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ABSTRACT

This study reviews the literature on gender issues in human development, focuses on student revealing differences in specific abilities of males and females, and discusses whether those differences are as well established as the literature suggests. The research literature is examined from the following perspectives: perception, physical/motor ability, moral reasoning, and cognitive ability. The study notes that males demonstrate higher levels of physical activity and score higher on measures of mathematical ability, but most studies reviewed emphasize the effect of age and environmental influences. Females tend to score higher on verbal measures after the age of 11 to approximately 13, with increasing superiority over males into adulthood. The review concludes that recent studies using sensitive statistical tests suggest that previous reports of gender differences have exaggerated their significance. Contains 31 references. (AP)

Gender Differences in Human Development: A Review of the Literature

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Running Head: GENDER DIFFERENCES

Abstract

In this brief review of the literature on gender issues in human development, focus is directed on studies revealing differences in specific abilities of males and females, and whether they are as "well-established" as some of this literature suggests. It appears that males demonstrate higher levels of physical activity and score higher on measures of mathematical ability, yet most studies reviewed emphasize the effect of age and environmental influences (e.g. socioeconomic status and differential socialization) on these measures. Females tend to score higher on verbal measures after the age of 11 to approximately 13, with increasing superiority over males into adulthood. Recent studies using sensitive statistical tests suggest, however, that previous reports of gender differences have exaggerated their significance.

Gender issues in the study of human development are abundant, and unfortunately, most often represented in conflicting literature that focuses upon differences between the sexes. Many topics involving gender differences have been extensively studied, culminating into a large body of research that, when viewed from a global perspective, can appear confusing. One frequently mentioned drawback of such studies is their lack of replicability, most often appearing in the form of inconsistent conclusions. In an effort to elucidate the true nature and extent of gender differences, Maccoby and Jacklin, in their book, "The Psychology of Sex Differences" (1974), provide a review of the literature regarding measurable differences between males and females. In this comprehensive review, differences in perception, physical abilities, cognitive abilities, and social behavior - among many other aspects of development - are examined. Comparisons are made between those studies showing significant differences and those that do not, and emphasis is placed upon determining the

factors - biological and/or environmental - involved in the development of those differences.

The focus of the present paper shall be to re-examine issues of gender differences as reviewed by Maccoby and Jacklin (1974). Consideration of all of the issues presented in their review, however, would go beyond the scope of this paper. Therefore, it is necessary to exclude some important areas of gender research in order to discuss some differences considered by Maccoby and Jacklin (1974) to be "well established". Now let us briefly examine the areas of perception, physical/motoric ability, moral reasoning, and cognitive ability, with reference given to studies culminating into and generated by Maccoby and Jacklin's (1974) conclusions.

Perception

Earlier research of gender differences in the realm of perception suggested that as children, males have an inherently greater interest in objects and visual patterns whereas females show more interest in people and facial features

(Garai & Scheinfeld, 1968). This might imply that differences in sensory modalities exist, thereby providing, for example, a possible explanation for the apparent superiority of female verbal skills over males. It is important to note, however, that sex differences in the development of nervous system modalities have not been established. Differences do exist, however, in olfactory sensitivity after puberty, and during the menstrual cycle (Schneider & Wolf, 1955), as women become more sensitive to odors due to an increase in the levels of estrogens within the endocrine system. There is also evidence (Kaplan & Fischer, 1964) that women are more sensitive to bitter tastes as adults. For the most part, however, research in the area of sensory processing has not substantiated previous claims of differences between the sexes. Tactile stimulation studies (Notermans & Tophoff, 1967) have not found differences in sensitivity between the sexes, nor have studies in auditory (Maccoby, 1969) or visual development (McCall et al., 1971) yielded significant gender differences.

One frequently cited study (Watson, 1969) compared rates of conditioning to either auditory or visual reinforcement between male and female infants and demonstrated higher male conditionability to visual reinforcement. The female infants, in contrast, showed higher conditionability to auditory reinforcement, thereby suggesting differences in early sensory modality. Follow-up studies (Ramey & Watson, 1972) however, failed to replicated these findings. Maccoby (1971) attributes the lack of evidence supporting gender differences in vision and audition to reductionistic methodologies, speculating that the "presentation of stimuli one at a time and isolated from their context, may have been a self-defeating strategy". She concludes her discussion of these sensory systems by asserting that males and females may in fact be very similar in their ability to extract information from the milieu of stimulation within their environment.

Physical/Motor Development

In the realm of motoric ability, recent

research (Thomas & French, 1985) reported no significant gender differences in the performance of 3 year-old children on various motor tasks, with exception to greater throwing ability found in male subjects. Previous findings that boys exhibit higher activity levels than girls led Thomas and Thomas (1988) to review four aspects of physical development - motor performance, motor activity, physical activity, and health related physical fitness - in an effort to determine the possible hereditary factors influencing physical skills. Motor performance on tasks such as the long-jump, running dash, grip strength, and shuttle run was found to be related to age; differences slightly favor boys in early childhood, increase somewhat until puberty, and then increase steadily until late adolescence. This pattern, Thomas and Thomas (1988) argue, is likely caused by differential treatment of boys and girls by their parents rather than underlying biological factors. For example, previous studies (Fling & Manosevitz, 1972; Fagot, 1987) suggest that fathers tend to

react more negatively when their sons engage in traditional feminine activities (playing with dolls) than when their daughters engage in traditional masculine activities (playing football). As a result of these stereotypical reactions, even teachers, coaches, and peers may have different expectations and provide different practice opportunities. According to Thomas and Thomas (1988) these effects can continue into puberty, "since girls are less likely to participate in activities that promote the development of motor skills associated with sport".

In their review of studies on gender differences in motor activity Thomas and Thomas (1988) concluded that two factors - the small number of studies in these areas and small effect size - decrease their reliability and that social influence magnify initial hereditary differences. Findings of gender differences in physical activity, however, are corroborated through observations of the amount of moderate to vigorous physical activity boys and girls engage

in. Gilliam et al. (1981) found that boys demonstrated a higher level of cardiovascular endurance during a given 12-hour period in the summer. Also, questionnaire studies (Kemper et al., 1985; Ross & Gilbert, 1985) have found that boys report more habitual physical activity than girls do and engage in more high intensity activities outside of school. These differences in physical activity, however, are found to decrease as a function of age, specifically, after puberty.

Male and female performance on health related physical fitness tasks was also examined by Thomas and Thomas (1988), who found that in the majority of the activities investigated (e.g. mile run, chin-ups, sit-ups, and sit-and-reach), differences in performance between male and female subjects are minimal during the prepubertal stages and are most likely influenced by differential treatment and expectations of girls. After puberty, large differences in performance between the sexes is believed to reflect the influence of hormonal changes

compounded by the aforementioned social/ environmental factors.

Thomas and Thomas (1988) conclude their review of gender differences in physical development/activity by stating that these attitudes and expectations of society result in a self-fulfilling prophecy wherein girls "participate, perform, practice, compete, and behave exactly as society expects". This in turn affects levels of physical activity and practice girls engage in, resulting in "lower levels of health related physical fitness and sport skills" among females. This view of gender differences in development emphasizes environmental factors, yet does not totally discount the effects of biological differences.

Stereotypical beliefs regarding male and female activities as described by Thomas and Thomas (1988) have recently been investigated within a developmental context by Weinraub et al. (1984), in which gender labeling, gender identity, sex-typed toy preferences, and awareness of adult sex role differences were

explored in 26-, 31-, and 36-month-old children. The primary purpose of their study was to determine the onset and development of sex-role differences between males and females. Findings suggest that "gender labeling, gender identity, sex-typed toy preference, and awareness of adult sex roles can be reliably observed in children as young as 26 months". By this age, it appears that children are aware of different choices in clothing, occupations, and domestic duties between men and women. For example, the children observed in this study demonstrated awareness that certain tasks - such as fire fighting and truck driving - are more characteristic of adult men, while other tasks - such as cooking, washing, and cleaning - are believed to be more characteristic of adult women. Moreover, results of the Weinraub et al. (1984) study indicate that boys initially show more awareness of sex roles than girls, perhaps resulting from a greater parental emphasis placed upon sex role socialization for boys. These findings support the assertion made by Thomas and Thomas (1988)

regarding differences in physical skills, and in turn substantiate claims of strong social influences in the development of gender differences. One researcher (Block, 1983) has argued that "until the effects of differential socialization of the sexes is specifically evaluated, the role of biological factors cannot even be assessed". Within this approach, differential socialization is recognized as confounding influences of biological factors and bidirectional effects of child and parent interaction.

Moral Reasoning

Research concerning the effects of sex on moral development, self, and social behavior is plentiful. In an investigation of recent allegations of sex bias in Kohlberg's theory of moral development, Walker (1984) reviewed studies comparing the development of moral reasoning between the sexes. In this meta-analysis it was discovered that, contrary to the prevailing stereotype that women are morally inferior to men, very few sex differences in moral

development have been found. Baumrind (1986) responded to this conclusion by stating that Walker's (1984) findings suggested that the source and specific nature of gender differences need to addressed. She holds that educational level is a key factor in determining an individual's level of moral reasoning. Mann-Whitney tests for sex differences revealed higher moral levels for men at the highest educational levels, whereas women obtained higher moral levels than men at the lowest educational levels. In her sample, the differences favoring males was found only at the higher educational levels, where men predominate. This data led Baumrind (1986) to conclude that the presence of sex differences in moral reasoning (as theorized by Kohlberg) depends upon educational level, and that if men and women are equated for educational level and the educational range is mid level, no sex difference in Kohlberg stage score is likely to be found.

Gilligan and Attanucci (1988) specifically address two moral orientations - Care Focus and

Justice Focus - in their approach to gender differences in moral reasoning. The Care Focus, that is, attention to the particular needs and circumstances of individuals, was found to be higher among women in their study of real-life dilemmas of 80 individuals. The Justice Focus, or the need to treat others as equals, was demonstrated as the more prevalent orientation among men. The conclusion reached by these researchers is that both men and women utilize both orientations when faced with moral dilemmas, yet due to the effect of differential socialization, differ in their approach to moral reasoning.

Cognitive Development

Perhaps the most extensively studied topic in the literature on gender differences is that of cognitive abilities. Early research suggested superior general intellectual ability in girls prior to the age of seven, and attributed differences to rate of maturation. Maccoby and Jacklin (1974) caution the reader in interpreting these early studies, proposing that two factors -

physical maturation and cultural differences of the subjects studied - serve to strengthen the argument that environmental influences, rather than biological factors, account for these differences.

Bayley (1956) found that correlations between intellectual development and physical growth tend to be negative. Maccoby and Jacklin (1974) therefore argue that intellectual development would have to be a reflection of the maturation of a system other than height or bone development. The other issue, cultural differences, is stressed as an environmental factor more likely to account for differences, as the higher scores of girls on intelligence measures are most often found in studies of disadvantaged children. Moreover, the one instance of higher scores in boys (Kohen-Raz, 1968) comes from a special subculture - Israeli kibbutzim - thereby weakening the maturational interpretation of sex differences in general intelligence measures.

Another important issue in the study of sex

differences in overall intellectual ability is the nature of the tests used. Maccoby and Jacklin (1974) point out that those studies finding higher intellectual skills in females used tests which rely heavily on verbal skills, whereas in the majority of the studies using well-balanced tests no sex differences were found. This seems to suggest that males and females differ with respect to their abilities in performing specific cognitive tasks, such as language. A considerable amount of research has been generated as a result of this suggestion. In their review of the literature, Maccoby and Jacklin (1974) concluded that specific cognitive gender differences were "well-established": girls have greater verbal ability than boys, whereas boys possess better mathematical ability than girls. Now let us briefly examine these two areas of cognitive ability.

Studies concerning verbal ability suggest that before the age of two years, males and females do not differ significantly in their performances on measures of language ability.

Measures used in these studies frequently involved spontaneous verbalizations and the recording of vocalizations to a caregiver, usually the mother of the subject. When differences were found they most often favored girls, though not to the level of significance. After the age of two years, it seems very difficult to determine whether there are any significant differences in verbal ability between the sexes, as boys appear to "catch up". As Maccoby and Jacklin (1974) note, "most studies in America detect no consistent sex differences [within this age range], including those tasks involving productive fluency as well as tests of understanding".

After the age of 10 or 11, females appear to exhibit greater verbal ability than males in the majority of the studies, and in many cases, the differences are significant. The female advantage ranges from about .1 to nearly .5 standard deviations, with the usual difference being about .25 SD (Maccoby & Jacklin, 1974). One example of the studies showing superior

female verbal abilities is that of Droege (1967), who, in a longitudinal analysis of a large group of high school students, discovered that the superiority of females on verbal tasks increased during their progression through high school. These results are especially important, as Maccoby and Jacklin (1974) point out, because the longitudinal design of the study provided a control for "differential dropout".

In the area of quantitative reasoning, there appear to be many studies suggesting that no sex differences exist during the preschool years except in disadvantaged populations where, once again, girls tend to outperform boys. In studies of older children, sex differences in mathematical ability tend to favor boys, particularly beyond the age of 9 years and into adulthood. Maccoby and Jacklin (1974) point out that greater expectations exist for boys to use math for their later careers and that they tend to take more math courses when they have a choice, yet the effects of interest level and differential socialization are believed to be

minimal. Studies equating the number of math courses taken by males and females have still revealed substantially higher math scores among males. For example, Backman (1972) examined patterns of mental abilities in 2,925 twelfth grade students and found significantly higher mean scores on verbal knowledge, mathematics and visual-spatial ability among males.

As in measuring general cognitive ability, an important issue in determining whether males are superior in mathematics appears to be the nature of the math tests used. For example, one interesting study (Walberg, 1969) found that scores on visual-spatial portions of a physics test were higher among boys and scores on portions calling for verbal skills in calculations were higher among females. This in turn suggests that verbal and spatial factors can influence science achievement, thereby minimizing the role of mathematical ability in the pursuit of science-based interests.

Maccoby and Jacklin (1974) and Jacklin (1989) provide a possible explanation for female

superiority, when it occurs, on measures of intellecual ability before adolescence. It has been stated that when differences do exist, they tend to be exhibited by higher scores obtained by females in disadvantaged populations. In these populations, females maintain their advantage to a later age. Findings that more males than females die before birth (McMilen, 1979) and that more males are born with birth defects support the possibility that males are more physically vulnerable than females and hence, are more likely to be adversely affected by the environmental conditions within a disadvantaged population. This type of situation, Maccoby and Jacklin note, could result in more "systemic damage" among boys, thereby accounting for their lower scores at these ages.

Much controversy has arisen over the years in response to studies suggesting significant gender differences in cognitive abilities. Some authors have criticized the statistical tests used in such studies, calling for more sensitive analyses of suspected sex differences. In response to the

conclusions of Stanley and Benbow (1982) that "huge" sex ratios in favor of males (5:1) are found in SAT-M scores, Rossi (1983) notes that differences in the form of ratios can be misleading. He argues that 1) the selection of a cutoff point [beyond a certain score] may be arbitrary; 2) the value of the ratio depends on the criteria selected and can be made impressively lopsided by selecting higher cutoff scores; and 3) the more impressive and striking the ratio, the smaller will be the proportion of the total sample represented by the ratio. As a result, Rossi asserts that ratios "can only exaggerate such differences" and that the exposure of these ratios to the public can be counterproductive in that gender differences may often be exaggerated.

In a meta-analysis using w^2 and d statistics, Hyde (1981) investigated the magnitude of gender differences in verbal ability, quantitative ability, and visual-spatial ability and found that, contrary to Maccoby and Jacklin's (1974) conclusions, gender differences in all of these

abilities are very small. In her conclusion, Hyde (1981) asserts that the lack of replicability represented in Maccoby and Jacklin's (1974) tables is perhaps the result of small differences in means for males and females, and that "in repeated samplings, many would find no significant gender differences".

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