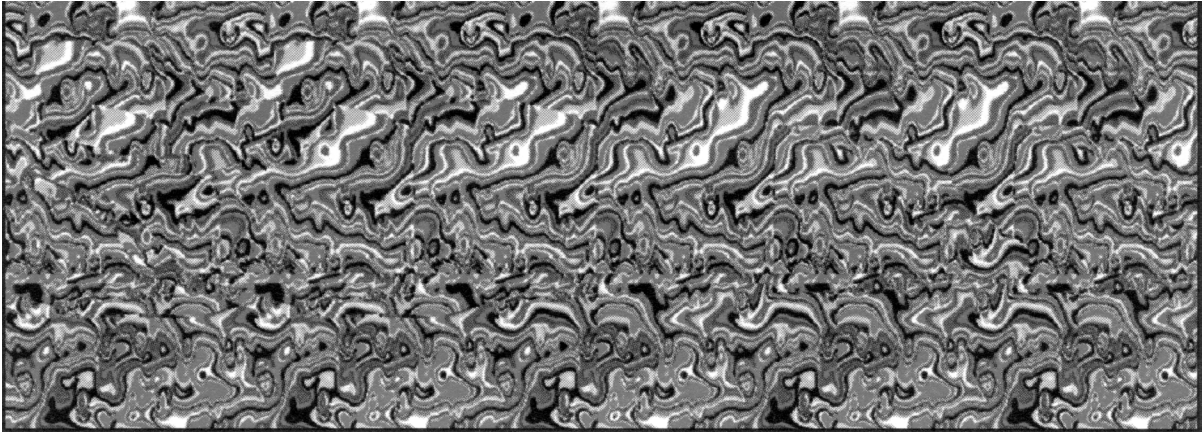
Pay particular attention to the heading outline. The Table of Contents provides a well-structured summary of the important material in this manuscript. Be sure to overview the Table of Contents before and after reading each chapter. Use the Table of Contents as a study guide. You should be able to reproduce its major components before proceeding to the next sections and chapters.

Some parts of the manuscript are intended to prompt your imagination or insure that you are able to see an issue from a particular point of view. Try to allow yourself to get “into” the examples. With any luck, it will make the manuscript more enjoyable as well as informative. I agree that some of the examples have obvious solutions or are simplistic, while the actual issues are subtle or are very complex. I've tried to provide you with examples of important issues in such a way that it's easy to care about the alternatives and easy to see which is the correct answer. From there, it's generally also easy to deal with complex cases. As a result, the style of the manuscript is informal with many examples and analogies. The underlying rationale for the style of the presentation comes from the fact that in order for many of us to build our personal wisdom, we often need conceptual or motivational scaffolding. Once our world view is formed we can discard the scaffolding, but it is nevertheless important for the construction. I also accept that this manuscript is not perfect. I revise it every year. I see things to fix every time I read it. However, to simplify

your task of learning, see this manuscript for what it can do for you, rather than for what it has not yet done. The bottom line is that it is critical for you to begin coming to grips with the general forms of the issues presented in this manuscript. Sooner or later your career will depend on how successfully you can cope with each problem. As we cover the material, consider alternatives to the positions expressed and the relative cost benefit ratios of the various approaches. What could be gained? What could go wrong? I believe that with these techniques you can learn for reasons other than the removal of pain, and that you can be motivated for reasons other than avoiding the repetition of a mistake you once made.

Plan on reading the manuscript completely through at least twice. The manuscript cannot discuss the big picture and the details necessary for you to fully understand the fine details of everything at the same time. The important details of the big picture can be several chapters after the initial introduction of the big picture. The second time through you can appreciate the big picture better knowing the fine details. Secondly, many issues are more meaningful after you've been exposed to other concepts presented later in the manuscript. Unfortunately, the manuscript must cover one issue at a time even though knowledge is much like a net. Knowledge works better if each idea is connected to every other node, rather than each idea only being connected to what went before in a single straight line, as it must be written. Just as a good symphony or a good pizza or an image in a picture is the simultaneous blending of many elements, wisdom is a perspective gained by correctly understanding how many important ideas fit together.

A critical, but often overlooked, problem with learning new things is that the most important aspect of what is to be learned is the organizing principle. This task is much like coming to see the “hidden” element in the picture below. All the “facts” are there, your task is to find and clearly see the organizing principle which brings order out of the seemingly random facts. Once you are able to see it, it is apparent even with a casual glance, but before you are able to see it, it is simply not there.



Possibly the best way to understand your task in this course is to examine this “hidden picture” metaphor in detail.

1. Points Illustrated by the Metaphor

The task of education is very much like the stereogram task - Nature has many events and patterns, a blurry mass of stimulus response relationships and possibilities. The task is to make sense out of nature and to see the fundamental processes that actually drive various phenomena, rather than simply repeating words from a textbook. Most people cannot do it. Most people see only the surface, the buzzing mass of confusion. That's why they pay professional psychologists to shape their pigeon, their kids, and themselves.

a. To “Say” Dolphin is Not the Same as to “See” the Dolphin

Simply saying “dolphin” when confronted with the picture may sound like the correct answer but it is wrong. Simply being able to repeat the definition of an emboldened word in a textbook is not to understand how nature works nor to see how all behavior is a manifestation of fundamental processes. Understanding the processes in nature and understanding their application is not just a string of words. It is something that is different about the way the world is seen. It dramatically changes your ability to solve problems.

b. The Baseline is Not the Total Absence of Anything to Say About Dolphins

There is a difference between someone who can describe what they actually see in the picture and someone who can't see anything in the picture, but having been told that there is a dolphin in the picture can extemporize at great length about dolphins. The difference between these two types of answers is consequential.

Just because someone can expound at great length about psychology does not

mean that they understand it or can correctly use their knowledge. The absence of something to say about psychology is not the only sign that the person is ignorant about the topic. Everyone has, and expresses, an opinion on psychology. Professional psychologists must do significantly better than amateurs. People can get talk-show quality advice for free.

c. The Dolphin Cannot Be Pointed To - It's Not a Simple Object Like an "X" on a Chalkboard

The dolphin in the picture is not an object that can be held in the hand nor does pointing to it or tracing its outline automatically enable someone to see it. It has no existence other than as specific relationships between irrelevant objects. Similarly, a fundamental process of nature is not an object or a vocabulary word, but rather it is a set of relationships embedded in "noise." It is a process, it's how things work. For example, reinforcement is an abstract relationship between behavior and stimuli. The behavior can be keypecking, saying hello, or a career helping people; the stimuli can be pieces of corn, a smile, or being categorized by people into the same group as Gandhi. Reinforcement is not the subject realizing what needs to be done in order to get the reward nor is it activity in the hypothalamus. It is a rate increase in a behavior attributable to the consequences of that behavior.

d. Seeing the Dolphin Is Not Something a Person Can Give You

No teacher can simply say words to a student and thereby enable the student to understand nature from then on, without the student having seriously looked at nature at some length with those basic processes in mind. There are thousands of hidden element pictures, but they are not all dolphins. There are an infinite number of situations in the natural world and there are an infinite variety of instantiations of the basic causal factors.

e. It Takes Active Practice and Time to See the Dolphin

Understanding is like the ability to see the dolphin, building muscles, and the ability to play a musical instrument; it cannot be given to someone through words in the absence of work on the part of the student.

It takes time, active practice, and feedback from nature to:

- i. see a fundamental process such as reinforcement everywhere and
- ii. to immediately think of those fundamental processes when a new specific problem arises.

f. To the Degree That a Person Believes That the Word or the Outline Pointed to Is Seeing the Dolphin, It Damages Their Ability to Actually See the Dolphin

It is obvious that a person hopelessly misses the point if they say “I don't want to fool around trying to see what is in the picture - tell me what to say - it is my right.” Similarly, if a person stops at the dictionary definition of reinforcement, for example, they will have difficulty coming to see how ubiquitous reinforcement is in nature and how it actually is the cause of most things people and other animals do. A person limited to a textbook definition will be slow to see reinforcement in the interaction between a mother and child and will be less likely to be able to give people the skill of helping people to help their children more effectively.

g. People Who See the Dolphin See a Different Picture Than People Who Don't

Professionals see a different world than amateurs. This is true in art, sports, music, and psychology. Whereas the lay see heroes, criminals, and willful children; professionals see people with different reinforcement histories. whereas the lay see immutable personalities, a professional sees a baseline behavior against which interventions can be evaluated.

h. If You See the Dolphin, You Know How Each Piece Relates To Every Other

If you understand a fundamental process, you are able to use facts in flexible, novel ways or to understand how totally novel things interact; you are said to be “fluent” in the area. It's important to note, however, that the reverse is not true (recall item **b.** in this list). Just because someone has a ready answer for a problem does not mean that they understand the solution. Recall the person who could extemporize about the dolphin without seeing it.

i. There Is Great Joy in Coming to See the Dolphin in the Squiggly Lines

It is a wondrous and exciting experience to realize that you understand important things about how nature actually works and that you can do things with that knowledge.

j. A Blind Person Or A Person With One Eye Cannot See The Dolphin

Some people may simply not be able to understand the fundamental processes driving nature. Saying “I just cannot do it” does not give wisdom nor does it give the right to be ignorant. For example, would you let a physician who “just could not understand” brain anatomy cut into your brain? Getting a note

from the school nurse or even from a judge, does not bestow the ability to understand nature.

k. Teaching People to Only Say “Dolphin” is Brainwashing

The difference between brainwashing and education is the different between teaching people to repeat words on authority on the one hand, and enabling people to understand how things work and why they work that way, on the other. In that sense, simply “saying dolphin” is opinion and superstition, while “seeing the dolphin” is fact and science.

I believe that my task is to help you to actually see the dolphin (understand the organizing principle), not to simply teach you to mouth the words “there's a dolphin in the picture” (mouthing the vocabulary words of behavior analysis). Even though it would take me only a few minutes of lecture time to cover the issue “reinforcement makes us who we are” and you would be able to write the phrase on a final exam with no further study (thus proving me a fantastic teacher and you a fantastic student?). Neither of us would have accomplished anything meaningful. The task of science is not to gather blind adherents, but rather to inform people of the nature of reality, and to provide them with the very complex skill of separating reality from illusion.

With some issues you'll get the organizing principle right away, and will wonder why others are taking so long to get it, or require so many examples; other times your roles may be reversed. In either event, always keep in mind that your task is to **understand for yourself** the issues we cover, not simply to learn to mouth the words. It is empty pedagogy for me to simply teach you to say words whenever you confront a problem. Ask me whatever questions are necessary as many times as necessary until you understand. With anything less, we are all on a fool's errand. The manuscript is intended to help you see the “picture,” not to just lay the facts before you and move on, leaving you to learn the hard way after you graduate.

A second critical, but overlooked, problem in education is that learning has more in common with building muscles or learning to play the piano than with a glass of water being filled from a source of water. Learning comes not from what I give you, but rather from what you do for yourself. A simple metaphor, familiar to everyone, is the difference between being the driver and being a passenger on a road trip. The driver can easily return to the destination again, while the passive passenger cannot. Learning is an activity that requires an active learner

Acknowledgment

I would like to thank the many students over the last ten semesters who have contributed to making this manuscript clearer with each revision.

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