

Notes on research on creativity from biographical sources
from talk to the Stanford Medical School Alumni
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see
creativity

Transition from previous speaker.

In his discussion on experience effects on the organization of the visual cortex David Hubel made some remark on immersion and problem solving as the basis of creative activity. I took that as a point of transition; without decrying what he said in any way I indicated that I was going to put more emphasis on fantasy and imagination: the development of hypotheses, the discovery of questions. What I had to say would leave no doubt about my indulgence in fantasy. He had also said something about age effects: my riposte would be that the loss of fantasy: the distance from childhood (not to mention having learned too much) may hinder a fresh approach. Some of us may still profit from a second childhood!

My thanks to Dr. Purpura as a fellow graduate of Stuyvesant High School for a welcome opportunity to visit a place that had occupied the larger part of my adult life and to rejoin many people with whom I hope to sustain neuronal connections (referring back to Hubel's talk).

He also gave me a difficult assignment to say something sensible about creativity: or failing that to lapse into reminiscence in a way that was never encouraged when I lived at Stanford and would not hasten to do where I live now. If I do lapse into indecent exposure I can fall back to another jurisdiction. On the other hand, many of you know me well enough to offer some corrective discipline against self-delusion. But you will recognize my act of trust in you.

Ed Rubenstein is well known for inflicting challenges like this especially on his friends.

For many years I have looked at scientific biography and discovery accounts. They have been inspirational but hardly ever enlightening for clues of process. What's wrong?

1. The observations are hardly ever and could not readily be controlled. We do not do comparative studies of competent but uncreative people.

2. (But I didn't go into this in my talk.) Intrinsic factors in intellectual development, the sorting out of genetic from environmental components will become accessible in the near future with advances in DNA research. For example polymorphisms that Dr. Cavalli-Sforza and his colleagues here work on.

3. (Pathology)

If we were to pursue case studies the example of medicine suggests that we focus on pathology: the experiments of nature, to understand the outcomes of people who would seem to be very promising but did not achieve that promise.

I referred although only anecdotally to studies and observations like those on the Terman group, the whiz kids, my own thoughts about the science talent search winners which suggested to me that early performance in those academic dimensions was not very often followed up by creative activity in later life. There is some other literature on this to which I may also allude but the matter should not be accepted on faith too lightly.

A remark on biography in general: that so many factors shape our lives no way could I review them here.

Science requires such a paradoxical blend of humility and aggression; the career of the scientist is subject to so many stresses (Lawrence Kubie): One wonders that anyone can stay the course! Yes there may be some connection between creativity and madness (The Divine Mad). The imaginative phase needs intermittent suspension of what we think we know-- what has been termed 'regression in service of the ego' --; but we must return to reality as well.

Many life stories do speak to the role of an inspirational mentor (mine was Francis Ryan at Columbia). For the rebellious, stubborn-minded infant, this may have as much to do with sympathetic socialization as well as intellectual evocation and discipline.

(How precocity fits in deserves further discussion. Ed Feigenbaum points out that precocious children may also be charismatic, attracting mentorial attention.)

We do have to worry what proposition 13 will do in California just as there has been a terrible deterioration of both science teaching, school support and libraries in New York City.

Back again to many comments that speak to the rarity with which early promise persists and we are surely dealing with many tragic losses here. I also referred to my own observation that I found many familiar names in the runners-up but not in the top echelon of science talent search.

Groups like Stuyvesant High School at large had done remarkably well: Dean Julie Crevans (UC-SF Medical school was another of my classmates). And behold the small cohort of 20 or 30 youngsters at the AISL in 1941. I have not investigated but would doubt if Barry Blumberg or Paul W. Berg or Charlie Yanofsky stood out purely grade-wise any more than I had.

One factor may indeed be the difficulty that standardized, multiple choice tests pose to the really imaginative child. That child can perhaps learn to be test-wise but is that what we want to reinforce? The really creative person will read interpretations into many questions that are likely to escape the test writer and may become either bored or disgusted or simply fail to see them in the simple-minded style of the writer, and fail.

And here is SLIDE 1. The ETS example.

Having little more to offer from overall analysis I will follow Dr. Purpura's invitation, and turn to one case study that I know particularly well namely my own scientific biography or more precisely the biography of an experiment that was first done almost precisely 37 years ago on June 2, 1946. Remark my skepticism about the factual accuracy of biographical and discovery accounts indicating the experience with Peter Friedman and Jerry Feitelson in trying to give authentic transcripts of the discussions in my own laboratory. In a matter of a few seconds or minutes our whole gestalt of the meaning of a question: the interpretation of our terms, could be so radically transformed that it would be very difficult indeed to go through the entire chain of reasoning by which we might jump from one plane to another. We did not however have detailed video transcripts which could try to illuminate our facial expressions and our body language, as well as all the details of our explicit discourse and those are experiments that perhaps deserve to be done. (I probably should ask Mike Cole out at UC San Diego if he's ever actually looked at that kind of discourse.)

Having expressed that skepticism I may be in the position of asserting that almost every proposition is false including this one.

As Dr. Purpura has told you I was just a week past my 21st birthday; in my third year of medical studies at Columbia P&S but at the time on elective study at Yale in Ed Tatum's laboratory. Professor Tatum had just left the biology department here at Stanford in a tradition that Warren Weaver had recorded: "biology departments don't need chemists". He was of course to return two years later in the wave of modernity that still pertains here in that field.

The Slide on the experiment.

I could tell you a lot more about the genetics of bacteria but that may have even less to do with "creativity" although perhaps some people in 1946 were quite ready to think it was a creative fabrication. I'm going to give it to you only in its essentials and focus on the setting in history that it made it possible.

The Slide on the intellectual history.

Not enough time for a detailed narrative - focus on setting the stage, the separation of disciplines, the tradition of schizomycetes. And then concentrate on social factors and related externals these are not very startling but they give some notion of the enablement. As that Slide indicates it has very much to do with trying to tease out what we all take for granted in the particular life that we live within our own skins. How rarely do we communicate with others in such a fashion as to enable us to discover what must not be taken for granted. Is that the artist's role? [thinking of Hollander coming on the program].

Coda.

Stein's compendium of research on creativity is as telling as anything else I know. He has the familiar trilogy of imagination criticism and communication. Imagination needs permission to fantasize. Criticism must come from the self, as well as others. Communication is not just to tell the world about additions to its knowledge but also to evoke that criticism so necessary to temper fantasy with reality.

Our university structures are relentless filters for the successful accomplishment and coordination of these abilities. A place like Stanford has people who almost all qualify in a very high order. These are the success stories I'm less certain how well and how far we nurture the development of these capabilities in the groups of people which are our responsibilities.

Further footnotes: My Slide on sociological background may have a lot to say about why I'm now at The Rockefeller University.

This discussion has a sociological cast which was greatly informed by my consultations at Center for Advanced Studies with Bob Merton and Harriet Zuckerman.

In the discussion there was a question about suffering as a stimulus to creativity. [] 1. Not obvious in anything I presented. 2. Some people may find escape from anxiety in creative work. 3. Bereavment may leave a person so self-abasing, stripped bare (Job-like), that with recovery a reassessment and career change may emerge. Scientific work needs both imagination and concentration, and I would not prescribe suffering for the latter.