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Educational Psychology

The Mystery of 23:

A meta-analytic essay examining the interplay between sex, gender, and motivation within the context of the formal education system.

The only truly universal law of the Behavioural and Social Sciences states that any aspect of human development occurs as a result of the interplay between biological maturation (including genetic predispositions) and environmental variability, especially during the respective critical period (Bors, 1994). While this 'synthesis' paradigm is applicable to virtually every subfield within both psychology and sociology, it is proving to be eminently important and controversial within the study of sex and gender development. The findings of such studies are beneficial to many different scientific domains, but are *monumental* within the area of Educational Psychology, due to the sex-based and gender-based disparities in motivation. An understanding of this interaction between sex, gender, and motivation will guide educational practices—specifically with regard to motivational techniques—to be more effective, efficient, and generalizable across the academic spectrum.

Before delving into the intricate and complex system of the interconnectedness of sex, gender, and motivation, one needs to operationally define and fully understand not only these three terms, but also any ideas and concepts therein. Within contemporary psychology, researchers distinguish between sex and gender. This distinction can be difficult to understand given that the terms are used almost interchangeably in mass media, as an effort to be politically correct (Torgrimson & Minson, 2005). Unfortunately, that political correctness is achieved at the expense of *scientific* correctness and appropriate usage of the aforementioned terms.

Firstly, sex is the biological aspect of being male or female, or put more concretely, the presence of the respective anatomical structure: a penis or a vagina (Heller, 2004). All human cells are comprised of “22 autosomes and [two] sex chromosomes” (Kimball, 2006, p. 1). The two sex chromosomes are the result of the pairing of the mother's X chromosome, and the father's contribution of either an X or a Y. The mother's egg always contains an X chromosome as the female sex-chromosome set is XX. The father's sperm contains either an X or a Y, as determined during sperm meiosis, which is the splitting of his genetic code for placement on the sperm (Kimball, 2006). If the sperm that fertilizes the egg carries the father's X chromosome, the resulting child will carry XX, which is a biological female. Contrapositively, if the fertilizing sperm carries the father's Y chromosome, the child will carry XY, which is a biological male. While it is *possible* for a child to be born with either both sex systems or neither sex system, those are scientific anomalies and are, therefore, out of the scope

of the current discussion. In essence, sex is a prenatally determined, biological construct, and refers primarily to the presence of either the male or the female reproductive systems and consequent hormonal balances, respectively.

Secondly, and in stark contrast to 'sex', gender is the social construct of culturally-determined, appropriate, or normative behaviours for each of the respective sexes. For instance, within many Western cultures, it is considered “normal” for women to wear nail polish, carry purses, and even to cry in public situations, but is “abnormal” for men to do the same (Nielsen, Walden, & Kunkel, 2000). As a counter example, it is considered acceptable for men to go out with their friends to a bar, have a few beers, and smoke cigars. If a woman engages in these same activities, it is typically considered to be non-normatively gendered behaviour (Nielsen, Walden, & Kunkel, 2000). While the terms “male” and “female” are associated with sex, the correlative terms for gender are “masculine” and “feminine,” respectively. This distinction in terminology and the aforementioned examples illustrate that there is not necessarily a direct link between one's biological sex and his or her assumed gender. As a grossly simplified example, a young girl may prefer playing 'Cowboys & Indians' with boys her age over playing 'House' with other little girls. While the child is biologically female, she is (at least with regard to this one area of play) assuming a more stereotypically masculine gender-role.

Thirdly, motivation is one's desires, goals, or other internal and external factors that drive one to behave in a certain way (Green & Foster, 1986). While there is no one universally accepted definition for motivation, this one is the most widely-appropriate within the Behavioural and Social Sciences, and especially in Educational Psychology. Many facets—ranging from sex-based and other genetic propensities, to gender roles, to external reward and other environmental variables—affect motivation in one way or another.

Having already briefly examined the biological process of sex determination, it is possible for one to assume that gender *also* develops in a static, unidirectional process. However, the process of gender development—being that it is socially constructed—is not as cleanly defined. Contrarily, there have been many theories throughout the history of psychology that attempt to explain how and why gender roles develop. Though these past theories are typically not readily accepted within the contemporary field of sex and gender development

because of their neglect in considering a synthesis model, they are worth noting as they served nicely as building blocks for current understandings.

Each of the five older theories of gender development coincided with a psychological school of thought: biological, psychosexual (a portion of Freud's psychodynamic theory), behavioural, social learning, and schema theory (Sternberg & Williams, 2002). First, the biological theorists believe that children both develop an understanding of their gender roles and assume those respective roles based on innate differences between males and females. Essentially, these theorists tend to think that there are discrepancies between male and female brains, hormonal balances, adrenal release timings, and other bodily matters (Kenrick, Trost, & Sundie, 2005). While the biological theorists at least respect the influence on gender of environmental variability (learning), they tend to almost wholly favour maturation. Thus, this particular school of thought proves to be more prominently associated with neuropsychology.

Second, in 1905, Sigmund Freud published his theory on the psychosexual development of children (Sternberg & Williams, 2002). In this stage theory, he argued that children progress through a series of conflicts revolving around some vaguely unified connection between sexuality—primarily sexual zones of the physical body (the anus, the genitals, et cetera)—and interpersonal relationships (Garcia, 1995). He stated that gender developed primarily in the phallic stage, which occurred between the approximate ages of 3 and 6 (Sigelman & Rider, 2006). Specifically, gender roles were reinforced by particular phenomena known as the Oedipal Complex in boys, and the Elektra Complex in girls. During these complexes, the boy or girl identifies more with the parent of the same sex and desires the parent of the opposite sex. When the child resolves this struggle, he or she identifies with the same-sex parent in such a way that he or she assumes the gender role of that parent (Garcia, 1995). Freud's theory—and other psychodynamic theories—tend to be quasi-syntheses of the behavioural and social-learning paradigms, in that they assert that a child develops his or her gender role by observing adults around them, and that those adults (primarily the mother and father) behave and treat the child in fundamentally different ways.

Third, behaviourists argue that gender develops as a result of one particular environmental variable:

parental treatment. Parents tend to treat boys and girls differently starting as early as the neonatal period (Sternberg & Williams, 2002). In one of the most famous studies on parental presumptions of infant gender normativity, Maccoby found that even when parents would see their newborns in the hospital nursery, they would describe the babies using culturally appropriate masculine and feminine terms (1980). For instance, if the child was a boy, the terms used would revolve around stereotypically masculine characteristics, such as the baby's strength or physical build, while girls would have terms regarding their disposition like 'sweet' and 'gentle' (Maccoby, 1980). Not only parents treat their boys and girls differently; teachers and other adults do as well. While teachers tend to acknowledge boys more often than they do girls, they tend to more often prefer the girls' passive learning styles (Meece, Glienke, & Burg, 2006). Behavioural theories of gender development would attribute the assumption of gender roles almost exclusively to this differential treatment from parents, teachers, and other adults.

Fourth, and going along with the behaviourist model, the social learning theory of gender development asserts that children assume their appropriate gender roles by observing adults engaging in gender-normative activities. However, the social learning theory expands on that idea by saying that children will imitate only those gendered behaviours and activities that they see being rewarded (Sternberg & Williams, 2002). Not only the adults with whom children come in direct contact have an influence on the child's role assumption. Television show characters, fashion advertisements in magazines, sex-differentiated toys, and children's peer groups perpetuate stereotypically normative gender-roles, and children readily notice the overt nature of these societal norms (***)

Fifth, the schema theories attempt to synthesize many of the concepts presented by the other schools of thought, but still fall slightly short of a true interconnected model. This theory claims that all people have an innate categorical system through which they make sense of experiences within their environment (Sternberg & Williams, 2002). However, these schemata are not static, unchanging organizational structures. Rather, they change with new experiences and understandings. For instance, a child might think that only females become teachers until he or she has a male teacher. This new understanding causes the child to modify his or her schema to include

this new understanding; what Piaget would call 'accommodation' (van Geert, 1998). Therefore, though the schema theory tries to unite all the other schools of thought, it primarily puts emphasis on the behavioural and social learning theories while primarily neglecting the biological differences between the sexes.

Within the contemporary field of educational psychology, there is a growing interest not only in the 'hows' and 'whys' of gender development, but also in the connection between sex, gender, and motivation. This connection isn't limited to disparities between males and females, but also includes similarities between the two. Currently, psychologists tend to focus their studies on the disparities between the sexes and the genders, while sociologists more often look for similarities therein. An understanding of both the psychological and sociological perspectives will enhance teachers' abilities to cater to the individual needs of the boys and girls in their classes—whether or not they assume the respective normative gender roles.

To better comprehend and analyze the current issues of sex and gender and their interconnectedness to formal education, it is necessary to look at previous studies and consequent findings in order to find historical links. For instance, throughout the twentieth century it was thought that there were biological differences between boys and girls that resulted in boys being predisposed to better understand mathematics and the sciences (Tiedemann, 2000). As a result of these (for whatever reason) unquestioned 'research findings,' many academic institutions in the United States and other Western cultures started developing programs to promote and enhance girls' performances in math and science. While some of the new programs did show statistical significance in raising girls' scores on the mathematics and science portions of standardized tests, some researchers questioned whether the performance disparity was indeed sex-based, or if it was rather a self-fulfilling prophecy (Nosek, Banaji, and Greenwald, 2002).

By the end of the 1990s, though, these programs had forged a contrapositive sex-based schism within math and science performance scores: males were demonstrating underachievement (Wiens, 2006). This idea that there could even be differences in how boys and girls perform on certain sections of so-called 'standardized tests' illustrates the presence of fundamental differences in learning styles of males and females. In order for teachers to serve each and every student, those differences need to be recognized, appreciated, and utilized

when planning lessons. Professor Kathryn Wiens not only recognized this new disparity and potentially the source of the paradigm shift, but also offered some potential practices that could help teachers cater to the needs of the boys in their classrooms. She makes the argument (with the backing of many neuropsychological studies) that boys “process visual stimuli” more effectively and in a shorter amount of time than do girls (Wiens, 2006, p. 22). This differential—presumed to stem from variations in the neural bundles of the occipital lobes—should prompt teachers to use a myriad of methods for conveying new information. Instead of only standing at the front of the room and lecturing, teachers need to incorporate graphic organizers, charts, videos, and other visual representations in order to more aptly accommodate the needs of males in their classrooms (Wiens, 2006). She also promotes the use of more movement and 'hands-on' activities throughout the day, in order to appeal to the typically more-masculine appreciation of Gardner's kinesthetic intelligence (Wiens, 2006; Rockwood, 2003). Through her analysis of male academic underachievement, Wiens has established a set of teaching practices that could lessen what she calls “The New Gender Gap” (2006).

Sex-based and gender-based disparities don't exist merely within the fields of math and sciences though. These differences can be readily observed across the academic gamut and they are not statically defined, which indicates that the differential is rooted in some underlying principle of education. There is a large body of evidence proclaiming that that principle is motivation. Specifically within motivation, researchers have two foci: examining the link between motivation and future goals, and the didactic motivational distinctions of degree and of kind (Giota, 2002; Greene & DeBacker, 2004; Martin, 2004).

Firstly, motivation and goal orientations are linked together simply by the definitions of each of the words. Students who are not highly motivated to develop a sense of mastery over their schoolwork do not have goals rooted in academia. Contrapositively, students who wish to proceed with their education and earn graduate-level degrees, must also possess the motivation to do so. Motivation and goal orientation are also distinctly tied with a particular culture's established gender-roles as well (Greene & DeBacker, 2004). For instance, in her 2002 study, Professor Joanna Giota found that boys and girls differed on the types of goal orientations they assumed. Giota separated goals into two groups of present—more commonly known as “short-term” in Western societies—and

future—more commonly known as “long-term” (2002). She created subcategories of 'self' and 'others' based on the the intended target for each of the goals. Through rigorous use of statistical MANOVAs, cluster analyses, and meta-analytic links to other studies, Giota found that there were indeed differences between the goal orientations of boys and girls (2002). She found that boys tended to fall into the 'self' subcategory of either the 'now,' or more commonly, the 'future' categories. Conversely, girls more often fell into the 'future-others' subcategory (Giota, 2002). She not only presents this sex-based distinction, but also extrapolates the data to hypothesize a correlation between these goal orientations and girls' stronger verbal abilities (Siegelman & Rider, 2006). She says that girls' verbal skills allow them to more readily pursue their 'future-others' orientations by sustaining a career “in the public sphere” (Giota, 2002).

Secondly, psychologists and educational researchers have often pondered whether sex-based and gender-based discrepancies in motivation were more ones of degree or of kind. Professor Andrew Martin investigated several different aspects of motivation, such as anxiety, mastery of learned skills, persistence, and self-sabotage (2004). He distinguished between differences in degree and of kind by saying that if boys and girls both had statistically significant demonstrations in a particular facet of motivation, but one sex was higher or lower than the other, that would indicate a difference of 'degree' (Martin, 2004). However, if, say, only girls showed statistically significant levels of anxiety, that would be a difference of kind. After complicated yet careful cluster analyses, he found that there were absolutely no sex-based distinctions in kind, but there were many disparities of degree (Martin, 2004). For instance, he found that girls were more likely to make detailed plans for long-term assignments, and to desire a higher level of mastery of a subject matter than were boys (Martin, 2004). Not-all-surprisingly then, girls also reported higher levels of academic anxiety (Martin, 2004). These sex-based differences in degree spanned several facets of motivation, and should therefore be taken into consideration during a teacher's planning of homework assignments and direct instruction of time management (Sternberg & Williams, 2002).

After having read the literature on sex-based and gender-based distinctions along several dynamics of motivation, one might assume that these findings only apply to the United States, the UK (Warrington & Younger,

1999), and other deemed 'Western' nations. However, in 2001, David Yun Dai applied these previous findings in order to investigate the multivariate facets of sex-differences and class distinctions in Chinese adolescents' academic motivation. Interestingly, he found nearly the same results that Giota, Martin, Greene & DeBacker, and others yielded: girls surpass boys in verbal skills without regard to class distinction (Yun Dai, 2001). Despite this interesting similarity to the previous Eurocentric studies, he found no statistically significant difference between boys' and girls' academic motivations (Yun Dai, 2001). Rather, he found that both boys *and* girls within the deemed 'high class' school had high aspirations for the future (Yun Dai, 2001).

Thus far, the vast majority of the research analysis has focused on academic achievement and performance in one subject matter or another. While links between sex, gender, and domain-specific performance have been solidified, cognitive developmental psychologists also investigate sex and gender differences in classroom behaviour and general activity participation. It has long been said that boys are more aggressive, not as sensitive to others' feelings, and more hesitant to express emotion than are girls (Macmillan, 2004). While Dr. Dan Kindlon and Dr. Michael Thompson—authors of *Raising Cain*—don't argue that these sex-based differences exist, they do argue against the ideas that they are extreme, static & unchanging, and most importantly, negative. Rather, they though boys might be predisposed to be more aggressive, that energy can be easily channeled into more constructive activities through kinesthetic activities, and group imaginative play (Kindlon & Thompson, 2000). As for not speaking about emotions and feelings, they provide convincing anecdotal and empirical evidence that boys can learn to be more expressive verbally and through writing, but that they need to be encouraged to do so by admired adults (Kindlon & Thompson, 2000; Thompson, 2000). It has also been argued that teachers more readily appreciate the gender-normative quiet passivity of girls in the classroom (Meece, Glienke, & Burg, 2006). Kindlon and Thompson claim that, despite the perceived behavioural and academic disadvantages of boys in the classroom, they have equally as much to offer to the school situation and it is the teacher's responsibility to foster their academic, personal, and social development in ways that promote growth for all students (2000).

The interplay between sex, gender, and motivation is prominent and substantiated through both anecdotal and empirical, psychometric research. While it is beneficial for parents, physicians, and all other adults to have an

understanding of this interconnectedness, it is imperative that teachers fully grasp their interwoven nature; the implications on formal education are extreme! Not only recognizing the differences between boys and girls, but utilizing those differences in order to create the best possible learning environment for all students, will allow a teacher to help each and every child reach his or her full potential.

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