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ABSTRACT

In an attempt to eliminate sexist bias in the design and interpretation of research, an investigation of early sex differences is presented. Included are quotations from "The American Woman," "Time," March 20, 1972, "To Be Young, Gifted, and Black" Lorraine Hansberry, "Change and Continuity in Infancy," Jerome Kagan. Results show that male and female subjects tend to view male and female babies differently. Male and female subjects tend to look at infants of their own sex in a more positive light than those of opposite sex. (NF)

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SEX DIFFERENTIATION IN EARLY INFANCY: PROBLEMS IN
METHODOLOGY AND INTERPRETATION OF DATA

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I had my first child, a girl, while I was a United States
Public Health Service post-doctoral research fellow at Yale
University. At the time I was aware of the blanket of set and
expectation that enveloped us both at her birth although I was
not particularly clear about the consequences. I remember
discussing, with my faculty sponsor and graduate students in
psychology, the impossibility of controlling sex-linked set and
expectation in order to ascertain what might be real sex
differences. Now, twelve years later, I not only think it
possible, but imperative.

The major reason why I think it is important to investigate
early sex differences is because we have currently in psychology a
very simplistic argument that implies that differences which appear
early must be unlearned. Also, some investigators report that
theorizing in infant studies has been shifting away from the role
of environmental shaping in the development of sex differences
toward viewpoints favoring biologically based differences (Kagan,
1971; Kagan and Moss, 1962). This is odd for two reasons. The
first is that in the light of widespread acceptance of the
importance of early experience in later behavior, we have very
little data on the behavior of infants in their home environments

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or of the precise nature of the interaction between parent and child. From a learning point of view, we would surely expect that since much reinforcement between parent and child is likely to be a variable schedules, one would expect this learning to be highly resistant to extinction.

The second reason why I would consider such a shift in theorizing odd is because we have only recently developed techniques for the investigation of neonatal and infant learning which makes it possible to investigate early learning (e.g. the work of Lipsett and his coworkers.) This work is probably the most significant of the decade, but it has largely been confined in its early phases to studies of laboratory learning and not of learning in the home environment. Support for unlearned sex differences largely comes from studies of animal behavior, not from studies of human behavior. Naomi Weisstein (1971) offers a pertinent critique of some of these studies. I think it more likely to be the case that rather than witnessing a "shift" in theorizing, we are witnessing the further "scientific" justification of the roles traditionally assigned to women.

Lest I be misunderstood, however, let me say at the outset that I am not out to prove a hypothesis of no-difference between the sexes. What my goal is can be stated simply: I want to eliminate sexist bias in the design and interpretation of research.

The infancy literature is frequently cited, and cited very uncritically, for a post-hoc rationalization of the status quo with respect to adult sex differences. Women are passive. Didn't Goldberg and Lewis (1969) show that when placed in a frustrating situation at 13 months with a barrier between themselves and the toys, girls cry "helplessly" while the same age boys manfully try

to umweg to get the toys? And there is a picture to illustrate the typical sex differences (pg. 27). She, in a pretty little dress, is crying; he is struggling to get out. This was reproduced in the recent special issue of Time (March 20, 1972) on The American Woman with interesting caption: "Physiologically, women are better-made animals." As many women have come to realize, we as women, have not yet been granted full humanity and in fact are largely defined biologically. As I will show, some interpreters of the infancy literature (e.g. Jerome Kagan) see the differential and generally more mature responses of infant girls as the earlier maturing of a lower organism.

I think that the tasks of critically analyzing the infant literature and doing new research, are imperative not because there is any necessary relationship between, for example, the amount of activity of the infant and ability to become a surgeon, or because it will necessarily improve the status of women, or that I feel there is any necessary relationship between an individual's "innate" abilities and how he/she should be treated. All I hope is that an examination of sexist bias in research will alert us to how we do treat each other.

I find a quote from Lorraine Hansberry's To Be Young, Gifted, and Black to be very relevant to the current ambivalent definitions of women, which alternately stress our superior, pedestal-type qualities with our inferior lower status qualities:

"None of which is intended to deny or contradict one fact: of course oppression does make people better than their oppressors. Apparently that cannot be otherwise; but that is not a condition fixed in time and space and sealed in the loins by genetic mysteries. The New Paternalists have mistaked the oppression of the Negro for "the Negro." They have found in his color, not in his bondage, the source of his grace and wily speech. They are certain as Genet that the

brooding hatred, which intelligent whites are now able to see, is somehow wedded to the blackness. It is an empty if seductive piece of poetry..." (pg. 211).

Similar and equally destructive "pieces of poetry" characterizes the typical analysis of women. What I believe we will find when we systematically investigate differences between the sexes is that it is mainly inequalities of status rather than biological factors which have given rise to sex differences that are taken to be inevitable and unmutable.

At the same time I feel that sex role expectations are always a factor in the development of the male and female child, and that differences due to biology cannot be determined unless sex-role expectations are controlled. This point was made over a hundred years ago by John Stuart Mill; although it has never been acted upon, it is still, nevertheless a valid one:

"Standing on the ground of common sense, and the constitution of the human mind, I deny that anyone knows, or can know, the nature of the two sexes, as long as they have only been seen in their present relation to one another. If man had ever been found in society without women, or women without men, or if there had been a society of men and women in which the women were not under the control of the men, something might have been positively known about the mental and moral differences which may be inherent in the nature of each. What is now called the nature of women is a eminently artificial thing--the result of forced repression in some directions, unnatural stimulation in others. It may be asserted without scruple, that no other class of dependents have had their character so entirely distorted from its natural proportions by their relation with their masters."

I agree with John Stuart Mill. But until we develop an equalitarian society in which women and men equally share, we must try to eliminate sexist bias in the design and interpretation of research.

With respect to the problem of sexism in Psychology,
Professor Paul H. Mussen, Professor of Psychology and Director

of the Institute of Human Development at the University of California at Berkeley has suggested that the problem of sex differences, like race differences, is how to interpret the facts (personal communication). I would suggest that that problem is not only how to interpret the facts, but what the facts are.

In the Goldberg and Lewis (1969) study previously cited, boys and girls were observed with their mothers in a free play situation. The authors report striking sex differences in the infant's behavior toward their mothers and in their play. In the play situation at 13 months, girls spent more time touching, looking, and vocalizing at their mothers, returned to their mothers more often, and spent more time close to their mother. When a barrier was placed to separate the child from the toys, girls spent more time crying and at the center of the barrier; boys spent more time at the end of the barrier. There were sex differences at six months in these infants that Goldberg and Lewis felt may be related to the later behavior: mothers of girls touched their infants more often than did mothers of boys. In addition mothers vocalized more to the girls than to the boys and more girls than boys were breast fed rather than bottle fed. They suggest that differential behavior on the part of the mother at 6 months may already be a response to differential behavior on the part of the infant.

However, Maccoby (1971) has recently repeated the Goldberg and Lewis procedures and found minor differences in barrier behavior between the sexes. There were borderline tendencies for males to manipulate the barriers more while girls tended simply to cling to it, but within-sex variability was enormous and sex differences were not significant. In the play sessions, the girls spent more time in proximity to the mother, but the

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differences were not significant. The boys made significantly more trips to the mother. I suspect there are differences in the samples of subjects used by Goldberg and Lewis, and Maccoby. In the Lewis and Goldberg study, 16% of the girls had severely rejecting mothers. High amounts of touching of parent by child at 13 months was associated with high amounts of touching between parent and child at 6 months, but also with little contact between mother and daughter at six months. The pronounced sex differences found in the Goldberg and Lewis study may reflect the influence of uncontrolled variables (e.g. degree of acceptance or rejection of the child by parents).

Maccoby (1971) feels that the bulk of the evidence indicates that dependency and attachment behavior are characteristic of all human children, and that there is no differentiation by sex in this behavior through the preschool period.

As Maccoby (1971) has also pointed out, there are a variety of meanings ascribed to the word passive which are not entirely consistent with one another. It is therefore not surprising that the existing body of research on sex differences does not give us a clear answer to the question of whether a female is really more passive than the male.

In summarizing the existing data on sex differences in dependency in nursery school children, she and her co-workers found that observational studies of dependency showed no consistent sex differences, whereas ratings of dependency usually showed girls to be more dependent than boys. Thus, the possibility clearly exists that ratings reflect the raters' perceptions of what is considered sex appropriate behavior.

Maccoby notes only two observational studies which are

opposed to her conclusions that few sex differences in dependency are found between boys and girls (Bronson, 1971, Goldberg and Lewis, 1969), and as has been noted she was unable to replicate the second.

In their study Goldberg and Lewis also suggest, and rightly so, that parents are active promulgators of sex-role behavior through reinforcement of sex-role appropriate responses within the first year of life. It is not only parents who reinforce sex appropriate behaviors; however, but also experimenters, (e.g. Goldberg and Lewis). Discussing play behavior Goldberg and Lewis conclude as follows: "their [girls'] play behavior reflected a more quiet style....[boys] played with toys requiring gross motor activity, were more vigorous, and tended to run and bang in their play. Obviously, these behavior differences approximate those usually found between the sexes at later ages (p. 29-30)". What isn't concluded with respect to girls is that in their study girls played with toys that required more fine than gross muscle coordination, they were more likely to play with the more constructive toys (blocks), complicated toys (peg board), and to play with combinations of toys. Boys were more likely to bang toys. (There were no sex differences in overall toy preference: for example both sexes preferred the lawnmower.) Do these differences which I have quoted from their data also approximate those usually found between the sexes at later ages? If so, most surgeons would be women.

As an example of problems in interpreting data, I would like to examine some of the work of Jerome Kagan, of Harvard University.

Kagan's recent developmental study of infancy reported in his book Change and Continuity in Infancy (1971) presents some interesting

examples of sexist bias in the interpretation of data. In this study, observations of infants were made at four different ages, 4, 13, 18 and 27 months. I will discuss measures of visual fixation and vocalization. Fixation time refers to the infant's visual orientation toward a stimulus. It was measured by the duration of the initial fixation, and by the total fixation time. Vocalization at 4, 8 and 13 months was measured by the duration of nonmeaningful vocalization; at 27 months the discrete number of stimuli to which the child verbalized, or the number of words in an utterance, was measured.

For both fixation time and vocalization, there were "minimal differences in mean or variance values for all variables, but major differences in the patterning and stability of these measures" (p. 180). For girls, fixation time at 8 months was more predictive of fixation time at 13 months than it was for boys, indicating more stable behavior. Girls also showed greater differential vocalization than boys to stimuli that were discrepant from stimuli that were familiar to them. For example at 4 months, fixation time and vocalization to a clay face was positively correlated for girls, but not for boys. At 8 months, boys tended to show increased vocalization to all stimuli, while the girl's vocalizations were associated with the nature of the stimulus, i.e. whether it had a high degree of meaning.

Several other studies (e.g. Zelazo, 1969) have confirmed the observation that infant girls show greater differential vocalization than boys to visual and auditory stimuli that are discrepant from a previously experienced stimulus. Kagan concludes that either "the boys did not have the schema for the original units

or...the boys were less disposed to vocalize when they encountered the relevant discrepancy." (105-106). He favors the latter hypothesis because the fixation time data did not reveal comparable sex differences. But, as mentioned previously, there were minimal differences in mean or variance scores for all variables, vocalization as well as fixation time, but there were differences in both in the patterning and stability of the measure.

How does Kagan explain the differences? The first explanation offered is that some mothers accelerate their daughters development by spending more time in face-to-face contact with them leading to "increased babbling in the girl and better articulated schema for human speech (p. 106)." This may be the case. Because girls do seem to get differential reinforcement for vocalization (Moss, 1967), it may account for sex differences in vocalization. It also implies that infant girls are learning things that infant boys aren't. There is also the interesting possibility that mothers are imitating the vocalizations of their three month old daughters more frequently than those of their sons (Moss, 1967) because the female infant at three months, according to Moss (1967), is fussing less and is less irritable, and perhaps more likely to be responsive. Perhaps the infant girl is reinforcing the mother for her vocalizations and thereby maintaining a higher rate of vocalization from parent to infant. However, the major difficulty with the acceleration hypothesis; as Kagan himself states (p. 82), is that it predicts more frequent vocalization to the stimuli by the girls and this did not occur at any age. The difference between infant boys and girls was the occasion on which they vocalized: girls' vocalized to discrepant stimuli, boys' vocalizations appeared to be

associated with restlessness. But data is trivial when compared to a hypothesis to be sustained. Here Kagan's implicit hypothesis is that infant boys recognized the difference but did not express it in their vocalizations. However, I need some evidence via some overt measureable response that they in fact did recognize the difference before I would give this hypothesis support.

The second interpretation is even more interesting. Kagan suggests, on the basis of data presented by Knox and Kimura (1970) that perhaps the normal dominance of left over right hemispheres becomes established earlier in girls than in boys. As a result, language functions might mature earlier in girls and the association between information processing and vocal responsivity will emerge earlier in the girl. Perhaps so.

But into what kind of traps does this type of theorizing lead us? Much evidence has accumulated clearly demonstrating that females are generally superior to males in verbal abilities, while males are superior to females in mathematical abilities with little or no information on why this is so. Carlsmith provides some interesting ideas with respect to this difference. She (1964) compared the relative verbal and mathematical abilities of male college students whose fathers had been absent in World War II with a control group whose fathers had not been absent. The subjects were all members of the Harvard class of 1964. She found that the performance of the father-absent group was similar to the pattern typically achieved by girls, i.e. their verbal scores were superior to their math scores on the College Entrance Examination Board tests. She also found that the relative superiority of Verbal to Math aptitude increases steadily the

longer the father is absent, and the younger the child is when the father left. The effect was strongest for students whose fathers were absent at birth and/or were away for over 30 months. The same results were obtained in two additional samples: the Harvard class of 1963 and another of high school students. Carlsmith, in reviewing possible explanations for her data finally concludes that although many studies point to a close, positive relation between father and son as a prerequisite for the development of a masculine conceptual approach, there is no explanation why it is necessary, or how the "masculine" approach develops. But I can now provide her with another possible explanation. According to Kagan's theorizing, what may happen is that the left hemisphere develops more rapidly in boys whose fathers are absent from home. Of course at this stage in the development of our knowledge of this phenomenon, it would be far more parsimonious, to assume that there are patterns of learning between father and son, as yet undetermined, which may typically be present when the father is home, and absent when he is not at home.

We also need information about what the effects of mother or father absence is on the intellectual development of the daughter and what effects mother absence has on the intellectual development of the son. Most importantly, we need much more data on parent-child interaction in the early months of life.

Let me quote directly from Kagan about some of the presumed implications of the central nervous system organization hypothesis used to explain sex differences in infant vocalization:

"This hypothesis generates some provocative corollaries, some of which are consonant with general experience and existing data. If the language functions of the left temporal cortex elaborate earlier in the female, experience is more likely to be transformed into

linguistic structures early in development at the expense of other categories of representation. If "language" is given primary responsibility for representation of the environment, the girl's language skills should be superior to other classes of intellectual competence. The equipotentiality of the hemispheres among young boys should lead to a more even development of mental talents and less obvious superiority of language over nonlanguage talents during early childhood (Knox and Kimura, 1970). Spatial skills, which are nonlinguistic and preferentially elaborated in the right hemisphere, should develop to higher levels in boys than girls. The empirical data affirm this prediction." (pg. 182). (Emphasis Mine).

How dissimilar is this from the 19th century reasoning that the brain and ovary could not develop at the same time, and if women were educated, vital energies expended in the brain would necessarily be removed from the proper development of the reproductive organs? (cf. Rosenberg, p. 3).

Why is it so difficult to say, simply and clearly, that infant girls appear to be capable of more mature responses earlier than are boys, without also inferring that therefore their ultimate intellectual development is likely to be less than that of boys?

A very important aspect of the Kagan study concerns class differences in development, which appear as early as 1 year. There was a correlation between educational level of the parents and various indicators of cognitive growth; these relationships were consistently stronger for girls than boys. Duration of fixation at 8, 13 and 27 months, increases in fixation from 13 to 27 months, increases in vocalization from 8 to 13 months, quality of vocabulary, and Embedded Figures test performance were all more clearly associated with parental social class for girls than for boys. Other investigators have also noted closer co-variation in females between social class and indices of

cognitive development (Hess, Shipman, Brophy and Bear, 1968). The stronger effects for the female were variously described by Kagan as "this strange interaction between maternal education and girls' development" (p. 185), and "this puzzling finding." (p. 85) Relations between social class and development do not readily jibe with a viewpoint that stresses biological differences between the sexes.

Kagan offers various explanations for the relationship between social class and mental development in females. My favorite is one I have labeled the "Lump Theory". This theory suggests that girls are less variable than boys on various biological variables (e.g. irritability, apathy, activity). If these dispositions have a greater range in boys than girls, the effects of experiential factors would be attenuated, thereby reducing the correlations between the particular aspect of development and any index of environmental tutoring such as social class. Kagan put this hypothesis very clearly:

"Consider the following analogy: a hand is to be placed on two pieces of clay. One lump is of homogeneous softness and pliability; the second of variable plasticity. Some parts yield easily, others with difficulty. If the hands come down on the clay with the same force they will make different impressions, and the homogeneous piece will take on a more faithful reflection of the force that was imposed on it." (p. 29).

And in discussing the greater predictability for girls than boys of fixation time at 13 months from the infant's fixation time at 8 months he says:

"Girls' development seems to stabilize earlier than that of boys, and this stabilization probably has a biological basis. Each child has a route to follow, the direction of that route is determined by both biological factors and the rearing milieu. Once the child is established on his route his velocity and direction resist change. The data suggest either that girls find their route before

boys, and/or that the girls' path is more heavily magnetized and she is held to it with greater firmness (p. 84-85)."

Roles traditionally assigned to women have historically attracted an elaborate body of scientific justification. Kagan's hypothesis (which I have labeled the "lump theory") is the most recent and "scientific" way of saying that a woman's characteristics are more firmly rooted in a biological basis than are man's.

One explanation offered for the correlation between class status and the infant girls development has considerably more likelihood of validation than the others. That hypothesis is that there is a greater variability across social class levels in maternal reactions to daughters than to sons. All mothers, regardless of class, expect that their sons will develop independence, responsibility, and a vocational skill. The same is not uniformly true of mothers' expectations for their daughters. The fact that class differences in development of infants from intact families are measurable by the end of the first year, and that they are more pronounced for females, indicates that we have much to learn about the influence of set and expectation in the behavioral interactions between infants and adults.

Although the task of eliminating sexist bias in research with infants appears herculean, there are some very concrete things that can be done now if we are interested in how much the individuals' unique behaviors influence both his/her development and the interaction between parent and child.

First, sex-related cues should be eliminated in infant studies. Identification by sex, name or type of clothes can be easily controlled in studies of infants. That it has not been considered necessary to do this, indicates the magnitude of the problem.

Investigators currently do not consider it necessary to control sex-related cues in evaluating infant behavior. However, Meyer and Sobieszek (1972) found that when behavior ratings were made of young children dressed in play clothes such that their appearance was not clearly sex-typed, behaviors were especially noted if they ran counter to sex-role stereotypes. That is, if a child behaved in an exuberant, uninhibited fashion, the behavior was more likely to be labeled aggressive if the child was thought to be a girl than if it was thought to be a boy.

In pilot work with Susan Keleman (1971) on the effect of perceived sex on behavior evaluations, we found that male and female subjects tended to view male and female babies differently. Male and female subjects tended to look at infants of their own sex in a more positive light than those of the opposite sex. However sex designation was random: half the time the child was identified as female, and half as male. Because of differential reaction dependent on sex of observer, both male and female observers should be used in recording behavior. When interaction between parent and child is observed, both mothers and fathers should be included.

Third, stress should be placed on observations of precisely defined behavior rather than ratings of behavior since, as mentioned previously, ratings may reflect the sex-role stereotypes.

Last, we should all, as psychologists, become aware in the design and analysis of research, of our own sexist bias. This is, indeed, the most difficult task.

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