

GENERAL DISCUSSION IMMEDIATELY AFTER THE TERMAN MEMORIAL SYMPOSIUM

Edited by J. W. Getzels

This discussion was conducted on Friday afternoon, November 7, 1975, from about 2:00 P.M. until 5:00 P.M., immediately following the presentation of the papers at the symposium. It was chaired by Professor Getzels and participated in actively by the thirty-one persons whose remarks appear in the following edited transcript. Another twenty or so persons listened but did not make comments. Names, affiliations, and addresses of the discussants are as follows:

Dr. Robert S. Albert, Professor of Psychology, Pitzer College, 1050 N. Mills Avenue, Claremont, California 91711.

Dr. Anne Anastasi, Professor of Psychology, Fordham University, Bronx, New York 10458.

Ms. Ann H. Barbee, Research Assistant, Terman Study of the Gifted, Stanford University, Stanford, California 94305.

Ms. Jane S. Brockie, Curriculum Specialist, Gifted Program, Pasadena Unified School District, 351 S. Hudson Avenue, Pasadena, California 91109.

Dr. Gwendolyn J. Cooke, Coordinator, Gifted and Talented Programs, Baltimore City Public Schools, 3 E. 25th Street, Baltimore, Maryland 21218.

Dr. James L. Fisher, Consultant, Gifted and Talented, Division of Instruction, Maryland State Department of Education, P.O. Box 8717, Baltimore-Washington International Airport, Baltimore, Maryland 21240.

Dr. Lynn H. Fox, Assistant Professor of Education and Coordinator of the Intellectually Gifted Child Study Group (IGCSG), Evening College and Summer Session, The Johns Hopkins University, Baltimore, Maryland 21218.

Mr. William C. George, Associate Director, Study of Mathematically Precocious Youth (SMPY), The Johns Hopkins University, Baltimore, Maryland 21218.

Dr. J. W. Getzels, R. Wendell Harrison Distinguished Service Professor in the Departments of Education and of Behavioral Sciences, University of Chicago, 5835 Kimbark Avenue, Chicago, Illinois 60637.

Ms. Gina Ginsberg, Executive Director, The Gifted Child Society, Inc., 59 Glen Gray Road, Oakland, New Jersey 07436.

Dr. Richard J. Haier, Laboratory of Psychology and Psychopathology, National Institute of Mental Health, 9000 Rockville Pike, Bethesda, Maryland 20014.

Ms. Elise A. Hancock, Editor, *Johns Hopkins Magazine*, The Johns Hopkins University, Baltimore, Maryland 21218.

Dr. James R. Hobson, retired Coordinator of Pupil Personnel Services, Public Schools of Brookline, Massachusetts, 463 Boylston Street, Newton Centre, Massachusetts 02159.

Dr. Ellen Hocking, Coordinator of Secondary Mathematics, Montgomery County Public Schools, 850 Hungerford Drive, Rockville, Maryland 20850.

Dr. David M. Jackson, Co-Director, National Institute on Gifted and Talented, 11539 Maple Ridge Road, Reston, Virginia 22090.

Dr. Elizabeth I. Kearney, Curriculum Specialist, Gifted Program, Pasadena Unified School District, 351 S. Hudson Avenue, Pasadena, California 91109.

Dr. Albert K. Kurtz, former Professor of Psychology, 1810 Ivy Lane, Winter Park, Florida 32792.

Mr. Leon L. Lerner, Counselor, Roland Park Junior High School, and Director of the B'nai B'rith Career and Counseling Services, 5207 Roland Avenue, Baltimore, Maryland 21210.

Dr. Richard F. McCoart, Professor and Chairperson, Department of Mathematics, Loyola College, 4501 N. Charles Street, Baltimore, Maryland 21210.

Dr. William B. Michael, Professor of Education and Psychology, University of Southern California, Los Angeles, California 90007.

Dr. Ellis B. Page, Professor of Educational Psychology, U-64, University of Connecticut, Storrs, Connecticut 06268.

Ms. Margaret Parker, Executive Director, Kootenay Centre for Gifted Children International, Box 805, Kaslo, British Columbia, Canada.

Dr. Kamla Patel, Institute for Behavior Research, 624 Graduate Studies Research Center, University of Georgia, Athens, Georgia 30602.

Dr. Marshall P. Sanborn, Professor of Education, University of Wisconsin, Madison, Wisconsin 53706.

Dr. Pauline S. Sears, Professor of Education, *Emerita*, Stanford University, Stanford, California 94305.

Dr. Robert R. Sears, Professor of Psychology and Education, *Emeritus*, Stanford University, Stanford, California 94305.

Dr. Julian C. Stanley, Professor of Psychology and Director of the Study of Mathematically Precocious Youth (SMPY), The Johns Hopkins University, Baltimore, Maryland 21218.

Dr. Virgil S. Ward, Professor of Education, University of Virginia, Charlottesville, Virginia 22903.

Dr. George S. Welsh, Professor of Psychology, University of North Carolina, Chapel Hill, North Carolina 27514.

Mr. Joseph R. Wolfson, fast-paced mathematics teacher, Montgomery County Public Schools, 850 Hungerford Drive, Rockville, Maryland 20850.

Dr. Dean A. Worcester, Professor of Educational Psychology, *Emeritus*, University of Nebraska, 1050 Arapahoe, Boulder, Colorado 80302.

DISCUSSION

GETZELS: There are a number of ways of proceeding with the free discussion. One way is to keep in mind several major topics that should be covered. This does not mean that we need to proceed in a rigid topical way; rather, here are four topics that I hope would be covered.

First, some rather more general remarks regarding the papers themselves—remarks that did not lend themselves to expression in the brief question-answer periods in the paper-reading sessions themselves.

Second is the kind of pertinent research being done either by those present here but who were not speakers or by others about whom we should know. That is, reports of studies which are relevant to what was said so that we have information beyond the information given at the symposium itself.

Third, along with that, additional practices. What is being done elsewhere in schools, classrooms, experimental programs, and such?

And fourth, suppose that money were to become available from foundations or government for work with the gifted, what should be done? What are the priorities? And with that, what should *not* be done?

ANASTASI: I had a few associations to Lynn Fox's paper, especially with regard to your reference to global versus analytical approaches

in connection with sex differences. At another point you talked about the preference for social classroom learning versus solitary learning. I am reminded in that connection of the distinction between what Jerry Kagan calls “reflective” and “impulsive” cognitive styles. Quite apart from sex differences, is there any relation between an individual’s preference for solitary versus social learning and his/her performance in mathematics? I would like to get your reaction to this idea. Isn’t it the case that mathematics, probably more than any other subject, requires the kind of cognitive style characterized by highly focused and sustained attention? This certainly corresponds to an analytic rather than a global style and implies a preference for solitary rather than social learning. Do you have any information, from the literature or from your own research, that would support the hypothesis that this kind of style is particularly required in mathematics?

FOX: I personally think that the sex per se is not as important as some of the authorities claim. There is no research evidence with which I am familiar that has clearly defined it. But I think that what you are suggesting is an entirely different approach to determine this. We do find boys who have some of these social interests, who don’t seem to be as analytic, who show some of the same reactions as girls, not wanting to be in special classes, not wanting to go to college early—things like this that don’t show the high interest in math, even though they have the aptitude. Do you know of something more specific?

ANASTASI: No. I was thinking if you didn’t know of such a study that it might be worth following up. You may want to look into these cognitive styles as they relate particularly to mathematics.

FOX: I was trying to think in the Helson studies of the female mathematician, if she actually said anything about cognitive style per se.

WELSH: Yes, she did. She talked about the patriarchal and matriarchal unconsciousness in the Jungian sense, general personality characteristics that she applied to the work of the mathematicians, and showed differences between the males and the females in this regard. I can’t remember all the details. The patriarchal I think is a more incisive, analytic way of dealing with the problems, whereas the matriarchal is a more flexible, adaptable, somewhat more open kind of style. So I don’t know whether this fits in exactly with what you were thinking in terms of cognitive style. I think that she is speaking here more in terms of personality characteristics.

ALBERT: I want to follow up on that. It seems to me that for a long time we have regretted that no one ever followed up Leta S. Hollingworth’s brilliant youths, but I think that in a way this project [SMPY] is the follow-up to that and much more. I wonder if with this group we could make some distinction between highly competent people and

people who might be potentially creative. One of the things that struck me is that these boys and girls, really adolescents, have a lot of the characteristics that you find in describing competent people. They don't, as far as we can tell, have many of the characteristics that would result in creativity later on. It came to my mind, along the same line, that you might want to find out something about convergence and divergence.

Something that struck me in the literature about people who are really fine researchers is that they tend to either have both styles in very high quantity or they pair up with somebody who complements them very well. The Watson and Crick "double-helix" pair is a good example. They really are twins. But they phase in beautifully. I remember that Einstein had a mathematician assigned to him. Sometimes his math gave out. That is true.

GETZELS: I would hope it should happen to me.

ALBERT: It should happen to all of us. The fact is, we have a group of people who really are on the threshold of potential great achievement. I don't know if we know yet if many of them will achieve it, have the kinds of background, personality, and cognitive style that might determine this.

STANLEY: I wanted to ask you a sort of rhetorical question. Suppose that you had Einstein on the panel last night at age thirteen, fourteen, or fifteen. Do you think you would have been impressed by him as a prospective great scientist, as the greatest scientist of the century? That is speculation. According to reports we read, Einstein was not an impressive youth; he was a stubborn person who wouldn't learn languages in the German gymnasium, and therefore couldn't pass the exams for the Technical University of Zurich. In answering questions last night, would he have seemed potentially creative in the sense we are talking about?

ALBERT: On that basis, just looking at them, no, although there were a couple of persons up there who really struck me. One was Eric. He had an edge to him which the others didn't and in a way, while he is far more verbal than perhaps Einstein would have been, Einstein had his quality of doing his own thing and setting his own pace. The only thing, you couldn't do it from the distance last night. But many of these people will have a predominant interest, one that forces them to work rather than one they are good at and will work at. I thought Eric did. I thought the boy at the very end [Joe B.] who was at Cornell was suggesting that not only they like to do their work but also they enjoy their work. That is what was in Einstein very early.

R. SEARS: An obsession.

ALBERT: It is not obsessively neurotic but a person passionately in love with something.

LERNER: I would like to pull this out of the laboratory into a kind of empirical framework. I guess I am looking at this from about 2,000

character and interest tests I have done in the last ten years or so working with high school kids, kids interested in math, and so on. I had the good fortune of sitting next to Eric's mother yesterday and talking at length with her. I wonder to what degree all of these cognitive items we are dealing with also involve interpersonal and social-domestic factors, and so on—other factors, which in turn touch on what kids do with all of these items that Dr. Anastasi mentioned.

Take Eric. Maybe because inherently I have been a counselor all my life, his mother immediately started telling me the whole story. What would have happened if Eric's mother were not the kind of vigorously assertive woman she seems to be? She said to her son, "This is what we do. This is what we are going to do," and wasn't cowed by the educators. What would Eric have been? I know Julian places very heavy emphasis upon what parents do with kids, don't you?

STANLEY: We in SMPY place heavy emphasis on what the youth is *eager* to do. That is quite different. Sometimes the student's real desires are difficult to discern. As I was arguing with an overpowering mother this morning before the first session, it is very difficult for her son to find out what he wants to do, because the mother won't even let him talk. I had to shut her up and say, "Let him talk."

I would like to make that clearer. We never are eager to find out what the parents primarily want to do, but instead what the youngster, considering all possibilities, is eager to do.

LERNER: I will set up another hypothesis and that is the child in relation to the parents. What can the child then do? David, one of my protégés, who did not participate in the panel simply because his parents think he is being pushed too hard, should have. So I am suggesting some kind of a relationship factor other than the cognitive style. There is a need for more research. I have seen some Einsteins remain in the womb, so to speak, simply because other factors impinged on the cognitive factors. Others were strong enough to say to their mothers: I will do what I want to do. This is an empirical kind of a problem.

KURTZ: I want to answer Stanley's question. I think I would have been very much impressed by Einstein for the simple reason that I was very much impressed by all those kids.

SANBORN [to Fox]: I had a number of thoughts running through my mind connected with your statements and Anne's. All of our work has been with young people one at a time, and with their parents one at a time. I think we have come to the conclusion that we are not willing to subscribe to very many sweeping generalizations. For example, what is cognitive or what we talk about as that might not be entirely cognitive.

What we found, for example, are things like this: that boys may differ from girls on whether they want to be identified as gifted, and further-

more they differ dramatically, depending on what kind of community they live in. Where they live, what the social context is, all these kinds of things have a lot to do with what we are likely to see them doing, what their performances show, and what kind of style they develop. To me, style is enormously important, but it is not cognitive, strictly.

ANASTASI: I want to follow up on that point and also on something Dr. Stanley said. I used the term "cognitive style" because it is common in the literature. I completely agree that the term may be misleading; I think this response style is probably more than 50 percent noncognitive.

To follow up the question about Einstein, I think one point that we might lose track of—and this fits in with Dr. Sanborn's point about the importance of the individual and his situational context—is that perhaps we would not have been impressed with Einstein as a child. Perhaps the thing that determined whether he eventually became so successful or not was something that happened between the time when he was twelve and the time when he was twenty. In other words, you cannot predict with 100 percent certainty from what you see in the child, because there is going to be an effect of what happens to him in the intervening years; and his final success is a product of all that happens to him. It is not just something that you can predict with 100 percent accuracy when a person is twelve years old.

P. SEARS: I would like to suggest that we have heard that mathematicians often like to be solitary and have few friends. We have also heard that the gifted child needs a warm relationship with people within the school. I will just suggest, because no one can prove me wrong, that Einstein would not have liked, as a boy, a warm relationship.

WARD: As a matter of fact, if I remember correctly from his autobiographical sketches, Einstein indicated just this preference for individual absorption. His phrasing was about like this: "I am a horse for single harness, built neither for tandem nor team work." And, he did *not* want "warm" relationships.

P. SEARS: He did the abstract.

WARD: Yes. I believe his observations indicated exactly what you were suggesting—that despite the extraordinarily warm compassion he felt for all mankind (reminiscent of Erikson's "my kind—mankind"), he did not want warm relationships even with members of his own family. I trust that I am recalling his sentiments faithfully, and if so, both observations are important.

PARKER: I want to speak to the point of something happening between 12 or 15 or so. I am thoroughly convinced, and maybe I will be proved wrong in the course of time, that it is what happens very much earlier to these kids that makes the difference between the survivors and

the nonsurvivors. I happen to be a parent of two brilliant children. I can look at them and see the difference between what has happened to our brilliant children versus the learning-disabled child. Maybe I am jumping the gun on this. I think we very seriously need research. Stanley in his papers has told us over and over about kids from the sixth grade onward, but I feel we have to go back. Our knowledge of learning and development is very shaky. We have to go back and do some vigorous, statistically based studies, and get samples, controls, and everything to find out whether or not there can be something very early in life to help us predict. Maybe if this child is helped, he can survive instead of going under, and he may be the one who gets through. I don't feel that we can start with age twelve.

ALBERT: What happened to Einstein between twelve and sixteen is that he had been thinking about relativity and had sort of met a dead-end and then had a tutor—which makes it very relevant to our program—who presented him with books dealing with relativity in the early stage. That was really the breakthrough.

The other thing which happened to him quite early was that his father gave him a compass. After that, he was fascinated by the interdependence of physical laws. This went on in his head to the point where relativity became a concept. He said at one point that he had the concept without the word, and he had the word after he had the tutor. I think there is a lot of relevance to what you are doing with these potentials.

GINSBERG: I want to react rather emotionally, I guess, to the concept of the child being killed in the womb by a pushy parent, and I would like to say two things.

Number one, the parent is the child's first teacher, and therefore has great impact. And number two, all parents love their children first and are pushy second. What we probably need as well as a lot of research is increased parent awareness and training. We need to take the emphasis out of the school and at least keep it in the home for those years when the children are still at home and the school is secondary in their lives. That happens much later.

PAGE: I would like to pick up on the comment made by Gowan when we began, which is related to what we are saying here. He wanted to classify the investigators of the gifted under a category called humanistic psychologists. I wish he were here to defend himself, because I still am not clear on his categories. The definitions seemed circular.

However, I do want to argue against the view that science should not dehumanize. It seems exactly the process of dehumanizing something rather than humanizing it. It is a matter of observing things in a global kind of way and abstracting from that and ultimately, we hope, moving toward not just a verbal abstraction, but a symbolic abstraction of it, and this is what we think of as scientific law.

This seems to be true on two levels. One, in studying creativity itself, it seems to me we are missing the point badly if we mush it up with words like "humanistic." We are closer to the mark if we follow the research talked about and described by Michael and others and look at the personalities of the people. Virgil Ward's comments about Einstein are certainly relevant.

Persons such as Einstein are, so far as science is concerned, rather queer birds, and I think we are missing the point if we don't acknowledge that. I would take exception with the idea that the first thing we notice about the gifted is that they are human beings. I would say that is the last thing that really differentiates them from other people.

It seems to me that the second level at which we must dehumanize is the level of the creative activities. That is to say, if we are interested in science, we need to take this process and look for the mechanism in it, look exactly for the inhuman aspect of it—that is, what goes on inside this gap of what is called incubation or the other "black boxes" which we have talked about, and later we can consider some processes toward that.

SANBORN: I have one reaction. I agree very strongly with the notion that, especially in our attempts to do formative studies, we often lose sight of the individuals about whom we are talking. We deal with abstractions. I nevertheless believe the human quality of the gifted child is enormously important as a major means of understanding gifted children as well as others.

At Wisconsin we have dealt entirely with adolescents. It is interesting to me to notice how often they give us almost textbook descriptions of things that are supposedly going on during adolescence. If you read adolescent psychology textbooks, the delightful thing about the youngsters we have worked with is that they are able to articulate and talk about issues in their lives which are what I would call adolescent issues. Maybe one of the ways that they differ from other children their own age is that they can talk so lucidly about what is going on inside themselves, but I don't think what is going on inside is all that much different from many other people their age and in their situation.

PAGE: I think we can agree that they are human beings. I think we can also agree that what distinguishes them from other human beings is not their humanness but rather strange qualities. I will quote from the Michael quote of the Taylor and Barron summary, and I will just pick out those things which make them seem obviously less than warm.

One, "manipulations involving things rather than people." Two, "a distant or detached attitude in interpersonal relations," and a "preference for intellectually challenging situations rather than socially challenging ones. . . ."

"A liking for method, precision, exactness, a preference for, among other things, isolation in dealing with a fact . . . a dislike of personally

toned controversy . . . a control of impulse amounting almost to overcontrol. . . . Relatively little talkativeness, gregariousness, impulsiveness . . . a lack of abstract thinking . . . rejection of group pressures . . . elegance in explanation. . . .”

I submit that none of those are traits which make them just folks.

STANLEY: We had the youth panel in front of us last night and it was interesting. I know a great deal about those youngsters. For some we have a folder two inches thick, and for others at least an inch thick. We have such things as personality scores for the group. The boys in our study, including those on the panel, tend (particularly on Eysenck's personality inventory) to be low on extroversion and low on neuroticism.

There were perhaps only one or two boys on the panel who probably don't fit that stereotype of the scientist fairly well. Last night, Mike, a sixteen-year-old physics major junior at Johns Hopkins who entered when he was fourteen, responded only once or twice, and then only when called on. Now, Mike is not bashful, timid, or shy, he is just not voluble. So because Gene didn't know the panel well enough to ask Mike points, Mike said nothing more. Even in that group, an especially personable and effective group, you have pretty much the stereotype of the achieving scientist—somewhat introverted but stable.

GETZELS: We keep thinking of the gifted as somehow the “quiz kids” who are “queer kids.” They are not queer; they are human in a unique sense. In this sense I suspect they are the very best kind of human beings. It is appropriate for them to be that way. It is appropriate, for example, for an artist to spend eighteen or twenty hours by himself in a studio; he is not prepared to do other more gregarious things. It is no more queer for him to be that way than it is, say, for dentists to be stoop-shouldered.

Having stooped shoulders does not make him, how shall I say, inhuman. The artist's being alone and really finding his expression that way rather than in some other way does not make him queer. It makes him unique. It doesn't make him bizarre. It certainly does not, I hope, make him inhuman.

SANBORN: You know, my reaction to that list of adjectives is that for one small segment of the people whom we call gifted, maybe it fits. I don't know who the norm group was that these adjectives were meant to describe, but they don't describe the 3,500 kids we have been working with in any general way at all. Our research shows that as a group, these kids are highly active socially, they are highly active physically. Two-thirds of the boys and about one-third of the girls are on varsity athletic teams, which far exceeds the varsity participation of kids in general in school. They are cheerleaders, they are social leaders, they are elected as class presidents. They are involved in Sunday School teaching and just a whole great variety of activities.

Now within the group there are going to be some youngsters for whom those adjectives would fit, but my concept of the gifted and talented child does not lead me to think that that is in any way adequate as a general description.

P. SEARS: There is some confusion here between scientists and gifted.

SANBORN: I mean even scientists.

P. SEARS: You are talking about a large group of gifted, talented children, I presume selected on a verbal intelligence test or artistic criteria.

SANBORN: There are a variety of criteria.

P. SEARS: You have got all of this variety, and I think this relates to Ellis Page's point, scientists and mathematicians are a little different in their modes of thought and their modes of reaction from a highly verbal kid—from Winston Churchill, who incidentally was not highly verbal as a child, but became so. But this is very different, and I think you are overgeneralizing and also over-individualizing at the same time by saying that there is a wide, wide variety. There are certain requirements in the personalities for a scientist or a mathematician that other highly talented people may not share whatsoever.

PATEL: There are several things that have been said I so much wanted to react to. It seems that personality characteristics are constantly being used as the criteria for describing the gifted, but some of us here are agreed that more than personality characteristics makes up what a person is.

I would prefer to think of it in terms of life style, not just cognitive style, but life style which is made up of many, many more components, and that successful people who are not scientists will not display one life style. I would like to suggest that that will take care of individual differences and different patterns of success. Success, I would like to submit, is not a composite factor. It is a profile. It can be seen as a profile of several factors, and if we look at it that way, we can look at it as several subsets of profiles. If we begin to think of success in terms of subsets of profiles, trying to match these together, I think we may be able to get a clearer picture of development from the point of view of integration.

LERNER: I want to pull together what Dr. Patel and Mrs. Ginsberg said. It suggests two things: the first being a need for research. I think we need research that above and beyond the personality and the internal aspects also gets at these external aspects. It isn't all inside, it is outside as well, which suggests the need for research. The technique for research needs to get out into the community, into the living space, into where these life styles are happening and the pulling together of what is being seen, especially in 1975. Maybe we might not think that this guy who sits alone is queer, but I bet his peers would, you see. We need to find this out, which gets us into a footnote here. This is to what degree, for instance,

ethnicity, the whole factor of ethnicity, bears on gifted and talented people. We have ideas. I don't know how much research we have. Here we will probably touch on why there are so few talented and gifted black children. We have them, certainly, but in comparison to other ethnic groups—Chinese, Jewish people, Greeks, etc.—we just don't know the answers. We may have our prejudices and ideas. I think we need to get out of the laboratories and into where the life styles are taking place, so I suggest a need for research and a possible technique for research.

WELSH: You said not to make any speeches, but may I use the blackboard?

STANLEY: Go ahead.

WELSH: It seems to me that what we need is a paradigm [see figure 10.1]. Whether with empirical research it turns out to be adequate or not, I think we have a way of organizing some of the concepts, personality, style, interest, personal characteristics, traits of behavior, ways of dealing with the world, etc. What I have proposed at some length, and I will simply profile it here, is two basic general personality dimensions that I think are more akin to the concept of style or temperament than anything else. One, a horizontal dimension that I call *intellectence*, differentiates the people at one end who are interested in concrete, literal, pragmatic ways of dealing with the world. At the other end of this dimension are those who are interested in abstractions, conceptual, and symbolic ways of dealing with the world. The other dimension, the vertical dimension, which I call *origence*, differentiates those who are more at home in and like a structured kind of situation from those at the other end, who want it unstructured, if we can use that word, as an open end. You can see where the situation enters and mathematicians fall. They fall here in the lower right quadrant of the figure. There are all kinds of evidence from the IPAR group and others. [For details, see chapter 9 in this volume.]

I think this is where we get the problem that somehow they are not human. I think they are impersonal in the sense that, say, psychologists are, who tend to fall around here (between upper and lower right quadrants). They deal with people as objects when they are dealing with psychology. It doesn't mean that we are then talking about their relations with their friends—that they are some kind of inhuman people who would exploit them. As a matter of fact, the exploiters fall up in this corner (upper left quadrant). At any rate, in terms of the style I have used an alliteration to refer to this type as the imaginative (upper left quadrant), this as the intuitive (upper right), this as the industrious (lower left), and this as the intellective (lower right).

The industrious person can get a great deal done by hard work and application; the intuitive one by letting his mind go and not being bound by restraints; the imaginative one, well, it comes from the unconscious

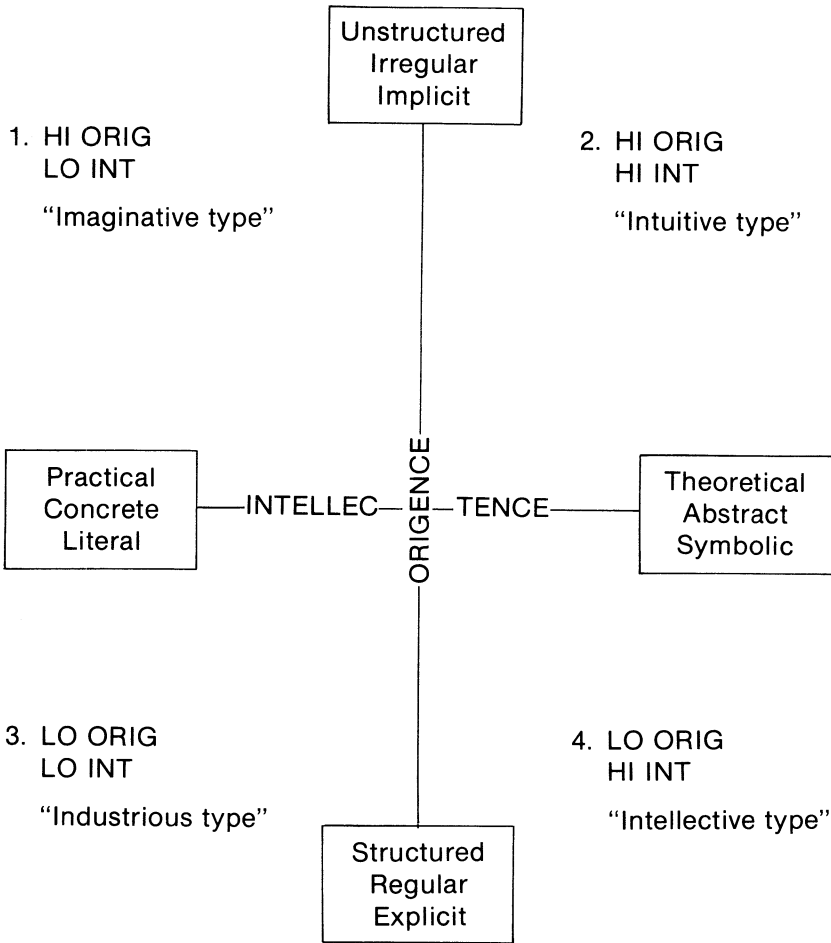


Fig. 10.1. Welsh's two-dimensional model for personality study

and there it is; and the intellective one by cognizing in a symbolic and orderly way, and this is where the mathematicians fall, here.

One final thing, and I will stop. The problem I think is that people keep thinking of creativity as a single dimension. They think of it as a continuum, in which the more the better. What I argue is, depending on what you do, what you want to do, and the situation in which you find yourself, the person who is relatively higher on these two dimensions will be the more creative, more original. If he is a banker, he falls here (lower left). The creative banker will be relatively higher than the rest of the bankers, but he won't be as high in his dimensions as an artist.

GETZELS: This is very pretty. I am struck by the applicability of the model to the longitudinal study of artists I have been doing. The use that different types of art students make of their similar technical talents depends very much on their personality and values. That is, students who have a need for structure tend to go into commercial art and those who prefer to work in unstructured situations go into fine art, so that although one cannot differentiate commercial art students and fine art students by technical skill—they are equally fine draftsmen—they can be differentiated on a structured–unstructured dimension like origence.

PAGE: What is the spine of that? You said—

WELSH: I use the term “origence” because some of my early work was done on originality with Frank Barron and uses the Barron–Welsh art scale for the origence axis.

PAGE: O-r-i-g-e-n-c-e?

WELSH: Yes, that implies an on-going activity. The horizontal axis was the scores on Terman’s Concept Mastery Test. Then I got personality characteristics for the four types generated by these two independent dimensions, analyzing the adjective check list, the Minnesota Multiphasic Personality Inventory, and the Strong Vocational Interest Blank.

PAGE: Do I understand that origence is the same dimension as structured–unstructured?

WELSH: Yes, the low of origence refers to interest in structure, regularity, rules, system, etc., and it opens up at the high end of origence.

LERNER: There is something to that from this point of view. If you move into the structure area, again thinking of thousands of kids and thousands of tests, why are kids structured? Are you moving into some organic basis or parental influence? I think of some of the art institutes in Maryland or the Rhode Island School of Design, which are unstructured. I will bet you two to one if you look into the case records of the kids you will find something in the behavioral aspect that wants them to beat the traces and become unstructured.

All I am suggesting again is that this seems to impinge on a life-style aspect, which suggests another item. Do we not therefore need to move in a sociological direction? I am not knowledgeable enough to know in terms of the research. Are we suggesting a need now to move into a kind of marriage with a sociological framework whereby we begin to understand this? For instance, medical sociology is a relatively new field and the sociologists are getting into the medical area and are finding they can help medicine by some kind of a sociological approach. How much can we find out if we move in this direction?

WARD: If I may add—the concept of the *sociology of knowledge* seems scarcely to be understood among educators. Some kind of general-

zation, of abstraction upon the *epistemological base* in all this paralleling what the child is and needs, it seems to me, is an essential consideration here also.

ANASTASI: I like the two-dimensional pattern very much, but I would still add a third dimension to it.

WELSH: I am working on that.

ANASTASI: I would say the third dimension is what others might call cognitive style but I prefer to call work habits; or what others call reflective versus impulsive, and I would like to call superficial versus subtle. Reflective persons delve deeply into something, stay with it, narrow their focus. The impulsives respond quickly, superficially, over a wider area. I think we can describe it better by calling it thorough (or deep, or subtle) versus superficial; but there is a very important dimension there.

WELSH: I can't develop it in all details, but my model delves in terms of the global to the surface, to the depth, and so on. If you take the upper corner, the imaginative corner up there is a global, diffused kind of way of dealing with things. As you move across the top, you go into a depth where you have a synthesis of what seems to be an open-ended kind of thing. Einstein, for example, brought order into what had before been diffuse. The unrelated detailed is at the lower left-hand corner; these are arranged in pattern relationships in the other corner. You can deal with cognitive style that way in terms of transition from one to the other.

PARKER: I am getting uncomfortable because there are so many categories that kids can be divided into. Our experience is that they are whole persons. Now, you know in the disciplines we are finding people who are wanting to bring things together. We have a person in Arcadia who I think is interested in universal studies. He set up a whole department where kids can take courses in math, science, history, bring them all together, and try to synthesize, because we need universal people in this world. Our problems are no longer simple enough to be dealt with by one person who is specializing in the tree or the leaf. He doesn't know enough about the world around him.

We have here a small group of kids who might be capable of the kind of universality. If we look back into their origins, one of the things we know about little kids is they don't split up until they are a little older. When you look at little kids, our information tells us little kids are not differentiated by math or science or verbal and nonverbal.

KEARNEY: I wanted to relate a comment that Dr. Gell-Mann of Cal Tech made when speaking to a parent group in our district one time. One of the parents asked him what he felt had been most beneficial to him, and he said, having parents and teachers who knew when to lend

support and when to get out of the way. In reaction to your comment about values, Texas Institute devised a value test a short while back. They used it in placing personnel with managerial groups so they don't clash.

I tested 150 of the gifted high school students and 150 of the students at the other end of the scale, the students who were in the remedial classes. I found that the gifted were almost always in the manipulative category—where they like to control the world, not necessarily Machiavellianly, but tried to control the situation they were in.

At the other end of the scale, I found ghetto leaders in exactly the same categories. They had the same responses. I thought it was very interesting that we had practically no gifted children who fell in the highly structured end of the scale where they really wanted to end up being controlled, where they wanted to go into a fundamentalistic situation. Our alternative school is about one-third gifted. I think they try to control their world. I don't know what its validity is, but it was an interesting attempt to see what would happen.

STANLEY: I don't want to choke off this discussion, but getting back for a moment to Mrs. Parker's real concern for some kind of wholeness in the child, all of us remember over the years the big argument about whether early general ability differentiated into special abilities at a later age. Betty Hagen did a study of this around 1949. Jerry Doppelt did one, also. Henry Garrett made this the topic of his presidential address to the American Psychological Association. But it doesn't seem to me with the limited experience I have had with mathematically talented youth who are quite young that this necessarily applies to these gifted youngsters. They do seem to be pretty strongly differentiated fairly early. I think Thurstone found that for samples of preschoolers. What we don't know is the form of development of each of the various abilities of the primary mental abilities or Wechsler intelligence test sort. Some develop quite differently from one individual to another. Nancy Bayley's work seems appropriate, showing that we don't have very good prediction of general intelligence from age two to age eight, but we do from (for example) age two to age two and one-half. By the time one gets to age six or seven, intelligence sort of settles down and becomes predictable. I won't feel comfortable in the gifted area with any concept of an undifferentiated child six or eight years old.

PARKER: I agree with you. It is the little kids I refer to. The reason I brought this up is that I have a very great concern if we are somehow socializing into bright-kid differentiations. I am only asking the question, and I appreciate what you said. I don't mean it in the sense of a single thing at all, but I mean it more in the sense of a breadth and a depth that has not yet been channeled by some of the things we find in the literature, when we ask the people what happened to you to make you a physicist,

mathematician, and so on. If there were some way we could preserve—we are going to get back into general words, global, universal, or wide-coverage aspect—a brilliant child is what I am talking about now. If we could preserve that, we might bring a more Renaissance-type man to attack the kinds of interdisciplinary problems we have in the world today, with a kind of mind that we are no longer producing. We really are getting the tree thinned out.

STANLEY: You may be implying the possibility of having an Erasmus instead of an Einstein and I don't—I just don't know. It doesn't seem, certainly in the scientific field, that this much breadth and depth both are any longer usable. Obviously, a person can attack a particular problem from all vantage points with an interdisciplinary team. But to create in one cortex all of the qualities that are needed seems to be, you know, unprofitable, an unlikely way to go about things. You may have unique synthesizers, politicians, and so on, but the idea that we should try to make a universal man out of one person isn't appealing to me, somehow.

HANCOCK: I have no professional expertise at all, but I have always understood that mathematical and musical talents often go together. Isn't the extreme musical talent obvious at one and one-half or two, some of them composing at three, this sort of thing? [This question did not get an answer. The answer seems to be "Yes," even though there may never have been a single individual who was both a musical and a mathematical *genius*. Among Dr. Stanley's talented youth there are several who could be excellent performers in either area. One at age sixteen was the top high school composer of classical music in the nation.]

ALBERT: Eric was very differentiated at six. I think we have a living model there. I have a question for you, Dr. Getzels, and that is, where would you put the fact that most creative people seem to have a capacity to be alone and work alone more than others and that they show this early? I don't find it in any of the quadrants. I find it as a common denominator. You were speaking of that earlier.

GETZELS: It puzzles me. The question is the chicken or the egg. That is, are the creative artists and scientists personalistically first loners, and therefore they immediately disregard certain kinds of occupations, vocations, whatever their talents are? That is, because they have to be alone, they are not therefore going to be salespersons, for example. Or, the other way around, since they have this talent that they want to express which requires being alone, therefore they must be alone; if they don't want to be alone, they cannot express their talent and therefore must slight it. I have no way of knowing that, because by the time the art students have come to art school to present a portfolio of stuff, they are already in fact alone and not in the queer sense alone. There is no great

painting, anymore than a great poem, that has ever been done by a committee. In this sense it is hard to say that if they are going to do this, going to be a poet, or a pure scientist, or something of that sort, they can be anything except loners.

ALBERT: I know of only one paper, by a British psychiatrist, that has dealt with this point.

R. SEARS: I just wanted to add one little item to support your art argument and Albert's comment. In the last few years I have been working rather extensively with modern novelists from a biographical standpoint, and the one thing that stands out so terribly characteristic of them is that they have been alone, and alone almost from birth. None of them, not one that I know of who is a nineteenth- or twentieth-century novelist, has ever grown up even in a large family. It is small families or else isolated within the family.

GETZELS: If I may make one more comment about the small family or isolation in the family, this is true also of the fine arts students. What is interesting also—we have heard this several times from several sources, a thing that puzzles me a great deal since I have no theoretical view in which to encompass the observation—is the gifted oldest son or oldest child phenomenon. It may very well be, to go back to Mrs. Parker's comment, that there is a period in which the gifted child grows up alone. At a very important early period of his life, he is either with adults or alone in the family.

ANASTASI: It is my hypothesis that their solitariness is closely linked with the reflective and thorough work style. To me that is a dimension.

May I add a footnote to the question of the differentiation of abilities with age? There is a fair amount of evidence from the factor-analytic literature that differentiation is not associated with age per se. It is associated with any condition that makes for a high level of development in the ability in question. Many conditions have been investigated in this connection, such as socioeconomic level, cultural differences, amount and kind of education, and occupational experience. There are even drug studies showing that, as performance level is depressed, performance becomes more generalized, or dedifferentiated. In general, differentiation in any cognitive domain is associated with a high level of performance in that domain (Anastasi 1970). This would fit in with your gifted children being more differentiated than normals at an early age.

LERNER: This is probably going to be emotional, maybe not on the topic but will hinge on Mrs. Parker's statement. I agree with Dr. Stanley that at this point Erasmus is dead. We can't be Erasmus because knowledge has exploded and you are going to spend a whole lifetime studying the left

part of the right side of some triangle. Yet, some place along the line, we have got to do something with our approach to knowledge as we know it. Maybe this is a whole new study, a whole new discipline itself, which pulls together the myopic aspect that we all get locked into. Departments in universities don't talk to each other because they don't understand each other, except that you now have interdisciplinary work.

Well, I would like to see us at least think about moving in that direction, because I think it is the only way we are going to survive. We are going to fall apart if we don't.

WARD: This gentleman [Lerner] has a propensity for exciting me somehow or other, and I want to bring it over again to the sociology of knowledge, and to Professor Stanley's doubts (relating to Mrs. Parker's thought) that the Renaissance man is a viable concept today. I have long been fond of a work which I can scarcely read with understanding, i.e., the two-volume *International Encyclopedia of Unified Science* (Neurath, Carnap, and Morris 1955), which is not exactly a "whole earth catalogue," but rather a work which in the contemporary period undertakes something of the holistic and integrative view of knowledge, which interested the eighteenth-century Encyclopedists. Another marvelous work is that of Margenau and his colleagues, entitled *Integrative Principles of Modern Thought* (Margenau 1972). There are only about twelve chapters in the Margenau volume, one on mathematics, as I remember; one on the life sciences, the physical sciences, and so on. Now both these extraordinary intellectual attainments suggest to me an epistemological depth and breadth which is entirely proper as an objective in the differential education of gifted youth. And such works may indeed represent a contemporary compromise between the tenuous prospect of knowing everything, to the more realistic curricular potentiality of representing in a useful and manageable way the entire range of human inquiry.

HAIER: I have a theoretical question that might be appropriate. Klaus Riegel at the University of Michigan and others have written about dialectical reasoning. I wonder whether what would distinguish the creative from noncreative within this highly select group might be the fact that although they all are very good at abstract thinking, only some of them will have dialectical reasoning ability. I wonder if anyone who has had experience with a gifted child has noticed a special ability to see inherent contradictions or what is called dialectical thinking, and whether or not that may be related to creativity.

MICHAEL: That is a hypothesis. It seems reasonable on the surface. I don't know of evidence on that. Some of the people who worked on formal operations processes, disjunctive sets, may have something to say

on that. Copeland down in Florida was working a bit in that field, at least tangentially. I don't know much more than that. Does anyone know if there are psychometric tests to get what they call—

WELSH: No. Let me respond. I don't mean to dwell on this, although I would like to, but empirically I have found that students who fall in the upper part of the high origence are better able to see things relationally that other people see as distinct and separate. They are able to see ways of bridging them. I don't know of any formal tests. I think we can probably devise one to get at this type of thing. You can observe it in the student, at any rate.

GETZELS: This is a good breaking point for the recess.

[Recess]

GETZELS: Dr. Pauline Sears is leaving shortly, and I think that we ought to take this opportunity to ask her to say something not just about the women in the Terman study but about the status of the study as a whole—how far it has to run, and perhaps both Pat and Bob Sears may respond to any questions.

P. SEARS: I will say something first because I have run into several misconceptions about the men. I told you there have been nine contacts over the fifty years. Every time the men have been surveyed as well as the women, and a lot of this has been published. It has been published up through the '60 survey [See Melita H. Oden's 1968 *Genetic Psychology Monograph*.] It just happens that we haven't had time to analyze the data on the men yet. Dr. Robert Hogan from the Psychology Department here at Hopkins, with whom I just talked, made a very interesting suggestion. We have been hearing a lot about men going into a demanding profession or business at a rather early age, competing first with a lot of pressure, and then at age forty-five or fifty deciding that they have lost out in a broad sense in life and going off to a desert island or to build a log cabin or something like this.

On the other hand, for many of our women, it was first marriage and children and then at age thirty-five or so deciding they have lost out on another aspect of life, which is professional work. The suggestion is to chart the men and women throughout these different age periods, changes in occupations, and so on. That is an interesting idea: men and women surveyed at the same age but with different past experiences.

R. SEARS: Just a word as to the present status of the study. Dr. Getzels was saying perhaps people would like to know where we stand. We had this last follow-up, from which Pat derived these three consequent variable measures on life style for the women. We will do essentially the same thing, but of course with different definitions, because they have to be different for the men. It just happens that Lee J. Cronbach and I, who had agreed to do the study of the men on the general subject of

retirement, have been tied up with other things and are only just now getting free. Pat had more time available, so she went to work on the women and did the study that was reported here. We hope to get started sometime later this year on the work with the men (Sears 1977).

The present status of the data is such that it can go public eventually, and I think before too long. We are now coding everything that was coded from 1921 on. I don't know how many variables there will turn out to be. I would guess somewhere around 2,000 to 3,000. This will all go on to a tape—anonously, of course—with case numbers, and will be available for responsible investigators. We will have to have some kind of local committee to determine who is a responsible investigator. In the meantime, if people do have the kind of interesting ideas that Dr. Hogan has just expressed to Mrs. Sears and want to write to us and propose investigations, we will be more than happy to be responsive to this.

I don't think this tape is going to be ready much before spring, but—

BARBEE: Dr. Sears, I just fainted; 2,000 variables, 1,528 cases!

R. SEARS: Actually, the problem is not quite as serious as that. As many as 80 percent of the variables don't have to be recoded. They are on cards at an appropriate place. They will be put on the tape. The study started in 1921. The only kind of machinery available then was the old hand-type machine. A lot of stuff was put on cards. You can imagine what a madhouse these files actually are, but fear not, they will be ready within the next year, I hope.

GETZELS: Thank you both, very, very much.

[Professors Pauline and Robert Sears depart.]

MICHAEL: Did I interpret them to say they are looking for people to help?

STANLEY: There seem to be two points. One was that they would welcome suggestions about what they might do themselves in terms of studying certain areas. For instance, Pat Sears said that she will take Bob Hogan's idea and do something with it.

The other point is that they would welcome proposals from persons like us to do studies of our own. They would screen such requesters and give the acceptable ones permission and lend them the tape. Is that correct?

GETZELS: I think that's correct.

STANLEY: Very, very good. It is the first time I am aware of, except for limited use by Schneidman (1971) of data about suicides in the Terman group, that they have ever let anybody have any of this information. I may be wrong. I have never heard or seen anything of that sort before, in terms of opening up the data.

MICHAEL: It would seem to me that you would need to know what variables they had and which ones they had access to, which ones they

weren't going to report. I know you could get some of this by reading the past volumes.

STANLEY: They will probably have a list of some kind.

MICHAEL: I suspect if you went up and talked to them for an hour or two you could get a pretty good idea.

GETZELS: The examination of their information blanks would give you some ideas of the kinds of data they have in the files.

Are there any other comments regarding the Terman project? May we then return to where we were just before we stopped. The issue was being raised that thinking is not just convergent-divergent but some other kind of thing which you called—

HAIER: Dialectical.

GETZELS: I think Dr. Michael was responding to it.

MICHAEL: I think all I said was that the hypothesis seemed to be a reasonable one and I was beginning to wonder whether people who had worked in the study of cognition haven't treated this problem. I was thinking there is a man named Copeland at one of the Florida universities, the one in Boca Raton—

STANLEY: Florida Atlantic?

MICHAEL: Florida Atlantic, who has endeavored to translate many concepts into methods and teaching in mathematics. It seems to me he touched on related topics, so I am sure work of this nature has been going on. But I am not well informed on it.

ALBERT: I was going to say I think Dr. Getzels has done a study that relates to problem spotting in creative people. I wonder if you could describe it. It seems to me we are talking about seeing a gap and following it up.

GETZELS: That is what Ellis Page and I were talking about during the break, so perhaps he will comment.

MICHAEL: There is sensitivity to problems, about being able to spot problems?

PAGE: In a way. It has to do—Dr. Getzels was talking about it—with asking the right question instead of giving the right answer, and I was discussing with him some work which is going on now, of which psychologists seem relatively unaware. This work is in the field of artificial intelligence (AI).

Now, at MIT, there has been for some time a laboratory of artificial intelligence. Marvin Minsky is the head of it and if you wish to bone up in this area you can look at his works, largely ones he has edited. For instance, he has one about semantic information processing, which is marvelous. It is a collection of doctoral dissertations in artificial intelligence, where people have been representing the world in certain ways.

Another source you can look for is the work of our fellow psychologist, Herbert Simon, and his colleagues at the Carnegie-Mellon University in Pittsburgh. You are aware that he has studied game playing at length in simulation, and simulation and AI have a lot to do with each other. It seems to me that these two areas are places in which there has been real attention to what we tend to treat as a "black box" in discussing the gifted. That is, what happens when one is presented with a problem and what the period of "incubation" could mean.

One of the characteristics of the solutions from AI or from a related field of operations research is that they tend to, they wish to, optimize some dimension of value.

Curiously enough, psychologists can talk forever about problem solving without realizing that what they are doing is optimizing a dimension of value. They are coming out for a solution that will satisfy certain needs or desires. This can be expressed, and has been expressed in the work in AI, operations research, and computer simulation of game playing as a dimension of value. Therefore, I think we need to pay attention to what values are being optimized, what the criteria of good solutions are, and then how these may be achieved.

It is rather astonishing that there is this field of operations research, for instance, which has concentrated on exactly a set of well-developed mathematical models for optimizing such things, and that these have not been applied yet to research on the gifted, at least in any great degree. For example, as I look over the Rossman model, which struck me as very desirable, they start out with some observation of a met difficulty, and the AI people start out with a statement of a verbal problem. Their models are so well developed that they actually print out on a computer. They are not just verbal circularities. You start with, say, a verbal problem. This verbal problem is parsed into deep structure, parsed into a symbolic, logical representation sometimes in the predicate calculus.

There is then an algebraic transformation of this problem, a statement of the desired solution. Then the question is raised, Is the solution available? and there is a consultation of some problem-solution matrix. You can imagine the problems to be the rows and the solutions to be the columns. If the answer is yes, a solution is available, you will go to a later step, seven. If it is no, you go to the next step. The next step is: Can you divide the problem into subproblems? If the answer is yes, you do so, divide it. If the answer is no, you examine it with failure; the problem is unsolvable. If the answer is yes and you have divided it into subproblems, then you take the first subproblem, is the solution available? You consult the problem-solving matrix. If yes, you go to seven, we will say; if no, you go back to five. Seven is the last step, are you finished with the problem?

Yes, examine it with success; if no, go back to step four, the solution available to the problem it presents.

One thing they use is something called a push-down store, where you put the major problems. The top problem is in first. If that is solvable, you solve it, your stack is empty, you have success. If not, you divide that into subproblems, put the subproblems in the stack. You solve those one at a time. As those are solved, the first one lifts and you get that. If not, you keep adding, dividing the problems until finally you reach an impasse, in which case you can't empty the stack and you are out. There are models available from these nonpsychologists, extremely bright people who are in this field of artificial intelligence. And, of course, I don't mean to be so parochial as to suggest MIT as the only home of such things; AI is being studied all over the country now.

MICHAEL: Also in Wales and Scotland.

PAGE: Yes, there has been a marked amount of work in it in Edinburgh.

GETZELS: If I might add to this from a somewhat different point of view. I don't know of any model of either creative work or problem solving that does not begin with a problem that is already given. In the Rossman, Wallas, or Dewey models, there is always a situation in which a problem is presented, is formulated. Then begins the real work of solving it, and the steps are clear.

There are hundreds of papers and experiments on problem solving, but I know almost no empirical paper or experiment on problem finding, on how one goes from a dilemma or indeterminate situation, to use a Dewey term, to a stated problem. And to quote Einstein, the formulation of a problem is often more essential than its solution, since once the problem is formulated, the solution, and I quote him, may be merely a matter of mathematical or technical skill. It is this part of the thinking process—the formulation of problems—that we know very little about.

Let me give an instance of the relation between how a problem is formulated and the quality of the solution that is reached. A car is traveling on a lonely rural road and blows a tire. The people look in the trunk and discover there is no jack. They pose the problem: Where can we get a jack? They remember that five miles back they had passed a gasoline station and they begin walking back to get a jack. Seems a reasonable thing to do. While they are gone, a car coming the other way also blows a tire, and its people also discover they don't have a jack. They look around, see a deserted barn at the side of the road with a pulley for lifting bales of hay. They move the car to the barn, lift the car on the pulley, change the tire, and drive off.

We are likely to say: What a clever solution. We should say: What a clever problem. The first ones formulated their dilemma into the problem:

Where can we get a jack? The second ones formulated the same dilemma into the problem: How can we lift the car? In the formulation of the problem is all the difference as to the kind of solution that will be reached (Getzels 1975). It is about this aspect of thinking and creativity that we know very little.

PAGE: Could I relate that as we did before? In the structure that I was talking about, if you start with an overall goal, such as I want to drive the car, can I drive it? No. Then I divide it into a subproblem, the wheel is bad, and so on. You keep dividing it. When a solution is impractical to solve at a low level, then one goes to a higher level, and, in fact, you do reach automatically the more important overreaching question: Can I lift the car?

GETZELS: That is what I came to also if I worked with most scientists. But this issue came to me when I was working with artists. You watch them put things together in their studio and ask them what they are doing, and they say they are creating a still-life problem. The difference between the commercial artist and the fine artist is that when the commercial artist walks into his studio he is given a problem. Some one says, would you draw an attractive corncob for a cereal box so that people will buy it? Note that the problem is presented to him, and then he goes through the steps you suggested with the presented problem as a beginning.

The fine artist does not begin that way. The fine artist walks into his studio, and all that is there is a blank canvas. No one presents him with a problem. He himself must formulate, create, the problem he will work on. Some artists run out of problems and turn to canned problems—problems that are not original with them. Their work may be technically proficient but not original or creative, like the copyist who makes a perfect copy but cannot conceive an original problem to work on. And that is the mystery: How are original problems found and formulated?

STANLEY: We know we use analysis a great deal, trying to reason about how the artists and others work. But in reading Eric Temple Bell's *Men of Mathematics* (Bell 1937), a fascinating volume about eminent mathematicians who of course had a great deal of insight, it is obvious that though many mathematicians created their own problems, a lot of them were simply solving very difficult problems that equally good or inferior mathematicians had formulated and that had resisted solution for many years.

So, although the art example is partly applicable, it would probably be a bit simplistic to generalize from a humanistic framework, an art framework or literature framework, to a mathematics framework, without entertaining the possibility that the solution, the creative solution, the original pioneering of the whole area often is in the process of solving

problems. The point is that some literary-oriented people thinking about mathematics—I am not talking about you, Jack, at all—will think, well, solving the problem is only a technical skill.

GETZELS: It is like the discussion of creativity and intelligence. People say they are different, which they obviously are not. They are related. Problem finding and problem solving are also obviously related. They are not dichotomous. To go back to Dr. Michael's paper, there is in all models he presents—Rossman's, Wallas's, Dewey's—the crucial step—as if by magic the formulation of a problem. We study thinking through problem solving by giving the person the problem he is to solve, when really the more creative thing might very well have been the thinking up of the problem rather than the solution afterward.

MICHAEL: We have this in doctoral statements. I try to say to students, if you could actually create a problem, that in itself would be a dissertation.

GETZELS: You bet. That is why the most popular degree, although people start for the Ph.D., is the A.B.D. All But Dissertation. No one really fails courses any more in graduate school. They take eight or ten hours of preliminary examinations in which we pose the problems. If they don't pass the first time, they do the second. They pass French, German. They have been solving problems right since the first grade. Now we say, you are ready, go out and formulate a problem, write a proposal on your own problem. It is at this point that there is the greatest attrition, or sometimes it takes them how long?

ANASTASI: Ten years.

STANLEY: May I at this point in the symposium, because our time is running out, make a soft pitch for a little more practical approach for the rest of the time? I see some very practical people here, three of our speakers and others. We professors like to act as academicians, as basic researchers. But one of the things that Terman did not do in his study, at least half of the ones here have tried to do. That is intervene on behalf of the intellectually gifted with techniques we already know to be useful to understand some rather practical things about how to set up programs that facilitate the development of the gifted. And maybe that would be worth some of the rest of the symposium's time.

MICHAEL: I am not quite satisfied to let this go yet—almost. I wish you would put down, not today obviously, but in writing the distinction here that you are trying to make. It almost seems to me as if we have possibly convergent production versus divergent production of problem formulation. I think this is something you and I might work on or think about.

GETZELS: I would be glad to. If you know something, you say it succinctly. If you don't, you go on and circle the problem.

MICHAEL: I alluded partly to this very concern this morning and I got partly the idea from Julian in the note he wrote on the side of the manuscript or in a letter, what about the elegant solution in the process of arriving at convergent production. That is the heart of it. I would like to follow this up, not today but in the future.

GETZELS: Fine. May we turn, then, as Julian suggested, to the more practical aspects, and why don't you pose the problem in this sense?

STANLEY: The problem is not so much to get practical as to focus on intervention on behalf of the intellectually gifted to help them in ways that are now known but seldom used.

HOCKING: I have an Ed.D. degree, which makes me feel out of it as far as everybody here is concerned. My Ed.D and dissertation happen to be chiefly in the field of mathematics teacher education, and for my dissertation research I did experimentation with student teachers on cognitive style. Along with that I am now in a position of supervising a program in which teachers are teaching the gifted, and I am very much concerned with what kind of teaching the gifted students need. I am wondering has any research been done. Has anything been done to say what these students need? We have talked about what they are and how to identify them, and what to do with them. But has anybody done it from the viewpoint of need, that they need this to succeed in the world, not just to be defined to be creative in one little narrow thing?

KEARNEY: There have been some studies, at least pieces of which I have seen that indicate some of the needs of the gifted. One of these at the secondary level is that the teacher is not only actually an expert in the field but has the characteristics that will allow him to put this information across successfully. The expert who is brilliant in his field and cannot communicate, does not have a good sense of humor, does not have a willingness to step aside, does not have a willingness to allow experimentation or open-ended questioning, probably isn't going to succeed with this group, at least not at the secondary level.

I think that, certainly at the elementary level, many characteristics of the teachers have been identified. I am interpreting your question to be the teacher talent because the needs are going to be academic needs that vary from child to child. I think it is a characteristic of personality frequently that is important in conveying information. There is a paper—by May Seagoe?—that sets forth the particular characteristics that she feels are very important. There is also a questionnaire for teachers to let them have a self-check to see whether or not they are the type of person that will succeed in this program. I think one thing that stands out over and over again is sense of humor and ability not to be threatened. The children last night made this comment several times, that they can't get along in a classroom where the teacher feels threatened by them.

FOX: I think Dr. Kearney covered all of the major points that I would have made. The expertise of the teacher is important, but so also is the openness to respond to students' questions. We have seen this a lot where in the course of teaching a fast-paced kind of mathematics program, the students pose questions that at that point in time are not in the teacher's lesson plans and are not in the textbook. The teacher responds to what they are asking. I think a master teacher is here.

STANLEY: Two of them.

FOX: Yes, Joe Wolfson and Dick McCoart, who have been very successful with gifted mathematics students. I think they could tell us what they do. There is probably a similarity.

McCOART: I think the best way to succeed with fast-paced students is to have a class that has just finished having Mr. Wolfson as a teacher. I found that no matter what I did, it was going to be a great success. The students did very well in the course.

I think the main thing I did for them, which their high school teachers couldn't possibly do, is that I went at a pace it would be impossible to keep up in a high school, at least in an average type of calculus class in high school. I was able to go deeply into groups, in proofs, in fact in some cases slightly more deeply than I go in my regular college course. Of course, one reason for this is that I would be asked questions about certain details that I wouldn't even be asked by some college students. As a matter of fact, I found myself doing a little bit of research on a couple of topics to get prepared to finish answering the question the next week. But I think of myself mainly as having been a pacesetter, and I think that for the students, just being together and working with other brilliant students, helped a lot.

For instance, this year I have a student who is taking a calculus course in independent study in high school, and being all alone, there is nothing except the book to challenge him. I could easily see a situation whereby no matter what the student did, the teacher would think that he was doing splendidly, whereas in this class, he is not the number one student. He has got to—even though on the aptitude scores he is very high—he has got to put forth the work. I tell the students they are not in competition with each other. They are there to enrich themselves, to see how well they can do on the Advanced Placement Program higher-level calculus exam next May, but certainly the spirit of competition is there and it helps them.

KEARNEY: I think there is another factor and it is very important. It was brought out by one of the students last night: Colin, I believe. The way the teacher poses the question is crucial to the learning process. Not what did Plato say and what did he mean in the cave allegory, but perhaps evaluate some aspect of Plato from the point of view of Machiavelli.

Then, even though you may not have covered this and that, you have caused them to take off in a new direction and synthesize their own information.

WOLFSON: I think a lot of this goes back to the point of not being threatened. You have to be willing to not come in with a lesson plan, because personally, I can't do that with any class that I teach. I don't particularly find in working with the gifted kids that I do anything in substance really different, except that they move at a much different pace. I have open-ended discussions in all of my classes.

LERNER: There is another ingredient. I have had the pleasure of working with Dr. McCoart and agree with him. Now, after the children have been to master teachers like Wolfson and McCoart, and had this lovely acceptance and warmth, and the pace that Dr. McCoart sets, the school has got to provide them with one more thing if they are going to survive, and that is freedom. This is contrary to what happens in many schools, namely, you don't have freedom to conceptualize, to be creative with what Dr. McCoart or Mr. Wolfson has just given you. For instance, we found after the kids left Dr. McCoart's class in an eighth-grade level, I was able to give them ten study periods a week. They could do what they wanted. They could go to the library, go across to the Enoch Pratt Library, go out onto the lawn if they wanted, but we found them gathering in groups and doing some peer teaching. This doesn't happen, for instance, in a lot of private schools which are supposedly better than public. The kids get a lot of busy work. I think the answer is a degree of freedom in which they can summon their soul. This is not new, read the poets. Whitman said summon your soul on a lonely beach and you will be creative. I think we can do some aspect of this administratively within the school setting.

We have the three ingredients, acceptance, nonthreatening, a degree of intellectual drive and freedom. I think that Dr. Stanley begins to put it on a practical level in the school setting. The question is: How do you sell all of this to administrators? I haven't found the answer.

STANLEY: Just one little clarification. I have known Joe Wolfson for several years, and he and Dick McCoart are about the best math teachers I have ever heard of since starting to teach math myself in 1937. I have never run across better ones. I don't think of Joe in his teaching as being especially warm. He is a great teacher, but not a sentimental-type teacher. He is a splendid stimulator and pacer who works closely and enthusiastically with the students. He accepts their questions, their answers. He is friendly with them, but there is no great deal of extra sentimentality and warmth. I don't mean that derogatorily at all. I have known a number of great teachers who have been like that. I would like to suggest that, for the fast-paced math classes in particular, the teacher does

not have to be an unusually warm, feeling, sympathetic, empathizing person to do the job well.

MICHAEL: Slow learners in statistics need that.

GEORGE: I would like to comment, bringing up what the kids said last night. There are a couple of things I think we have found, Joe and Dr. McCoart will agree. First is the learning style of the students. It tends somewhat toward a particular orientation. Some students are more socially oriented, and they get along better in a certain type of classroom atmosphere. Other students are much more theoretical, investigative; they move much quicker if that type of environment is maintained.

Second is that the students themselves want to do it. This is a big factor. They have made the decision themselves on the program or on the process by which they want to learn. In other words, it is their choice, if they want to go into a math class or into another area. I think a student has got to be able to make that decision, not the counselor, not the teacher, not mom, not dad, but the student. I think that too often we get teacher, counselor, and parents advising. There is a need for guidance and stimulation, of course, but it comes back to finding out what the student himself or herself really wants to do. Sometimes we lose that when everybody is trying to be helpful.

I think Terri pointed out she was glad to have parental support, but at the same time it wasn't you *have* to do it. If she had really wanted to stop, she could have.

The other important area is homework. It is a matter of self-pacing, learning not to do homework at the last minute. Terri commented that she waited until the last minute because she didn't think she could do it. Toward the end, she spread her homework out some. Much has to do with self-pacing. There are a lot of other factors you have to consider. The ones I have mentioned are three of them.

PATEL: My work with students in India has continuously brought up the factor of communication. The students feel that the teachers must not communicate downward to them and the students must not communicate upward, but they must communicate horizontally. They must communicate on the same level. The teachers must be accepting, and both must work together. The fact is the teachers learn many things and are not ashamed to learn something from a student or say they are unable to answer questions. These are some of the aspects of communicating horizontally, as I call it. I feel that this, of all my studies, is one of the most important factors in making a successful teacher for an intelligent student.

COOKE: I wanted to pick up on Dr. McCoart and Mr. Wolfson's comments about the teacher of the gifted. I am willing to bet that in the dynamics that take place in your classes with those boys and girls,

although it might not be especially warm and sympathetic—it is teacher-directed as well as student-initiated—there is interaction between the students as a result of a question posed by you, as well as students responding to you.

Also, you are accepting of the solutions or postulates that they might pose to a given problem. But some teachers aren't able to deal with this. It is this that makes the difference in terms of a good teacher of the gifted and one who is not successful with them. It goes back to Ned A. Flanders' interaction scales; I think it is a model that teachers of the gifted can use in order to allow gifted students to feel free to be creative, feel free to take risks, feel free to resolve problems or come to various kinds of solutions.

FOX: The study that was done by Casserly [see chapter 6 in this volume] of the girls in the advanced placement courses noted that the teacher of these classes demanded that everyone in the class had to participate. He would ask them questions and he helped bring his girls to the point where they weren't shy about being wrong. So often girls are allowed to sit passively in a class and are afraid. It is a risk-taking thing, I think, and these teachers encourage the girls. We are not negative about people's having wrong ideas. You know, you put forth your ideas and the rest of us will help you modify and we will pose the point to you, but it is not in a critical way. We are not attacking you. We are all working toward solving the problem.

GETZELS: Over and over there is the issue of risk taking. The classroom must be a place where one may take a risk because expressing something new or dealing with something you don't already know is risky. You think of a group of us here who have to say something. It is threatening, and I think the big achievement is to create a situation in which the student and the teacher both are able to take a risk without feeling that they will be derogated if they happen to be wrong.

STANLEY: There is one other thing both of these persons said that is fundamental to our whole concept of fast-math classes, and particularly for the benefit of the public school persons I would like to bring this out clearly. That is, attending a fast-math class on Saturdays or after school hours is a privilege, not a right. Failure of certain students, failure to keep up is bound to occur, and therefore dropping out is expected of some of the youngsters. Quite a few will not work hard enough. They do the homework hurriedly on the last night before class, or they are not able to stand being lower in the group, or some of them will prove not to be able enough. There is a certain amount of dropout expected. The corollary of this is that neither Mr. Wolfson or Dr. McCoart feel terribly threatened by losing a few students.

Dr. McCoart, for instance, is heroic with his willingness to come to class early and stay late. We provide an assistant, Mike, who was on the

stage last evening, as his assistant. Mike tutors all who seek his help or who drop behind. If the student won't use that and drops down so far he cannot keep up with the class any longer, that student is expected to quit. We even have them, in this case, taking calculus in high school for credit and taking Dr. McCoart's supplemental course without credit. The attitude the typical public school teacher must have is that being in a class is a right and the teacher must work a lot with the slow ones to the detriment, often, of the average and above-average; that cannot be tolerated in fast-paced classes for the mathematically highly able. The teacher must work with the faster ones and say to the others, you are able enough to learn much of the material through homework. If you don't, it is too bad. Sounds like a hardhearted prescription, but it can't work well otherwise.

McCOART: One interesting thing that I have run into is that when I ask a question in a fast-paced class, and the person starts to answer, I am not too quick in calling that person wrong until I see exactly what it is going to develop into, because quite often it will turn out to be a different way of looking at it from the way I looked at it. If I will just give the student a chance to speak, it often turns out that he has got quite a good way of doing the problem his way.

HANCOCK: There is a man at Hopkins [Professor Robert Pond], head of the materials sciences department, who taught a course last spring on creativity, which sounds nutty but he is himself an adventurer. His theory was that what he needed to teach is what he calls the forgettery, which is a capacity to tackle the problem without having presolutions in mind. It was his idea that he could teach this ability, and eight of his nine students have come up with stuff that was patentable; I think there are five patents, some having already gone into production. Some of you might care to ask him how he is doing this. It is what you were saying about posing the problem. Incidentally, he himself also avoided the Ph.D. mill. This may have something to do with it.

PARKER: The same question that I put to the brilliant kids last night, with respect to what they want in a different class, also asked them what they like in a teacher. Two of the recurring themes are first, that the teacher be well prepared; you assign to brilliant youths a teacher who doesn't know his subject, and they are embarrassed. Another one is that he be fair, that he wait until the kid is finished and evaluate his idea first before saying no, you are wrong. This is what they ask for but hardly expect. When they tell you what they want in a teacher, this is the kind of answer that comes up most frequently.

KEARNEY: I have two comments that I think tie in with this. One, I think the teacher has to have enthusiasm for his subject. The other thing is that I think we can kill the risk-taking urge so that school kids won't take risks.

Last year we had an opportunity to test a number of private school students who entered our school. They came from a very structured private school, and our psychologist came back and said, "I think there is something wrong with me. I am getting a strange pattern of responses. Every time I ask a question and they answer, they say, is that right? In the section where they are assembling pictures or puzzles, many of the children, not just one, took the puzzle, and when they had a piece left over handed it back." These were straight A students, did very well in academic subjects, but there was a tremendous tension about taking a risk. I think somewhere along the line they had been discouraged. I am not certain that willingness to take risks is killed permanently, but I certainly think that it is hampered and maybe stifled for a long time.

MICHAEL: There's a point I would like to make on that. In reading as I was getting ready for the paper, and I am not knocking anybody's religion, it appears that the Catholics as a group have made very few contributions in science or mathematics. I have worked with Catholic students and Sisters, and all exhibited the same behavior: May I do this? Is it okay if I proceed this way? They cannot feel free to go on their own. I am not trying to condemn their religion or their faith, or anything like that. But I think there is a certain rigidity there, at least up to a few years ago, in the way they were taught that prevented freedom of risk taking.

GETZELS: There is a paper by David McClelland on risk taking and creativity. [See chapter 7 in this volume.] I think that is part of it.

WARD: Are you going to come to the money question before we leave?

GETZELS: Yes. It is really not a money question but a general practical question. And we have, if I may put it this way, our man from Washington here. We will call on him.

WARD: May I take a risk, since that appears (thankfully) to be appropriate in this conference? I have been prompted a half-dozen times to make at least a minispeech on a certain idea, and I'd like very much to get it in at this point—watching time closely.

GETZELS: Please.

WARD: Can we any longer afford in society, in human culture, that old cultural lag, in which I believe some fifty years were observed to transpire between the origination of a good idea and its implementation? Could we not, rather, say once a decade or so—a kind of academic or scientific generation in this era of knowledge explosions—deliberately calculate, or recalculate our gains in given bodies of information, and use the firmest residual generalizations within that field of endeavor as ground upon which to advance toward next-higher levels of inquiry? There have been, as this conference of course remarks, some fifty years of inquiry into the nature of giftedness or talent since the launching of Terman's studies; and I believe that there is from this great volume of

inquiry, scattered and discrete though it is, a sufficient body of reliable information to warrant an effort toward the formulation of at least a rudimentary order, or science of Differential Education for the Gifted. I have been calling for this kind of effort for some fifteen years, and my confidence in our need for it has grown stronger with time.

Now I would like to tie this notion to the money question. As we know, federal monies are now—the proposal deadline being November 14, some six and three-quarter days from this afternoon—being given categorically for the special education of gifted and talented youth for the first time in the history of federal aid to education. Two-hundred and fifty thousand dollars is small money as things go these days, and the very wisest stewardship of this sum is indicated. Thus I would greatly like to see some portion of this sum go to a nonempirical research activity, possibly centering on a training effort as well, through which this search for order and reliable principle within a massive and loose volume of information would take place. Even a moderately successful effort of this intellectual nature would be greatly consequential. The study and direct utilization of reliably established constructs and generalizations could, and should, replace uselessly repetitious inquiry into the simpler problems; and essential research could, and should, take place above the level of primitive induction. And, most importantly, of course, youth who qualify for differentiated developmental experience would receive the benefits of what is our most discerning effort in their behalf.

Finally, lest this minispeech extend beyond intent and propriety, may I urge even in this assembly of proven researchers, and even in the tall shadow of the empirical scientist whose work is memorialized on this occasion, that the quest I am urging is a philosophic one, best mounted by persons qualified for philosophic analysis and reconstruction, as distinct from experimental. We should continually remind ourselves that Terman himself spoke of his research as being a “prolegomenon” to education; and that science is advanced by alternating transactions between controlled investigation and reflective imagination. May we paraphrase: “Terman, like Galileo, is dead; but long live Terman!” Despite the educator’s apparent dread of imagination and of “theory,” the man himself would, I respectfully submit, favor our breaking occasionally, and deliberately, from the perennially empirical in favor of the rational quest after order within the masses of information that have accumulated through our interest in gifted and talented youth.

WELSH: Amen.

GETZELS: Perhaps this is the time, Dave, Dr. David Jackson, he is from an organization near Washington dealing directly with the gifted. He probably knows more about the funding for the gifted, not only in government but also in the private sector, than anyone else.

JACKSON: I would like to speak first to Virgil's last statement. I am afraid that what we know about the American government would lead us to believe that the wisdom necessary to go in the direction he has outlined is more likely to be found among scientists than to be found within the political structure.

Turning to the subject of money, I believe the most significant money which is available today is available at the state level in a few states. The federal funding is beginning in a small way and will require tremendous efforts on the part of many people if it is to grow, whereas we find some surprising things at the state level. The largest expenditure at the state level for the education of gifted children is found in Florida, where a recent reformulation of the basic state-aid formula gave a factor of three to one to the gifted. However, this money is not found so much at the local level, because the money comes to the county level, where it doesn't all reach local school gifted programs. Yet Florida, Pennsylvania, Illinois, and California make multimillion dollar appropriations annually for the gifted.

There is another group of states, perhaps half a dozen, that also make substantial allocations. Yet the total number of states that make funding available to every school district in the state is today probably only about nine or ten.

The thing I would feel most strongly about, that I would like to convey to this group, is that not much is going to happen in terms of funding for the gifted until we change public consciousness in this country. We must reach the general public, and of course professional educators are part of the general public.

BROCKIE: We have had extensive experience in going to electors and trying to raise their consciousness. We have been successful in the last two years. Two bills related to improving the funding for gifted students in California have gone through the legislature with very little resistance, and in both cases they were vetoed by two different governors.

KEARNEY: Republican and Democratic.

BROCKIE: One Ronald Reagan and the other Jerry Ford [she meant Jerry Brown].

KEARNEY: What?

BROCKIE: I know why I made that slip.

GETZELS: So do the rest of us.

BROCKIE: He made the statements when he vetoed the bill and other bills in education that he intended not to sign any education bills. He wanted the education program in California to be totally reorganized. But we learned something else, incidentally, in talking with one of his advisors. He said, "Where are the parents? We don't want to listen to you. The people who want it should be the parents. They are the ones who got

the funding in the first place in California.” One of the women with us said, “I am a parent here. I represent several parent groups, including several hundred families.” He said, “But you are with them.”

KEARNEY: He also does not want to hear from students. He feels that we have used them as pawns if he hears from them, and therefore support must come from the parents themselves. I think that, in addition, another factor must be involved. That is to indicate why gifted programs will end up profiting, making all schools more profitable for all students. If it is seed money that is being used to expand educational opportunities for all children by exploring new fields, I think you will find a more ready acceptance on the part of the legislative bodies.

STANLEY: What about the possibility that you could show definite savings through, for example, the kinds of things that SMPY has tried?

KEARNEY: We have done that.

STANLEY: In other words, there could be cost-accounting efficiency. It would be very difficult to take the kind of things we do and show that they apply to all students because they clearly don't in the same degree.

KEARNEY: We use placement to make savings. We have used programs that started new directions and saved money in the sense of time and energy. We have done a number of these things. What it really boils down to is that old feeling that the gifted are going to make it in spite of us, so put the money where it is needed at the other end. We really have trouble breaking through.

BROCKIE: When you start with students already at the top, how do you show growth?

STANLEY: You get a higher ceiling for the curricula they use.

JACKSON: I would like to comment on an example of poor legislative draftsmanship in the federal program, because the section of Public Law 93383, Section 404, supporting the gifted, says that money for research shall be transferred by the Commissioner of Education to the National Institute of Education. This law was passed at a time when the climate was such that the Commissioner would in no wise make any such transfer for any purpose to the National Institute of Education.

Yes, sir, we had a little chat with one of the administrative aides to a senator, another man and I, about how we could somehow get an appropriation for research, get this actually accomplished, because one of the most severe problems we have in demonstrating the utility of programs for the gifted is that we don't have the technology available to really do a good job of finding racial and ethnic minority group children who are gifted.

Three examples of work in this area are hung up at the moment because validity studies have not been conducted. We badly need this

kind of thing and we are trying to think of ways that we could get a federal appropriation to support research in this field and other fields which are badly needed.

I feel that this whole program of trying to help gifted children will gradually fall apart if we don't get some fundamental research done in the next few years.

STANLEY: And yet, Dave, we in our own efforts have studiously avoided the word research. We do some research of a sort, but we do not say the word. The word frightens teachers, parents, and legislators. Can you not somehow use other words to get around that problem?

BROCKIE: Evaluation, or is that scary?

STANLEY: Helping youngsters, developing and evaluating curricula, and so on, but leave off the "research" side as an emphasis. I don't think it will be popular. It will be the expendable part of the budget, particularly for the U.S. Commissioner of Education.

JACKSON: But there is a new popularity of honesty in this country, and I think one reason we haven't gotten too far in recent decades on the gifted is we have tried to proceed euphemistically. We have talked about the more able learners, and so on, and we have not confronted the hard question of educating the public as to what the actual needs of these students are and how it will benefit society. I think we have got to turn honest and take the longer-range point of view and do the job.

KEARNEY: California demands that we use the term gifted in any materials that go out that have to do with a legal program. It must have the term "gifted" in it. All euphemisms we are told to cross out. We are told to rephrase them. I think this is one move in that direction.

COOKE: Dr. Jackson, was not the legislation drafted so that indeed it did speak to five or six areas where universities could do research? The problem is that it was not funded at a level whereby the different kinds of things recommended by the persons who were instrumental in getting that legislation passed could take place.

FISHER: That is, I think, a very valid statement, because if there had been \$10 or \$15 million instead of \$2.56 million, then perhaps such a transfer would have taken place. Research would have been supported.

COOKE: And to respond to Dr. Kearney here, I am surprised, if I heard you correctly this morning, when you say that you received \$67 per pupil in excess costs for the gifted. We in Baltimore City spend that much in excess costs for the handicapped, and yet we had a senator from Montgomery County to pose the position that we were padding and that those funds were not needed. I applaud California for using those kinds of funds in that fashion.

KEARNEY: There is \$1,800 per pupil for the handicapped in California, so it is the same percentage approach.

GETZELS: Dave, just one more. I think we would appreciate the kind of data that the rest of us do not easily come by, the ratio of funds for gifted as against, in the same bureau, the handicapped and others.

JACKSON: The gifted get about 1 percent of what the handicapped get in the Bureau for Education of the Handicapped.

KEARNEY: If we could convince the public, and I am using the word loosely, that certain children are severely handicapped by being gifted, we would end up having sympathy on our side.

PARKER: Someone spoke yesterday or this morning—maybe it was one of the youngsters last night. They took the words that you have used so beautifully so many times: Who has looked at what happens to the gifted kids who are not taken care of? I got started on that years ago, and the thing that I have found most successful when I am talking to boards of trustees, radio, television, parents, meetings, anyplace where I am talking with the public, is that I know my facts from the public health people. I bring out the child, demonstrated by the correctional agency, who is very high level, off all the tests, but who is not communicating and needs psychiatric care costing hundreds of dollars a week to the state because he was not served adequately as a gifted child when his parents went and beat on the door and got turned away. If you want to get something done, get yourself half a dozen case histories, go to your public health man, find out if he understands your ways—you have to know how to do it—and take the statements that Stanley made years ago about what happens to the kids who aren't helped. Take this to the public and say, you want to save money? Look at what is going on in your correctional institutions, what juvenile delinquency is doing in the world today. Where are our best criminals coming from? Our bright kids that get turned off; our bright kids that aren't helped. It is one thing that nobody has a comeback for. I am talking in public and to anybody from public health, corrections, mental health. You get a good psychologist or psychiatrist who counsels with kids in trouble; he can give you case after case of a kid who busts the test but is asocial. That is the kind of help that gets the parents on our side who don't have a bright kid themselves, but who see the social cost of not helping a gifted kid.

STANLEY: Dr. Hobson, who is sitting back here—

HOBSON: I have been itching, yes. I have been itching and now I am going to risk. One thing we have not addressed ourselves to is what a school system can do for itself to help solve this problem. There are two or three very practical things that can be done. I would like to say first, it is awfully hard to arouse the gifted to put on a big show to a school committee. What is the percentage of gifted? Well, even in the most favored communities you won't call it more than five percent. How much noise can five percent of the parents make against the taxpayers and the

other people who don't want to spend that money? But there are things the school system can do.

In the first place, you can practice early admission. You can admit a whole flock of children, not just the gifted, but the bright, the ones who could profit by entering school a year early. All you need to do is look. Look at physiology. I don't remember the figures. As I recall, a child's brain is 90 percent grown at age six. The things that happen after he learns language, say between three and six, are much more important than what may happen to him in any other three years of his life. What you have to do, you need grist worthy of the mill. You need it for all children, but especially for gifted children.

If they differ in school, they differ before they go to school, at least a year or two before. Let's practice early admissions. [See Hobson 1963.]

There is another little strategy we can use. If you have a high school organized with department heads, it is awfully difficult to take care of individual children who show precocity in various areas down in the junior high school or in elementary school. But if you have directors of instruction, it also helps the curriculum, I might add. If you have a unified curriculum from kindergarten through grade twelve, the director of instruction has a very great say. He can arrange for the child to take some work in high school. That is not the same as picking out these children who are talented in one specific direction. I think that universities and contacts with schools around them are better fitted to do something about that.

You are better fitted in your own school system if you have a director all the way through from kindergarten to grade twelve. He can move the children up. He can make an excuse for them to go to high school and take certain things. You can do those things. Then after you prove the value of this, perhaps you can get a little money. You have to have somebody who wants to do this. It takes a lot of work. You have got to commit your superintendent. You have got to have an enlightened electorate who will elect school people who will go for something like this. If you have those things, it can be done.

It has been mentioned that teachers are not comfortable. They don't like to have people taken out of their class. I would like to suggest in closing that if you had a few Erics to put in a few classes that teachers would be very glad to have these children out.

GETZELS: Dean Worcester, perhaps you might like to comment, sir?

WORCESTER: I would like to say something. They say that pride is the worst of the deadly sins, in which case I am a grievous sinner, but my guilt has to be shared a good deal with Dr. Stanley, who has nurtured my pride so much by inviting me to come here to these meetings.

I have talked with some people who have been more or less discouraged about the outlook of the programs for the gifted. But during the time that I have vaulted into middle age, maybe I have seen a good many changes, but I think the spiral is always upward.

In the '20s we had the age of what some people call the common man. Margaret Mead called it, I believe, the age of mediocrity, when the idea was to have everybody just as near alike as they could be. We developed standardized tests, and administrators had as their ideal to bring everybody to the standard, but they had no interest in carrying anybody beyond the standard. The ideal of the typical administrator was to have a curve of distribution which would be a straight vertical line.

Then in addition to the major work classes in Cleveland and various places we could cite over the country, we began to have quite an interest in gifted children. I took a half year to travel over the country and found they were appointing committees widely. They hadn't gotten very far, but there were a lot of individuals who were busy, and we gained something very definitely over the '20s.

Then we came into the '60s with the demand that everybody should be admitted to college, whether he was competent or not. Once he was there, there should be no grades, everybody should pass, regardless. And we had, again, a tendency to level off in our affirmative action groups. Again, I think there was a tendency more and more to have us all alike. For every place we had to find somebody who was, if not highly qualified, at least not totally incompetent from some other group to fill it.

I think I see now very definitely a swing again, another curve on the spiral, and I think it is a spiral upward. With such programs as we have here and others we could cite, I think we can see with a good deal of hope a development for some little time now, at least encouraging development, in our total interest for the gifted.

At least, that is my feeling as an optimist, and for me it is just as easy to be an optimist as a pessimist and a lot more fun.

[Applause]

GETZELS: This would be a happy note on which to stop. Yet there is still a little time until scheduled adjournment for further consideration of the last topic we mentioned at the beginning. That is the policy question of what needs to be done. Assume that California does well by gifted children and Washington does well and foundations do well, what are the kinds of ideas that they ought to entertain both in research and practice, and in other activities as well?

PAGE: Being incorrigibly an abstractor, I would like to try to put the policy question about where the money should be spent in an abstract formulation. Operations research has ways of considering such matters, once the dimension of value is specified.

Now, if we think of an outcome of an educational program as being a set of scores from tests, then one can design a program with a number of possible outcomes in mind. One of them is to maximize the sum of the scores. That has an obvious appeal, but it does mean that the resources may be spent more on the gifted than on the dull because the gifted will grow more in their scores.

Another outcome possible is to minimize the variance of the scores. This is the egalitarian approach. We want everybody to be equal, a straight vertical line of distribution. The only way you can do this is to pound the gifted on the head.

Another is to maximize the sum of scores, keeping the variance of scores no greater than before, so that we are not too offended by increased differences among people. This seems to me impossible, again without drastically handicapping the able.

Another is to maximize the sum of scores, keeping the expenses for the bright no greater than before, no greater than they would be for the rest of the distribution. This implies the kind of policy formulation that was described here, what the district can do for itself.

Well, practically, in a climate which is anti-elitist and unrealistically environmentalist, maybe this last is the necessary kind of solution. This requires a definition, an accounting of the performance and a demonstration to decision makers that you really are maximizing the score without too great an increase in the variance.

I think that can be shown. I think it can be shown in traditional research terms using objective measures, which of course is one of the brilliancies of the present SMPY.

KEARNEY: I have a concern that I would love to have someone—there are quite a few psychologists here—do something with. This is a group of gifted that we know have neurological handicaps, not enough to ever put them in our mental health programs or our programs for special education. They survive in our schools. They are certainly adequate students, but their potential has a lid on it. I know there is research done by Kephart and Cruickshank and a number of other people in the field of learning disability. I would love to see someone take on these students, work with them, and try to do something to at least relieve to some extent the problems that are causing them to perform at a level lower than their potential.

I understand it is a very expensive process. I naively suggested that if we could find \$25,000, we would try to do something. I was told by our special education division that if I could find \$200,000, I could probably do something. Would any of you like the project?

FOX: I think one of the problems I see with the suggestions for what the local system can do for itself is that local school systems are not good

risk takers. It is very easy for them to set entrance requirements that don't have to be defended; it is very easy for them to say, your child has to be five before a certain date in order to enter kindergarten in the fall. It is very easy for them to have straight promotions: no one is accelerated, no one is held back. I think the problem is: What incentive can parents offer to the school system to make them willing to take the risk to use other criteria for entrance, more realistic criteria for entrance? That is, to make them say we believe that scores on a test indicate readiness for reading better than chronological age itself does. Therefore, we are going to let children into school earlier who exhibit this readiness. We believe that readiness for algebra is not determined well by chronological age, but has other components.

One of the problems I see is how to get the school system to be willing to put itself out on the line to make these decisions about children and then to take the responsibility. Also, the fact that some gifted children may, when challenged, fail.

I hope that maybe Dr. Kearney will respond to this. You have come the closest to describing what might be an ideal school program for the gifted. You are closer, from what we can gather, than elsewhere in the country in having risk-taking operations for students. But the state in your situation has already said you use the school board to determine these things.

KEARNEY: You need school board support. It is a permissive program in California. It does exist only with the permission of the school board. They may withdraw their support and decide you won't have a program. We have a pet line and actually we stole it from Dr. Barbour, who was the assistant superintendent in San Diego, that parents own the schools; whether they realize it or not, they own the schools because they pay the taxes that support them. If the parents really want the program and they organize and are logical and present their case persuasively and strongly, as you were talking about presenting it, I think most school districts will respond.

We happen to be involved, and I think I will pass the buck to Jane at this point, with a district that abuts ours. The parents at San Gabriel wanted a gifted program. They came to visit us.

BROCKIE: The parents felt they weren't having the services they wanted. They had a paper program that wasn't really definite. A PTA president pushed it all the way to the board and got no response. Finally, she was told, well, prove it. She got a committee of parents, and came and visited our program. They were interested in the elementary level particularly. They went back and said, this is the kind of program we want, invited us to come and show their school board. And they made their

point. They were assigned a consultant who came and said, "I have got to have a program, I have got to do it similar to yours. Where do you get your teachers? May I have teachers referred to me who decided not to work for you? Will you come and in-service my teachers?" As a result of this parent pressure, they evolved the program. This happened in more than one district. We had a district closer to us than San Gabriel. I was invited to attend a meeting of parents. We went with our slide projector and handouts, thinking we would sit around in a group about like this. We arrived at the junior high school auditorium. It was overflowing. There must have been 500 parents there. We explained our program, much as we have done today, but we had more time. We went into a little more depth and showed some photographs, things children do. We were just swamped. Those parents organized a newsletter. They started charging for membership. They turned that entire school district around. It was not a diverse population; it was a homogeneous population and really an upper-middle-class community. They have a "swinging" program now, and it was totally done by the parents. They said they met resistance at the administrative level. They shopped around. Then they brought what they wanted back to their district.

PARKER: May I get on the record that childhood research is a must? I would also like to state this—that if parents and people like us let the school district get away with things that are not law but custom, it is our fault. The first thing we need to know is what the school law is in our state for our kids, and you would be surprised what is not in school law.

If you go to the principal and say it is law, and he says show me in the law, read it. He won't know what to do. Parents should take the trouble, at least one of you in your group, to read the law and tell the others what it is, what is in it. You can be polite but you can know your facts, get your information before you go, and this is what your group probably did. They came to you and got the information and they went ahead.

KEARNEY: That's right.

PARKER: If you know what is available to you, you can go and ask for it. The principal can't, but you can go down and say, the law says. You can say, show me. And about research, I want to emphasize that there is a great need for infant research as a foundation for our other research.

COOKE: In terms of research, I would like to see two areas touched, longitudinal studies with the culturally different in addition to peer identification.

PATEL: I was thinking in terms of this nation at the present going through this economic crisis which this nation has not known for many, many years. I would like to see studies on career change and studies of people capable of changing from one pattern of doing something in their

lives to something else and adjusting easily. I think perhaps the gifted have this capacity, which people have not looked at. [E.g., see Sears' chapter in this volume.]

Another, I would look at the teacher in the world community. A lot of work that is done here is copied elsewhere; I would like to see a lot of cross-national, cross-cultural validity type of work done, initiated by leadership here.

WARD: In addition to all these, please, a philosophic reordering of our information and our obligation.

STANLEY: I don't want to sound overly proud, but just today I received a notice of the award of a grant from the Robert Sterling Clark Foundation, congratulating me on the symposium. They had held it up a week in order to coincide with these meetings. SMPY has a twenty-month grant to package some of the ideas that we have developed. I have been invited by the Director of the Office of Gifted and Talented of the United States Office of Education to disseminate them nationwide through his office. Within twenty months or so we should have at least three distinct packages available for implementation in various parts of the country. These will probably be about identifying mathematically highly talented youths, studying their characteristics, and setting up special fast-math classes for them.

These will be detailed programmatic packages. If we are successful for the first twenty months, we may get further support from the Clark Foundation to develop another five or six packages to disseminate.

PAGE: That is marvelous news and thoroughly deserved.

GETZELS: On this happy note again, thank you all very, very much, and unless the organizer [Dr. Stanley] wishes to say another word, we stand adjourned.

PAGE: I would like to compliment our chairman for the splendid way in which he has moderated this long, productive discussion.

GETZELS: Thank you.

[Thereupon, at 5:00 P.M., the discussion was concluded.]

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