

SSP100 Class Notes
Introduction to the Learning Module: Philosophy and
Psychology

David Beaver
Stanford University

Spring, 2001

Plato Perfect Forms, learning as *re-cognition*.

“Soc. Do you see, Meno, what advances he has made in his power of recollection?”
(Plato, *Meno*, 380BC)

British Empiricists Locke, Berkeley, Hume. *Idea is the object of thinking. Every man being conscious to himself that he thinks; and that which his mind is applied about whilst thinking being the ideas that are there, it is past doubt that men have in their minds several ideas,- such as are those expressed by the words whiteness, hardness, sweetness, thinking, motion, man, elephant, army, drunkenness, and others: it is in the first place then to be inquired, How he comes by them?*

I know it is a received doctrine, that men have native ideas, and original characters, stamped upon their minds in their very first being. This opinion I have at large examined already; and, I suppose what I have said in the foregoing Book will be much more easily admitted, when I have shown whence the understanding may get all the ideas it has; and by what ways and degrees they may come into the mind;- for which I shall appeal to every one's own observation and experience.

*2. All ideas come from sensation or reflection. Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas:- How comes it to be furnished? Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from EXPERIENCE. In that all our knowledge is founded; and from that it ultimately derives itself. Our observation employed either, about external sensible objects, or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have, do spring. (Locke, *Essay Concerning Human Understanding*, Book 2 Chapter I - Of Ideas in general, and their Original, 1689)*

Some of our ideas have a natural correspondence and connexion one with another: it is the office and excellency of our reason to trace these, and hold them together in that union and correspondence which is founded in their peculiar beings. Besides this,

there is another connexion of ideas wholly owing to chance or custom. Ideas that in themselves are not all of kin, come to be so united in some men's minds, that it is very hard to separate them; they always keep in company, and the one no sooner at any time comes into the understanding, but its associate appears with it; and if they are more than two which are thus united, the whole gang, always inseparable, show themselves together.

6. This connexion made by custom. This strong combination of ideas, not allied by nature, the mind makes in itself either voluntarily or by chance; and hence it comes in different men to be very different, according to their different inclinations, education, interests, etc. Custom settles habits of thinking in the understanding, as well as of determining in the will, and of motions in the body: all which seems to be but trains of motions in the animal spirits, which, once set a going, continue in the same steps they have used to; which, by often treading, are worn into a smooth path, and the motion in it becomes easy, and as it were natural. As far as we can comprehend thinking, thus ideas seem to be produced in our minds; or, if they are not, this may serve to explain their following one another in an habitual train, when once they are put into their track, as well as it does to explain such motions of the body. A musician used to any tune will find that, let it but once begin in his head, the ideas of the several notes of it will follow one another orderly in his understanding, without any care or attention, as regularly as his fingers move orderly over the keys of the organ to play out the tune he has begun, though his unattentive thoughts be elsewhere a wandering. Whether the natural cause of these ideas, as well as of that regular dancing of his fingers be the motion of his animal spirits, I will not determine, how probable soever, by this instance, it appears to be so: but this may help us a little to conceive of intellectual habits, and of the tying together of ideas.

7. Some antipathies an effect of it. That there are such associations of them made by custom, in the minds of most men, I think nobody will question, who has well considered himself or others; and to this, perhaps, might be justly attributed most of the sympathies and antipathies observable in men, which work as strongly, and produce as regular effects as if they were natural; and are therefore called so, though they at first had no other original but the accidental connexion of two ideas, which either the strength of the first impression, or future indulgence so united, that they always afterwards kept company together in that man's mind, as if they were but one idea. I say most of the antipathies, I do not say all; for some of them are truly natural, depend upon our original constitution, and are born with us; but a great part of those which are counted natural, would have been known to be from unheeded, though perhaps early, impressions, or wanton fancies at first, which would have been acknowledged the original of them, if they had been warily observed. A grown person surfeiting with honey no sooner hears the name of it, but his fancy immediately carries sickness and qualms to his stomach, and he cannot bear the very idea of it; other ideas of dislike, and sickness, and vomiting, presently accompany it, and he is disturbed; but he knows from whence to date this weakness, and can tell how he got this indisposition. Had this happened to him by an over-dose of honey when a child, all the same effects would have followed; but the cause would have been mistaken, and the antipathy counted natural. (Locke, *Essay Concerning Human Understanding*, Book 1, Chapter XXXIII Of the Association of Ideas, 1689)

Though it be too obvious to escape observation, that different ideas are connected to-

gether; I do not find that any philosopher has attempted to enumerate or class all the principles of association; a subject, however, that seems worthy of curiosity. To me, there appear to be only three principles of connexion among ideas, namely, Resemblance, Contiguity in time or place, and Cause or Effect. (Hume, *An Enquiry Concerning Human Understanding*, 1748)

Rousseau The state of nature. “Dear kindly sergeant Krupke, ya gotta understand. It’s just our bringing up-ke that gets us outa hand! Our mothers all are junkies our fathers all are drunks! Golly Moses, Naturally we’re punks!” (Stephen Sondheim, “Gee, Officer Krupke”, from *West Side Story*, 1961)

Kant *Synthetic/Analytic*, and *a priori/a posteriori*

Behaviorism Pavlov, Thorndike, Watson, Skinner

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant- chief, and yes, even beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors (John Watson, 1924)

Analytical Behaviorism Ryle, Dennett

Heritability *Family, adoption, and twin studies and combinations of these designs can be used to estimate the magnitude of genetic effects as well as their statistical significance. This is the descriptive statistic called heritability. Heritability is an estimate of effect size given an particular mix of existing genetic and environmental factors in a particular population at a particular time. It is a descriptive statistic that estimates the proportion of phenotypic variance (i.e., individual difference in a population, not behavior of a single individual) that can be accounted for by genetic variance. It describes “what is” rather than predicting “what could be” or “what should be.” Heritability does not imply genetic determinism—it refers to probabilistic propensities, not predetermined programming.*

Consider height. Correlations for first-degree relatives are about .45 on average, whether relatives are reared together or adopted apart. Identical and fraternal twin correlations are .90 and .45, respectively, regardless of whether they are reared together or adopted apart. These results indicate significant genetic effects. For these height data, heritability is estimated as 90%. This estimate of effect size indicates that, of the difference among individuals in height in the population sampled, most of the differences are due to genetic rather than environmental differences among individuals. (Robert Plomin, *Genetics and Experience: The Interplay Between Nature and Nurture*, p 43-44)

Back to Nature Cognitive Science, Newell and Simon (problem space, task environment, General Problem Solver), Chomsky

Study of the actual observed ability of a speaker to distinguish sentences from non-sentences, detect ambiguities, etc., apparently forces us to the conclusion that this grammar is of an extremely complex and abstract character, and that the young child has succeeded in carrying out what from the formal point of view, at least, seems to be a remarkable type of theory construction. Furthermore, this task is accomplished in an astonishingly short time, to a large extent independently of intelligence, and in a comparable way by all children. Any theory of learning must cope with these facts.

It is not easy to accept the view that a child is capable of constructing an extremely complex mechanism for generating a set of sentences, some of which he has heard, or that an adult can instantaneously determine whether (and if so, how) a particular item is generated by this mechanism, which has many of the properties of an abstract deductive theory. Yet this appears to be a fair description of the performance of the speaker, listener, and learner. If this is correct, we can predict that a direct attempt to account for the actual behavior of speaker, listener, and learner, not based on a prior understanding of the structure of grammars, will achieve very limited success. The grammar must be regarded as a component in the behavior of the speaker and listener which can only be inferred, as Lashley has put it, from the resulting physical acts. The fact that all normal children acquire essentially comparable grammars of great complexity with remarkable rapidity suggests that human beings are somehow specially designed to do this, with data-handling or "hypothesis-formulating" ability of unknown character and complexity.⁴⁸ The study of linguistic structure may ultimately lead to some significant insights into this matter. At the moment the question cannot be seriously posed, but in principle it may be possible to study the problem of determining what the built-in structure of an information-processing (hypothesis-forming) system must be to enable it to arrive at the grammar of a language from the available data in the available time. At any rate, just as the attempt to eliminate the contribution of the speaker leads to a "mentalistic" descriptive system that succeeds only in blurring important traditional distinctions, a refusal to study the contribution of the child to language learning permits only a superficial account of language acquisition, with a vast and unanalyzed contribution attributed to a step called generalization which in fact includes just about everything of interest in this process. If the study of language is limited in these ways, it seems inevitable that major aspects of verbal behavior will remain a mystery. (Chomsky, Noam, "A Review of B. F. Skinner's Verbal Behavior", Language 35(1):26-58, 1959).

Summary From nature (nativism) to nurture (empiricism) and back again!